



NOAA Atlas 14



# Precipitation-Frequency Atlas of the United States

Volume 11 Version 2.0: Texas

Sanja Perica, Sandra Pavlovic, Michael St. Laurent,  
Carl Trypaluk, Dale Unruh, Orlan Wilhite

U.S. Department  
of Commerce

National Oceanic  
and Atmospheric  
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National Weather  
Service

Silver Spring,  
Maryland, 2018



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## **1. Abstract**

NOAA Atlas 14 contains precipitation frequency estimates for the United States and U.S. affiliated territories with associated lower and upper bounds of the 90% confidence interval and supplementary information on temporal distribution of heavy precipitation, analysis of seasonality and trends in annual maximum series data, etc. It includes pertinent information on development methodologies and intermediate results. The results are published through the [Precipitation Frequency Data Server \(PFDS\)](#).

The Atlas is divided into volumes based on geographic sections of the country. It is intended as the U.S. Government source of precipitation frequency estimates and associated information for the United States and U.S. affiliated territories.

## 2. Preface to Volume 11

NOAA Atlas 14 Volume 11 contains precipitation frequency estimates for selected durations and frequencies with associated lower and upper bounds of the 90% confidence interval and supplementary information on the temporal distribution of heavy precipitation, analysis of seasonality and trends in annual maximum series data, etc., for the state of Texas. The results are published through the [PFDS](#).

NOAA Atlas 14 Volume 11 was developed by the Hydrometeorological Design Studies Center within the Office of Water Prediction of the National Oceanic and Atmospheric Administration's National Weather Service. Any use of trade names in this publication is for descriptive purposes only and does not imply endorsement by the U.S. Government.

**Citation and version history.** This documentation and associated artifacts such as maps, grids, and point-and-click results from the PFDS are part of a whole with a single version number and can be referenced as:

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite (2018). NOAA Atlas 14 Volume 11 Version 2, *Precipitation-Frequency Atlas of the United States, Texas*. NOAA, National Weather Service, Silver Spring, MD.

The version number has the format P.S, where P is a primary version number representing a number of successive releases of primary information. Primary information is essentially the data. S is a secondary version number representing successive releases of secondary information. Secondary information includes documentation and metadata. S reverts to zero (or nothing; i.e., Version 2 and Version 2.0 are equivalent) when P is incremented. When documentation is completed and added without changing any prior information, the version number is not incremented.

The primary version number is stamped on the artifact or is included as part of the filename where the format does not allow for a version stamp (for example, files with gridded precipitation frequency estimates). All location-specific output from the PFDS is stamped with the version number and date of download.

Table 2.1 lists the version history associated with the NOAA Atlas 14 Volume 11 precipitation frequency project and indicates the nature of changes made.

*Table 2.1. Version history of NOAA Atlas 14 Volume 11.*

| <b>Version</b> | <b>Release date</b> | <b>Notes</b>                   |
|----------------|---------------------|--------------------------------|
| Version 1      | November 2017       | Draft data used in peer review |
| Version 2      | September 2018      | Final data released            |

### 3. Introduction

#### 3.1. Objective

NOAA Atlas 14 Volume 11 provides precipitation frequency estimates for durations of 5-minute through 60-day at average recurrence intervals of 1-year through 1,000-year for the State of Texas. The estimates and associated upper and lower bounds of the 90% confidence interval are provided at 30-arc second resolution. The Atlas also includes information on temporal distributions for heavy precipitation amounts for selected durations and seasonal information for annual maxima data used in the frequency analysis. In addition, the potential effects of climate change as trends in historic annual maximum series are examined.

The precipitation frequency estimates in NOAA Atlas 14 Volume 11 supersede the estimates published in the following publications:

- a. [NOAA Technical Memorandum NWS HYDRO-35](#), *Five- to 60-Minute Precipitation Frequency for the Eastern and Central United States* (Frederick et al., 1977) for 5-minute to 60-minute durations;
- b. [Weather Bureau Technical Paper No. 40](#), *Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years* (Hershfield, 1961) for 2-hour to 24-hour durations;
- c. [Weather Bureau Technical Paper No. 49](#), *Two- to Ten-Day Precipitation for Return Periods of 2 to 100 Years in the Contiguous United States* (Miller, 1964) for 2-day to 10-day durations.

#### 3.2. Approach and deliverables

Precipitation frequency estimates have been computed for a range of frequencies and durations using a regional frequency analysis approach based on L-moment statistics calculated from annual maximum series. This section provides an overview of the approach; greater detail is provided in Section 4.

The annual maximum series (AMS) were extracted for a range of durations between 15-minute and 60-day from precipitation measurements recorded at variable or constant time increments, from 1-minute to 1-day, obtained from various sources. The tables in Appendix A.1 give detailed information on all stations whose data were used in the frequency analysis. The annual maximum series data were screened for data quality. The 1-day and 1-hour annual maximum series data were also analyzed for potential trends (Appendix A.2).

A region of influence approach was used for the regional L-moments computation at each station across all selected durations. A variety of probability distribution functions were examined for each region and duration and the most suitable distribution was selected. Distribution parameters, and consequently precipitation frequency estimates, were determined based on the mean of the annual maximum series at the station and the regionally determined higher order L-moments. Precipitation frequency estimates were smoothed across durations to ensure consistency. Partial duration series-based precipitation frequency estimates were calculated indirectly from AMS-based precipitation frequency estimates using Langbein's formula.

For areas where snowfall contributes to the precipitation AMS, empirical equations may be developed to produce frequency estimates for rainfall (i.e., liquid precipitation only) from corresponding precipitation frequency estimates. In the NOAA Atlas Volume 11 project area, the contribution of snowfall to AMS is trivial due to geo-climatic conditions, so no separate rainfall frequency analysis was needed.



A Monte-Carlo simulation approach was used to produce upper and lower bounds of the 90% confidence interval for the precipitation frequency estimates. 5-minute and 10-minute estimates were computed by applying scaling factors to matching 15-minute estimates.

Grids of precipitation frequency estimates were determined based on grids of mean annual maxima and at-station precipitation frequency estimates. The mean annual maxima grid for each duration was derived from at-station mean annual maxima using PRISM interpolation methodology (Appendix A.3). The grids of precipitation frequency estimates for all frequencies were then derived in an iterative process using the inherently strong linear relationship that exists between mean annual maxima and precipitation frequency estimates at the 2-year average recurrence interval and between precipitation frequency estimates at consecutive frequencies for a given duration (Section 4.8.2). The resulting grids were examined and adjusted in cases where inconsistencies occurred between durations and frequencies. Both spatially interpolated and point estimates for selected durations and frequencies were subject to external peer review (Appendix A.4). A similar approach was used to derive grids of lower and upper bounds of the 90% confidence interval.

Climate regions were delineated based on characteristics of annual maximum data. The regions were used in the extraction and seasonality analysis of annual maxima and calculations of temporal distributions of heavy precipitation. Temporal distributions, expressed in probability terms as cumulative percentages of precipitation totals, were computed for precipitation magnitudes exceeding precipitation frequency estimates for the 2-year average recurrence interval for selected durations (Appendix A.5). The seasonality analysis was done by tabulating the number of annual maxima exceeding precipitation frequency estimates for several selected threshold frequencies (Appendix A.6).

NOAA Atlas 14 Volume 11 precipitation frequency estimates for any location in the project area are available in a variety of formats through the [PFDS](#) via a point-and-click interface; more details are provided in Section 5. Additional results and information available there include:

- ASCII grids of partial duration series-based and annual maximum series-based precipitation frequency estimates and related confidence limits for a range of durations and frequencies with associated metadata;
- cartographic maps of partial duration series-based precipitation frequency estimates for selected frequencies and durations;
- final, quality controlled annual maximum series for all observing locations used in the analysis;
- temporal distributions;
- seasonality analysis of annual maxima.

Cartographic maps were created to serve as visual aids and are not recommended for estimating precipitation frequency estimates. Users are advised to take advantage of the PFDS interface or the downloadable underlying ASCII grids for obtaining precipitation frequency estimates.

Please notice that precipitation frequency estimates from this Atlas are estimates for a point location and are not directly applicable for an area. Also, precipitation frequency estimates for each volume of NOAA Atlas 14 were computed independently using all available data at the time. Some discrepancies between volumes at project boundaries are inevitable and they will generally be more pronounced for rarer frequencies.

## 4. Frequency analysis

### 4.1. Project area

The project area encompasses the entire state of Texas (Figure 4.1.1), which is the second largest state in the United States by both area and population. The vast expanse of the state contains great regional differences. While there is not a standard classification system, the following four regions are usually recognized as the principal geographic regions of the state: the Gulf Coastal Plain, the Great Plains, the North Central Plains, and the Basin & Range Province. Due to their size and complexity, those regions are often further divided into sub-regions in order to adequately depict their physical characteristics.

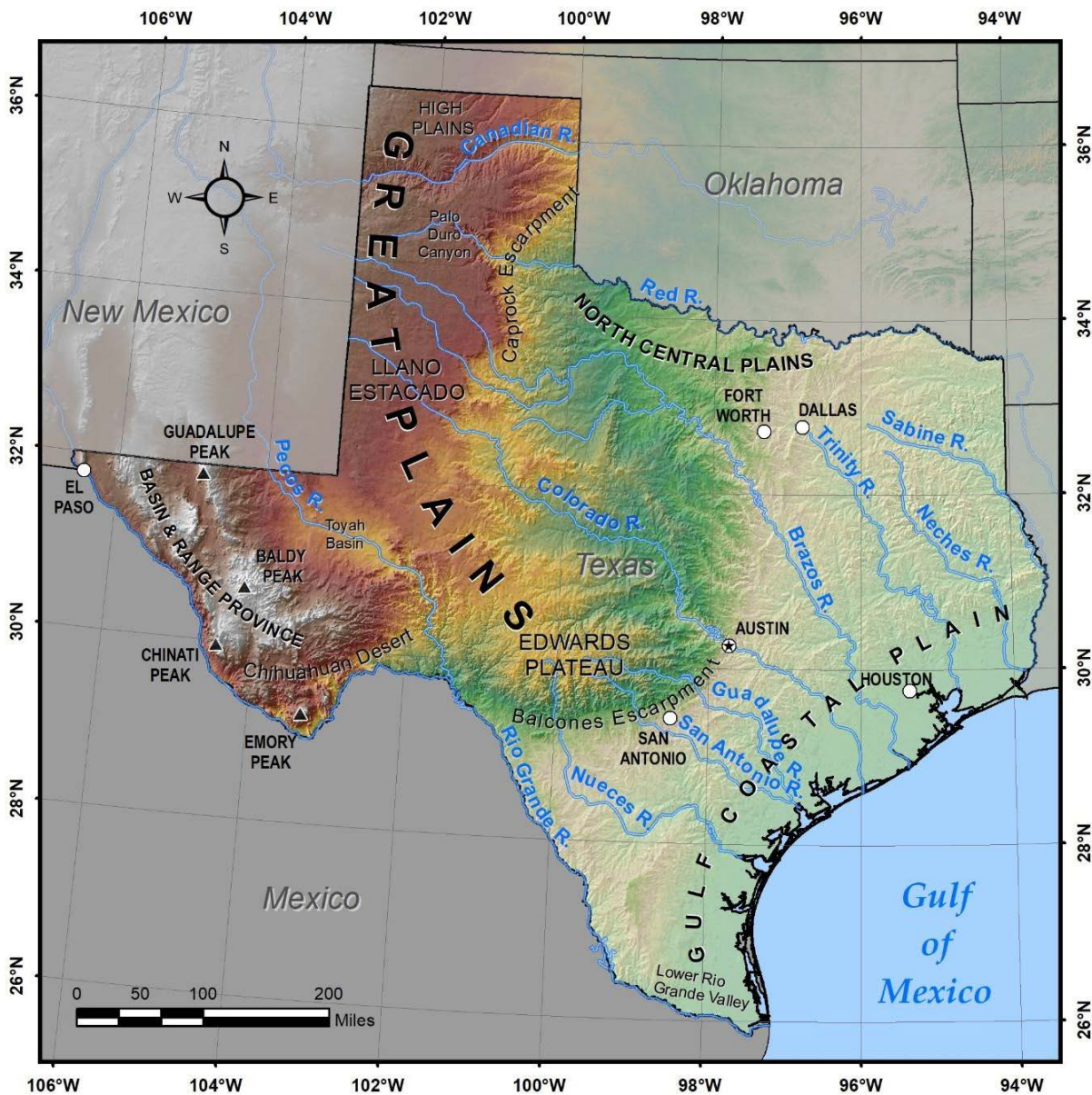


Figure 4.1.1. Project area for NOAA Atlas 14 Volume 11 (shaded relief was obtained from [USGS EROS Data Center](#)).

The Gulf Coastal Plain is the area of relatively flat, low-lying terrain stretching from extreme southeast Texas to the Louisiana border and encompasses over 100,000 mi<sup>2</sup> in Texas. This region continues through the Southeastern United States to the Florida Panhandle. Much of the coastal plain is treeless prairie, except for a few forested belts of land known as cross timbers. Inland elevation gradually increases west towards the Balcones Fault and Escarpment, which begins at the Rio Grande and extends north past the City of Austin.

West of the Balcones Escarpment lies the Edwards Plateau, which is part of the Great Plains region. The Great Plains region is a large area of relatively flat higher elevations that spans from northwestern Texas to North Dakota. To the northwest of the Edwards Plateau is another relatively flat area of higher elevation known as the Llano Estacado or Staked Plains. The Llano Estacado stretches north to the Canadian River. The High Plains are a portion of higher elevated Great Plains in the northern panhandle of Texas. The High Plains gradually increase in elevation from about 2,700 feet in the east to over 4,000 feet near the New Mexico border. In the Panhandle region of Texas, the eastern edge of the Great Plains is defined by the Caprock Escarpment.

The North Central Plains make up the area east of the Caprock Escarpment and north of the Colorado River. This region is part of the interior or central lowlands that stretch through the Midwestern States and into Canada. The majority of the western portion of this region, the Rolling Plains, is between 1,000 and 3,000 feet above sea-level. The eastern section contains the Grand Prairie and Western Cross Timbers.

The Basin and Range Province is in extreme western Texas. This region stretches far into Mexico and the inland western United States and is the only mountainous part of Texas. This area of the state is dominated by several mountain ranges which include the Davis, Chisos, Guadalupe and Chinati ranges. The highest peak in the project area is Guadalupe Peak (Guadalupe Mountains) near the New Mexico border at 8,751 feet, but many summits rise above 7,000 feet including: Baldy Peak (Davis Mountains) at 8,378 feet, Chinati Peak (Chinati Mountains) at 7,728 feet and Emory Peak (Chisos Mountains) at 7,824 feet. The Basin and Range Province is also a part of the Chihuahuan Desert. The Chihuahuan Desert is the second largest desert in North America, after the Great Basin Desert. It stretches into northern Mexico, southern New Mexico, and Arizona.

**Climatology of extreme precipitation.** One of the most distinct characteristics of the precipitation climatology of Texas is the variation in moisture across the state. This is caused by the predominantly westerly winds bringing dry continental air down off the mountains in the west and the proximity to the Gulf of Mexico supplying ample moisture over the eastern portion of the state. Most of the Texas Great Plains and higher elevations of the Basin and Range Province are considered semi-arid, with lower elevations classified as desert. To the east of approximately longitude 100<sup>0</sup>W is where the state transitions from a semi-arid to a humid subtropical region. Mean annual precipitation (MAP) is largest near the Louisiana border and decreases to the west and south. East of Houston, MAP values range from 55-60 inches. Moving southward along the coast, values decrease to 25-30 inches in Brownsville. MAP continues to decrease to the west, with San Antonio receiving around 30-35 inches, decreasing to a minimum of 8-10 inches over El Paso.

In general, most extreme precipitation events occur between the late spring and early fall at hourly durations. At daily durations, the rainy season is slightly longer, beginning in early spring and ending in late fall. The rainy season tends to become shorter moving from east to west. Only extreme eastern Texas has a daily rainy season that extends the entire year. A large portion of annual maxima occur during the spring and fall during favorable large-scale synoptic patterns. Cold, dry air in the upper levels of the atmosphere approaches from the Rocky Mountains, colliding with warm, moist subtropical air transported from strong low-level southerly flow off the Gulf of Mexico. This interaction creates an environment of high instability and wind shear that is favorable for severe convection. Severe storms are initiated and intensified by the combination of this unstable atmosphere and dynamic forcing through the passing of an upper level trough, convergence boundary, dry line or cold front. Frontal boundaries tend to have a north-

south alignment but can shift more east-west and become stationary, producing heavy rain over one area for several days. Often in Texas, a distinct north-south boundary known as a dry line forms with a sharp decrease in moisture from east to west. This boundary is often seen in the spring and summer over the central portion of the state, but it can move eastward or westward during the course of the day. Heavy rainfall can also result from training thunderstorms, where consecutive storms follow the path of the preceding storm, producing copious amounts of rainfall over one area for several hours. In the central Texas Hill Country, rainfall can be enhanced further due to the orographic effects and soil moisture gradients of the Balcones Escarpment. In extreme western Texas, most significant events occur during the summer monsoon season when there tends to be weaker dynamic forcing and solar insolation plays a more dominant factor for convective initiation of brief, heavy downpours.

Texas' proximity to the Gulf of Mexico makes it highly susceptible to extreme rainfall caused by tropical cyclones (TCs), especially during the late summer and early fall. The amount of rainfall produced varies with the speed and size of the TC. Larger and slower-moving TCs often produce the most significant events. Interactions with frontal boundaries or elevated terrain can enhance the amount of rainfall produced. The remnants of Eastern Pacific TCs are also capable of causing extreme rainfall in Texas. Some of the notable TCs to cause extreme rainfall of roughly 25 inches or more include the September Hurricane (1921), Hurricane Alice (1954), unnamed storm (1960), Hurricane Beulah (1967), Hurricane Fern (1971), Tropical Storm Amelia (1978), Tropical Storm Claudette (1979), Tropical Storm Allison (2001), and Hurricane Harvey (2017). Harvey's 7-day rainfall total of 60.58 inches in Nederland is the record amount for the continental United States, with many areas surrounding Houston exceeding 40 inches over a 4-day period. Claudette produced a U.S. 24-hour record precipitation of 43 inches over Alvin. Other U.S. records in Texas include: 3.95 inches in 14 minutes in Galveston on 4 June 1871 from a TC, 15 inches in 2 hours and 22 inches in 2.75 hours at Woodward Ranch on 21 May 1935, and 36.40 inches in 18 hours at Thrall on 9 September 1921 from a TC.

**NOAA Atlas 14 Volume 11 climate regions.** Based on the climatology of extreme precipitation and the seasonality analysis of annual maxima (Appendix A.6), three climate regions, shown in Figure 4.1.2, were delineated to assist in extraction of the annual maximum series data (Section 4.3) and in portraying the temporal distributions of extreme events (Appendix A.5). Climate regions were attuned to make them consistent with climate regions from NOAA Atlas 14 Volumes 8 and 9.



Figure 4.1.2. Climate regions delineated for NOAA Atlas 14 Volume 11.

#### 4.2. Precipitation data collection and formatting

Precipitation measurements were obtained for 11,934 stations from a number of federal, state, and local agencies. The majority of the stations were from the NWS Cooperative Observer Program (COOP) database maintained by the National Centers for Environmental Information (NCEI). In order to have a uniform system of numbering, each station was assigned a unique six-digit identification number (SID). Except for NCEI stations, assigned identification numbers do not match identification numbers assigned by agencies that collected or provided the data. Table 4.2.1 lists all agencies that provided the data (not necessarily agencies that collected the data) along with the datasets' names, their abbreviations used in Appendix A.1, and the first two digits of the stations' identification numbers that are common for all stations from the same dataset.

Table 4.2.1. List of agencies, datasets with their abbreviated names used in Appendix A.1, data reporting intervals, and common SID's digits.

| Agency/network                                 | Dataset  | Abbr. | Reporting interval | Common SID's digits   |
|--|--|-------|--------------------|---|
| National Centers for Environmental Information | DSI-3240   | NCEI  | 1-hour             | 03 <sup>(1)</sup> , 05 <sup>(1)</sup> , 14 <sup>(1)</sup> , 16 <sup>(1)</sup> , 29 <sup>(1)</sup> , 34 <sup>(1)</sup> , 41 <sup>(1)</sup>   |
|  | DSI-3260   | NCEI  | 15-min             | 03 <sup>(1)</sup> , 05 <sup>(1)</sup> , 14 <sup>(1)</sup> , 16 <sup>(1)</sup> , 29 <sup>(1)</sup> , 34 <sup>(1)</sup> , 41 <sup>(1)</sup>   |
|  | Global Historical Climatological Network (GHCN) Daily                | NCEI  | 1-day              | 03 <sup>(1)</sup> , 05 <sup>(1)</sup> , 14 <sup>(1)</sup> , 16 <sup>(1)</sup> , 29 <sup>(1)</sup> , 34 <sup>(1)</sup> , 41 <sup>(1)</sup> , 69 <sup>(2)</sup> , 79 <sup>(2)</sup> , 90 <sup>(2)</sup> , 98 <sup>(3)</sup> |
|  | Automated Surface Observing System                                   | NCEI  | 1-min              | 78  |
|  | Integrated Surface Data – Lite                                       | NCEI  | 1-hour<br>1-day    | 64  |
|  | Climate Database Modernization Program (CDMP)                        | NCEI  | 1-hour<br>1-day    | 99 <sup>(4)</sup>   |
|  | Quality Controlled Local Climatological Data                         | NCEI  | 1-hour             | 56  |
|  | Unedited Local Climatological Data                                   | NCEI  | 1-hour             | 55  |
|  | Unedited/Raw Sub-Hourly/Hourly Precipitation Data                    | NCEI  | 15-min             | 66  |
| City of Austin                                 | ALERT Network  | COA   | varying            | 65 <sup>(5)</sup>   |
| City of Dallas                                 | ALERT Network  | COD   | varying            | 81  |
| Earth Observing Laboratory                     | NWS Hydrometeorological Automated Data System                        | HADS  | 1-hour             | 85  |
| Edwards Aquifer Authority                      |  | EAA   | 1-hour             | 62  |
| Guadalupe-Blanco River Authority               |  |       | 6-min              | 77 <sup>(6)</sup>   |
| Harris County Flood Control District           | Flood Warning System   | HCFC  | varying            | 60  |
| Jefferson County Drainage District 6           | ALERT Network  | DD6   | varying            | 82  |
| Lower Colorado River Authority                 | LCRA Hydromet  | LCRA  | varying            | 63  |
| Midwestern Regional Climate Center             | CDMP 19 <sup>th</sup> Century Forts and Voluntary Observers Database | FORTS | 1-day              | 52  |
| National Atmospheric Deposition Program        |  | NADP  | 1-day              | 54  |
| National Estuarine Research Reserve System     | Wide Monitoring Program Data   |       | 15-min<br>1-hour   | 57 <sup>(6)</sup>   |
| Oklahoma Mesonet                               |  | OKM   | 15-min<br>1-day    | 86  |
| Sabine River Authority                         |  |       | 1-day              | 58 <sup>(6)</sup>   |
| San Antonio River Authority                    |  |       | varying            | 91 <sup>(6)</sup>   |
| Servicio Meteorologico Nacional, Mexico        |  | SMN   | 1-day              | 61  |

|   |  |      |                 |                   |
|---|--|------|-----------------|-------------------|
| Tarrant Regional Water District                                 | Tarrant County Urban Flood Control Network                     | TRWD | 15-min          | 83                |
| Texas A&M University  | Texas Evapotranspiration Network                               | TEN  | 1-hour<br>1-day | 89                |
| Texas Commission on Environmental Quality                       | Air Quality Network  | TCEQ | 1-hour          | 75                |
| Texas Tech University   | West Texas Mesonet   | WTM  | 5-min           | 80                |
| Texas Water Development Board                                   |  |      | 1-hour<br>1-day | 84 <sup>(6)</sup> |
| Titus County  | Fresh Water Supply District No. 1                              | TCWS | 1-day           | 53                |
| U.S. Bureau of Reclamation                                      | HydroMet   | USBR | 1-hour<br>1-day | 87                |
| U.S. Dept. of Agriculture (USDA), Agricultural Research Service | Grassland Soil and Water Research Laboratory's Riesel Rainfall | USDA | varying         | 94                |
| USDA, Forest Service  | Remote Automated Weather Station Network                       | RAWS | 1-hour          | 76                |
| USDA, Natural Resources Conservation Service                    | Soil Climate Analysis Network                                  | SCAN | 1-hour          | 88                |
| U.S. Geological Survey  | Nation Water Information System                                | NWIS | 15-min          | 59                |

- (1) SIDs by state: 03 - Arkansas, 05 - Colorado, 14 - Kansas, 16 - Louisiana, 29 - New Mexico, 34 - Oklahoma, 41 - Texas.
- (2) 69 - Community Collaborative Rain, Hail, & Snow (CoCoRaHS) Network, 79 - stations with a Weather Bureau Army Navy (WBAN) identifier, 90 - Mexico.
- (3) Two stations 200+ miles apart (Loma Alta and Loma Alto) were mistakenly combined into a single station in NCEI's GHCN dataset. The later part of this data (2005-2016) was separated and assigned to Loma Alto station with a new SID (98-0001).
- (4) NCEI's stations for which additional data were digitized using information from the CDMP through the NCEI-developed Environmental Document Access and Display System, Version 2 (EV2) application.
- (5) City of Austin ALERT data was acquired via LCRA Hydromet.
- (6) Dataset not used in frequency analysis; not included in Appendix A.1.

In areas of high importance or scarce data, additional precipitation data were digitized to improve analysis by extending record lengths and/or including extreme events missing in digitized datasets. The additional digitized data were collected from the NCEI CDMP dataset and consist mainly of data from NOAA Work Projects Administration (WPA) Precipitation Tabulations (hourly), Climate Records Books (daily), and Original COOP observer forms (daily). Figure 4.2.1 shows locations of hourly and daily stations for which up to 50 and 89 additional years, respectively, were digitized. In many cases, the highest extracted annual maxima came from the digitized periods. For example, several of the largest AMS values for the NCEI's daily station Taylor (41-8861) came from the newly digitized data from 1903 to 1932, including the 7-11 September 1921 extreme event when 23.11 inches fell in 24 hours. All stations for which additional data were digitized are listed in Table A.1.6 of Appendix A.1.

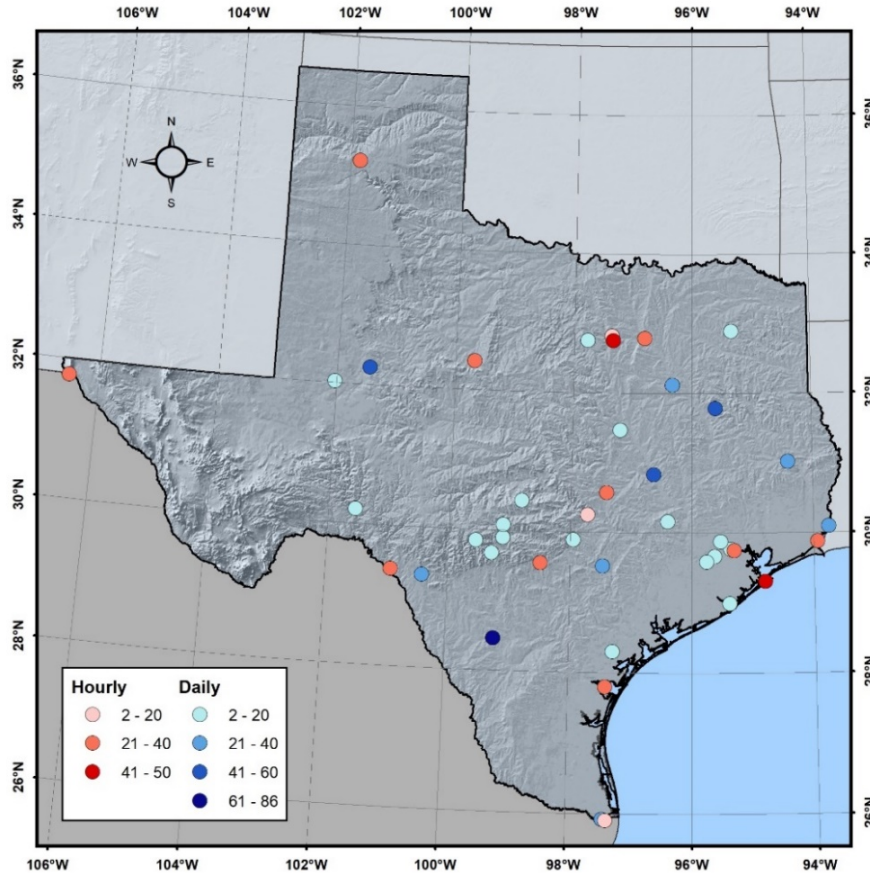


Figure 4.2.1. The locations of stations where hourly and daily records were extended through digitization. Legend indicates number of data years that were digitized.

All data were formatted to a common format at one of three base durations that corresponded to the original reporting period: 15-minute, 1-hour, or 1-day. Data recorded at variable time steps were formatted at 15-minute increments. Where available, records extended through December 2017, with a few stations updated through June 2018 to account for an extreme event in Southern Texas (e.g., Weslaco, SID 41-9588). Table 4.2.2 lists the total number of stations that were obtained and formatted for each interval.

Table 4.2.2. The number of stations that were obtained per formatting interval.

| Formatting interval | Abbr. | Number of stations |
|---------------------|-------|--------------------|
| 1-day               | DLY   | 6,541              |
| 1-hour              | HLY   | 3,704              |
| 15-minute           | 15M   | 1,689              |
| <b>TOTAL</b>        |       | <b>11,934</b>      |

In addition, monthly maxima for various n-minute durations (5-minute through 60-minute) were obtained for 106 NCEI stations to which any available data from the NWS and Federal Aviation Administration’s Automated Surface Observing System (ASOS) network (archived by NCEI) were added; they were used to develop scaling factors for generation of precipitation frequency estimate grids at 5-minute and 10-minute durations (Section 4.8.2).



### 4.3. Annual maximum series extraction

The precipitation frequency analysis approach used in this project is based on analysis of annual maximum series (AMS) across a range of durations. AMS for each station were obtained by extracting the highest precipitation amount for a particular duration in each successive year. Based on the distribution of heavy precipitation events for this project area, calendar year was used rather than a standard water year (October - September) so that a year begins and ends during a relatively dry season. Annual maximum data at stations were extracted for all durations equal to or longer than the base duration (or reporting interval) up to 60 days. AMS for the 1-day through 60-day durations were compiled from daily, hourly, and 15-minute records. To accomplish this, 15-minute and 1-hour data were first aggregated to constrained 1-day (hours 0 to 24) values before extracting 1-day and longer duration annual maxima. Hourly and 15-minute data were used to compile AMS for 1-hour through 12-hour durations, where 15-minute data were aggregated first to constrained 1-hour (0 to 60 minutes) values before extracting annual maximum value. 15-minute data were also used to compile AMS for 15-minute and 30-minute durations.

The procedure for developing an AMS from a precipitation dataset used similar criteria as in previous volumes that were designed to extract only reasonable maxima if a year was incomplete or had accumulated data. Accumulated data occur in some records where observations were not taken regularly, so recorded numbers represent accumulated amounts over extended periods of time. Since the precipitation distribution over the period is unknown, the total amount was distributed uniformly across the whole period. All annual maxima that resulted from accumulated data were flagged and screened to ensure that the incomplete data did not result in erroneously low maxima (Section 4.5.1).

The criteria for AMS extraction also exclude maxima if there were too many missing or accumulated data during the year and more specifically during critical months when precipitation maxima were most likely to occur (“wet season”). Wet seasons were resolved by assessing the periods in which two-thirds of AM occurred at each station and by inspecting histograms of annual maxima for the 1-day and 1-hour durations in a region. The final wet season months assisted in the determination of the climate regions depicted in Figure 4.1.2. The assigned wet season months for each region are shown in Table 4.3.1.

*Table 4.3.1. Wet season months for each region for daily and sub-daily durations.*

| Region                 | Wet season months  |                     |
|------------------------|--------------------|---------------------|
|                        | Daily durations    | Sub-daily durations |
| Interior Highlands (1) | May - October      | May - September     |
| Central Plains (2)     | April - October    | May - September     |
| Gulf Coast (3)         | January - December | April - October     |

The flowchart in Figure 4.3.1 depicts the AMS extraction criteria for all durations. Various thresholds for acceptable amounts of missing or accumulated data were applied to the year and wet season. The extracted maximum value of a given duration for a given year had to pass through all of the criteria in the flowchart to be accepted. Various codes were assigned to both accepted and rejected maxima based on the amount of missing and accumulated data in each year (see Figure 4.3.1) to assist in further quality control of AMS as described in Section 4.5.1.

For example, in a year with less than 20% of the measurements missing in the whole year and during the assigned wet season, if more than 66% of the measurements were accumulated, then the maxima for that year was (conditionally) rejected and assigned code 130. If the year had between 33% and 66% accumulated data, then it was further screened by assessing the lengths of the accumulation periods. If the lengths of the accumulation periods for more than 33% of the accumulated data were equal to or longer than threshold accumulation period lengths ( $D_{\text{thresh}}$ ), then the maximum for that year was (conditionally)

rejected (code 140). Threshold accumulation period lengths were defined as matching the selected duration for durations less than 2 days, as equal to half of duration period for durations between 2 days and 20 days, and as equal to 15 days for durations equal to or longer than 30 days. If the year had less than 33% accumulated data, the extracted maximum was passed to another set of criteria for accumulations during its wet season, etc.

If a rejected annual maximum was higher than 85% of the accepted maxima at that station, then it was kept in the series (code 30). Also, if a rejected 1-day annual maximum was higher than any accumulated amount in a year, then it was kept in the series and assigned code 40. Years in which a maximum was rejected were marked as missing in the series.

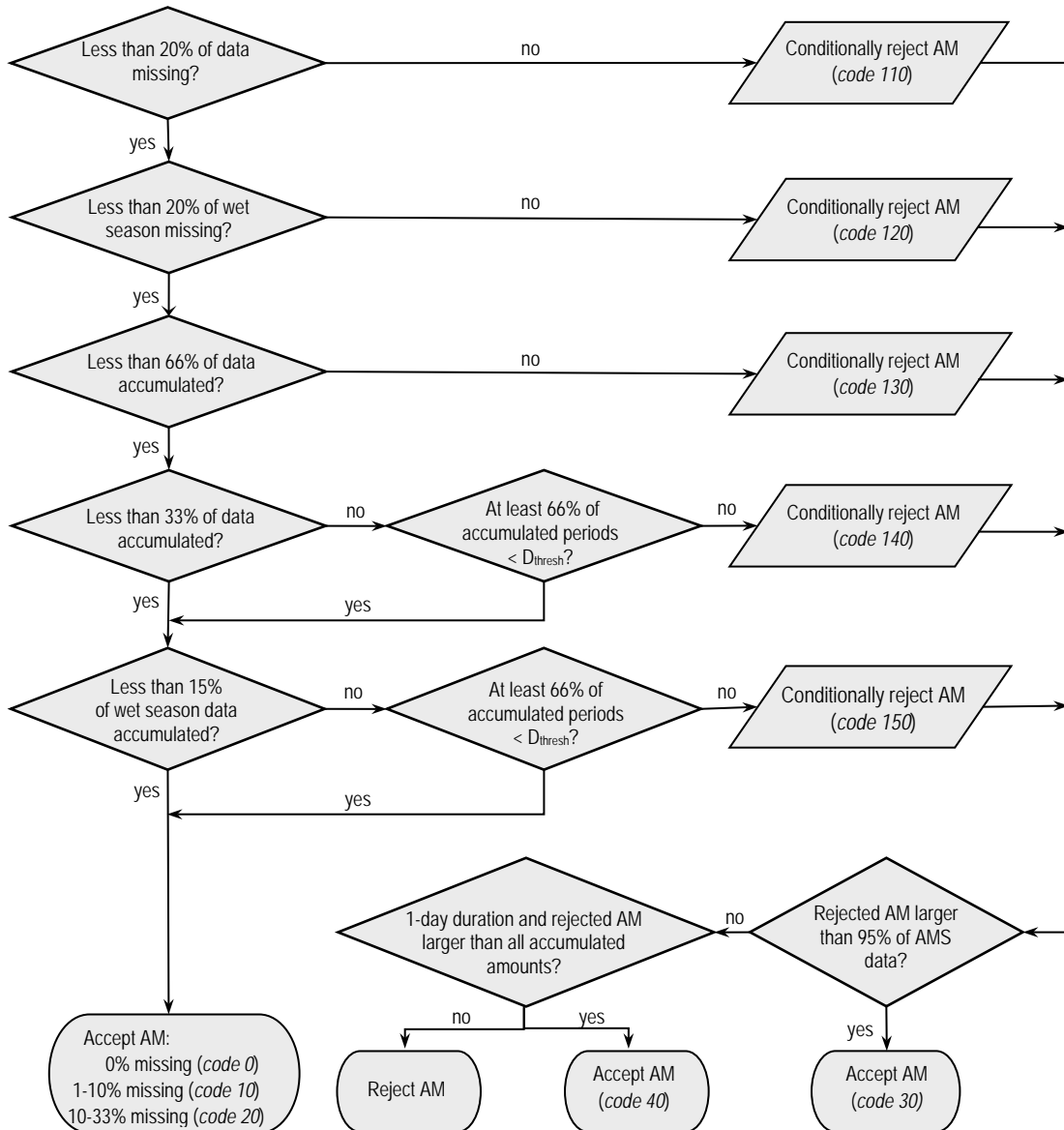


Figure 4.3.1. Criteria used to extract annual maxima. Data quality codes were assigned based on acceptance and rejection;  $D_{thresh}$  depends on duration.

#### 4.4. Station screening

Station screening was done in the following order: a) examination of geospatial data, b) screening for duplicate records at co-located daily, hourly, and/or 15-minute stations and extending records using data from co-located stations, c) screening nearby stations for potentially merging records or removing shorter, less reliable records in station dense areas, and d) screening for sufficient number of years with usable data.

**Geospatial data.** Latitude, longitude, and elevation data for all stations were screened for errors. Several stations had to be re-located because they plotted in a different state or were clearly misplaced based on inspection of satellite images and maps. Misplacement was typically the result of no seconds recorded in latitude and longitude data. There were also several stations with no elevation data; for those stations, elevation was estimated from high-resolution digital elevation model (DEM) grids. Several corrections to metadata were also made based on input received during the peer review (see Appendix A.4).

**Co-located stations.** Co-located stations were defined as stations that have the same geospatial data but report precipitation amounts at different time intervals. The screening of co-located stations was done as follows:

- If co-located 15-minute and hourly stations provided data for the same period and there were no differences in AMS for constrained 1-hour maxima (15-minute data aggregated on the clock hour), only the 15-minute station was retained and used to extract AMS for all longer durations.
- If a 15-minute or hourly station provided data for the same period as a co-located daily station and there were no differences in AMS for constrained 1-day maxima (15-minute or 1-hour data aggregated from 0 to 24 hours), only the 15-minute or hourly station was retained and used to extract AMS for all longer durations.
- If periods of record at co-located stations were consistent but did not completely overlap, aggregated data from the station with the shorter reporting interval were used to extend the record of the station with the longer reporting interval.
- If the station with the longer reporting interval had a longer period of record, then it was retained in the dataset in addition to the co-located station with the shorter reporting interval.

AMS data consistency across durations was ensured in later quality control procedures (Section 4.5.4).

**Nearby stations.** Nearby stations were defined as stations located within three miles with consideration to elevation differences. However, in areas of flat terrain, stations up to five miles apart or farther may have been considered. The records of nearby stations were considered for merging to increase record lengths. In station-dense areas, such as around Houston, Dallas/Fort Worth, and Austin, some stations were removed from the analysis if a nearby station had a longer overlapping record, better quality data, or was highly correlated.

**Record length.** Record length was characterized by the number of years for which annual maxima could be extracted (i.e., data years) rather than the entire period of record. Daily stations were considered for frequency analysis if they had at least 30 data years, but allowances were made for isolated stations. A minimum of 20 data years was required for stations recording at sub-daily durations, with a few exceptions (for example, a station that caught an extreme event).

Figure 4.4.1 shows histograms for the number of AMS data years of stations retained for frequency analysis across daily, hourly, and sub-hourly durations after all the screenings were done. The average and median record lengths as well as corresponding ranges of record lengths are given in Table 4.4.1.

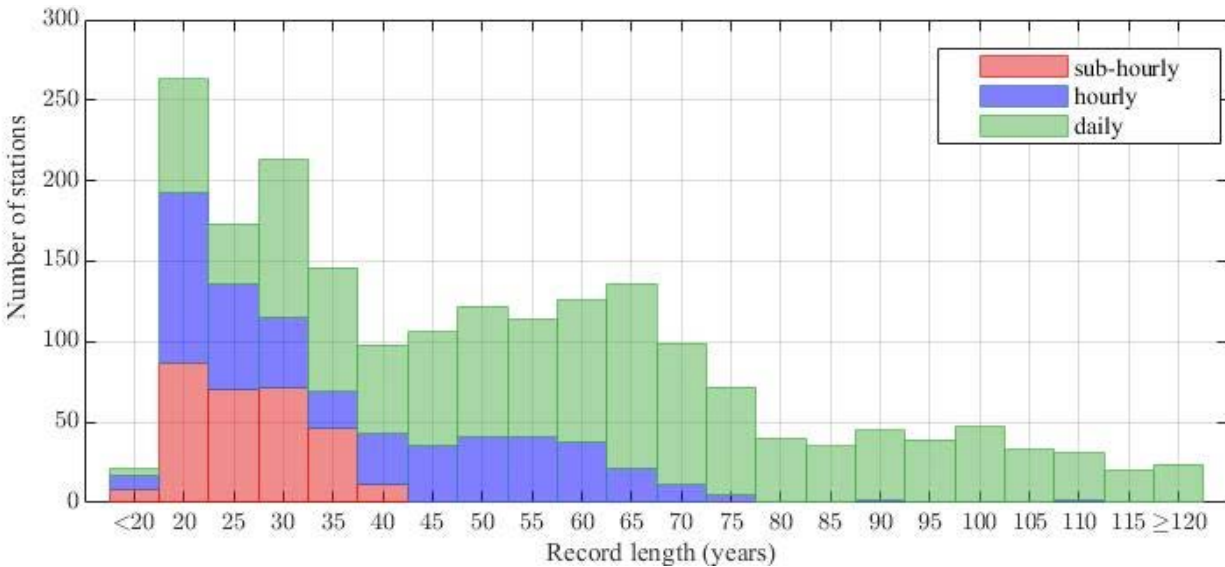


Figure 4.4.1. Number of stations available for precipitation frequency analysis across sub-hourly, hourly and daily durations.

Table 4.4.1. Record length statistics for stations used in frequency analysis for different durations.

| Duration (D)                     | Number of stations | Record length (data years) |        |        |
|----------------------------------|--------------------|----------------------------|--------|--------|
|                                  |                    | average                    | median | range  |
| Daily (1-day ≤ D ≤ 60-day)       | 1,231              | 60                         | 63     | 17-150 |
| Hourly (1-hr ≤ D < 24-hr)        | 478                | 41                         | 37     | 12-114 |
| Sub-hourly (15-min ≤ D < 60-min) | 294                | 28                         | 28     | 15-77  |

Locations of stations recording precipitation data at 1-day intervals that were used in the frequency analysis are shown in Figure 4.4.2 and locations of stations recording at 1-hour and sub-hourly intervals, as well as n-minute stations, are shown in Figure 4.4.3. More detailed information on each station whose data were used to calculate precipitation frequency estimates is given in the following six tables in Appendix A.1.

Table A.1.1 shows Texas locations for which precipitation frequency estimates were derived. The table shows each location's state (for consistency with table A.1.2), name, identification number (SID), latitude, longitude, elevation, and AMS record lengths (data years) across sub-hourly, hourly, and daily durations. It also lists SIDs for stations that contributed data to each location for sub-hourly, hourly, and/or daily durations.

Table A.1.2 shows similar information for stations in Arkansas (AR), Colorado (CO), Kansas (KS), Louisiana (LA), New Mexico (NM), and in the United Mexican States (MX).

Details on contributing stations' metadata are provided in Table A.1.3 for Texas stations and in Table A.1.4 for stations outside Texas. The tables show each station's state, name, SID, shortest formatting interval (see Table 4.2.2), latitude, longitude, elevation, dataset identifier (see Table 4.2.1), and the period of record. Similar information is shown in Table A.1.5 for stations used in derivation of n-minute scaling factors (see Section 4.6.3).

Finally, Table A.1.6 lists stations for which additional data were digitized (Section 4.2), showing each station's state, name, SID, formatting interval (Table 4.2.2), dataset identifier (Table 4.2.1), and the period(s) of record for which data were digitized.

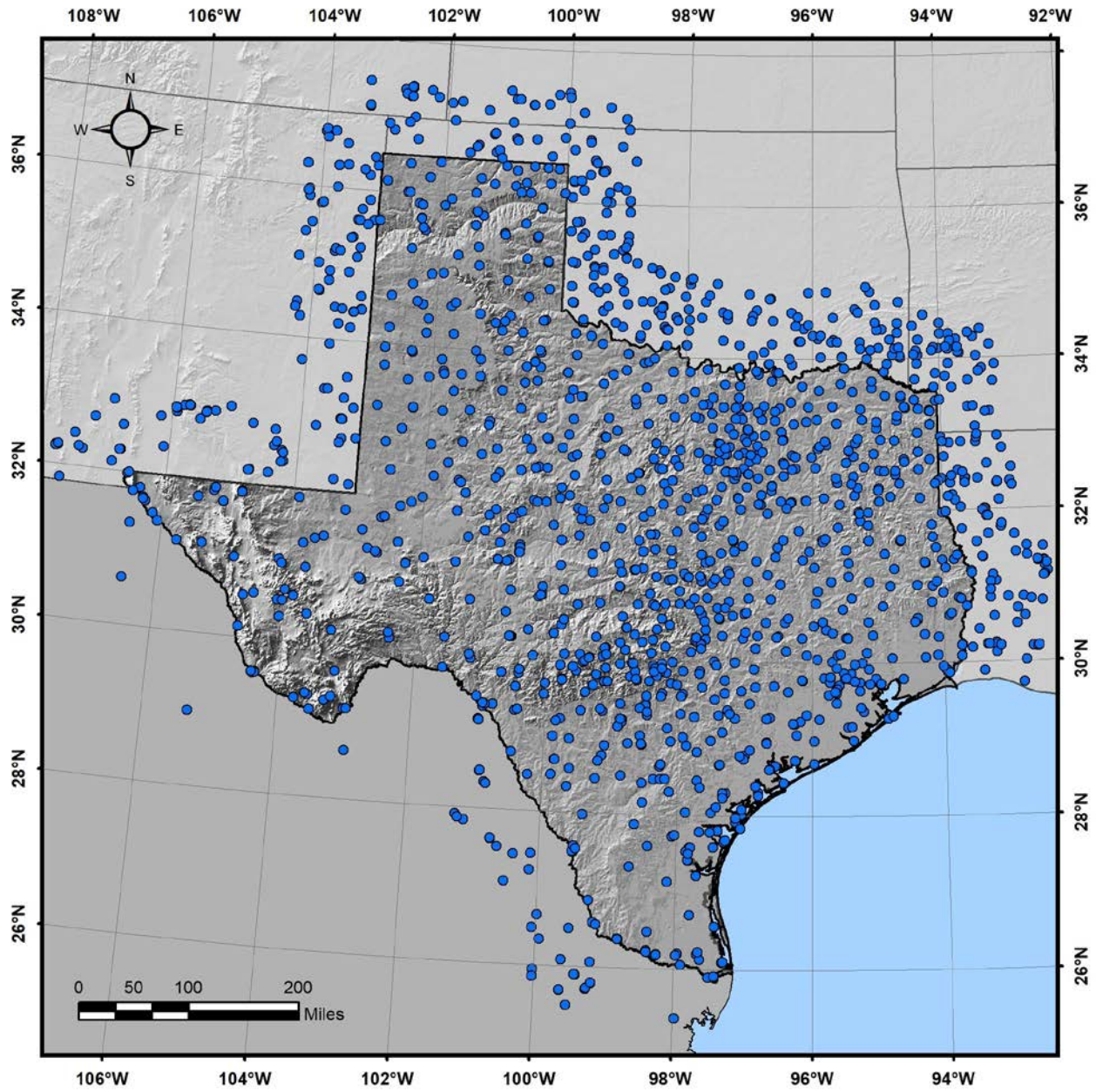


Figure 4.4.2. Map of stations recording at 1-day intervals used in frequency analysis.

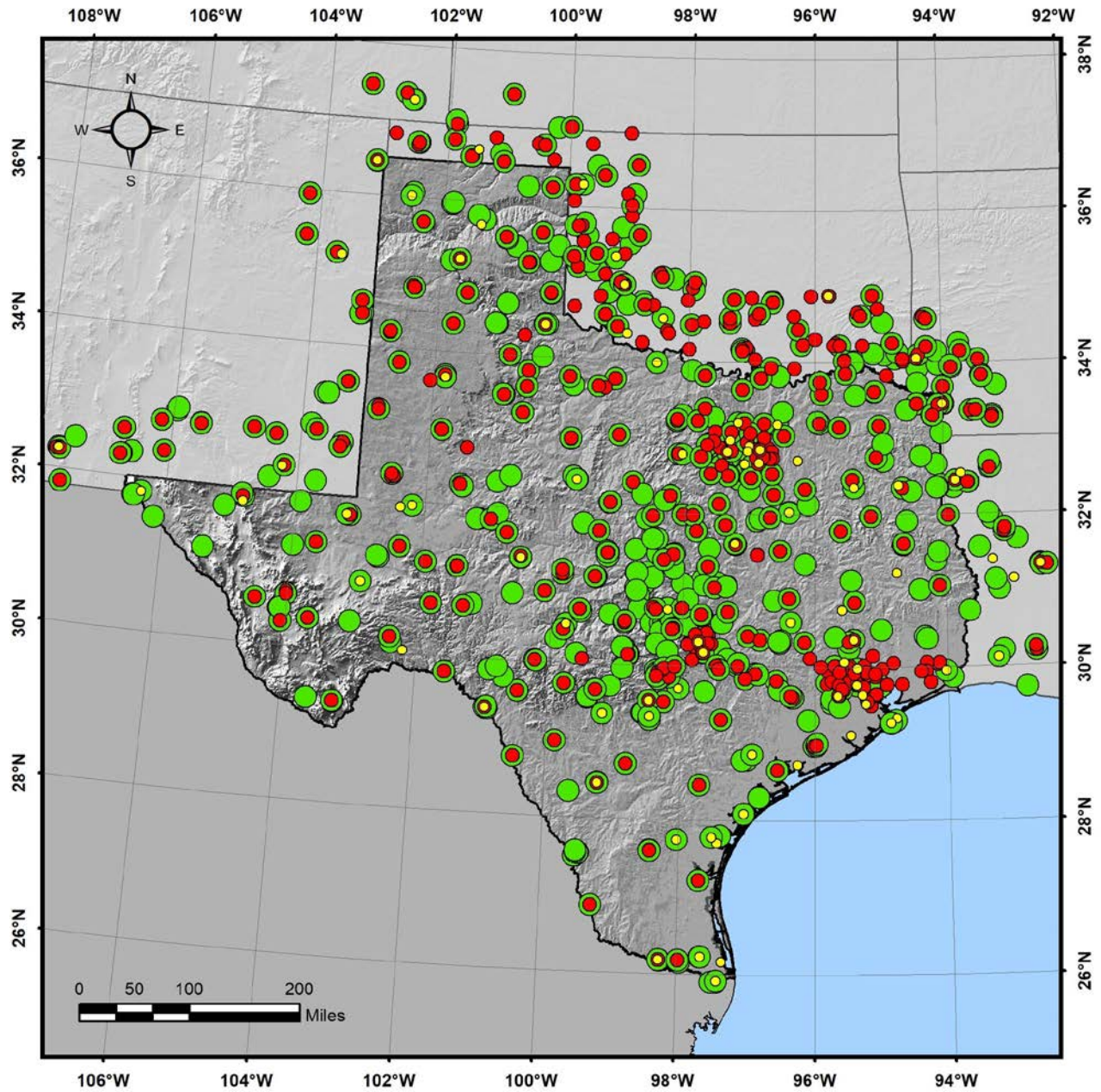


Figure 4.4.3. Map of stations recording at 1-hour (green circles) and 15-minute or variable intervals (red circles) used in the analysis; n-minute stations are shown as yellow circles.

## 4.5. AMS screening and quality control

### 4.5.1. Outliers

For this project, outliers are defined as annual maxima which depart significantly from the trend of the corresponding remaining maxima. Since data at both high and low extremities can considerably affect precipitation frequency estimates, they have to be carefully investigated and either corrected or removed from the AMS if erroneous or due to measurement errors. The high and low outliers' thresholds from the Grubbs-Beck statistical test (Interagency Advisory Committee on Water Data, 1982) and the median +/- two standard deviations thresholds were used to identify low and high outliers for all durations. Low outliers, which frequently came from years with missing and/or accumulated data, were typically removed from the annual maximum series. All values identified as high outliers were mapped with concurrent measurements at nearby stations. Questionable values that could not be confirmed were investigated further using climatological observation forms, radar data, monthly storm data reports and other historical weather event publications. Depending on the outcome of each investigation, values were either kept as is, corrected, or removed from the datasets.

An example of an outlier examination is shown in Figure 4.5.1. Statistical tests indicated that the 24-hour annual maximum amount of 9.90 inches recorded on 21 December 1991 at Morgan, TX (41-6058) was a high outlier. Investigation of the original observation form for the month in question showed that the recorded value was a 2-day accumulation, but the storm data for nearby stations indicated that most of the rainfall from this event occurred in less than 24 hours. For example, the nearest station in Meridian, 7 miles away, received 6.50 inches in 10 hours. Instead of equally distributing 2-day accumulation at Morgan in daily increments, which would likely underestimate the extracted 1-day annual maximum for 1991, 1-day to 2-day rainfall ratios from Meridian were applied and 8.40 inches was then extracted as the 1-day AM value for that year.

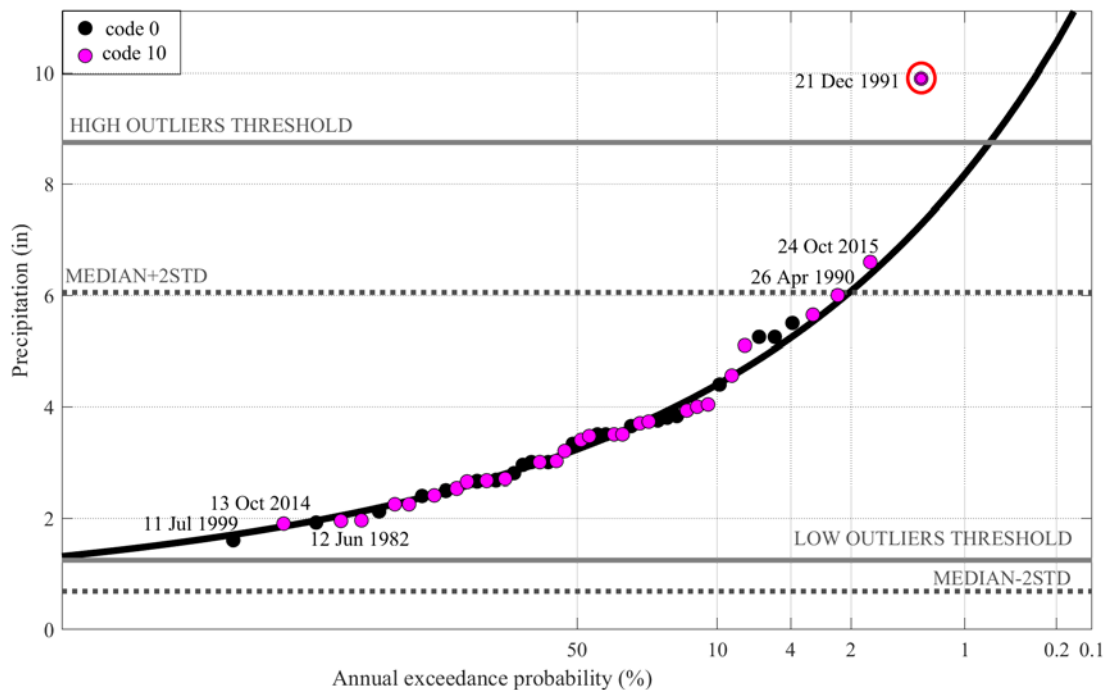


Figure 4.5.1. Outlier tests for 1-day AMS at Morgan, TX (41-6058). Data quality codes in the legend were assigned to annual maxima during the extraction process (Section 4.3).

#### 4.5.2. Missing significant events in records

Precipitation frequency estimates can be significantly affected by an incomplete data record, particularly if one of the highest observed amounts is missing, either because it occurred outside a station's period of record (POR), because the rain gauge was destroyed during an event, or due to data that was never archived or digitized or was otherwise lost over time. Less commonly, the rainfall amounts were misread from the observation forms, or the station was discontinued.

Several significant events that were either missing, underestimated, or recorded erroneously in various stations' records were added, if they were well documented and/or recorded at nearby stations. Table 4.5.1 shows the most notable cases with the reference to where these events were documented. For example, the Langtry hourly gauge stopped recording during Hurricane Alice in June of 1954 and a significant portion of the event was missing from its hourly record. Because of this, AM amounts extracted for that year were low for a range of durations. Missing hourly data were filled in using the estimated mass rainfall curve for this station found in Weather Bureau's storm data reports and used to update AM values for this year. As a result, the 24-hour AM value increased by almost 10 inches.

*Table 4.5.1. List of the most significant events that were corrected or added to the stations' records.*

| Name (SID)                    | Date           | Original         | Updated  | References  |
|-------------------------------|----------------|------------------|--|---|
| Benavides 2<br>(41-0690)      | 30 May 1987    | 1.22 in/1-day    | 12.20 in/1-day                                     | a) 1987-05 cooperative observation form for Benavides 2, TX<br>b) Duval County Picture newspaper, 03 June 1987  |
| Bonham 3NNE<br>(41-0923)      | 13 May 1982    | 2.6 in/1-day     | 12.60 in/1-day                                     | 1982-05 cooperative observation form for Bonham 3NNE, TX  |
| Brackettville<br>(41-1007)    | 15 Jun 1899    |                  | 18.00 in/1-day                                     | CD publication of 1899-06 for Texas <sup>(1)</sup>  |
| Houston Hobby<br>AP (79-0042) | 27-28 Aug 1945 |                  | 14.58 in/1-day<br>16.09 in/2-day                   | CD publication of 1945-08 for Texas <sup>(2)</sup>  |
| Houston Satsuma<br>(41-4329)  | 5-6 Dec 1935   |                  | 16.49 in/2-day                                     | <i>Major Texas Floods of 1935</i> (Dalrymple et al., 1937) <sup>(3)</sup>   |
| Langtry<br>(41-5048)          | 26-27 Jun 1954 | 12.83 in/24-hour | 22.71 in/24-hour                                   | NCEI's EV2 database <sup>(4)</sup>  |
| Liberty<br>(41-5196)          | 20 May 2000    | 1.91 in/1-day    | 19.10 in/1-day                                     | 2000-05 cooperative observation form for Liberty, TX  |
| Medina 1NE<br>(41-5742)       | 2-3 Aug 1978   |                  | 26.01 in/1-day<br>31.19 in/2-day                   | a) 1978-08 cooperative observation form for Medina 1NE, TX;<br>b) <i>Floods in Central Texas, August 1-4, 1978</i> (Schroder et al., 1985) <sup>(5)</sup> |
| Valley Junction<br>(41-9280)  | 28-30 Jun 1899 |                  | 30.00 in/1-day<br>36.45 in/2-day<br>39.55 in/3-day | a) 1899-06 cooperative observation form for Valley Junction, TX;<br>b) <i>Excessive Rainfall in Texas</i> (pp 7, 25, 27; Vance, 1934) <sup>(6)</sup>      |
| Vanderpool 10N<br>(41-9312)   | 1-2 Jul 1932   |                  | 22.50 in/1-day<br>33.50 in/2-day                   | <i>Major Texas Floods of 1936</i> (Dalrymple et al., 1939) <sup>(7)</sup>   |

<sup>(1)</sup> Amount from digitized data for Fort Clark, TX.

<sup>(2)</sup> Retrieved from Houston daily precipitation.

<sup>(3)</sup> Event occurred outside POR.

<sup>(4)</sup> Estimate from mass rainfall curve at Langtry.

<sup>(5)</sup> Estimate from mass rainfall curve at Medina 3W.

<sup>(6)</sup> Amount from digitized data for Valley Junction. Event was recorded at nearby Hearne, TX and is an estimate.

<sup>(7)</sup> Outside POR. Estimate from Humble Pipe Line Co. (12 miles north of Vanderpool)



### 4.5.3. Correction for constrained observations

**Daily durations.** The majority of AMS data used in this project came from daily stations at which readings were taken once per day (usually around 8 am local time, but this can vary over the course of a station’s record and from station to station). Due to the fixed beginning and ending of observation times at daily stations, the true 24-hour (unconstrained) annual maximum could be up to 100 percent larger than the corresponding 1-day (constrained) value extracted from the daily records.

For extreme events, unconstrained 24-hour AM values were determined by inspection of information from nearby gauges, and by reviewing storm reports, storm data, and radar data. For some events, weather observers computed their own 24-hour rainfall totals or made special observations that made it possible to determine more accurate unconstrained values. For example, for the April 1991 thunderstorm in Harlingen, which caused significant flooding in the area, the observer noted that the rain began after midnight on the 5th and that 14.76 inches fell by noon next day. Even though most of the 2-day accumulated rainfall fell in less than 12 hours, digitized records show 7.00 inches of rain on the 5th and 9.79 inches on the following day because the observer measured the rainfall at 7 am local time, which was roughly in the middle of the event. In this case, the observer’s estimate was accepted as the 24-hour AM value for 1991. Table 4.5.2 lists the most notable cases for which AM values were corrected.

*Table 4.5.2. Examples of significant adjustments on 1-day AM values to account for fixed-clock observations. Bold font indicates 1-day AM values before correction.*

| Station name | SID     | Date           | 1-day AM values (in)<br>from digital records |              | 24-hour<br>AM value<br>(in) |
|--------------|---------|----------------|--|--------------|-----------------------------|
|              |         |                | day 1  | day 2        |                             |
| Center       | 41-1578 | 14-15 Sep 1978 | 6.50   | <b>9.20</b>  | 15.70                       |
| Harlingen    | 41-3943 | 05-06 Apr 1991 | 7.00   | <b>9.79</b>  | 14.76                       |
| Henderson    | 41-4081 | 20-21 Jun 1993 | <b>7.52</b>                                  | 6.63         | 14.15                       |
| Karnes City  | 41-4696 | 30-31 Aug 1981 | 3.75   | <b>11.00</b> | 14.75                       |
| McCamey      | 41-5707 | 04-05 Oct 1986 | <b>9.13</b>                                  | 8.68         | 16.21                       |
| Sommerville  | 41-8445 | 03-04 Dec 1913 | 5.00   | <b>7.75</b>  | 12.75                       |
| Terrell      | 41-8929 | 19-20 Apr 1976 | <b>8.32</b>                                  | 4.80         | 13.12                       |

At all daily stations, correction factors were applied to AM to account for the likely failure of capturing the true unconstrained values. The correction factor for each daily duration was estimated as the coefficient of a zero-intercept regression model using concurrent (occurring within +/- 1 day) constrained and unconstrained annual maxima from hourly stations as independent and dependent model variables, respectively. Correction factors for all daily durations are given in Table 4.5.3.

*Table 4.5.3. Correction factors applied to constrained AMS data across daily durations.*

| Duration (days)   | 1    | 2    | 3    | 4    | 7    | >7   |
|-------------------|------|------|------|------|------|------|
| Correction factor | 1.11 | 1.04 | 1.03 | 1.02 | 1.01 | 1.00 |

**Hourly durations.** While significant underestimations due to constrained observations are commonly seen for daily stations, ‘clock-hour’ observations also affect hourly measurements at stations recording at 1-hour intervals. Data from stations recording at sub-hourly durations or from first-order hourly stations, which often report unconstrained amounts, were used to make corrections. For example, the maximum 1-hour value of 3.29 inches recorded at 6:00 pm local time on 27 February 1921 at Del Rio WB City hourly station was increased by 1.63 inches based on the corresponding 60-min value of 4.82 inches reported at the first-order hourly station (also in Jennings, 1963).

For other AM data extracted at hourly stations, the correction factors were developed from concurrent (occurring within +/- 1 hour) annual maxima at co-located hourly (constrained) and 15-minute (unconstrained) stations using a similar approach as for daily stations. Correction factors applied to constrained AMS data across hourly durations are shown in Table 4.5.4.

*Table 4.5.4. Correction factors applied to constrained AMS data across hourly durations.*

| <b>Duration (hours)</b>  | 1    | 2    | 3    | 6    | >6   |
|--------------------------|------|------|------|------|------|
| <b>Correction factor</b> | 1.10 | 1.04 | 1.02 | 1.01 | 1.00 |

**Sub-hourly durations.** Because sub-hourly measurements are also constrained by a fixed beginning and end measurement, as a further enhancement, a similar adjustment was done for sub-hourly durations. The correction factors for sub-hourly AMS were developed from zero-intercept regression models using concurrent (occurring within +/- 1 hour) constrained and unconstrained annual maxima for each duration estimated from 1-min stations; they are shown in Table 4.5.5.

*Table 4.5.5. Correction factors applied to constrained AMS data across sub-hourly durations.*

| <b>Duration (minutes)</b> | 15   | 30   | 45   | >45  |
|---------------------------|------|------|------|------|
| <b>Correction factor</b>  | 1.10 | 1.05 | 1.03 | 1.00 |

#### **4.5.4. Inconsistencies across durations**

At co-located stations, it was not unusual that corresponding annual maxima differed for some years during their overlapping periods of record. Related 1-day maxima at co-located daily and hourly stations were compared, and each pair of significantly different estimates was investigated. Effort was made to identify the source of the error and to correct erroneous observations across all durations that were affected.

Annual maxima at each station were also compared across all durations in each year to ensure that every extracted amount for a longer duration was at least equal to the corresponding amount for the successive shorter duration. Inconsistencies of this type occurred at stations with a significant number of missing and/or accumulated data and resulted from different AMS extraction rules applied for different durations (Section 4.3), or from the correction for constrained observations (Section 4.5.3). In those cases, shorter duration annual maxima were used to replace annual maxima extracted for longer durations. Typically, adjustments of this type were small.

#### **4.5.5. Trend analysis**

The precipitation frequency analysis methods used in NOAA Atlas 14 are based on the assumption that the annual maximum series used in the analysis are stationary. Statistical tests for trends in AMS and the main findings for this project area are described in more detail in Appendix A.2. Briefly, the stationarity assumption was tested by applying a parametric *t*-test and non-parametric Mann-Kendal test for trends in means and Levene's test for trends in variance in the 1-day and 1-hour AMS data at the 5% significance level. For the 1-day duration, testing was done on stations with at least 70 years of data; for the 1-hour duration, the minimum number of data years was lowered to 40 to increase sample size. Overall, the Mann-Kendall test detected slightly more positive trends in the means than the *t*-test, but neither test detected trends in almost 90% of the stations at both durations. Levene's test did not detect trends in variance in more than 95% of stations at both durations. Spatial maps did not reveal any spatial coherence in trend results.

The relative magnitude of any trend in the AMS means was also assessed for three climate regions delineated for this project (see Figure 4.1.2). AMS from all stations in each region were rescaled by corresponding mean values and then regressed against time. The regression results were tested as a set against a null hypothesis of zero serial correlation. The null hypothesis of no trends in AMS data could not be rejected at 5% significance level at any region.

#### 4.6. Precipitation frequency estimates with confidence limits at stations

##### 4.6.1. Overview of methodology and related terminology

Precipitation magnitude-frequency relationships at individual stations have been computed using a regional frequency analysis approach based on L-moment statistics. Frequency analyses were carried out on annual maximum series (AMS) for the following seventeen durations: 15-minute, 30-minute, 1-hour, 2-hour, 3-hour, 6-hour, 12-hour, 1-day, 2-day, 3-day, 4-day, 7-day, 10-day, 20-day, 30-day, 45-day, and 60-day. Frequency estimates based on partial duration series (PDS), which include all amounts for a specified duration at a given station above a pre-defined threshold regardless of year, were developed from AMS data using a formula that allows for conversion between AMS and PDS frequencies. Precipitation frequency estimates at 5-minute and 10-minute durations were derived from corresponding 15-minute estimates. To assess the uncertainty in estimates, 90% confidence intervals were constructed on both AMS and PDS frequency curves.

Frequency analysis involves fitting an assumed distribution function to the data. The following distribution functions were analyzed with the aim to identify a distribution that provides the best precipitation frequency estimates for the project area across all frequencies and durations: 3-parameter Generalized Extreme Value (GEV), Generalized Normal, Generalized Pareto, Generalized Logistic, and Pearson Type III distributions; 4-parameter Kappa distribution; and 5-parameter Wakeby distribution.

When fitting a distribution to a precipitation annual maximum series extracted at a given location (and selected duration), the result is a frequency distribution relating precipitation magnitude to its annual exceedance probability (AEP). The inverse of the AEP is frequently referred to as the average recurrence interval (ARI), also known as return period. When used with the AMS-based frequency analysis, ARI does not represent the “true” average period between exceedances of a given precipitation magnitude, but the average period between years in which a given precipitation magnitude is exceeded at least once. Those two average periods can be considerably different for more frequent events. The “true” average recurrence interval (ARI) between exceedances of a particular magnitude can be obtained through frequency analysis of PDS.

Differences in magnitudes of corresponding frequency estimates (i.e., quantiles) from the two series are negligible for ARIs greater than about 15 years, but notable at smaller ARIs (especially for  $ARI \leq 5$  years). Because the PDS can include more than one event in any particular year, the results from a PDS analysis are more reliable for designs based on frequent events (e.g., Laurenson, 1987). To avoid confusion, herein the term AEP is used with AMS frequency analysis and ARI with PDS frequency analysis. The term “frequency” is interchangeably used to specify the ARI and AEP.

L-moments (Hosking and Wallis, 1997) provide an alternative way of describing frequency distributions to traditional product moments (conventional moments) or the maximum likelihood approach. Since sample estimators of L-moments are linear combinations of ranked observations, they are less susceptible to the presence of outliers in the data than conventional moments and are well suited for the analysis of data that exhibit significant skewness. L-moments typically used to calculate parameters of various frequency distributions include 1<sup>st</sup> and 2<sup>nd</sup> order L-moments: L-location ( $\lambda_1$ ) and L-scale ( $\lambda_2$ ), and the following L-moment ratios: L-CV ( $\tau$ ), L-skewness ( $\tau_3$ ), and L-kurtosis ( $\tau_4$ ). L-CV, which stands for “coefficient of L-variation”, is calculated as the ratio of L-scale to L-location ( $\lambda_2 / \lambda_1$ ). L-skewness and L-

kurtosis represent ratios of the 3<sup>rd</sup> order ( $\lambda_3$ ) and 4<sup>th</sup> order ( $\lambda_4$ ) L-moments to the 2<sup>nd</sup> order ( $\lambda_2$ ) L-moment, respectively, and thus are independent of scale.

One of the primary problems in precipitation frequency analysis is the need to provide estimates for average recurrence intervals that are significantly longer than available records. Regional approaches, which use data from stations that are expected to have similar frequency distributions, have been shown to yield more accurate estimates of extreme quantiles than approaches that use only data from a single station. The number of stations used to define a region should be large enough to smooth variability in at-station estimates, but also small enough that regional estimates still adequately represent local conditions. The region-of-influence approach (Burn, 1990) used in this volume defines regions such that each station has its own region with a potentially unique combination of nearby stations. Stations are selected based on the maximum allowable distance from the target station that is defined in a geographic space and in a space of selected statistical attribute variables. Like with other regionalization approaches, there is a level of subjectivity involved in the process, for example, in choosing attribute variables, selecting the maximum allowable distance as well as attributes' weights and transformations for similarity distance algorithms. One of the advantages of the region-of-influence approach is that it results in a smooth transition in estimates across regional boundaries, which is relevant for the mapping of precipitation frequency estimates.

A frequency curve that is calculated from sample data represents some average estimate of the population frequency curve, but there is a high probability that the true value lies above or below the sample estimate. Confidence limits provide a measure of the uncertainty. They represent values between which one would expect the true value to lie with a certain confidence; they are not necessarily equidistant from the estimates. The width of a confidence interval between the upper and lower confidence limits is affected by several factors, such as the degree of confidence, sample size, exceedance probability, and so on. In this volume, simulation-based procedures were used to estimate confidence limits of a 90% confidence interval.

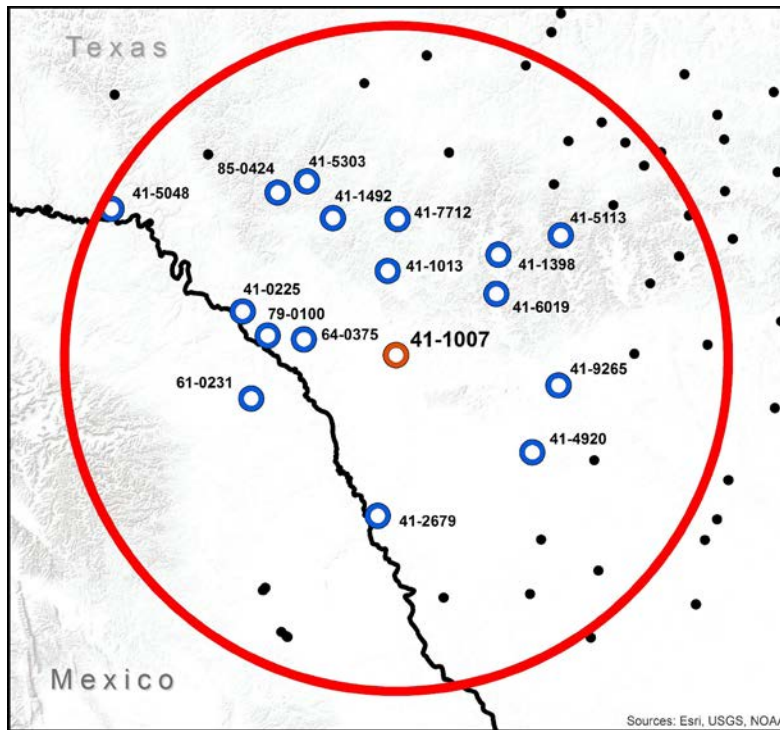
It should be noted that precipitation frequency estimates from NOAA Atlas 14 are point estimates and are not directly applicable to larger areas. The conversion of a point to an areal estimate is usually done by applying an appropriate areal reduction factor to the average of the point estimates within the subject area. Areal reduction factors are generally a function of the size of an area and the duration of the precipitation. The depth-area-duration curves from the Technical Paper No. 29 (U.S. Weather Bureau, 1957), developed for the contiguous United States, can be used for this purpose.

Also, precipitation frequency estimates for each NOAA Atlas 14 volume were computed independently using all available data at the time. Some discrepancies between volumes at project boundaries are inevitable and they will generally be more pronounced for more rare frequencies.

#### **4.6.2. Regionalization**

For each station, an initial region was created by grouping the closest 15 stations. Any station within a 60-mile radius that captured the highest observed 1-hour or 1-day amount was also automatically included in the initial region. Stations were then added to or removed from the region based on examination of their distance from a target station, inspection of their locations with respect to mountain ridges, elevation difference, difference in mean annual maxima, maximum recorded values and record lengths for selected durations, etc. (see an example in Figure 4.6.1) and assessment of similarities/dissimilarities in the progression of relevant L-moment statistics across durations compared with other stations in the region (see Figure 4.6.2). While highly dependent on station density, typical regions included between 15 and 25 stations with a cumulative number of data years between 700 and 1,800 for daily durations and 200 and 700 for hourly durations. However, in some areas of low station density some regions may have less 10 stations, with a cumulative number of data years as low as 200 for daily durations and 59 for hourly durations.

**Regional L-moments calculation.** For a given duration, regional estimates of L-moment ratios (L-CV, L-skewness and L-kurtosis) were obtained by averaging corresponding station-specific estimates weighted by record lengths. Regional L-moment ratios were then used to estimate higher order L-moments at each station.



| Index   | SID     | Distance<br>(mi) | Elev<br>(ft) | Elev<br>diff<br>(ft) | N<br>24h | N<br>1hr | MAM<br>24h<br>(in) | MAM<br>diff<br>(in) | MAX<br>1h<br>(in) | MAX<br>6h<br>(in) | MAX<br>24h<br>(in) | MAX<br>10d<br>(in) |
|---|---------|------------------|--------------|----------------------|----------|----------|--------------------|---------------------|-------------------|-------------------|--------------------|--------------------|
| <b>SELECTED STATIONS</b>  |         |                  |              |                      |          |          |                    |                     |                   |                   |                    |                    |
| 1   | 41-1007 |                  | 1119         |                      | 131      | 0        | 3.85               | 0.00                | -                 | -                 | 19.98              | 21.00              |
| 2   | 41-1013 | 20.33            | 1759         | 640                  | 35       | 0        | 3.48               | -0.37               | -                 | -                 | 8.30               | 16.16              |
| 3   | 64-0375 | 22.51            | 1082         | -37                  | 34       | 0        | 3.57               | -0.28               | -                 | -                 | 11.65              | 15.27              |
| 4   | 41-6019 | 28.24            | 1302         | 183                  | 31       | 0        | 4.15               | 0.30                | -                 | -                 | 22.26              | 23.39              |
| 5   | 79-0100 | 31.21            | 1001         | -118                 | 111      | 95       | 3.38               | -0.47               | 4.82              | 10.95             | 17.48              | 20.93              |
| 6   | 41-7712 | 32.61            | 1726         | 607                  | 37       | 0        | 3.17               | -0.68               | -                 | -                 | 8.99               | 17.92              |
| 7   | 41-1398 | 34.46            | 1480         | 361                  | 59       | 0        | 3.85               | -0.00               | -                 | -                 | 9.29               | 16.16              |
| ...   |         |                  |              |                      |          |          |                    |                     |                   |                   |                    |                    |
| <b>BACKUP STATIONS</b>  |         |                  |              |                      |          |          |                    |                     |                   |                   |                    |                    |
| 17  | 41-5048 | 76.90            | 1289         | 170                  | 83       | 65       | 3.01               | -0.84               | 6.84              | 17.63             | 22.71              | 23.54              |
| 18  | 41-7706 | 50.21            | 2382         | 1263                 | 73       | 55       | 3.54               | -0.31               | 3.00              | 6.00              | 10.55              | 12.98              |
| 19  | 41-0560 | 53.90            | 745          | -374                 | 32       | 0        | 3.42               | -0.43               | -                 | -                 | 7.23               | 10.87              |
| 20  | 41-7232 | 55.82            | 2051         | 932                  | 52       | 0        | 4.03               | 0.18                | -                 | -                 | 9.08               | 13.61              |
| ...   |         |                  |              |                      |          |          |                    |                     |                   |                   |                    |                    |
| <b>Enter SID for station(s) you want to remove from "Selected stations" list:</b> |         |                  |              |                      |          |          |                    |                     |                   |                   |                    |                    |
| <b>Enter SID for station(s) you want to add from "Backup stations" list:</b>      |         |                  |              |                      |          |          |                    |                     |                   |                   |                    |                    |

Figure 4.6.1. An example of a spatial plot with accompanying table used in an interactive process for adding or removing stations assigned to the Brackettville (41-1007) station's region.

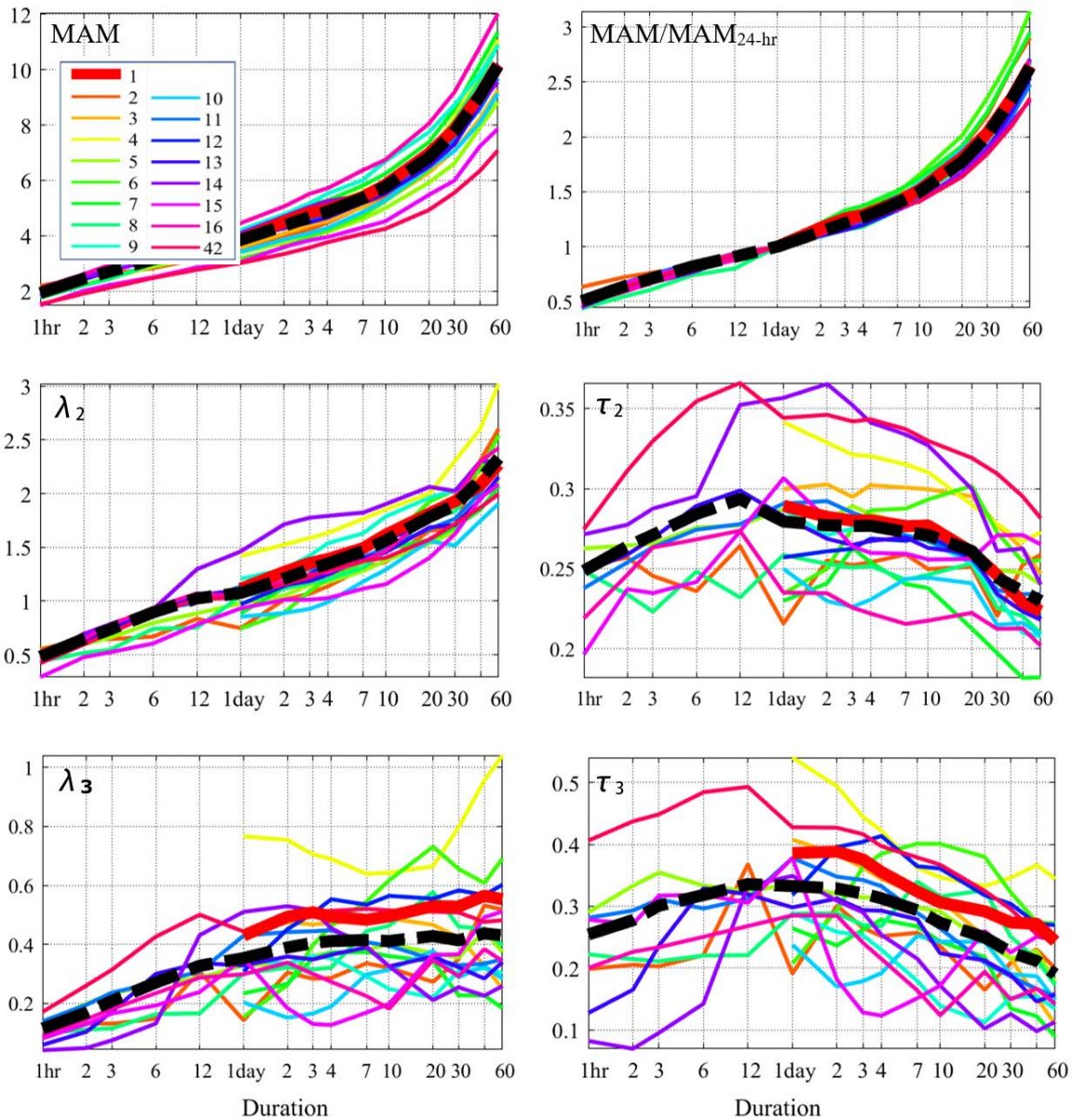


Figure 4.6.2. An example of plots of L-moments (left panels),  $MAM/MAM_{24-hr}$  and L-moment ratios (right panels) across hourly and daily durations for stations assigned to the Brackettville's region. Thick red lines show statistics for the target station, thin colored lines show statistics for other stations in the region, and thick dashed black lines show corresponding regional estimates.

**Station dependence.** Since stations were selected based on geographic proximity to a target station, it was likely that some of the extracted annual maxima at nearby stations came from the same storm events. Dependence in AMS data for stations within a region was analyzed using a  $t$ -test for the significance of a correlation coefficient at the 5% level. Analysis indicated that cross-correlation among stations was often statistically significant in areas with a dense network of rain gauges and that the number of dependent station pairs increased with duration length. The impact of station dependence was accounted for during the construction of confidence intervals on estimates where it could have substantial influence (see Section 4.6.5).

### 4.6.3. AMS-based estimates

**Choice of distribution.** A goodness-of-fit test based on L-moment statistics for 3-parameter distributions, as suggested by Hosking and Wallis (1997), was used to assess which of the five 3-parameter distributions listed in Section 4.6.1 provide acceptable fit to the AMS data. Results of  $\chi^2$ - and Kolmogorov-Smirnov tests and visual inspection of probability plots for all seven distributions for 1-hour, 1-day, and 10-day durations, like the one shown in Figure 4.6.3, were considered during distribution selection.

Although it is not required to use the same type of distribution across all durations and/or regions, changes in distribution type for different durations or regions often lead to considerable discontinuities in frequency estimates across durations or between nearby locations, particularly at more rare frequencies. Based on the test results, the GEV distribution, which is generally recommended for analysis of extreme event, provided an acceptable fit to data more frequently than any other distribution. Accordingly, the GEV distribution was adopted across all stations and for all durations.

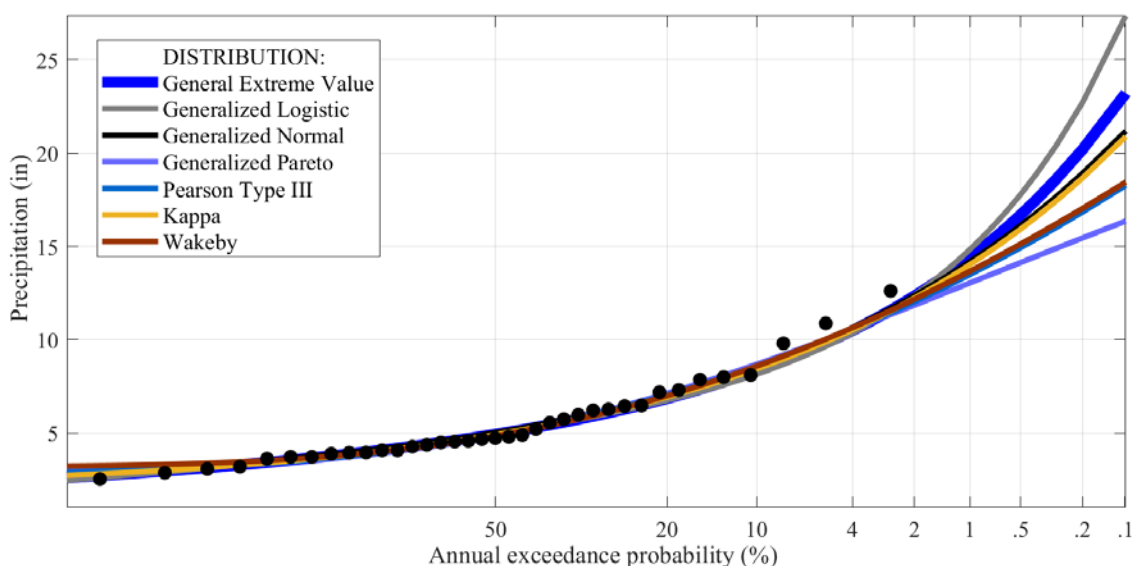


Figure 4.6.3. Probability plots for selected distributions for 1-day AMS at the Cotulla, TX (99-2048) station.

**Frequency estimates for hourly and daily durations.** For each station and for each hourly and daily duration, L-moment statistics were used to calculate the parameters of the GEV distribution and to produce precipitation frequency estimates for the following annual exceedance probabilities (AEPs): 1/2 (50%), 1/5, 1/10, 1/25, 1/50, 1/100, 1/200, 1/500, and 1/1000. This calculation was repeated for all durations and for all stations. Since L-moments, and consequently, precipitation frequency estimates, were calculated independently for each duration, the resulting depth-duration-frequency (DDF) curves did not always look smooth. Smoothing of quantiles using PCHIP (Piecewise Cubic Hermite Interpolating Polynomial) function (Fritsch and Carlson, 1980) improved the shape of DDF curves. Figure 4.6.4 illustrates precipitation depth-duration-frequency curves before and after smoothing for Dallas Fort Worth International Airport, TX (79-0018).

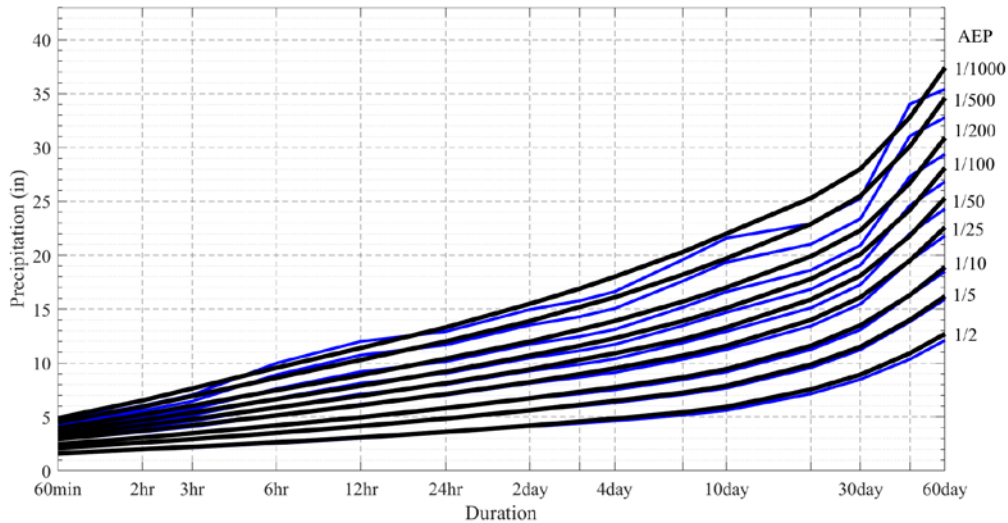


Figure 4.6.4. DDF curve for the Dallas Fort Worth International Airport, TX (79-0018) station. Black lines represent original estimates; blue lines represent smoothed estimates.

**DDF adjustment for stations affected by Hurricane Harvey.** Hurricane Harvey made landfall in Texas as Category 4 hurricane on 25 August 2017. The massive storm landed and stalled around southern Texas for days, dumping as much as 26.5 inches of rainfall in 24-hours and more than 40 inches in seven days over a large area in and around the vicinity of Houston and Port Arthur. Harvey broke all multi-day rainfall records and became the official highest amount of rainfall ever to fall on the continental U.S. from a single storm, with total of 60.58 inches over a 7-day period.

The investigation of the effect of Harvey on DDF curves indicated that the large multi-day amounts observed during Harvey unduly affected GEV distribution parameterization and consequently precipitation frequency estimates, especially for 1000-year ARI between 2-day and 20-day durations (see Figure 4.6.5 as an example).

The 1000-year 24-hour and the 1000-year 30-day estimates, which were not significantly skewed due to Harvey, were used as anchor points for adjusting 1000-year estimates between 2-day and 20-day durations. Final adjustments were made based on inspection of spatial patterns for 100-year and 1000-year estimates across affected durations.

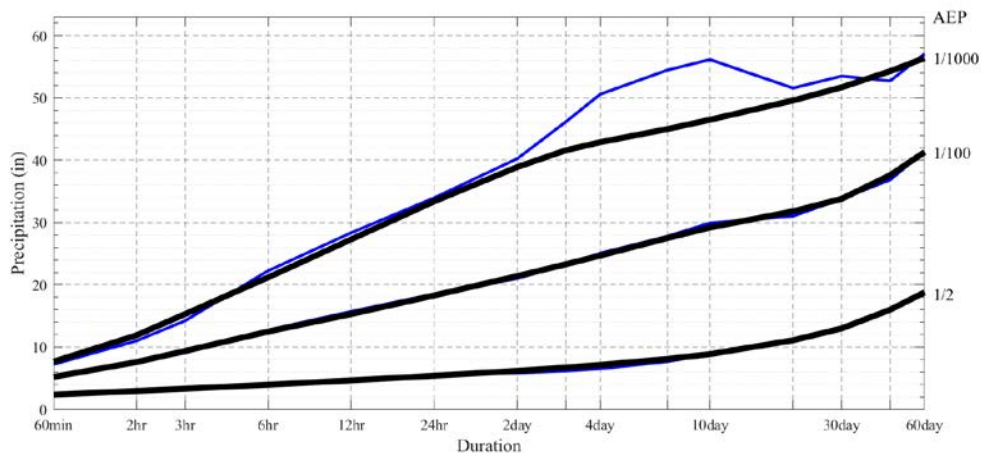


Figure 4.6.5. Adjustment on the multi-day 1000-year (1/1000 AEP) precipitation frequency estimates at Liberty, TX (41-5196) station to account for Harvey's impact. Blue lines represent original estimates; black lines represent adjusted estimates.



**Frequency estimates for sub-hourly durations.** The shortest duration at which AMS data were extracted was 15 minutes. Regional L-moment statistics were calculated for the 15-minute and 30-minute durations at stations that had 15-minute AMS data available for at least one station assigned to their region. L-moments were then used to produce precipitation frequency estimates in the same manner as for hourly and daily durations. However, in many cases, resulting precipitation frequency estimates were implausible, especially for AEPs of 1/100 (1%) or less. The primary cause of this was the sample size, as very few stations with measurements at sub-hourly durations were available, and when they were available, they typically had short periods of record. This resulted in unreliable moments (especially higher-order moments), and consequently, unreliable precipitation frequency estimates.  $\lambda_1$  moments (i.e., mean annual maxima) were less sensitive to sample size and were generally in line with corresponding estimates at nearby stations.  $\lambda_1$  moments were also, for the most part, consistent with the expected progression across hourly and daily durations (see top left panel of Figure 4.6.2). For that reason, mean annual maxima at 15-minute and 30-minute durations were retained for derivation of MAM grids (see Section 4.8.1). At-station quantiles, which were assessed as unreliable, were not interpolated to create precipitation frequency grids; an alternative approach described in Section 4.8.2 was used for that purpose.

Similarly, for the 5-minute and 10-minute durations, very few n-minute stations were available to compute precipitation frequency estimates using regional L-moments or to develop MAM grids. Therefore, an alternative approach described in Section 4.8.2 was used to develop these estimates, as well.

#### 4.6.4. PDS-based estimates

PDS-based precipitation frequency estimates were calculated indirectly from Langbein's formula (Langbein, 1949) which transforms a PDS-based average recurrence interval (ARI) to an annual exceedance probability (AEP):

$$AEP = 1 - \exp\left(-\frac{1}{ARI}\right).$$

PDS-based frequency estimates were calculated for the same durations as AMS-based estimates for 1-, 2-, 5-, 10-, 25-, 50-, 100-, 200-, 500-, and 1,000-year ARIs. Selected ARIs were first converted to AEPs using the above formula and then precipitation frequency estimates were calculated for those AEPs following the same approach that was used in the AMS analysis.

#### 4.6.5. Confidence limits

A Monte Carlo simulation procedure that accounts for inter-station dependence described in Hosking and Wallis (1997), was used to construct 90% confidence intervals (i.e., 5% and 95% confidence limits) on both AMS-based and PDS-based precipitation frequency curves (see Section 4.6.2 for spatial dependence analysis). At each station, 1,000 simulated data sets per duration were used to generate precipitation quantiles. Estimates were sorted from smallest to largest and the 50th value was selected as the lower confidence limit, while the 950th value was selected as the upper confidence limit. It should be noted that confidence intervals constructed through this approach account for uncertainties in distribution parameters, but not for other sources of uncertainties (for example, distribution selection) that could also significantly impact the total error, particularly at more rare frequencies.

For some stations, due to differences in record lengths across hourly and daily durations, confidence intervals for hourly durations were wider than corresponding intervals at daily durations; therefore, they were restricted by the corresponding values at 24-hour duration. Confidence limits for sub-hourly durations were calculated using similar approaches that were used to calculate frequency estimates at those durations. Since confidence limits were derived for each duration independently, like precipitation frequency estimates, they could fluctuate from duration to duration and were smoothed across durations using cubic spline functions.

#### **4.7. Rainfall (liquid precipitation) frequency estimates**

Precipitation frequency estimates from Section 4.6 represent precipitation magnitudes regardless of the type of precipitation. For some applications it may be important to know frequency estimates from liquid precipitation (i.e., rainfall) only. For example, rainfall is treated differently from snowfall in watershed modeling because of different runoff producing mechanisms. While the rainfall generates runoff almost immediately, snowfall generally goes into storage until it melts and produces runoff at a later time.

For NOAA Atlas 14 project areas where snowfall contributes to the precipitation AMS, empirical equations were developed to produce frequency estimates for rainfall (i.e., liquid precipitation only) from corresponding precipitation frequency estimates (see for example, Section 4.7 of [Volume 7](#)). In the NOAA Atlas Volume 11 project area, the contribution of snowfall to AMS is trivial due to geo-climatic conditions, so no separate rainfall frequency analysis was needed.

#### **4.8. Derivation of grids**

##### **4.8.1. Mean annual maximum precipitation**

Grids of mean annual maxima (MAM) served as the basis for deriving gridded precipitation frequency estimates at different frequencies and durations. The station mean annual maximum values for the 17 durations from 15-minute and 60-day were spatially interpolated to produce corresponding mean annual maximum grids at 30 arc-seconds resolution using a hybrid statistical-geographic approach for mapping climate data named Parameter-elevation Regressions on Independent Slopes Model (PRISM), developed by Oregon State University's PRISM Climate Group (e.g., Daly et al., 2002).

Several iterations with the PRISM Climate Group were made to ensure satisfactory MAM patterns. Gauged locations where interpolated MAMs for selected base durations (15-minute, 1-hour, 1-day, 10-day) were more than 10% different (determined by jackknife analysis) than the expected at-station MAMs were carefully re-examined. As a result of those reviews, some MAM estimates were adjusted. MAMs were also estimated for a couple of locations to better anchor the spatial interpolation in coastal and varied terrain areas and/or where the lack of stations with sufficiently long records unduly influenced expected spatial patterns, particularly at hourly durations. MAMs were raised for several stations southwest of Houston in the vicinity of El Campo and Bay City area to improve the steep spatial gradient and improve patterns that were due to a couple of missing significant events in a low-density station area. This adjustment was made as a result of comments received during the peer review process (see Appendix A.4).

Appendix A.3 provides detailed information on the PRISM-based methodology for creating the mean annual maximum grids. In summary, a unique regression function was developed for each target grid cell to derive mean annual maximum values for each duration that accounted for the difference between an observing station's and the target cell's mean annual precipitation, topographic facet, coastal proximity, the distance of an observing station to the target cell, etc. Jackknife cross-validation indicated that the overall percent bias was less than 0.5% and the mean absolute error was less than 4% across all durations.

##### **4.8.2. Precipitation frequency estimates with confidence limits**

**Estimates for 60-minute through 60-day durations.** The spatial interpolation technique used in this volume developed grids of AMS-based and PDS-based precipitation frequency estimates along the frequency dimension for a given duration. Hence, the evolution of frequency-dependent spatial patterns for a given duration was independent of other durations. The technique utilizes the inherently strong linear relationship that was found to exist between precipitation frequency estimates for consecutive frequencies, as well as mean annual maxima and 2-year precipitation frequency estimates. For example,

Figure 4.8.1 a) shows the relationship between the 50-year and 100-year estimates for the 24-hour duration for this project area together with regression lines for a linear model and zero-intercept model. The  $R^2$  values are very close to 1.0, which was common for all relationships. Another common occurrence was a negligible intercept coefficient in the linear model regression equations, so a zero-intercept model was adopted for all frequencies and durations. The slope coefficient of the zero-intercept model represents an average domain-wide ratio between consecutive quantiles; in this case, 1.148 is an average ratio between 100-year and 50-year quantiles for the 24-hour duration for the whole project area. Although the correlation coefficients were very high, when plotted on a map, at-station ratios showed some regional features (as shown in Figure 4.8.1 b) for the same example); this finding was used in the grid generation process.

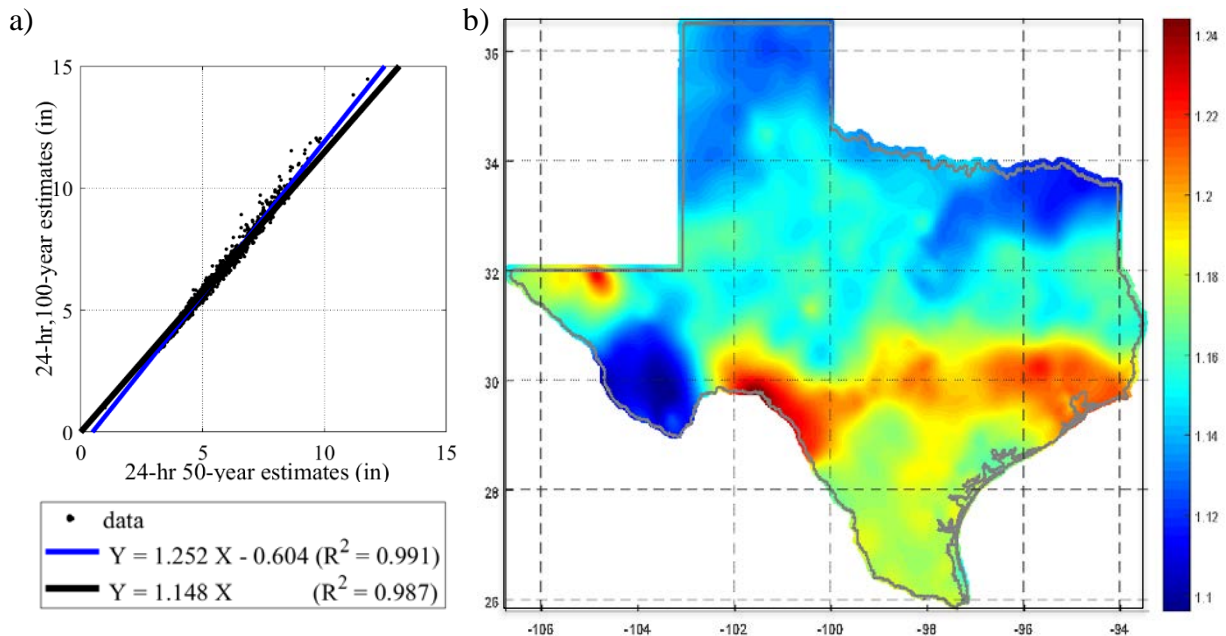


Figure 4.8.1. a) Scatter plot of 100-year versus 50-year 24-hour precipitation frequency estimates. Linear model and zero-intercept linear model regression lines are also shown. b) Spatially interpolated ratios used to calculate 24-hour 100-year precipitation frequency grid from the 24-hour 50-year grid.

For each duration, the calculation began with the PRISM-derived MAM grid as the initial predictor grid and the grid of 2-year precipitation frequency estimates as the resulting subsequent grid. At-station ratios between the 2-year estimates and corresponding MAM estimates were spatially interpolated to a grid using a natural neighbor interpolation method, which provides a smooth approximation to the underlying "true" function while remaining true to the at-station estimates. Gridded MAM estimates were then multiplied by corresponding gridded ratios to create a grid of 2-year precipitation frequency estimates. In the subsequent run, ratios between the 5-year and 2-year estimates were interpolated and used to calculate the 5-year precipitation grid from the 2-year grid, and so forth. The grid of 2-year precipitation frequency estimates was also used to create a grid of 1-year estimates. The same process was repeated for all hourly and daily durations.

During the review process, station-driven contour lines were showing up in cartographic maps in flat terrain areas (see Appendix A.4). The majority of these were driven by small differences in MAM estimates at nearby stations and selected mapping contour intervals, but to reduce a number of station-driven contours in the final cartographic maps, a dynamic filter was applied to the precipitation frequency grids. Parameters of the filter, which controlled the amount of smoothing, were a function of elevation gradients and proximity to the coastline. Parameters were selected such that minimal smoothing was

applied at the coastline or in the mountains, maximum smoothing was applied in flat terrain, and the transition from one to another was gradual. The resulting smoothed grid then served in the subsequent run as the basis for the derivation of the next grid.

To ensure consistency in grid cell values across all durations and frequencies (e.g., 24-hour estimate has to be at least equal to 12-hour estimate), duration-based internal consistency checks were conducted. For inconsistent cases, the longer duration grid cell value was adjusted by multiplying the shorter duration grid cell value by 1.01 to provide a 1% difference between the values. After grid cell consistency was ensured across durations, it was performed across frequencies to ensure that there were no frequency-based inconsistencies caused by the adjustment across durations.

A jackknife cross-validation was used to evaluate the spatial interpolation technique's performance for interpolating precipitation frequency estimates. It was cost prohibitive to re-create the PRISM mean annual maximum grids for each cross-validation iteration. For this reason, the cross-validation results reflect the accuracy of the interpolation procedure based on the same mean annual maximum grids. Figure 4.8.2 shows validation results for 100-year estimates for the 1-hour and 24-hour durations as histograms showing the distribution of differences in estimates with and without each station (errors). Overall, the spatial interpolation technique adequately reproduced values. Errors in 100-year estimates were less than  $\pm 5\%$  for 95% of stations for the 1-hour duration and for 99% of stations for the 24-hour duration.

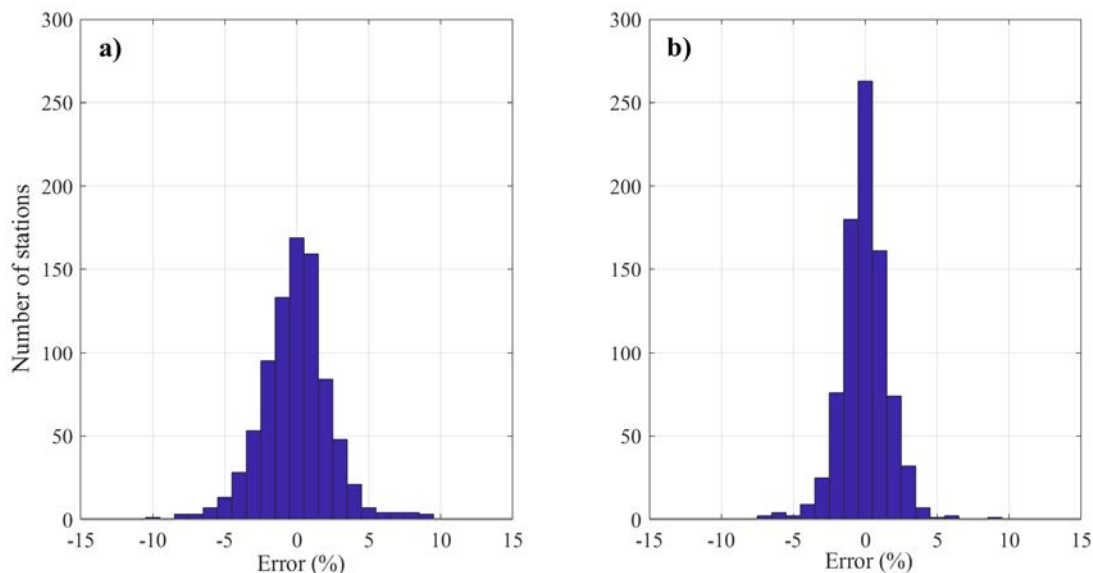


Figure 4.8.2. NOAA Atlas 14 Volume 11 jackknife cross-validation results for: a) 100-year 1-hour estimates, and b) 100-year 24-hour estimates.

**Estimates for 5-minute through 30-minute durations.** A similar approach to the one used to derive grids of precipitation frequency estimates for hourly and daily durations was used to derive gridded estimates for the 15-minute and 30-minute durations. For 15-minute, a grid of 2-year precipitation frequency estimates was calculated by multiplying the 15-minute MAM grid with a grid of ratios between the 2-year estimates and corresponding MAM estimates. In the subsequent run, a grid of ratios between the 5-year and 2-year estimates was used to calculate the 5-year grid from the 2-year grid, and so forth. The main difference is that, due to concerns about the soundness of at-station precipitation frequency estimates computed directly from AMS for sub-hourly durations, instead of using interpolating gridded ratios from sub-hourly estimates, corresponding 60-minute ratio grids were assumed to characterize 15-minute ratio grids. The same process was used for 30-minute duration, as well.

Precipitation frequency grids for 5-minute and 10-minute durations were derived by multiplying the 15-minute precipitation frequency grids by scaling factors. Scaling factors were obtained from n-minute stations; they were calculated as average ratios of 5-minute and 10-minute annual maxima to corresponding 15-minute annual maxima. Given that relatively few n-minute stations were available, and that at-station scaling factors varied little across the project area, they were assumed to be uniform for the whole area: 0.57 for 5-minute duration and 0.82 for 10-minute duration. The scaling factors were applied to the 15-minute precipitation frequency grids for all frequencies to create matching 5-minute and 10-minute grids.

**Confidence limits.** Grids of upper and lower limits of the 90% confidence interval for the precipitation frequency estimates between 5-minute and 60-day durations were derived using same procedures that were used to create grids of precipitation frequency estimates.

## **5. Precipitation Frequency Data Server**

NOAA Atlas 14 precipitation frequency estimates are delivered entirely in digital form in order to make the estimates more widely available and to provide them in various formats. [Precipitation Frequency Data Server \(PFDS\)](#) provides a point-and-click web portal for precipitation frequency estimates and associated information.

In early 2011 the PFDS underwent a major redesign to make PFDS pages interactive. Since then, PFDS pages were enhanced on several occasions to improve the usability and readability of the PFDS website's content, to increase data download speeds, and to provide additional information. In order to keep this section of the documentation up-to-date for all volumes, the PFDS section is offered as a separate document. This document is updated as needed and is available for download from [here](#).

## 6. Peer review

A peer review of preliminary results for the NOAA Atlas 14 (NA14) Volume 11 precipitation frequency project was carried out in the period between 20 November 2017 and 19 January 2018. The request for review was sent via email to individuals who were suggested by agencies that funded this work as potential reviewers, expressed interest in participating in the review, or who have subscribed to the HDSC mailing list-server.

The review package included the following items:

- a. Station metadata. Reviewers were asked to examine the accuracy of stations' metadata and provide comments on suggested station deletions and merges. Station metadata were grouped into three categories: a) Texas stations used in the frequency analysis, b) stations outside Texas that assisted in the analysis, and c) stations that were examined but not retained for the analysis. The metadata tables included information on each station's name, state, source of data, latitude, longitude, elevation, and period of record. The tables also provided basic information on other stations that contributed data to each station for sub-hourly, hourly, and/or daily durations, if applicable. If station data was collected but not used in the analysis, a brief comment on why the data was not used was also provided. Generally, stations were not used because there was another nearby station with a longer period of record, station data were assessed unreliable for this specific purpose, or the station's period of record was not long enough and it was not a candidate for merging with any nearby station.
- b. At-station depth-duration-frequency (DDF) curves. Reviewers were asked to examine the DDF curves for stations retained in the analysis for 1-hour to 10-day durations and for 2-year through 100-year average recurrence intervals and to comment on their reasonableness.
- c. Spatially-interpolated estimates. Reviewers were invited to comment on the overall and local spatial patterns in spatially-interpolated precipitation frequency estimates for 2-year and 100-year ARIs and for 60-minute, 6-hour, 24-hour, and 10-day durations. To illustrate how much estimates changed in the project area, cartographic maps showing the differences between NOAA Atlas 14 and superseded NOAA 100-year estimates for 60-minute, 6-hour, 24-hour, and 10-day durations were also shared.

As part of the peer review process, several meetings and panel discussions were arranged to address any questions or concerns reviewers may have had after looking over the information shared. Comments were received from twenty-six individuals representing various federal, state, and local agencies. Their reviews provided critical feedback that improved the estimates. Reviewers' comments regarding station metadata, at-station precipitation frequency estimates, and their spatial patterns can be found in Appendix A.4 along with HDSC responses.

## 7. Comparison with previous NOAA publications

The precipitation frequency estimates in NOAA Atlas 14 (NA14) Volume 11 supersede the estimates published in the following publications:

- a. [NOAA Technical Memorandum NWS HYDRO-35](#), *Five- to 60-Minute Precipitation Frequency for the Eastern and Central United States* (Frederick et al., 1977) for 5-minute to 60-minute durations;
- b. [Weather Bureau Technical Paper No. 40](#), *Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years* (Hershfield, 1961) for 2-hour to 24-hour durations;
- c. [Weather Bureau Technical Paper No. 49](#), *Two- to Ten-Day Precipitation for Return Periods of 2 to 100 Years in the Contiguous United States* (Miller, 1964) for 2-day to 10-day durations.

Precipitation frequency estimates at the 100-year average recurrence interval from NOAA Atlas 14 were examined in relation to corresponding estimates from NOAA Technical Memorandum NWS HYDRO-35 (HYDRO35) for the 60-minute duration and the Weather Bureau Technical Paper No. 40 (TP40) for the 24-hour duration. Corresponding grids from HYDRO35 and TP40, which were used in the comparison, were obtained by interpolating digitized isopluvials from paper cartographic maps using the standard spatial interpolation tools available in ArcGIS.

**100-year 60-minute.** The maps in Figures 7.1 and 7.2 illustrate the differences between NA14 and HYDRO35 100-year 60-minute estimates in inches and in percentages, respectively. The contour lines superimposed on the maps represent isopluvials from HYDRO35. 100-year 60-minute precipitation frequency estimates at specific locations across the project area changed between -1.39 and 1.24 inches, or from -39% to 36%. The increase of more than one inch occurred in South Texas from Del Rio to Brackettville, extending south to Eagle Pass. Other areas with notable increases in estimates include the vicinity of Houston, where estimates increased in the range of 0.51 - 0.75 inches, areas of the Texas Hill Country to the west of San Antonio with increases in the range of 0.51 - 1.0 inches, and Austin and surrounding areas with increases in the range of 0.51 - 0.75 inches. The largest decreases of up to 1.39 inches occurred in Southwest Texas, in and around the vicinity of Big Bend National Park, including Rio Grande Village. Another large area that experienced a decrease includes portions of the Edwards Plateau in the vicinity of Junction, where estimates decreased between 0.50 and 0.74 inches.

The differences in estimates between the two publications are attributed to several factors. Firstly, differences in data quality control procedures and frequency analysis approaches (such as distribution selection, parameter estimation method, regional versus at-station methods) affect estimates, especially at higher ARIs. Section 4.6.1 of this document describes the methods used in NA14 and their advantages. Secondly, differences in spatial interpolation techniques impact estimates at ungauged locations. Isopluvials in HYDRO35 were based solely on station data without incorporating topographic features; NA14 estimates were based on PRISM products that integrate topography (see Section 4.8 for more details). Finally, the increase in the amount of available data from HYDRO35 to NA14, both in the number of stations and their record lengths, has a considerable effect on estimates. HYDRO35 was published in 1977 using data from 1948 to 1972. Stations retained for analysis in HYDRO35 had between 15 and 25 years of data. At those stations, 46 additional years of data were potentially available for the NA14 analyses. Also, many stations that were rejected at the time due to short records (less than 15 years) were included in NA14. For example, for Big Bend National Park in Brewster County, which saw some of the most significant decreases in estimates (up to 39%), not a single sub-daily station was used in HYDRO35 due to short periods of record, whereas for the NA14 analysis 59 years of data was available at one station in the area.



A detailed comparison of the numbers of stations and record lengths available to each of the two projects could not be provided since the HYDRO35 project covered a significantly larger area and the necessary information was not available in the HYDRO35 document.

**100-year 24-hour.** The maps in Figures 7.3 and 7.4 illustrate the differences between NA14 and TP40 100-year 24-hour estimates in inches and in percentages, respectively. The contour lines superimposed on the maps represent isopluvials from TP40. 100-year 24-hour precipitation frequency estimates at specific locations across the project area changed between -2.63 and 6.91 inches, or from -40% to 152%. Some of the largest increases occurred in the area surrounding the Guadalupe Mountains in West Texas, with an increase of up to almost 7 inches (~150%) in the vicinity of Guadalupe Peak, the highest point in Texas. NA14 analysis by design accounts for topographic effects, but also could rely on stations in the area with relatively long records. In contrast, the TP40 analysis, which did not account for orographic impacts, was unable to resolve the effect of mountainous terrain on estimates without a single observation site in the vicinity.

Much of Southeast Texas along the Gulf Coast, including the Houston area, experienced increases in estimates of more than 3 inches, and as high as 6 inches (increase of ~50%) in Liberty. Areas further down the coast towards Corpus Christi experienced increases in the range of 2–3 inches (up to 30%). Estimates increased up to 5 inches in the Texas Hill Country in the vicinity of Medina, embedded within a large area that increased 3 to 4 inches from Langtry, Del Rio, and Eagle Pass extending eastward all the way to San Marcos. Estimates decreased as much as 2.63 inches (40% decrease) in Southwest Texas, in and around the vicinity of Big Bend National Park, including Rio Grande Village.

Differences in estimates can be attributed to similar factors as for the 60-minute duration: different data quality control techniques, frequency analysis approaches, and spatial interpolation techniques. Also, many stations that were rejected at the time due to short records (less than 15 years) were included in NA14 and 60 additional data years were potentially available at stations used in TP40 for the NA14 analysis, since TP40 was published in 1961 with data collected through 1957. A more detailed comparison of the numbers of stations and their record lengths between the two projects could not be provided since the necessary information was not available in the TP40 document.

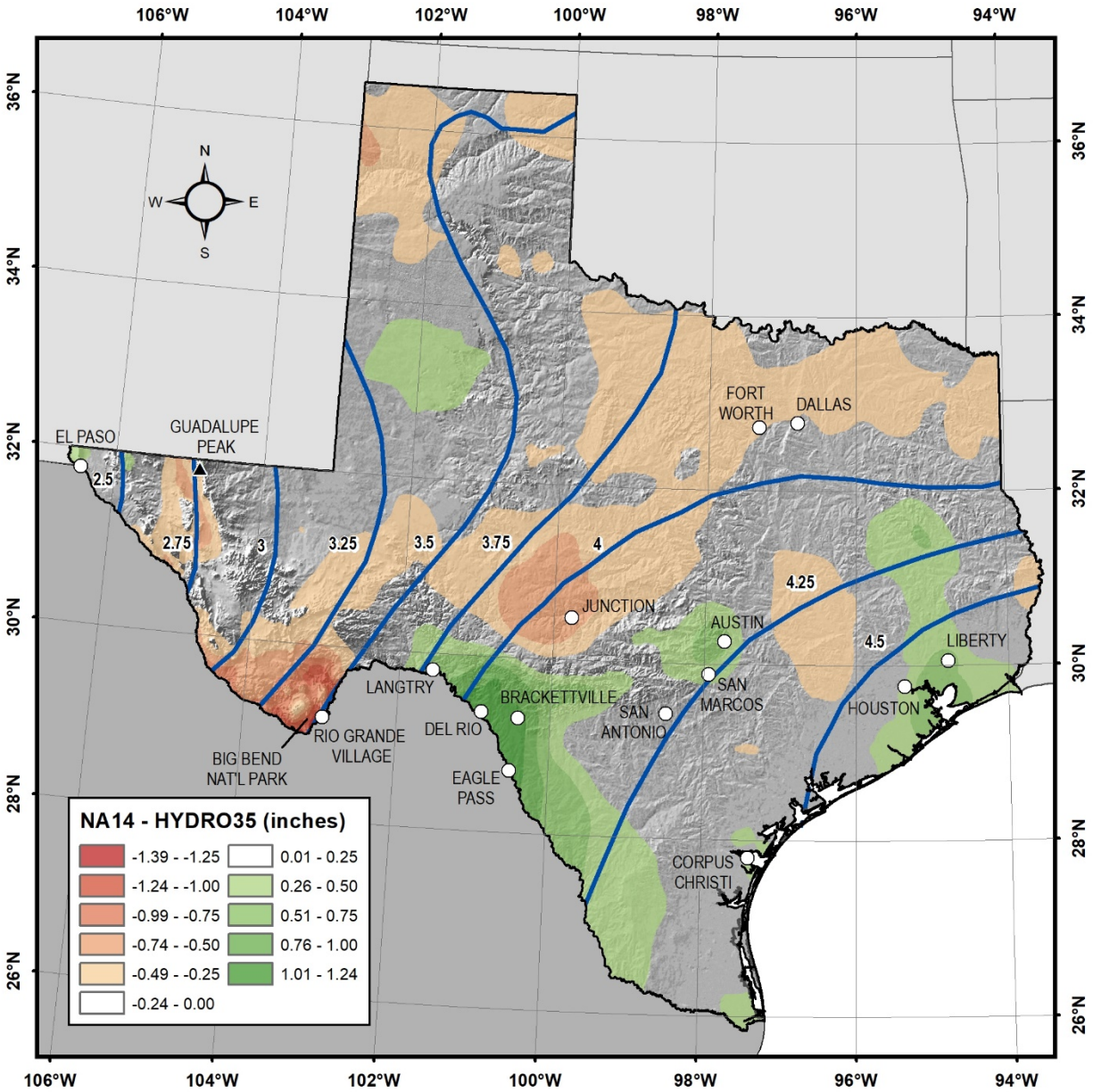


Figure 7.1. Map showing differences in 100-year 60-minute estimates (in inches) between NA14 and HYDRO35 for Texas. Superimposed on the map are isopluvials (blue lines) from HYDRO35.

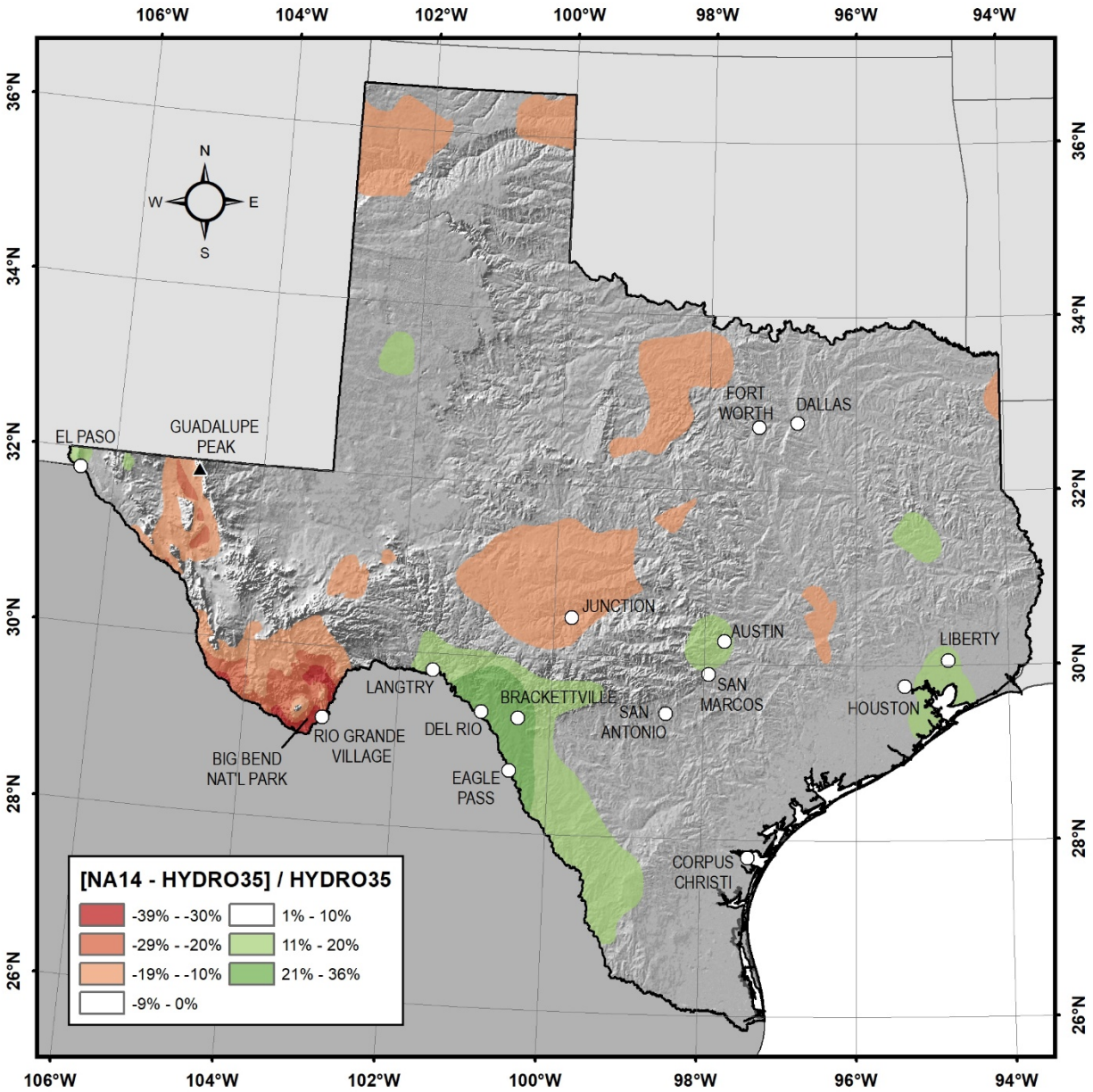


Figure 7.2. Map showing percent differences in 100-year 60-minute estimates between NA14 and HYDRO35 for Texas.

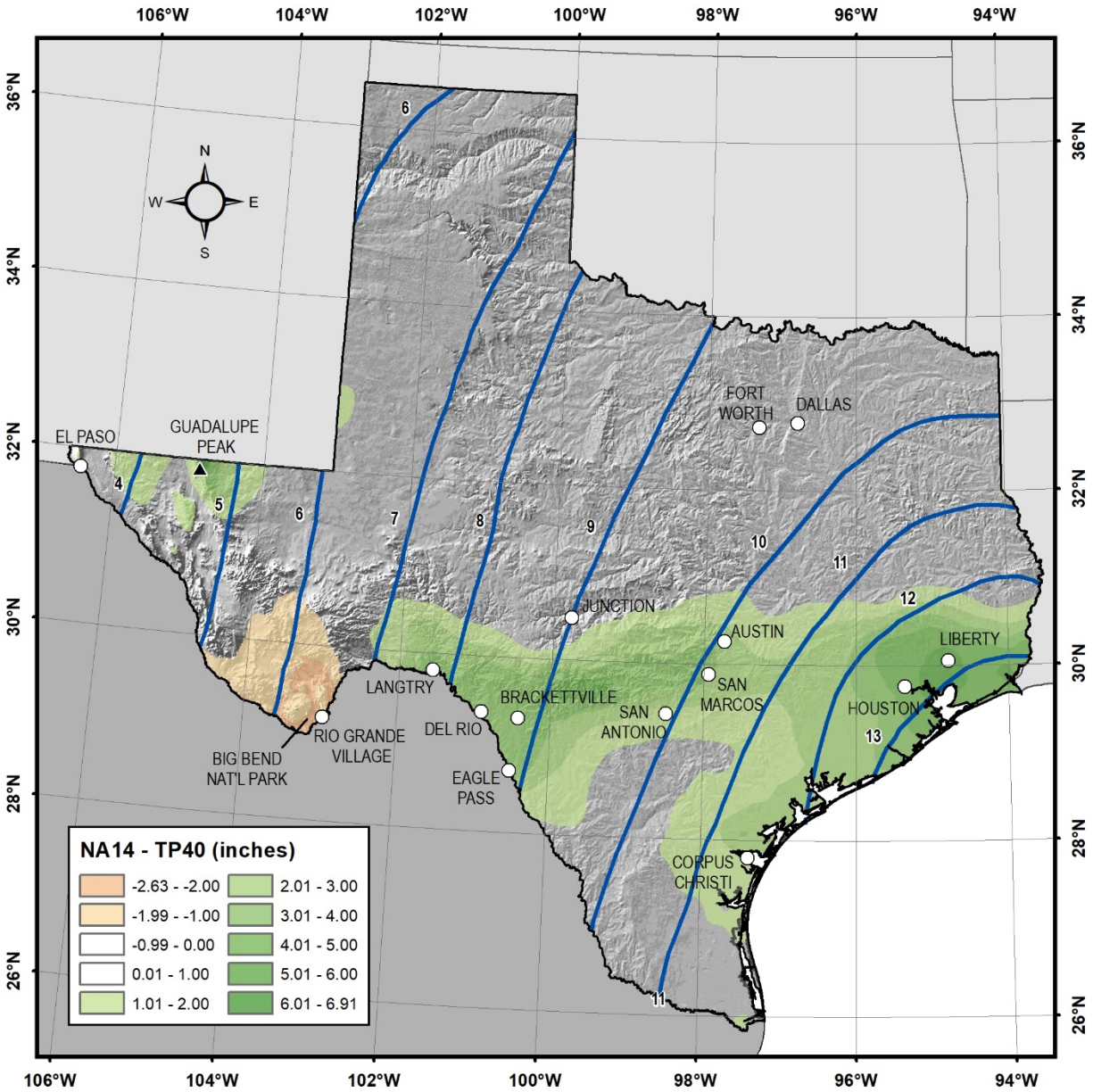


Figure 7.3. Map showing differences in 100-year 24-hour estimates (in inches) between NA14 and TP40 for Texas. Superimposed on the map are isopluvials (blue lines) from TP40.

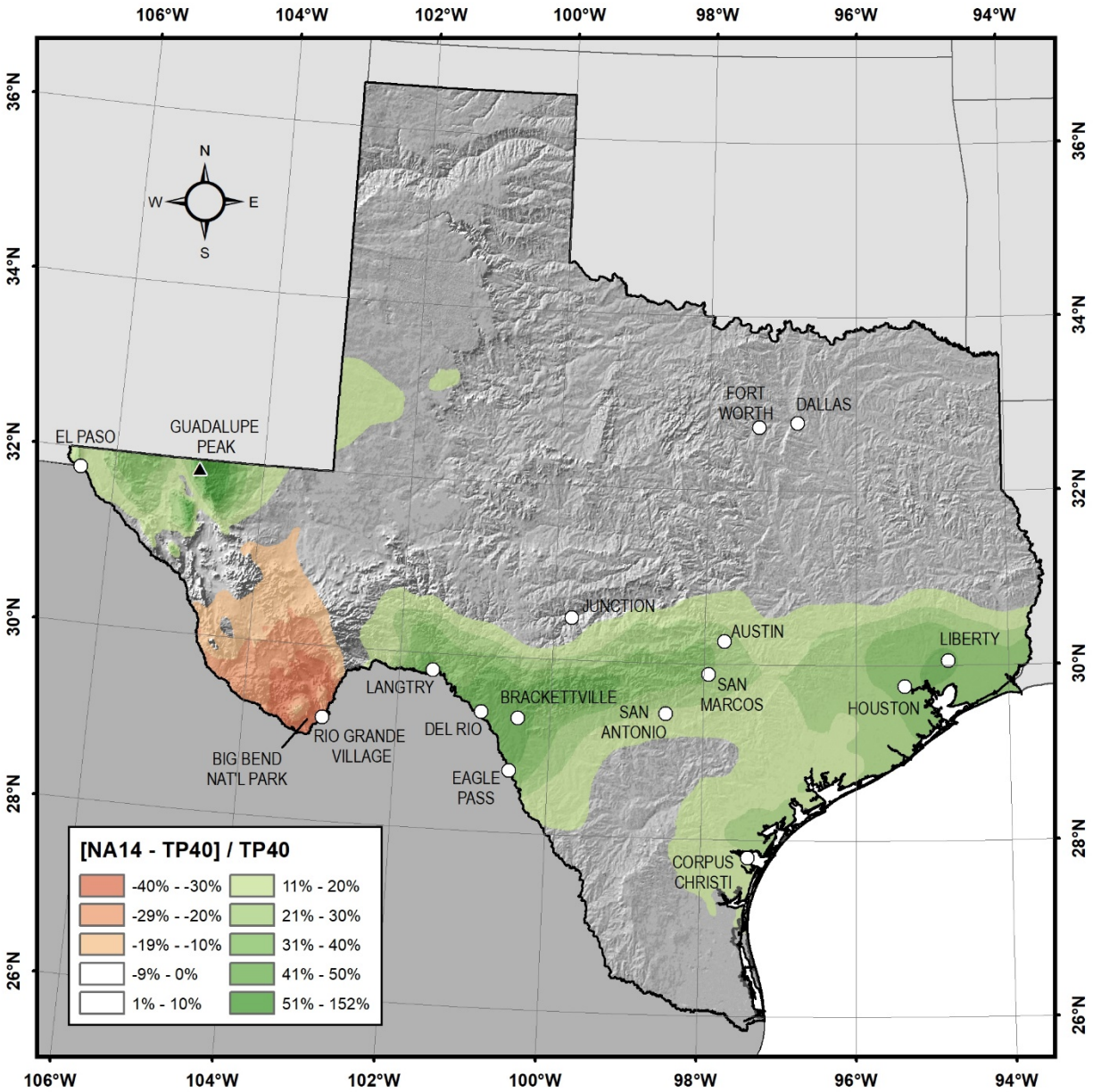


Figure 7.4. Map showing percent differences in 100-year 24-hour estimates between NA14 and TP40.

**Appendix A.1. Metadata for stations used to prepare precipitation frequency estimates.**

*Table A.1.1. Texas locations for which precipitation frequency estimates were directly derived. The table shows each location’s state (for consistency with table A.1.2), name, identification number (SID), latitude, longitude, elevation, and AMS record lengths (data years) across sub-hourly, hourly, and daily durations. It also lists SIDs for stations that contributed data to this location for sub-hourly, hourly, and/or daily durations. Details on contributing stations’ metadata are provided in Tables A.1.3 and A.1.4.*

| State | Name            | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |  |  |
|-------|-----------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|--|--|
|       |                 |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly   | daily  |
| TX    | ABERNATHY       | 41-0012 | 33.8400  | -101.8581 | 3360          | 0          | 0      | 71    |                            |  | 41-0012 DLY  |
| TX    | ABILENE RGNL AP | 79-0090 | 32.4106  | -99.6822  | 1791          | 0          | 110    | 109   |                            | 99-0017 HLY<br>56-0163 HLY<br>55-0086 HLY<br>41-0016 HLY | 99-0017 HLY<br>56-0163 HLY<br>55-0086 HLY<br>41-0016 HLY<br>41-0016 HLY<br>79-0090 DLY |
| TX    | ACKER RCH       | 41-0025 | 28.1569  | -98.5142  | 436           | 0          | 0      | 38    |                            |  | 98-0001 DLY<br>41-0025 DLY   |
| TX    | ACKERLY 4SE     | 41-0034 | 32.4899  | -101.6635 | 2765          | 0          | 0      | 57    |                            |  | 41-0034 DLY  |
| TX    | ADAMSVILLE      | 41-0050 | 31.2833  | -98.1500  | 1030          | 0          | 20     | 23    |                            | 41-0050 HLY  | 41-0050 HLY<br>41-0050 DLY   |
| TX    | ALBANY          | 41-0120 | 32.7047  | -99.3011  | 1440          | 0          | 0      | 113   |                            |  | 41-0120 DLY  |
| TX    | ALEDO 4 SE      | 41-0129 | 32.6444  | -97.5617  | 791           | 0          | 0      | 48    |                            |  | 69-2294 DLY<br>41-0129 DLY   |
| TX    | ALICE           | 41-0144 | 27.7283  | -98.0678  | 200           | 0          | 17     | 99    |                            | 55-0047 HLY<br>56-0116 HLY                               | 79-0053 DLY<br>41-0144 DLY   |
| TX    | ALPINE          | 41-0174 | 30.3764  | -103.6600 | 4449          | 25         | 30     | 87    | 41-0174 15M                | 41-0174 HLY  | 41-0174 DLY  |
| TX    | ALTO 5 SW       | 41-0190 | 31.6094  | -95.1342  | 279           | 0          | 0      | 64    |                            |  | 41-0190 DLY  |
| TX    | ALVARADO 4NE    | 41-0202 | 32.4644  | -97.1831  | 705           | 0          | 0      | 52    |                            |  | 41-0201 DLY<br>41-0202 HLY<br>41-0202 DLY  |
| TX    | ALVIN           | 41-0204 | 29.3653  | -95.2336  | 30            | 0          | 0      | 107   |                            |  | 69-0719 DLY<br>41-0204 DLY   |
| TX    | ALVORD 3 N      | 41-0206 | 33.3869  | -97.7164  | 856           | 3          | 56     | 62    | 66-0206 15M<br>41-0206 15M | 66-0206 15M<br>41-0206 HLY                               | 41-0206 HLY<br>41-0206 DLY   |

| State | Name                             | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |  |  |
|-------|----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|--|--|
|       |                                  |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly   | daily  |
| TX    | AMARILLO                         | 79-0116 | 35.2333  | -101.7089 | 3586          | 0          | 76     | 77    |   | 78-0007 15M<br>56-0183 HLY<br>41-0211 HLY                | 41-0211 HLY<br>79-0116 DLY   |
| TX    | AMARILLO                         | 99-0212 | 35.2063  | -101.8358 | 3663          | 0          | 37     | 37    |   | 99-0212 HLY  | 99-0212 HLY  |
| TX    | AMISTAD DAM                      | 41-0225 | 29.4608  | -101.0286 | 1158          | 0          | 0      | 54    |   |  | 41-0225 DLY  |
| TX    | ANAHUAC                          | 41-0235 | 29.7878  | -94.6342  | 23            | 0          | 0      | 99    |   |  | 82-2250 15M<br>41-0235 DLY   |
| TX    | ANDERSON                         | 41-0244 | 30.4833  | -95.9833  | 351           | 0          | 0      | 53    |   |  | 41-0244 DLY  |
| TX    | ANDICE 2 SW                      | 41-0246 | 30.7569  | -97.8619  | 1060          | 0          | 0      | 48    |   |  | 41-0246 DLY  |
| TX    | ANDREWS                          | 41-0248 | 32.3483  | -102.5517 | 3192          | 39         | 67     | 72    | 66-0250 15M<br>80-0008 15M<br>41-0248 15M | 66-0250 15M<br>80-0008 15M<br>41-0248 15M<br>41-0248 HLY | 66-0250 15M<br>80-0008 15M<br>41-0248 15M<br>41-0248 HLY<br>41-0248 HLY<br>41-0248 DLY |
| TX    | ANGLETON 2 W                     | 41-0257 | 29.1572  | -95.4592  | 26            | 0          | 0      | 102   |   |  | 69-0721 DLY<br>41-0257 DLY   |
| TX    | ANNA                             | 41-0262 | 33.3500  | -96.5167  | 679           | 0          | 43     | 59    |   | 41-0262 HLY  | 69-0988 DLY<br>41-0262 HLY<br>41-0262 DLY  |
| TX    | ANSON                            | 41-0268 | 32.7667  | -99.8900  | 1719          | 0          | 0      | 53    |   |  | 41-0268 DLY  |
| TX    | ANTELOPE                         | 41-0271 | 33.4414  | -98.3689  | 1024          | 0          | 0      | 77    |   |  | 41-0271 DLY  |
| TX    | ARANSAS PASS 2                   | 41-0302 | 27.9167  | -97.1333  | 20            | 0          | 0      | 30    |   |  | 69-0543 DLY<br>41-0302 DLY   |
| TX    | ARANSAS WR                       | 41-0305 | 28.3081  | -96.8047  | 16            | 0          | 18     | 75    |   | 76-0025 HLY<br>64-0662 HLY                               | 41-0437 DLY<br>76-0025 HLY<br>64-0662 HLY<br>41-0305 DLY                               |
| TX    | ARCHER CITY 1E                   | 41-0313 | 33.5947  | -98.6117  | 1053          | 0          | 0      | 66    |   |  | 41-0313 DLY  |
| TX    | ARLINGTON SIX FLAGS              | 41-0337 | 32.7572  | -97.0736  | 535           | 0          | 0      | 72    |   |  | 69-2419 DLY<br>41-0337 DLY   |
| TX    | ARMAND BYU AT<br>GENOARED BLF RD | 60-0022 | 29.6345  | -95.1123  | 15            | 31         | 31     | 31    | 60-0024 15M<br>60-0022 15M                | 60-0024 15M<br>60-0022 15M                               | 60-0024 15M<br>60-0022 15M   |

| State | Name                   | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |   |
|-------|------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|---|
|       |                        |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly  | daily   |
| TX    | ARTHUR CITY            | 41-0367 | 33.8756  | -95.5022  | 427           | 26         | 31     | 100   | 41-6834 15M                               | 41-6834 HLY   | 41-6834 HLY<br>41-0367 DLY  |
| TX    | ASPERMONT              | 41-0394 | 33.1525  | -100.2333 | 1670          | 0          | 0      | 102   |   |   | 41-0394 DLY   |
| TX    | ATHENS                 | 41-0404 | 32.1633  | -95.8300  | 449           | 0          | 0      | 68    |   |   | 41-0404 DLY   |
| TX    | ATLANTA                | 41-0408 | 33.1244  | -94.1661  | 315           | 0          | 0      | 65    |   |   | 41-0408 DLY   |
| TX    | AUSTIN                 | 41-0420 | 30.2682  | -97.7426  | 523           | 31         | 46     | 127   | 65-0089 15M<br>63-0193 15M                | 99-0420 HLY<br>65-0089 15M<br>63-0193 HLY                               | 52-0438 DLY<br>52-7207 DLY<br>52-0434 DLY<br>52-0420 DLY<br>99-0420 HLY<br>65-0089 15M<br>63-0193 HLY<br>41-0432 DLY<br>41-0420 DLY |
| TX    | AUSTIN BERGSTROM<br>AP | 79-0073 | 30.1831  | -97.6800  | 479           | 31         | 31     | 80    | 65-0091 15M<br>78-0010 15M<br>63-0201 15M | 65-0091 15M<br>64-0309 HLY<br>55-0073 HLY<br>63-0201 HLY<br>41-0429 HLY | 41-4185 DLY<br>64-0319 DLY<br>55-0073 HLY<br>63-0201 HLY<br>41-0429 HLY<br>79-0073 DLY  |
| TX    | AUSTIN SAN ANTONIO     | 79-0064 | 29.7036  | -98.0281  | 633           | 0          | 20     | 19    |   | 55-0056 HLY<br>56-0128 HLY  | 79-0064 DLY   |
| TX    | AUSTIN-CAMP MABRY      | 79-0086 | 30.3208  | -97.7603  | 669           | 31         | 74     | 79    | 65-0064 15M<br>78-0009 15M                | 56-0159 HLY<br>55-0082 HLY<br>41-0428 HLY                               | 79-0086 DLY   |
| TX    | AUSTWELL               | 41-0436 | 28.3889  | -96.8389  | 23            | 0          | 0      | 57    |   |   | 41-0436 DLY   |
| TX    | AVALON                 | 41-0440 | 32.2067  | -96.7958  | 531           | 0          | 0      | 35    |   |   | 41-0440 DLY   |
| TX    | AYISH BAYOU            | 85-0308 | 31.3961  | -94.1508  | 230           | 0          | 22     | 23    |   | 85-0308 HLY   | 85-0308 HLY   |
| TX    | BAKERSFIELD            | 41-0482 | 30.8878  | -102.3008 | 2546          | 0          | 0      | 72    |   |   | 41-0482 DLY   |
| TX    | BALLINGER 2 NW         | 41-0493 | 31.7414  | -99.9764  | 1755          | 0          | 0      | 114   |   |   | 41-0493 DLY   |
| TX    | BALMORHEA              | 41-0498 | 30.9844  | -103.7403 | 3222          | 0          | 0      | 87    |   |   | 41-0498 DLY   |
| TX    | BANDERA 0.2 N          | 69-0640 | 29.7284  | -99.0735  | 1257          | 0          | 15     | 17    |   | 85-0323 HLY   | 85-0323 HLY<br>69-0634 DLY<br>69-0640 DLY   |



| State | Name                              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |  |
|-------|-----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|--|
|       |                                   |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly  | daily  |
| TX    | BANKERSMITH                       | 41-0509 | 30.1400  | -98.8189  | 1749          | 37         | 72     | 74    | 63-0154 15M<br>41-0509 15M                | 63-0154 HLY<br>41-0509 HLY  | 63-0154 HLY<br>41-0509 HLY<br>41-0509 DLY  |
| TX    | BARDWELL DAM                      | 41-0518 | 32.2631  | -96.6369  | 463           | 29         | 37     | 52    | 41-0518 15M                               | 41-0518 HLY   | 41-0518 DLY  |
| TX    | BARTON CRK AT LOOP<br>360, AUSTIN | 63-0192 | 30.2442  | -97.8021  | 527           | 30         | 31     | 31    | 65-0031 15M<br>63-0192 15M                | 65-0031 15M<br>63-0192 15M  | 65-0031 15M<br>63-0192 15M   |
| TX    | BARTON CRK AT SH 71<br>N OAK HILL | 63-0191 | 30.2963  | -97.9256  | 763           | 31         | 31     | 31    | 65-0032 15M<br>63-0191 15M                | 65-0032 15M<br>63-0191 15M  | 65-0032 15M<br>63-0191 15M   |
| TX    | BATESVILLE                        | 41-0560 | 28.9567  | -99.6228  | 745           | 0          | 0      | 32    |   |   | 41-0560 DLY  |
| TX    | BAY CITY WTR WKS                  | 41-0569 | 28.9797  | -95.9750  | 52            | 31         | 73     | 82    | 63-0236 15M<br>41-0569 15M                | 63-0236 15M<br>41-0569 15M<br>63-0236 HLY<br>41-0572 HLY<br>41-0569 HLY | 63-0236 15M<br>41-0569 15M<br>41-0569 HLY<br>41-0569 DLY                               |
| TX    | BAYTOWN                           | 41-0586 | 29.7917  | -95.0436  | 26            | 0          | 0      | 58    |   |   | 41-0586 DLY  |
| TX    | BEAUMONT CITY                     | 41-0611 | 30.0969  | -94.0997  | 20            | 0          | 0      | 113   |   |   | 41-0611 DLY  |
| TX    | BEAUMONT RSCH CTR                 | 41-0613 | 30.0689  | -94.2928  | 26            | 24         | 24     | 54    | 82-5100 15M                               | 82-5100 15M   | 41-0613 DLY  |
| TX    | BEDIAS                            | 41-0635 | 30.7833  | -95.9500  | 335           | 0          | 0      | 35    |   |   | 41-0635 DLY  |
| TX    | BEEVILLE 5 NE                     | 41-0639 | 28.4575  | -97.7061  | 256           | 35         | 46     | 111   | 66-0639 15M<br>41-0639 15M                | 66-0639 15M<br>41-0639 HLY  | 41-0639 DLY  |
| TX    | BEEVILLE CHASE<br>NAAS            | 79-0049 | 28.3667  | -97.6667  | 197           | 0          | 0      | 38    |   |   | 79-0049 DLY  |
| TX    | BELTON DAM                        | 41-0665 | 31.1000  | -97.4833  | 663           | 0          | 38     | 49    |   | 41-0665 HLY   | 69-0596 DLY<br>41-0665 HLY<br>41-0665 DLY  |
| TX    | BENAVIDES 2                       | 41-0690 | 27.5969  | -98.4161  | 381           | 32         | 68     | 75    | 66-0690 15M<br>41-0689 15M<br>41-0690 15M | 66-0690 15M<br>41-0689 HLY<br>41-0690 HLY                               | 66-0690 15M<br>41-0689 HLY<br>41-0690 HLY<br>66-0690 15M<br>41-0689 HLY<br>41-0690 DLY |
| TX    | BENBROOK DAM                      | 41-0691 | 32.6475  | -97.4439  | 791           | 24         | 58     | 67    | 66-0691 15M<br>41-0691 15M                | 66-0691 15M<br>41-0691 HLY  | 41-0691 DLY  |
| TX    | BENJAMIN 4 SSE                    | 41-0704 | 33.5333  | -99.7667  | 1401          | 0          | 0      | 31    |   |   | 41-0704 DLY  |

| State | Name               | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |   |
|-------|--------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|---|
|       |                    |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily                                     |
| TX    | BERTRAM 3 ENE      | 41-0738 | 30.7603  | -98.0164  | 1138          | 31         | 47     | 50    | 66-0738 15M<br>41-0738 15M                | 66-0738 15M<br>41-0738 HLY                | 41-0738 DLY                               |
| TX    | BIG LAKE 2         | 41-0779 | 31.2000  | -101.4625 | 2733          | 34         | 60     | 70    | 80-0011 15M<br>41-0776 15M<br>41-0779 15M | 80-0011 15M<br>41-0776 HLY<br>41-0779 HLY | 41-0776 HLY<br>41-0779 DLY                |
| TX    | BIG SPRING         | 79-0113 | 32.2442  | -101.4536 | 2510          | 0          | 0      | 110   |   |   | 99-0786 DLY<br>41-0786 HLY<br>79-0113 DLY |
| TX    | BIG SPRING FLD STN | 41-0784 | 32.2683  | -101.4858 | 2510          | 36         | 50     | 58    | 66-0784 15M<br>41-0784 15M                | 66-0784 15M<br>41-0784 HLY                | 41-0784 HLY<br>41-0784 DLY                |
| TX    | BIG WELLS 2W       | 41-0787 | 28.5731  | -99.6044  | 541           | 0          | 0      | 82    |   |   | 41-0787 DLY                               |
| TX    | BISHOP 0.4 ENE     | 69-2228 | 27.5861  | -97.7908  | 62            | 0          | 0      | 36    |   |   | 41-0805 DLY<br>69-2228 DLY                |
| TX    | BLANCO             | 41-0832 | 30.1061  | -98.4286  | 1381          | 0          | 0      | 120   |   |   | 41-0832 DLY                               |
| TX    | BLOYS CAMPGROUND   | 41-0861 | 30.5333  | -104.1333 | 5764          | 0          | 0      | 35    |   |   | 41-5854 DLY<br>41-0861 DLY                |
| TX    | BOERNE             | 41-0902 | 29.7986  | -98.7353  | 1444          | 0          | 0      | 121   |   |   | 41-0902 DLY                               |
| TX    | BON WIER           | 41-0917 | 30.7333  | -93.6500  | 89            | 0          | 29     | 66    |   | 41-0917 HLY                               | 41-0917 DLY                               |
| TX    | BONHAM 3NNE        | 41-0923 | 33.6403  | -96.1661  | 591           | 0          | 0      | 102   |   |   | 41-0923 DLY                               |
| TX    | BONITA 4NW         | 41-0926 | 33.8472  | -97.6528  | 984           | 30         | 66     | 73    | 66-0926 15M<br>41-0926 15M                | 66-0926 15M<br>41-0926 HLY                | 41-0926 HLY<br>41-0926 DLY                |
| TX    | BOOKER             | 41-0944 | 36.4533  | -100.5394 | 2749          | 0          | 0      | 77    |   |   | 41-0944 DLY                               |
| TX    | BORGER             | 41-0958 | 35.6364  | -101.4542 | 3211          | 0          | 0      | 67    |   |   | 41-0958 DLY                               |
| TX    | BOWIE              | 41-0984 | 33.5511  | -97.8472  | 1079          | 0          | 0      | 90    |   |   | 41-0984 DLY                               |
| TX    | BOXELDER 3 NNE     | 41-0991 | 33.5164  | -94.8608  | 440           | 0          | 0      | 52    |   |   | 41-0991 DLY                               |
| TX    | BOYD               | 41-0996 | 33.0800  | -97.5639  | 732           | 0          | 0      | 59    |   |   | 83-0010 15M<br>41-0996 DLY                |
| TX    | BOYS RANCH         | 41-1000 | 35.5303  | -102.2564 | 3192          | 0          | 0      | 72    |   |   | 41-8852 DLY<br>41-1000 DLY                |
| TX    | BRACKETTVILLE      | 41-1007 | 29.3167  | -100.4144 | 1119          | 0          | 0      | 131   |   |   | 99-3260 DLY<br>99-1007 DLY<br>41-1007 DLY |

| State | Name               | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |  |
|-------|--------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|--|
|       |                    |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily  |
| TX    | BRACKETTVILLE 22 N | 41-1013 | 29.6100  | -100.4519 | 1759          | 0          | 19     | 35    |                            | 66-1013 15M<br>41-1013 HLY                | 41-1013 DLY  |
| TX    | BRADY              | 41-1017 | 31.1444  | -99.3492  | 1709          | 35         | 67     | 82    | 66-1017 15M<br>41-1017 15M | 66-1017 15M<br>85-0354 HLY<br>41-1017 HLY | 41-1017 DLY  |
| TX    | BRAVO              | 41-1033 | 35.6200  | -103.0072 | 4075          | 0          | 0      | 74    |                            |   | 41-1033 DLY  |
| TX    | BRAZOS             | 41-1035 | 32.6489  | -98.1336  | 840           | 0          | 0      | 69    |                            |   | 41-1035 DLY  |
| TX    | BRECKENRIDGE       | 41-1042 | 32.7500  | -98.9017  | 1171          | 0          | 0      | 86    |                            |   | 41-1043 DLY<br>41-1042 DLY   |
| TX    | BREMOND            | 41-1045 | 31.1589  | -96.6825  | 469           | 0          | 0      | 54    |                            |   | 41-1045 DLY  |
| TX    | BRENHAM            | 41-1048 | 30.1592  | -96.3972  | 312           | 0          | 0      | 126   |                            |   | 99-1048 DLY<br>41-1048 DLY   |
| TX    | BRICE 2 S          | 41-1057 | 34.6833  | -100.9000 | 2228          | 0          | 38     | 40    |                            | 41-1057 HLY                               | 41-1057 HLY  |
| TX    | BRIDGEPORT         | 41-1063 | 33.2064  | -97.7761  | 768           | 0          | 0      | 103   |                            |   | 41-1063 DLY  |
| TX    | BRIGGS             | 41-1068 | 30.8833  | -97.9333  | 1090          | 0          | 49     | 51    |                            | 41-1068 HLY                               | 41-1068 HLY  |
| TX    | BRITTON            | 41-1081 | 32.5500  | -97.0667  | 561           | 0          | 25     | 31    |                            | 41-1081 HLY                               | 41-1081 HLY<br>41-1081 DLY   |
| TX    | BROADDUS           | 41-1089 | 31.3050  | -94.2703  | 246           | 0          | 0      | 64    |                            |   | 41-4523 DLY<br>41-1089 DLY   |
| TX    | BRONSON            | 41-1094 | 31.3500  | -94.0167  | 322           | 0          | 0      | 46    |                            |   | 41-1094 DLY  |
| TX    | BRONTE 11 NNE      | 79-0009 | 32.0408  | -100.2494 | 1998          | 0          | 0      | 55    |                            |   | 41-6495 DLY<br>79-0009 DLY   |
| TX    | BROWNFIELD #2      | 41-1128 | 33.1908  | -102.2681 | 3301          | 0          | 0      | 100   |                            |   | 41-1127 DLY<br>41-1128 DLY   |
| TX    | BROWNSVILLE        | 79-0043 | 25.9156  | -97.4186  | 23            | 0          | 93     | 150   |                            | 99-1137 HLY<br>56-0108 HLY<br>41-1136 HLY | 99-1137 HLY<br>56-0108 HLY<br>41-1136 HLY<br>99-1137 DLY<br>99-0003 DLY<br>41-1133 DLY<br>41-1136 HLY<br>79-0043 DLY |
| TX    | BROWNWOOD 2ENE     | 41-1138 | 31.7383  | -98.9456  | 1401          | 0          | 0      | 114   |                            |   | 41-1138 DLY  |

| State | Name                       | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations |             |             |             |             |             |
|-------|----------------------------|---------|----------|-----------|---------------|------------|--------|-------|-----------------------|-------------|-------------|-------------|-------------|-------------|
|       |                            |         |          |           |               | <1hr       | hourly | daily | <1hr                  | hourly      | daily       |             |             |             |
| TX    | BUCHANAN DAM               | 41-1165 | 30.7500  | -98.4167  | 1020          | 0          | 23     | 34    | 63-0066 15M           | 41-1253 DLY | 63-0067 15M | 63-0067 15M | 41-1165 HLY | 41-1165 DLY |
| TX    | BUCKNERS CRK NR<br>MULDOON | 63-0224 | 29.8452  | -97.0447  | 299           | 0          | 23     | 23    | 63-0224 15M           | 63-0224 15M | 63-0224 HLY | 63-0224 HLY |             |             |
| TX    | BUFFALO                    | 41-1188 | 31.4667  | -96.0500  | 358           | 0          | 0      | 47    |                       |             |             |             |             | 41-1188 DLY |
| TX    | BULER 4 NNW                | 41-1203 | 36.1833  | -100.8333 | 2972          | 0          | 0      | 32    |                       |             |             |             |             | 41-1203 DLY |
| TX    | BULVERDE                   | 41-1215 | 29.7386  | -98.4522  | 1079          | 0          | 0      | 73    |                       |             |             |             |             | 41-1215 DLY |
| TX    | BUNKER HILL                | 41-1224 | 36.1500  | -102.9333 | 4347          | 0          | 0      | 40    |                       |             |             |             |             | 41-1224 DLY |
| TX    | BURKETT                    | 41-1239 | 31.9917  | -99.2203  | 1555          | 0          | 0      | 58    |                       |             |             |             |             | 41-1239 DLY |
| TX    | BURLESON                   | 41-1246 | 32.5067  | -97.3444  | 761           | 29         | 32     | 71    | 66-1246 15M           | 66-1246 15M | 41-1245 DLY | 41-1246 DLY | 41-1246 HLY | 41-1246 DLY |
| TX    | BURNET                     | 41-1250 | 30.7586  | -98.2339  | 1286          | 0          | 0      | 103   |                       |             |             |             |             | 63-0143 HLY |
|       |                            |         |          |           |               |            |        |       |                       |             |             |             |             | 41-1250 DLY |
| TX    | BURNET 6 SSE               | 63-0142 | 30.6686  | -98.2110  | 1101          | 0          | 26     | 26    | 63-0142 HLY           | 63-0142 HLY |             |             |             | 63-0142 HLY |
| TX    | CALDWELL                   | 41-1314 | 30.5328  | -96.7022  | 364           | 0          | 0      | 53    |                       |             |             |             |             | 41-1314 DLY |
| TX    | CALLIHAM                   | 41-1337 | 28.4658  | -98.3539  | 217           | 0          | 0      | 38    |                       |             |             |             |             | 41-1337 DLY |
| TX    | CAMERON                    | 41-1348 | 30.8458  | -96.9700  | 364           | 0          | 0      | 92    |                       |             |             |             |             | 41-1348 DLY |
| TX    | CAMP VERDE                 | 41-1395 | 29.8947  | -99.1050  | 1604          | 0          | 0      | 23    |                       |             |             |             |             | 99-1395 DLY |
|       |                            |         |          |           |               |            |        |       |                       |             |             |             |             | 41-1395 DLY |
| TX    | CAMP WOOD                  | 41-1398 | 29.6703  | -100.0097 | 1480          | 0          | 0      | 59    |                       |             |             |             |             | 41-1398 DLY |
| TX    | CANADIAN                   | 41-1412 | 35.9092  | -100.3883 | 2300          | 0          | 0      | 89    |                       |             |             |             |             | 89-0087 DLY |
|       |                            |         |          |           |               |            |        |       |                       |             |             |             |             | 41-1412 DLY |
| TX    | CANDELARIA                 | 41-1416 | 30.1383  | -104.6822 | 2877          | 0          | 0      | 69    |                       |             |             |             |             | 41-1416 DLY |
| TX    | CANTON 5 W                 | 41-1425 | 32.5669  | -95.9578  | 486           | 0          | 0      | 45    |                       |             |             |             |             | 41-1425 DLY |
| TX    | CANYON                     | 41-1430 | 34.9806  | -101.9264 | 3589          | 0          | 0      | 93    |                       |             |             |             |             | 41-1430 DLY |
| TX    | CANYON DAM                 | 41-1429 | 29.8608  | -98.1958  | 1010          | 29         | 34     | 56    | 66-1429 15M           | 66-1429 15M | 41-1429 HLY | 41-1429 DLY | 85-0382 HLY | 41-1429 DLY |
|       |                            |         |          |           |               |            |        |       | 41-1429 15M           | 85-0382 HLY |             |             |             | 41-1429 DLY |
|       |                            |         |          |           |               |            |        |       |                       | 41-1429 HLY |             |             |             |             |

| State | Name               | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |  |
|-------|--------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|--|
|       |                    |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily  |
| TX    | CANYON DAM #1      | 41-1431 | 29.8617  | -98.2919  | 981           | 0          | 0      | 53    |                            |                            | 69-1037 DLY<br>41-8414 DLY<br>41-1431 HLY<br>41-1431 DLY |
| TX    | CANYON DAM #3      | 41-1433 | 29.9464  | -98.3969  | 1234          | 0          | 34     | 51    |                            | 41-1433 HLY                | 41-1433 HLY<br>41-1433 DLY                               |
| TX    | CANYON DAM #4      | 41-1434 | 29.9111  | -98.3714  | 1168          | 25         | 43     | 51    | 66-1434 15M<br>41-1434 15M | 66-1434 15M<br>41-1434 HLY | 41-1434 HLY<br>41-1434 DLY                               |
| TX    | CARRIZO SPRINGS 3S | 41-1486 | 28.4894  | -99.8733  | 614           | 0          | 0      | 84    |                            |                            | 41-1486 DLY  |
| TX    | CARROLLTON         | 41-1490 | 32.9850  | -96.9258  | 545           | 0          | 0      | 74    |                            |                            | 41-1490 DLY  |
| TX    | CARTA VALLEY       | 41-1492 | 29.7908  | -100.6742 | 1850          | 0          | 27     | 43    |                            | 41-1492 HLY                | 41-1492 DLY  |
| TX    | CARTHAGE           | 41-1500 | 32.1614  | -94.3397  | 305           | 0          | 0      | 62    |                            |                            | 41-1500 DLY  |
| TX    | CASE RCH 3 S       | 41-1511 | 31.6333  | -101.0333 | 2478          | 0          | 0      | 34    |                            |                            | 41-1511 DLY  |
| TX    | CASTOLON           | 41-1524 | 29.1344  | -103.5150 | 2169          | 0          | 0      | 37    |                            |                            | 41-1524 DLY  |
| TX    | CATARINA           | 41-1528 | 28.3392  | -99.6328  | 561           | 0          | 29     | 39    |                            | 41-1528 HLY                | 41-1528 DLY  |
| TX    | CEDAR BYU AT US 90 | 60-0121 | 29.9729  | -94.9855  | 48            | 31         | 31     | 31    | 60-0121 15M                | 60-0121 15M                | 60-0121 15M  |
| TX    | CEDAR CREEK 5 S    | 41-1541 | 30.0164  | -97.4786  | 436           | 32         | 30     | 38    | 41-7497 15M<br>41-1541 15M | 41-7497 HLY<br>41-1541 HLY | 41-7497 HLY<br>41-1541 HLY<br>41-1541 DLY                |
| TX    | CELINA             | 41-1573 | 33.3167  | -96.8000  | 679           | 0          | 0      | 45    |                            |                            | 69-1189 DLY<br>41-1573 DLY                               |
| TX    | CENTER             | 41-1578 | 31.8075  | -94.1642  | 325           | 0          | 0      | 77    |                            |                            | 41-1578 DLY  |
| TX    | CENTER CITY        | 41-1580 | 31.4683  | -98.4106  | 1365          | 0          | 0      | 54    |                            |                            | 63-0249 HLY<br>41-1580 DLY                               |
| TX    | CENTERVILLE        | 41-1596 | 31.2581  | -95.9744  | 322           | 0          | 0      | 78    |                            |                            | 41-1596 DLY  |
| TX    | CHALK MTN          | 41-1625 | 32.1561  | -97.9369  | 1132          | 0          | 0      | 48    |                            |                            | 41-1625 DLY  |
| TX    | CHANNING           | 41-1646 | 35.6869  | -102.3342 | 3799          | 33         | 59     | 69    | 41-1646 15M                | 41-1646 HLY                | 41-1649 DLY<br>41-1646 HLY<br>41-1646 DLY                |
| TX    | CHAPMAN RCH        | 41-1651 | 27.5892  | -97.4547  | 26            | 0          | 0      | 40    |                            |                            | 41-1651 DLY  |
| TX    | CHARLOTTE 5 NNW    | 41-1663 | 28.9275  | -98.7494  | 440           | 0          | 0      | 48    |                            |                            | 41-1663 DLY  |

| State | Name                         | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |  |   |
|-------|------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|--|---|
|       |                              |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly   | daily                                     |
| TX    | CHEAPSIDE                    | 41-1671 | 29.3092  | -97.4061  | 367           | 29         | 59     | 71    | 66-1671 15M<br>41-1671 15M | 66-1671 15M<br>41-1671 HLY                               | 41-1671 HLY<br>41-1671 DLY                |
| TX    | CHEROKEE 2 NNW               | 63-0051 | 31.0167  | -98.7221  | 1540          | 0          | 45     | 45    |                            | 41-1680 HLY<br>63-0051 HLY                               | 41-1680 HLY<br>63-0051 HLY                |
| TX    | CHEROKEE 4 SSE               | 63-0113 | 30.9232  | -98.6846  | 1443          | 0          | 24     | 26    |                            | 63-0113 HLY  | 63-0113 HLY                               |
| TX    | CHEROKEE 8 NNE               | 63-0046 | 31.0648  | -98.6030  | 1600          | 0          | 25     | 26    |                            | 63-0046 HLY  | 63-0046 HLY                               |
| TX    | CHILDRESS MUNI AP            | 79-0104 | 34.4272  | -100.2831 | 1952          | 29         | 46     | 111   | 41-1698 15M<br>78-0018 15M | 41-1696 HLY<br>56-0174 HLY<br>55-0095 HLY<br>41-1698 HLY | 41-1696 HLY<br>41-1696 DLY<br>79-0104 DLY |
| TX    | CHILLICOTHE                  | 41-1701 | 34.2500  | -99.5167  | 1401          | 0          | 0      | 66    |                            |  | 41-1701 DLY                               |
| TX    | CHISOS BASIN                 | 41-1715 | 29.2703  | -103.3003 | 5299          | 0          | 0      | 72    |                            |  | 41-1715 DLY                               |
| TX    | CHOKE CANYON DAM             | 41-1720 | 28.4675  | -98.2525  | 230           | 0          | 0      | 94    |                            |  | 41-9009 DLY<br>41-1720 DLY                |
| TX    | CIBOLO CREEK                 | 41-1741 | 29.0167  | -97.9333  | 312           | 0          | 0      | 32    |                            |  | 41-1741 DLY                               |
| TX    | CLARENDON                    | 79-0123 | 34.9325  | -100.8903 | 2700          | 0          | 0      | 105   |                            |  | 79-0123 DLY                               |
| TX    | CLARKSVILLE 1W               | 41-1773 | 33.6108  | -95.0717  | 427           | 40         | 65     | 103   | 66-1773 15M<br>41-1773 15M | 66-1773 15M<br>41-1774 HLY<br>41-1773 HLY                | 66-1773 15M<br>41-1772 DLY<br>41-1773 DLY |
| TX    | CLAUDE                       | 41-1778 | 35.1100  | -101.3619 | 3396          | 0          | 0      | 80    |                            |  | 41-1778 DLY                               |
| TX    | CLEAR CK AT BAY<br>AREA BLVD | 60-0011 | 29.4977  | -95.1599  | 2             | 30         | 30     | 30    | 60-0010 15M<br>60-0011 15M | 60-0010 15M<br>60-0011 15M                               | 60-0010 15M<br>60-0011 15M                |
| TX    | CLEBURNE                     | 41-1800 | 32.3139  | -97.4061  | 784           | 0          | 0      | 106   |                            |  | 41-1800 DLY                               |
| TX    | CLEVELAND                    | 41-1810 | 30.3636  | -95.0839  | 197           | 0          | 0      | 64    |                            |  | 41-1810 DLY                               |
| TX    | CLIFTON 10 E                 | 41-1823 | 31.8000  | -97.4333  | 669           | 0          | 0      | 63    |                            |  | 41-1823 DLY                               |
| TX    | COLDSRING 5 SSW              | 41-1870 | 30.5333  | -95.1500  | 354           | 0          | 0      | 48    |                            |  | 41-1870 DLY                               |
| TX    | COLDWATER                    | 41-1874 | 36.4000  | -102.5667 | 4131          | 0          | 0      | 32    |                            |  | 41-1874 DLY                               |
| TX    | COLEMAN                      | 41-1875 | 31.8281  | -99.4339  | 1732          | 0          | 0      | 118   |                            |  | 41-1875 DLY                               |
| TX    | COLLEGE STN                  | 79-0017 | 30.5892  | -96.3647  | 305           | 0          | 21     | 122   |                            | 55-0018 HLY<br>56-0082 HLY                               | 41-1888 DLY<br>55-0018 HLY<br>79-0017 DLY |
| TX    | COLORADO CITY                | 41-1903 | 32.3978  | -100.8594 | 2110          | 0          | 0      | 74    |                            |  | 41-1903 DLY                               |

| State | Name                      | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |  |
|-------|---------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|--|
|       |                           |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly  | daily  |
| TX    | COLORADO RIVER AT BASTROP | 63-0212 | 30.1047  | -97.3192  | 316           | 0          | 29     | 29    |                            | 63-0212 HLY   | 63-0212 HLY  |
| TX    | COLUMBUS                  | 41-1911 | 29.6989  | -96.5731  | 226           | 0          | 28     | 82    |                            | 63-0229 HLY   | 41-1911 DLY  |
| TX    | COMANCHE                  | 41-1914 | 31.8983  | -98.6033  | 1385          | 0          | 0      | 93    |                            |   | 76-0045 HLY<br>41-1914 DLY   |
| TX    | COMFORT 2                 | 41-1920 | 29.9614  | -98.8944  | 1434          | 0          | 0      | 29    |                            |   | 41-1920 HLY<br>41-1920 DLY   |
| TX    | COMMERCE 4SW              | 41-1921 | 33.1997  | -95.9283  | 551           | 34         | 66     | 73    | 66-1921 15M<br>41-1921 15M | 66-1921 15M<br>41-4392 HLY<br>41-1921 HLY                               | 41-4392 HLY<br>41-1921 HLY<br>41-1921 HLY<br>41-1921 DLY                               |
| TX    | CONCORD                   | 41-1937 | 31.9167  | -94.5833  | 541           | 0          | 20     | 20    |                            | 41-1937 HLY   | 41-1937 HLY  |
| TX    | CONLEN                    | 41-1946 | 36.2353  | -102.2406 | 3819          | 0          | 0      | 69    |                            |   | 41-1946 DLY  |
| TX    | CONROE                    | 41-1956 | 30.3303  | -95.4831  | 246           | 28         | 61     | 91    | 78-0025 15M<br>41-1956 15M | 85-0402 HLY<br>76-0046 HLY<br>55-0114 HLY<br>56-0199 HLY<br>41-1956 HLY | 69-2190 DLY<br>41-1956 DLY   |
| TX    | COOPER                    | 41-1970 | 33.3744  | -95.6933  | 486           | 0          | 0      | 65    |                            |   | 41-1970 DLY  |
| TX    | COPE RCH                  | 41-1974 | 31.5333  | -101.2842 | 2480          | 0          | 0      | 69    |                            |   | 41-1974 DLY  |
| TX    | COPPERAS COVE 5 NW        | 41-1990 | 31.1603  | -97.9564  | 1230          | 0          | 0      | 96    |                            |   | 41-1986 DLY<br>69-1151 DLY<br>41-1984 DLY<br>41-1990 DLY                               |
| TX    | CORNUDAS SVC STN          | 41-2012 | 31.7800  | -105.4700 | 4308          | 0          | 0      | 59    |                            |   | 69-1570 DLY<br>41-2012 DLY   |
| TX    | CORPUS CHRISTI            | 41-2014 | 27.8000  | -97.4000  | 10            | 0          | 45     | 90    |                            | 99-2014 HLY<br>41-2014 HLY  | 69-2229 DLY<br>52-2011 DLY<br>99-2014 HLY<br>41-2014 HLY<br>41-2014 HLY<br>41-2014 DLY |
| TX    | CORPUS CHRISTI            | 79-0048 | 27.7839  | -97.5108  | 46            | 0          | 70     | 70    |                            | 56-0112 HLY<br>41-2015 HLY  | 79-0048 DLY  |

| State | Name                      | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |   |
|-------|---------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|---|
|       |                           |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily   |
| TX    | CORPUS CHRISTI NAS        | 79-0050 | 27.6833  | -97.2833  | 20            | 0          | 0      | 88    |                            |   | 41-1073 DLY<br>69-2225 DLY<br>79-0050 DLY   |
| TX    | CORRIGAN 1 ENE            | 41-2017 | 31.0033  | -94.8161  | 200           | 0          | 0      | 20    |                            |   | 41-2017 DLY   |
| TX    | CORSICANA                 | 41-2019 | 32.1225  | -96.4867  | 449           | 0          | 0      | 115   |                            |   | 41-2019 DLY   |
| TX    | CORSICANA 8 E             | 41-2020 | 32.1183  | -96.3256  | 377           | 0          | 0      | 56    |                            |   | 69-2256 DLY<br>99-2020 DLY<br>41-2020 DLY   |
| TX    | CORSICANA<br>CAMPBELL FLD | 79-0142 | 32.0311  | -96.3989  | 449           | 0          | 20     | 19    |                            | 55-0121 HLY<br>56-0206 HLY                | 79-0142 DLY   |
| TX    | CORYELL CITY              | 41-2024 | 31.5500  | -97.6167  | 973           | 0          | 36     | 37    |                            | 41-2024 HLY                               | 41-2024 HLY   |
| TX    | COTTONWOOD                | 41-2040 | 30.1606  | -99.1356  | 2123          | 0          | 0      | 92    |                            |   | 41-1481 DLY<br>41-2040 DLY  |
| TX    | COTULLA                   | 99-2048 | 28.4567  | -99.2183  | 476           | 32         | 54     | 102   | 78-0021 15M<br>41-2048 15M | 55-0049 HLY<br>56-0120 HLY<br>41-2048 HLY | 79-0058 DLY<br>99-2048 DLY  |
| TX    | CRANDALL                  | 41-2080 | 32.6297  | -96.4581  | 430           | 0          | 0      | 32    |                            |   | 69-1815 DLY<br>41-2080 DLY  |
| TX    | CRANE                     | 41-2082 | 31.4072  | -102.3578 | 2556          | 25         | 54     | 71    | 41-2082 15M                | 41-2082 HLY                               | 41-2082 HLY<br>41-2082 DLY  |
| TX    | CRANFILLS GAP             | 41-2086 | 31.7717  | -97.8239  | 978           | 27         | 51     | 61    | 66-2086 15M<br>41-2086 15M | 66-2086 15M<br>41-2086 HLY                | 41-2086 HLY<br>41-2086 DLY  |
| TX    | CRESSON                   | 41-2096 | 32.5286  | -97.6189  | 1040          | 31         | 63     | 69    | 66-2096 15M<br>41-2096 15M | 66-2096 15M<br>41-2096 HLY                | 41-2096 DLY   |
| TX    | CRIDER RCH                | 41-2104 | 30.0667  | -99.7333  | 2199          | 0          | 0      | 33    |                            |   | 41-2104 DLY   |
| TX    | CROCKETT                  | 41-2114 | 31.3072  | -95.4508  | 348           | 0          | 0      | 103   |                            |   | 41-2114 DLY   |
| TX    | CROSBYTON                 | 41-2121 | 33.6517  | -101.2450 | 3009          | 0          | 0      | 121   |                            |   | 41-2121 DLY   |
| TX    | CROSS PLAINS              | 41-2128 | 32.1167  | -99.1667  | 1742          | 35         | 62     | 74    | 66-2131 15M<br>41-2131 15M | 66-2131 15M<br>41-2128 HLY<br>41-2131 HLY | 66-2131 15M<br>41-2128 HLY<br>41-2131 HLY<br>41-2128 HLY<br>41-2131 HLY<br>41-2128 HLY<br>41-2128 DLY |



| State | Name                           | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |  |
|-------|--------------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|--|
|       |                                |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly  | daily  |
| TX    | CROWELL                        | 41-2142 | 33.9900  | -99.7303  | 1480          | 0          | 0      | 99    |   |   | 41-2142 DLY  |
| TX    | CRYSTAL CITY                   | 41-2160 | 28.6794  | -99.8311  | 581           | 0          | 0      | 69    |   |   | 69-2922 DLY<br>41-2160 DLY                               |
| TX    | CUERO                          | 41-2173 | 29.0892  | -97.3433  | 213           | 0          | 0      | 111   |   |   | 41-2173 DLY  |
| TX    | CUMMINS CRK NR<br>FRELSBURG    | 63-0228 | 29.8258  | -96.5807  | 228           | 0          | 22     | 22    |   | 63-0228 15M<br>63-0228 HLY  | 63-0228 15M<br>63-0228 HLY                               |
| TX    | CYPRESS                        | 41-2206 | 30.0211  | -95.7069  | 151           | 31         | 29     | 70    | 66-2206 15M<br>60-0094 15M<br>41-2206 15M | 66-2206 15M<br>60-0094 15M<br>41-2206 HLY                               | 60-0094 15M<br>41-2206 DLY                               |
| TX    | CYPRESS CK AT<br>KUYKENDAHL RD | 60-0082 | 30.0244  | -95.4764  | 85            | 30         | 30     | 31    | 60-0083 15M<br>60-0082 15M                | 60-0083 15M<br>60-0082 15M  | 60-0083 15M<br>60-0082 15M                               |
| TX    | DACUS                          | 41-2218 | 30.4364  | -95.7919  | 240           | 0          | 0      | 53    |   |   | 41-2218 DLY  |
| TX    | DAINGERFIELD 9 S               | 41-2225 | 32.9203  | -94.7225  | 299           | 0          | 0      | 72    |   |   | 41-2225 DLY  |
| TX    | DALHART MUNI AP                | 79-0149 | 36.0167  | -102.5500 | 3990          | 0          | 21     | 109   |   | 41-2238 HLY<br>56-0259 HLY<br>55-0162 HLY<br>41-2240 HLY                | 41-2239 DLY<br>79-0149 DLY                               |
| TX    | DALLAS FT WORTH AP             | 79-0018 | 32.8978  | -97.0189  | 561           | 0          | 70     | 76    |   | 41-3283 HLY<br>78-0028 15M<br>41-2242 HLY                               | 41-3283 HLY<br>78-0028 15M<br>41-2242 HLY<br>79-0018 DLY |
| TX    | DALLAS HENSLEY FLD<br>NAS      | 79-0150 | 32.7333  | -96.9667  | 492           | 24         | 24     | 70    | 81-0038 15M                               | 81-0038 15M   | 81-0038 15M<br>79-0150 DLY                               |
| TX    | DALLAS LOVE FLD                | 79-0088 | 32.8519  | -96.8556  | 440           | 32         | 72     | 77    | 41-2244 15M<br>78-0026 15M                | 56-0161 HLY<br>55-0084 HLY<br>41-2244 HLY                               | 79-0088 DLY  |
| TX    | DALLAS REDBIRD AP              | 79-0029 | 32.6808  | -96.8681  | 659           | 26         | 26     | 26    | 81-0027 15M<br>78-0066 15M                | 81-0027 15M<br>78-0066 15M<br>81-0027 15M<br>55-0028 HLY<br>56-0092 HLY | 81-0027 15M<br>79-0029 DLY                               |

| State | Name               | SID         | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations |             |             |
|-------|--------------------|-------------|----------|-----------|---------------|------------|--------|-------|-----------------------|-------------|-------------|
|       |                    |             |          |           |               | <1hr       | hourly | daily | <1hr                  | hourly      | daily       |
| TX    | DALLAS WFAA        | 41-2247     | 32.7667  | -96.7833  | 479           | 24         | 50     | 64    | 81-0041 15M           | 81-0041 15M | 41-2243 DLY |
|       |                    |             |          |           |               |            |        |       | 81-0040 15M           | 81-0040 15M | 81-0041 15M |
|       |                    |             |          |           |               |            |        |       |                       | 99-2243 HLY | 81-0040 15M |
|       |                    |             |          |           |               |            |        |       |                       |             | 81-0040 15M |
|       |                    |             |          |           |               |            |        |       |                       |             | 79-0155 DLY |
|       |                    | 41-2247 DLY |          |           |               |            |        |       |                       |             |             |
| TX    | DANEVANG 1 W       | 41-2266     | 29.0567  | -96.2319  | 69            | 0          | 0      | 121   |                       |             | 41-2266 DLY |
| TX    | DARROUZETT         | 41-2282     | 36.4453  | -100.3264 | 2539          | 0          | 0      | 69    |                       |             | 41-2282 DLY |
| TX    | DAVILLA 2N         | 41-2295     | 30.8014  | -97.2689  | 558           | 0          | 0      | 61    |                       |             | 41-2295 DLY |
| TX    | DECATUR            | 41-2334     | 33.2733  | -97.5769  | 978           | 0          | 0      | 65    |                       |             | 41-2334 HLY |
|       |                    |             |          |           |               |            |        |       |                       |             | 41-2334 DLY |
| TX    | DECKER POWER PLANT | 65-0100     | 30.3036  | -97.6143  | 562           | 31         | 31     | 31    | 63-0203 15M           | 63-0203 15M | 63-0203 15M |
|       |                    |             |          |           |               |            |        |       | 65-0100 15M           | 65-0100 15M | 65-0100 DLY |
| TX    | DEKALB             | 41-2352     | 33.4797  | -94.6175  | 341           | 0          | 0      | 61    |                       |             | 69-0786 DLY |
|       |                    |             |          |           |               |            |        |       |                       |             | 41-2352 DLY |
| TX    | DEL RIO INTL AP    | 79-0100     | 29.3783  | -100.9269 | 1001          | 24         | 96     | 112   | 41-2360 15M           | 99-2357 HLY | 99-2357 HLY |
|       |                    |             |          |           |               |            |        |       | 78-0031 15M           | 41-2361 HLY | 41-2364 DLY |
|       |                    |             |          |           |               |            |        |       |                       | 56-0171 HLY | 41-2357 HLY |
|       |                    |             |          |           |               |            |        |       |                       | 55-0093 HLY | 79-0099 DLY |
|       |                    |             |          |           |               |            |        |       |                       | 41-2357 HLY | 79-0100 DLY |
|       |                    | 41-2360 HLY |          |           |               |            |        |       |                       |             |             |
| TX    | DELL CITY 5SSW     | 41-2354     | 31.8769  | -105.2369 | 3796          | 0          | 0      | 37    |                       |             | 69-1573 DLY |
|       |                    |             |          |           |               |            |        |       |                       |             | 41-2354 DLY |
| TX    | DENISON DAM        | 41-2394     | 33.8167  | -96.5667  | 614           | 0          | 52     | 86    |                       | 41-2394 HLY | 41-2397 DLY |
|       |                    |             |          |           |               |            |        |       |                       |             | 41-2394 DLY |
| TX    | DENTON 2 SE        | 41-2404     | 33.1992  | -97.1050  | 630           | 28         | 59     | 101   | 66-2404 15M           | 66-2404 15M | 41-2404 DLY |
|       |                    |             |          |           |               |            |        |       | 41-2404 15M           | 41-2404 HLY |             |
| TX    | DENTON MUNI AP     | 79-0031     | 33.2061  | -97.1989  | 643           | 0          | 21     | 34    |                       | 55-0032 HLY | 41-2403 DLY |
|       |                    |             |          |           |               |            |        |       |                       | 56-0098 HLY | 55-0032 HLY |
|       |                    |             |          |           |               |            |        |       |                       |             | 56-0098 HLY |
|       |                    |             |          |           |               |            |        |       |                       |             | 79-0031 DLY |
| TX    | DEPORT 4 NW        | 41-2415     | 33.5639  | -95.3742  | 436           | 0          | 48     | 49    |                       | 41-2415 HLY | 41-2415 HLY |
|       |                    |             |          |           |               |            |        |       |                       |             | 41-2415 DLY |
| TX    | DERBY 1 S          | 41-2417     | 28.7528  | -99.1353  | 489           | 0          | 0      | 33    |                       |             | 41-2417 DLY |

| State | Name                              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |   |
|-------|-----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|---|
|       |                                   |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily   |
| TX    | DEVINE 0.4 S                      | 69-2146 | 29.1400  | -98.9053  | 650           | 0          | 0      | 21    |   |   | 41-2430 DLY<br>69-2146 DLY  |
| TX    | DIALVILLE 2 W                     | 41-2444 | 31.8614  | -95.2619  | 617           | 0          | 0      | 114   |   |   | 41-2444 DLY   |
| TX    | DILLEY                            | 41-2458 | 28.6806  | -99.1833  | 551           | 0          | 0      | 93    |   |   | 41-2458 DLY   |
| TX    | DIME BOX                          | 41-2462 | 30.3561  | -96.8289  | 335           | 26         | 24     | 69    | 66-2462 15M<br>41-2462 15M                | 66-2462 15M<br>41-2462 HLY                | 41-2462 DLY   |
| TX    | DIMMITT 2 N                       | 41-2464 | 34.5858  | -102.3120 | 3852          | 0          | 0      | 58    |   |   | 41-2464 DLY   |
| TX    | DIMMITT 6 E                       | 41-2463 | 34.5500  | -102.2167 | 3812          | 0          | 0      | 60    |   |   | 41-2463 DLY   |
| TX    | DRY DEVILS RVR N<br>COMSTOCK 22NE | 85-0424 | 29.8767  | -100.8967 | 1467          | 0          | 22     | 22    |   | 41-3103 HLY<br>85-0424 HLY                | 41-3103 HLY<br>85-0424 HLY  |
| TX    | DRYER 1 NW                        | 41-2595 | 29.3833  | -97.2667  | 302           | 0          | 0      | 44    |   |   | 69-1214 DLY<br>41-2595 DLY  |
| TX    | DUBLIN 2SE                        | 41-2598 | 32.0628  | -98.3047  | 1467          | 0          | 0      | 97    |   |   | 41-2598 DLY   |
| TX    | DUMAS                             | 41-2617 | 35.8731  | -101.9725 | 3655          | 0          | 0      | 70    |   |   | 41-2617 DLY   |
| TX    | DUMONT                            | 41-2621 | 33.8094  | -100.5169 | 2011          | 23         | 30     | 45    | 66-2621 15M<br>41-2621 15M                | 66-2621 15M<br>41-2621 HLY                | 41-2621 DLY   |
| TX    | DUNDEE 6 NNW                      | 41-2633 | 33.8158  | -98.9317  | 1050          | 0          | 0      | 86    |   |   | 41-2633 DLY   |
| TX    | E FORK SAN JACINTO<br>AT FM 1485  | 60-0068 | 30.1453  | -95.1245  | 58            | 28         | 28     | 29    | 60-0068 15M                               | 60-0068 15M                               | 60-0068 15M   |
| TX    | EAGLE LAKE RESCH<br>CTR           | 41-2676 | 29.6211  | -96.3661  | 177           | 31         | 40     | 40    | 66-2676 15M<br>41-2675 15M<br>41-2676 15M | 66-2676 15M<br>41-2675 HLY<br>41-2676 HLY | 41-2675 HLY<br>41-2676 HLY<br>41-2676 HLY<br>41-2676 DLY                |
| TX    | EAGLE MTN LAKE<br>DAM             | 41-2678 | 32.8833  | -97.4667  | 679           | 0          | 0      | 63    |   |   | 41-2677 DLY<br>69-2454 DLY<br>85-0462 HLY<br>83-0015 15M<br>41-2678 DLY |
| TX    | EAGLE PASS 3N                     | 41-2679 | 28.7569  | -100.4792 | 814           | 36         | 66     | 115   | 66-2679 15M<br>41-2679 15M                | 66-2679 15M<br>41-2679 HLY                | 66-2679 15M<br>41-2679 HLY<br>41-2679 DLY                               |
| TX    | EASTLAND                          | 41-2715 | 32.3989  | -98.8175  | 1437          | 20         | 37     | 90    | 41-2715 15M                               | 41-2715 HLY                               | 41-2715 HLY<br>41-2715 DLY  |

| State | Name                         | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |   |
|-------|------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|---|
|       |                              |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily   |
| TX    | EDEN                         | 41-2741 | 31.2208  | -99.8494  | 2051          | 26         | 48     | 66    | 63-0032 15M<br>41-2744 15M | 63-0032 HLY<br>41-2744 HLY                | 41-2744 HLY<br>41-2741 DLY  |
| TX    | EDNA HWY 59 BRG              | 41-2768 | 28.9667  | -96.6833  | 69            | 0          | 0      | 82    |                            |   | 41-2769 DLY<br>41-2768 DLY  |
| TX    | EDOM                         | 41-2772 | 32.3656  | -95.6089  | 509           | 0          | 0      | 72    |                            |   | 69-2672 DLY<br>41-2772 DLY  |
| TX    | EL CAMPO                     | 41-2786 | 29.2000  | -96.2653  | 112           | 0          | 0      | 108   |                            |   | 69-2734 DLY<br>41-7020 DLY<br>41-2786 DLY   |
| TX    | EL INDIO 7ESE                | 41-2824 | 28.4747  | -100.2147 | 807           | 0          | 0      | 39    |                            |   | 41-2824 DLY   |
| TX    | EL PASO                      | 79-0125 | 31.7587  | -106.4843 | 3773          | 0          | 45     | 60    |                            | 99-2870 HLY<br>41-2870 HLY<br>75-0009 HLY | 99-2870 HLY<br>41-2870 HLY<br>75-0009 HLY<br>41-2870 HLY<br>75-0009 HLY<br>52-2799 DLY<br>79-0125 DLY |
| TX    | EL PASO INTL AP              | 79-0115 | 31.8111  | -106.3758 | 3917          | 0          | 74     | 78    |                            | 56-0182 HLY<br>41-2797 HLY                | 41-2797 HLY<br>79-0115 DLY  |
| TX    | ELAM CREEK - LAKE<br>JUNE RD | 81-0022 | 32.7344  | -96.6950  | 460           | 25         | 25     | 25    | 81-0022 15M                | 81-0022 15M                               | 81-0022 15M   |
| TX    | ELDORADO                     | 41-2809 | 30.8694  | -100.5994 | 2441          | 0          | 42     | 58    |                            | 41-2811 HLY                               | 41-2811 HLY<br>41-2809 DLY  |
| TX    | ELECTRA                      | 41-2818 | 34.0308  | -98.9117  | 1217          | 0          | 0      | 57    |                            |   | 69-2903 DLY<br>41-2818 DLY  |
| TX    | ELGIN                        | 41-2820 | 30.3492  | -97.3683  | 581           | 0          | 0      | 56    |                            |   | 41-2820 DLY   |
| TX    | EMORY                        | 41-2902 | 32.8711  | -95.7797  | 486           | 0          | 0      | 58    |                            |   | 69-2332 DLY<br>41-2902 DLY  |
| TX    | ENCINAL                      | 41-2906 | 27.9775  | -99.3847  | 545           | 0          | 0      | 100   |                            |   | 41-2906 DLY   |
| TX    | ENNIS                        | 41-2925 | 32.3333  | -96.6333  | 525           | 0          | 0      | 47    |                            |   | 69-1250 DLY<br>41-2925 DLY  |
| TX    | EVADALE                      | 41-3000 | 30.3333  | -94.0833  | 33            | 0          | 0      | 51    |                            |   | 41-3000 DLY   |

| State | Name                             | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |   |
|-------|----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|---|
|       |                                  |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily                                     |
| TX    | EVANT 1SSW                       | 41-3005 | 31.4625  | -98.1619  | 1247          | 20         | 50     | 65    | 41-3005 15M                               | 85-0470 HLY<br>41-3005 HLY                | 85-0470 HLY<br>41-3005 HLY<br>41-3005 DLY |
| TX    | F.M.1406 - NORTH FORK<br>TAYLORS | 82-5500 | 29.9478  | -94.4003  | 31            | 26         | 26     | 26    | 82-5500 15M                               | 82-5500 15M                               | 82-5500 15M                               |
| TX    | FABENS                           | 41-3033 | 31.5000  | -106.1500 | 3612          | 0          | 23     | 31    |   | 41-3033 HLY                               | 41-3033 DLY                               |
| TX    | FAIR OAKS RCH                    | 41-3038 | 29.7500  | -98.6333  | 1302          | 0          | 0      | 34    |   |   | 69-1841 DLY<br>41-3038 DLY                |
| TX    | FAIRFIELD 3W                     | 41-3047 | 31.7322  | -96.2078  | 433           | 0          | 0      | 52    |   |   | 41-3047 DLY                               |
| TX    | FALCON DAM                       | 41-3060 | 26.5581  | -99.1372  | 322           | 0          | 0      | 57    |   |   | 61-0536 DLY<br>41-3060 DLY                |
| TX    | FALFURRIAS                       | 41-3063 | 27.1353  | -98.1203  | 138           | 0          | 0      | 100   |   |   | 41-3063 DLY                               |
| TX    | FALLS CITY 7 WSW                 | 41-3065 | 28.9614  | -98.1103  | 344           | 0          | 0      | 69    |   |   | 41-3065 DLY                               |
| TX    | FARMERSVILLE                     | 41-3080 | 33.1414  | -96.2933  | 627           | 0          | 0      | 52    |   |   | 41-3080 DLY                               |
| TX    | FEDOR                            | 41-3112 | 30.3164  | -97.0545  | 482           | 0          | 0      | 49    |   |   | 41-3112 DLY                               |
| TX    | FERRIS                           | 41-3133 | 32.5339  | -96.6608  | 469           | 31         | 60     | 73    | 66-3133 15M<br>41-3133 15M                | 66-3133 15M<br>41-3133 HLY                | 41-3133 HLY<br>41-3133 DLY                |
| TX    | FIFE                             | 41-3142 | 31.3833  | -99.3667  | 1391          | 0          | 0      | 31    |   |   | 41-3142 DLY                               |
| TX    | FISCHERS STORE                   | 41-3156 | 29.9756  | -98.2647  | 1161          | 30         | 55     | 107   | 66-3156 15M<br>41-1436 15M<br>41-3156 15M | 66-3156 15M<br>41-1436 HLY<br>41-3156 HLY | 41-3156 DLY                               |
| TX    | FLAT                             | 41-3171 | 31.3089  | -97.6306  | 850           | 19         | 47     | 61    | 41-3171 15M                               | 41-3171 HLY                               | 69-1150 DLY<br>41-3171 HLY<br>41-3171 DLY |
| TX    | FLATONIA 4SE                     | 41-3183 | 29.6339  | -97.0644  | 469           | 0          | 0      | 109   |   |   | 41-3183 DLY                               |
| TX    | FLINT                            | 41-3192 | 32.2000  | -95.3500  | 479           | 0          | 0      | 39    |   |   | 41-3192 DLY                               |
| TX    | FLOMOT 4 NE                      | 41-3196 | 34.2675  | -100.9336 | 2359          | 0          | 0      | 65    |   |   | 41-3196 DLY                               |
| TX    | FLORENCE                         | 41-3199 | 30.8392  | -97.7925  | 988           | 0          | 0      | 53    |   |   | 41-3199 DLY                               |
| TX    | FLORESVILLE                      | 41-3201 | 29.1333  | -98.1628  | 400           | 0          | 0      | 97    |   |   | 41-3201 DLY                               |
| TX    | FLOYDADA                         | 41-3214 | 33.9850  | -101.3339 | 3222          | 0          | 0      | 72    |   |   | 41-3214 DLY                               |
| TX    | FLOYDADA 9 SE                    | 41-3215 | 33.8761  | -101.2464 | 3130          | 0          | 0      | 65    |   |   | 41-3215 DLY                               |
| TX    | FOLLETT                          | 41-3225 | 36.4328  | -100.1369 | 2583          | 0          | 0      | 80    |   |   | 41-3225 DLY                               |

| State | Name                    | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |  |
|-------|-------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|--|
|       |                         |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily  |
| TX    | FORESTBURG 5 S          | 41-3247 | 33.4773  | -97.5598  | 1109          | 0          | 0      | 76    |                            |   | 41-3247 DLY  |
| TX    | FORSAN                  | 41-3253 | 32.1117  | -101.3642 | 2749          | 0          | 0      | 58    |                            |   | 41-3253 DLY  |
| TX    | FORT MCKAVETT           | 41-3270 | 30.9303  | -100.1125 | 2215          | 38         | 44     | 53    | 66-3270 15M<br>41-3270 15M | 66-3270 15M<br>41-3270 HLY                | 41-3270 HLY<br>41-3270 DLY                               |
| TX    | FOWLERTON               | 41-3299 | 28.5033  | -98.8392  | 299           | 0          | 0      | 81    |                            |   | 41-3299 DLY  |
| TX    | FRANKLIN                | 41-3321 | 31.0328  | -96.4889  | 466           | 0          | 0      | 44    |                            |   | 41-3321 DLY  |
| TX    | FREDERICKSBURG          | 41-3329 | 30.2392  | -98.9089  | 1686          | 0          | 59     | 95    |                            | 63-0152 HLY<br>41-3329 HLY                | 41-3329 DLY  |
| TX    | FREEPORT 2 NW           | 41-3340 | 28.9844  | -95.3808  | 7             | 0          | 0      | 94    |                            |   | 99-3340 DLY<br>41-3340 DLY                               |
| TX    | FREER                   | 41-3341 | 27.8722  | -98.6175  | 561           | 0          | 0      | 59    |                            |   | 41-3341 DLY  |
| TX    | FRIONA                  | 41-3368 | 34.6400  | -102.7231 | 4009          | 0          | 0      | 79    |                            |   | 41-3368 DLY  |
| TX    | FRISCO                  | 41-3370 | 33.1925  | -96.7931  | 748           | 0          | 42     | 51    |                            | 66-3370 15M<br>41-3370 HLY                | 41-3370 DLY  |
| TX    | FROST                   | 41-3379 | 32.0833  | -96.8000  | 522           | 0          | 0      | 42    |                            |   | 69-2254 DLY<br>41-3379 DLY                               |
| TX    | FT DAVIS                | 41-3262 | 30.5997  | -103.8869 | 4865          | 0          | 0      | 100   |                            |   | 41-3262 DLY  |
| TX    | FT GRIFFIN              | 41-3265 | 32.9236  | -99.2225  | 1227          | 0          | 0      | 31    |                            |   | 52-0248 DLY<br>52-3265 DLY<br>41-3265 DLY                |
| TX    | FT HANCOCK 8SSE         | 41-3266 | 31.1853  | -105.7414 | 3502          | 0          | 0      | 42    |                            |   | 41-3266 DLY  |
| TX    | FT MC INTOSH            | 41-3267 | 27.5000  | -99.5167  | 459           | 0          | 0      | 62    |                            |   | 61-0534 DLY<br>41-3267 HLY<br>41-3267 DLY                |
| TX    | FT MCKAVETT             | 41-3257 | 30.8275  | -100.1103 | 2168          | 0          | 0      | 69    |                            |   | 41-4627 DLY<br>41-2630 DLY<br>52-3257 DLY<br>41-3257 DLY |
| TX    | FT STOCKTON 35 SSW      | 41-3278 | 30.3833  | -103.0333 | 4393          | 0          | 26     | 25    |                            | 41-3278 HLY                               | 41-3278 HLY  |
| TX    | FT STOCKTON PECOS<br>AP | 79-0126 | 30.9119  | -102.9167 | 3009          | 0          | 26     | 129   |                            | 41-3280 HLY<br>55-0110 HLY<br>56-0189 HLY | 41-3277 DLY<br>52-3280 DLY<br>41-3280 DLY<br>79-0126 DLY |

| State | Name                      | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |  |  |
|-------|---------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|--|--|
|       |                           |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly   | daily  |
| TX    | FT WORTH MEACHAM<br>FLD   | 79-0089 | 32.8192  | -97.3614  | 686           | 37         | 70     | 72    | 41-3284 15M<br>78-0038 15M | 99-3284 HLY<br>56-0162 HLY<br>55-0085 HLY<br>41-3284 HLY | 41-3284 HLY<br>79-0089 DLY                               |
| TX    | FT WORTH NAS              | 79-0077 | 32.7667  | -97.4500  | 607           | 0          | 0      | 55    |                            |  | 64-0363 DLY<br>79-0077 DLY                               |
| TX    | FT WORTH VICKERY<br>BLV   | 41-3286 | 32.7333  | -97.3333  | 659           | 0          | 41     | 61    |                            | 99-0001 HLY  | 99-0001 HLY<br>41-3290 DLY<br>41-3286 DLY                |
| TX    | FT WORTH WSFO             | 41-3285 | 32.8339  | -97.2975  | 643           | 42         | 52     | 55    | 66-3285 15M<br>41-3285 15M | 66-3285 15M<br>41-3285 HLY                               | 41-3285 HLY<br>41-3285 DLY                               |
| TX    | FUNK RCH                  | 41-3401 | 31.4775  | -100.7978 | 2070          | 0          | 0      | 54    |                            |  | 41-3401 DLY  |
| TX    | GAGEBY 3 WNW              | 41-3410 | 35.6317  | -100.3922 | 2778          | 32         | 61     | 61    | 66-3410 15M<br>41-3410 15M | 66-3410 15M<br>41-3410 HLY                               | 66-3410 15M<br>41-3410 HLY                               |
| TX    | GAIL                      | 41-3411 | 32.7744  | -101.4539 | 2530          | 16         | 16     | 75    | 80-0031 15M                | 80-0031 15M  | 80-0031 15M<br>41-3411 DLY                               |
| TX    | GAINESVILLE               | 41-3415 | 33.6358  | -97.1447  | 781           | 27         | 53     | 106   | 66-3415 15M<br>41-3415 15M | 66-3415 15M<br>41-3415 HLY                               | 66-3415 15M<br>41-3415 HLY<br>41-3415 DLY                |
| TX    | GALVESTON                 | 79-0055 | 29.3048  | -94.7934  | 7             | 0          | 104    | 137   |                            | 99-3430 HLY<br>41-3430 HLY                               | 99-3430 HLY<br>41-3430 HLY<br>52-3430 DLY<br>79-0055 DLY |
| TX    | GALVESTON SCHOLLES<br>FLD | 79-0047 | 29.2733  | -94.8592  | 7             | 0          | 19     | 39    |                            | 41-3431 HLY<br>55-0043 HLY<br>56-0111 HLY                | 41-3431 HLY<br>55-0043 HLY<br>56-0111 HLY<br>79-0047 DLY |
| TX    | GARDEN CITY               | 41-3445 | 31.8667  | -101.4814 | 2654          | 0          | 0      | 88    |                            |  | 41-3445 DLY  |
| TX    | GARDEN CITY 16 E          | 41-3446 | 31.8333  | -101.2000 | 2461          | 0          | 23     | 25    |                            | 41-0463 HLY<br>41-3446 HLY                               | 41-0463 HLY<br>41-3446 HLY                               |
| TX    | GATESVILLE                | 41-3485 | 31.4144  | -97.7019  | 827           | 0          | 0      | 101   |                            |  | 41-3485 DLY  |
| TX    | GEORGE WEST 2 SSW         | 41-3508 | 28.3064  | -98.1222  | 226           | 0          | 0      | 97    |                            |  | 41-3508 DLY  |

| State | Name              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |   |
|-------|-------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|---|
|       |                   |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily                                     |
| TX    | GEORGETOWN LAKE   | 41-3507 | 30.6836  | -97.7172  | 840           | 20         | 25     | 80    | 66-3507 15M<br>41-3507 15M | 66-3507 15M<br>85-0509 HLY<br>41-3507 HLY | 41-3506 DLY<br>41-3507 DLY                |
| TX    | GIDDINGS 5E       | 41-3525 | 30.1872  | -96.8594  | 436           | 0          | 0      | 77    |                            |   | 41-3525 DLY                               |
| TX    | GILMER 4 WNW      | 41-3546 | 32.7464  | -95.0497  | 390           | 27         | 58     | 85    | 41-3546 15M                | 85-0512 HLY<br>76-0058 HLY<br>41-3546 HLY | 85-0512 HLY<br>76-0058 HLY<br>41-3546 DLY |
| TX    | GLADEWATER 3 WSW  | 41-3565 | 32.5269  | -94.9600  | 243           | 0          | 0      | 29    |                            |   | 41-9709 DLY<br>41-3565 DLY                |
| TX    | GLEN ROSE 2 W     | 41-3591 | 32.2342  | -97.7853  | 656           | 0          | 0      | 36    |                            |   | 41-3591 DLY                               |
| TX    | GOLD              | 41-3605 | 30.3481  | -98.6861  | 1640          | 0          | 0      | 67    |                            |   | 41-3605 DLY                               |
| TX    | GOLDTHWAITE 1 WSW | 41-3614 | 31.4403  | -98.5903  | 1506          | 0          | 0      | 82    |                            |   | 41-3614 DLY                               |
| TX    | GOLIAD            | 41-3618 | 28.6617  | -97.3850  | 141           | 0          | 0      | 100   |                            |   | 41-3620 DLY<br>41-3618 DLY                |
| TX    | GONZALES 1N       | 41-3622 | 29.5175  | -97.4597  | 381           | 0          | 0      | 111   |                            |   | 99-3622 DLY<br>41-3622 DLY                |
| TX    | GOOSE CREEK       | 41-3640 | 29.7333  | -94.9667  | 23            | 31         | 43     | 76    | 60-0119 15M                | 60-0119 15M<br>41-0587 HLY                | 60-0119 15M<br>41-0587 HLY<br>41-3640 DLY |
| TX    | GORDON 1SW        | 41-3639 | 32.5408  | -98.3814  | 1020          | 0          | 0      | 66    |                            |   | 41-9015 DLY<br>41-3639 DLY                |
| TX    | GORDONVILLE       | 41-3642 | 33.7953  | -96.8531  | 722           | 17         | 47     | 61    | 41-3642 15M                | 41-3642 HLY                               | 69-1377 DLY<br>41-3642 HLY<br>41-3642 DLY |
| TX    | GORMAN 2 NNE      | 41-3646 | 32.2422  | -98.6631  | 1381          | 0          | 44     | 45    |                            | 41-3646 HLY                               | 41-3646 HLY<br>41-3646 DLY                |
| TX    | GRAHAM            | 41-3668 | 33.1203  | -98.5669  | 1079          | 0          | 0      | 98    |                            |   | 41-3668 DLY                               |
| TX    | GRANDFALLS 3SSE   | 41-3680 | 31.3028  | -102.8222 | 2425          | 0          | 0      | 75    |                            |   | 41-3680 DLY                               |
| TX    | GRANGER           | 41-3685 | 30.7150  | -97.4483  | 571           | 0          | 0      | 39    |                            |   | 41-3685 DLY                               |
| TX    | GRANGER DAM       | 41-3686 | 30.7189  | -97.3211  | 554           | 24         | 27     | 37    | 66-3686 15M<br>41-3686 15M | 66-3686 15M<br>41-3686 HLY                | 41-3686 DLY                               |
| TX    | GRAPELAND         | 41-3689 | 31.4833  | -95.4833  | 479           | 0          | 0      | 32    |                            |   | 41-3689 DLY                               |



| State | Name                             | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |                            |
|-------|----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|----------------------------|
|       |                                  |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily                      |
| TX    | GRAPEVINE DAM                    | 41-3691 | 32.9506  | -97.0553  | 584           | 36         | 56     | 85    | 66-3691 15M<br>41-3691 15M | 66-3691 15M<br>41-3691 HLY | 41-3691 DLY                |
| TX    | GREENS BYU AT MT<br>HOUSTON PKWY | 60-0104 | 29.8920  | -95.2380  | 24            | 29         | 30     | 31    | 60-0116 15M<br>60-0104 15M | 60-0116 15M<br>60-0104 15M | 60-0116 15M<br>60-0104 15M |
| TX    | GREENVILLE KGVL<br>RADIO         | 41-3734 | 33.1678  | -96.0983  | 545           | 0          | 0      | 109   |                            |                            | 41-3734 DLY                |
| TX    | GROESBECK                        | 41-3770 | 31.5167  | -96.5333  | 469           | 24         | 24     | 36    | 41-3771 15M                | 41-3771 HLY                | 41-3771 HLY<br>41-3770 DLY |
| TX    | GROVETON                         | 41-3778 | 31.0611  | -95.1344  | 351           | 0          | 0      | 54    |                            |                            | 41-3778 DLY                |
| TX    | GRUVER                           | 41-3787 | 36.2631  | -101.4050 | 3169          | 0          | 0      | 72    |                            |                            | 41-3787 DLY                |
| TX    | GUADELUPE PEAK                   | 76-0061 | 31.9250  | -104.8253 | 7755          | 0          | 27     | 28    |                            | 85-0504 HLY<br>76-0061 HLY | 85-0504 HLY<br>76-0061 HLY |
| TX    | GUNTER 5 S                       | 41-3822 | 33.3750  | -96.7611  | 735           | 0          | 0      | 51    |                            |                            | 41-3822 DLY                |
| TX    | GUTHRIE                          | 41-3828 | 33.6267  | -100.3369 | 1759          | 0          | 0      | 62    |                            |                            | 41-3828 DLY                |
| TX    | HAGANSPORT                       | 41-3846 | 33.3361  | -95.2486  | 361           | 0          | 0      | 88    |                            |                            | 41-3846 DLY                |
| TX    | HALL RCH                         | 41-3871 | 30.1333  | -99.6000  | 2280          | 0          | 32     | 33    |                            | 41-3871 HLY                | 41-3871 HLY                |
| TX    | HALLETTSVILLE 2 N                | 41-3873 | 29.4706  | -96.9397  | 276           | 0          | 0      | 120   |                            |                            | 41-3873 DLY                |
| TX    | HAMILTON 2E                      | 41-3884 | 31.7044  | -98.0853  | 1125          | 0          | 0      | 49    |                            |                            | 41-3884 DLY                |
| TX    | HAMLIN 1SW                       | 41-3890 | 32.8694  | -100.1211 | 1719          | 0          | 0      | 82    |                            |                            | 69-1803 DLY<br>41-3890 DLY |
| TX    | HARLETON                         | 41-3941 | 32.6761  | -94.5781  | 344           | 0          | 0      | 62    |                            |                            | 69-1687 DLY<br>41-3941 DLY |
| TX    | HARLINGEN                        | 41-3943 | 26.2028  | -97.6728  | 39            | 0          | 0      | 103   |                            |                            | 41-3943 DLY                |
| TX    | HARLINGEN RIO<br>GRANDE AP       | 79-0034 | 26.2281  | -97.6542  | 33            | 0          | 21     | 30    |                            | 55-0034 HLY<br>56-0100 HLY | 55-0034 HLY<br>79-0034 DLY |
| TX    | HARPER 1W                        | 41-3954 | 30.3011  | -99.2681  | 2060          | 0          | 0      | 73    |                            |                            | 41-3954 DLY                |
| TX    | HARRY STONE PARK -<br>MILLMAR DR | 81-0016 | 32.8261  | -96.6753  | 528           | 25         | 25     | 25    | 81-0016 15M                | 81-0016 15M                | 81-0016 15M                |
| TX    | HART                             | 41-3972 | 34.3697  | -102.1175 | 3665          | 0          | 0      | 56    |                            |                            | 41-3972 DLY                |
| TX    | HARTLEY 4 ESE                    | 41-3981 | 35.8656  | -102.3319 | 3904          | 0          | 0      | 71    |                            |                            | 41-3979 DLY<br>41-3981 DLY |
| TX    | HASKELL                          | 41-3992 | 33.1497  | -99.7350  | 1578          | 0          | 0      | 109   |                            |                            | 41-3992 DLY                |

| State | Name            | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |  |   |
|-------|-----------------|---------|----------|-----------|---------------|------------|--------|-------|---|--|---|
|       |                 |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly   | daily                                     |
| TX    | HAWKINS         | 41-4020 | 32.5781  | -95.2033  | 335           | 0          | 0      | 62    |   |  | 41-4020 DLY                               |
| TX    | HAWLEY 3 NE     | 41-4026 | 32.6500  | -99.7333  | 1650          | 0          | 0      | 48    |   |  | 41-6494 DLY<br>41-4026 DLY                |
| TX    | HEBBRONVILLE    | 41-4058 | 27.3194  | -98.6775  | 581           | 0          | 0      | 94    |   |  | 41-4058 DLY                               |
| TX    | HEMPHILL 6 NE   | 41-4077 | 31.4072  | -93.7842  | 180           | 0          | 0      | 42    |   |  | 41-4076 DLY<br>41-4077 DLY                |
| TX    | HEMPSTEAD       | 41-4080 | 30.1000  | -96.0833  | 253           | 0          | 0      | 83    |   |  | 60-0235 15M<br>41-4080 DLY                |
| TX    | HENDERSON       | 41-4081 | 32.1808  | -94.7964  | 420           | 0          | 0      | 109   |   |  | 41-4081 DLY                               |
| TX    | HENLY           | 41-4088 | 30.2000  | -98.2167  | 1270          | 0          | 0      | 36    |   |  | 63-0169 HLY<br>41-4088 DLY                |
| TX    | HENRIETTA       | 41-4093 | 33.8128  | -98.2003  | 932           | 0          | 0      | 101   |   |  | 41-4093 DLY                               |
| TX    | HEREFORD        | 41-4098 | 34.8172  | -102.4003 | 3819          | 35         | 57     | 86    | 80-0037 15M<br>59-0001 15M<br>41-4098 15M | 80-0037 15M<br>59-0001 15M<br>41-4100 HLY<br>41-4098 HLY | 41-4100 HLY<br>41-4098 DLY                |
| TX    | HEWITT          | 41-4122 | 31.4667  | -97.2000  | 659           | 0          | 0      | 118   |   |  | 99-4122 DLY<br>41-4122 DLY                |
| TX    | HICO            | 41-4137 | 31.9844  | -98.0311  | 1043          | 28         | 26     | 93    | 41-4137 15M                               | 41-4137 HLY  | 41-4137 DLY                               |
| TX    | HIGGINS         | 41-4140 | 36.1161  | -100.0239 | 2566          | 0          | 0      | 67    |   |  | 41-4140 DLY                               |
| TX    | HILLSBORO       | 41-4182 | 32.0161  | -97.1094  | 551           | 0          | 0      | 110   |   |  | 41-4182 DLY                               |
| TX    | HINDES          | 41-4191 | 28.7167  | -98.8000  | 360           | 19         | 53     | 55    | 41-4191 15M                               | 41-4191 HLY  | 41-4191 HLY                               |
| TX    | HONDO MUNI AP   | 79-0062 | 29.3600  | -99.1742  | 919           | 0          | 21     | 118   |   | 56-0126 HLY<br>55-0054 HLY<br>41-4256 HLY                | 41-4254 DLY<br>55-0054 HLY<br>79-0062 DLY |
| TX    | HONEY GROVE     | 41-4257 | 33.5842  | -95.8994  | 663           | 37         | 57     | 96    | 66-4257 15M<br>41-4258 15M<br>41-4257 15M | 66-4257 15M<br>41-4258 HLY<br>41-4257 HLY                | 41-4257 DLY                               |
| TX    | HORDS CREEK DAM | 41-4278 | 31.8456  | -99.5606  | 1942          | 0          | 48     | 64    |   | 63-0017 HLY<br>85-0556 HLY<br>41-4278 HLY                | 63-0017 HLY<br>41-4278 HLY<br>41-4278 DLY |
| TX    | HORGER          | 41-4280 | 31.0000  | -94.1667  | 112           | 0          | 0      | 36    |   |  | 41-4280 DLY                               |

| State | Name                      | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations |             |             |
|-------|---------------------------|---------|----------|-----------|---------------|------------|--------|-------|-----------------------|-------------|-------------|
|       |                           |         |          |           |               | <1hr       | hourly | daily | <1hr                  | hourly      | daily       |
| TX    | HOUSTON ADDICKS           | 41-4309 | 29.7689  | -95.6439  | 91            | 29         | 69     | 68    | 41-4309 15M           | 85-0310 HLY | 85-0310 HLY |
|       |                           |         |          |           |               |            |        |       | 60-0006 15M           | 41-4309 15M | 41-4309 15M |
|       |                           |         |          |           |               |            |        |       | 60-0005 15M           | 60-0006 15M | 60-0006 15M |
|       |                           |         |          |           |               |            |        |       |                       | 60-0005 15M | 60-0005 15M |
|       |                           |         |          |           |               |            |        |       | 41-0054 HLY           | 41-0054 HLY |             |
|       |                           |         |          |           |               |            |        |       | 41-4309 HLY           | 41-4309 HLY |             |
| TX    | HOUSTON ALIEF             | 41-4311 | 29.7147  | -95.5947  | 72            | 32         | 65     | 72    | 60-0039 15M           | 60-0039 15M | 60-0039 15M |
|       |                           |         |          |           |               |            |        |       | 60-0038 15M           | 60-0038 15M | 60-0038 15M |
|       |                           |         |          |           |               |            |        |       | 41-4311 15M           | 41-4311 HLY | 41-4311 HLY |
|       |                           |         |          |           |               |            |        |       |                       | 41-4311 DLY |             |
| TX    | HOUSTON BARKER            | 41-4313 | 29.8142  | -95.7275  | 128           | 0          | 0      | 72    |                       |             | 69-1674 DLY |
|       |                           |         |          |           |               |            |        |       |                       |             | 69-1627 DLY |
|       |                           |         |          |           |               |            |        |       |                       |             | 60-0129 15M |
|       |                           |         |          |           |               |            |        |       |                       |             | 41-4313 HLY |
|       |                           |         |          |           |               |            |        |       |                       | 41-4313 DLY |             |
| TX    | HOUSTON DEER PARK         | 41-4315 | 29.7283  | -95.1306  | 36            | 0          | 0      | 63    |                       |             | 41-4315 DLY |
| TX    | HOUSTON HEIGHTS           | 41-4321 | 29.7914  | -95.4261  | 66            | 0          | 0      | 57    |                       |             | 41-4321 DLY |
| TX    | HOUSTON HOBBY AP          | 79-0042 | 29.6381  | -95.2819  | 43            | 0          | 0      | 85    |                       |             | 99-4307 DLY |
|       |                           |         |          |           |               |            |        |       |                       |             | 79-0042 DLY |
| TX    | HOUSTON INDEP HTS         | 41-4323 | 29.8667  | -95.4167  | 92            | 28         | 29     | 73    | 60-0221 15M           | 60-0221 15M | 60-0221 15M |
|       |                           |         |          |           |               |            |        |       | 60-0056 15M           | 60-0056 15M | 60-0056 15M |
|       |                           |         |          |           |               |            |        |       | 60-0115 15M           | 60-0115 15M | 60-0115 15M |
|       |                           |         |          |           |               |            |        |       |                       |             | 41-4323 DLY |
| TX    | HOUSTON INTERCONT<br>AP   | 79-0061 | 29.9800  | -95.3600  | 95            | 0          | 48     | 48    |                       | 64-0236 HLY | 79-0061 DLY |
|       |                           |         |          |           |               |            |        |       |                       | 60-0067 15M |             |
|       |                           |         |          |           |               |            |        |       |                       | 56-0124 HLY |             |
|       |                           |         |          |           |               |            |        |       |                       | 41-4300 HLY |             |
| TX    | HOUSTON NORTH<br>HOUSTON  | 41-4327 | 29.8733  | -95.5275  | 112           | 0          | 0      | 76    |                       |             | 99-4327 DLY |
|       |                           |         |          |           |               |            |        |       |                       |             | 41-4327 DLY |
| TX    | HOUSTON SAN<br>JACINTO DA | 41-4328 | 29.9167  | -95.1500  | 59            | 30         | 30     | 64    | 60-0064 15M           | 60-0064 15M | 60-0064 15M |
|       |                           |         |          |           |               |            |        |       | 60-0122 15M           | 60-0122 15M | 60-0122 15M |
|       |                           |         |          |           |               |            |        |       | 60-0065 15M           | 60-0065 15M | 60-0065 15M |
|       |                           |         |          |           |               |            |        |       |                       |             | 60-0122 15M |
|       |                           |         |          |           |               |            |        |       |                       | 60-0065 15M |             |
|       |                           |         |          |           |               |            |        |       |                       |             | 41-4328 DLY |

| State | Name                     | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |   |
|-------|--------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|---|
|       |                          |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly  | daily   |
| TX    | HOUSTON SATSUMA          | 41-4329 | 29.9333  | -95.6333  | 121           | 33         | 74     | 76    | 60-0085 15M<br>60-0087 15M<br>41-4329 15M | 60-0085 15M<br>60-0087 15M<br>41-4329 15M<br>41-4329 HLY                | 60-0085 15M<br>60-0087 15M<br>41-4329 15M<br>41-4329 HLY<br>41-4329 DLY   |
| TX    | HOUSTON SPRING<br>BRANCH | 41-4331 | 29.8042  | -95.4914  | 92            | 21         | 22     | 67    | 60-0141 15M                               | 60-0141 15M   | 41-3043 DLY<br>41-4317 DLY<br>60-0141 15M<br>41-4331 DLY  |
| TX    | HOUSTON WB CITY          | 79-0056 | 29.7622  | -95.3593  | 52            | 29         | 90     | 125   | 60-0220 15M<br>60-0219 15M<br>60-0135 15M | 99-4305 HLY<br>60-0220 15M<br>60-0219 15M<br>60-0135 15M<br>41-4305 HLY | 99-4305 DLY<br>99-4305 HLY<br>60-0220 15M<br>60-0219 15M<br>60-0135 15M<br>41-4305 HLY<br>60-0220 15M<br>60-0219 15M<br>60-0135 15M<br>41-4305 HLY<br>79-0056 DLY |
| TX    | HOUSTON-PORT             | 41-4326 | 29.7456  | -95.2800  | 20            | 29         | 29     | 29    | 60-0227 15M<br>60-0134 15M<br>60-0226 15M | 60-0227 15M<br>60-0134 15M<br>60-0226 15M                               | 60-0227 15M<br>60-0134 15M<br>60-0226 15M<br>41-4326 DLY  |
| TX    | HOUSTON-WESTBURY         | 41-4325 | 29.6600  | -95.6275  | 49            | 0          | 0      | 74    |   |   | 99-4325 DLY<br>41-4325 DLY  |
| TX    | HUCKABAY                 | 41-4343 | 32.3389  | -98.2972  | 1414          | 0          | 0      | 39    |   |   | 41-4343 DLY   |
| TX    | HUDSPETH RIVER<br>RANCH  | 41-4348 | 30.0050  | -101.1772 | 1631          | 0          | 0      | 35    |   |   | 41-0479 DLY<br>41-4348 DLY  |
| TX    | HUMBLE                   | 41-4362 | 30.0000  | -95.2500  | 102           | 29         | 29     | 60    | 60-0067 15M                               | 60-0067 15M   | 60-0067 15M<br>41-4362 DLY  |
| TX    | HUMBLE PUMP STN 5<br>WN  | 41-4363 | 30.3606  | -100.3056 | 2201          | 0          | 0      | 60    |   |   | 41-4363 DLY   |
| TX    | HUNT 10 W                | 41-4375 | 30.0628  | -99.5050  | 2011          | 33         | 33     | 37    | 66-4375 15M<br>41-4375 15M                | 66-4375 15M<br>41-4375 15M  | 41-4375 15M<br>41-4375 DLY  |

| State | Name              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |  |   |
|-------|-------------------|---------|----------|-----------|---------------|------------|--------|-------|---|--|---|
|       |                   |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly   | daily                                     |
| TX    | HUNT 3 SW         | 41-4374 | 30.0294  | -99.3614  | 1870          | 0          | 0      | 60    |   |  | 69-1900 DLY<br>41-4374 DLY                |
| TX    | HUNTSVILLE        | 41-4382 | 30.7064  | -95.5422  | 495           | 0          | 0      | 111   |   |  | 41-4382 DLY                               |
| TX    | HURST SPRINGS     | 41-4390 | 31.6544  | -97.7086  | 1030          | 0          | 0      | 46    |   |  | 41-4390 DLY                               |
| TX    | HYE               | 41-4402 | 30.2533  | -98.5711  | 1457          | 0          | 0      | 64    |   |  | 41-4402 DLY                               |
| TX    | IMPERIAL          | 41-4425 | 31.2667  | -102.7000 | 2402          | 0          | 40     | 68    |   | 41-1185 HLY<br>41-4425 HLY   | 41-1185 HLY<br>41-1185 DLY<br>41-4425 DLY |
| TX    | INDIAN GAP        | 41-4440 | 31.6667  | -98.4167  | 1575          | 0          | 37     | 52    |   | 41-7274 HLY<br>41-4440 HLY   | 41-7274 HLY<br>41-7274 DLY<br>41-4440 DLY |
| TX    | IOWA PARK EXP STN | 41-4471 | 33.9167  | -98.6500  | 981           | 0          | 0      | 32    |   |  | 41-9730 DLY<br>41-4471 DLY                |
| TX    | IREDELL           | 41-4476 | 31.9808  | -97.8731  | 902           | 36         | 43     | 45    | 66-4476 15M<br>41-4476 15M                | 66-4476 15M<br>41-4476 HLY   | 66-4476 15M<br>41-4476 HLY                |
| TX    | ITASCA            | 41-4505 | 32.1597  | -97.1422  | 705           | 0          | 0      | 31    |   |  | 41-4503 DLY<br>41-4505 DLY                |
| TX    | JACKSBORO         | 41-4517 | 33.2206  | -98.1561  | 1083          | 30         | 65     | 70    | 66-4517 15M<br>41-4520 15M<br>41-4517 15M | 41-4520 15M<br>41-4517 15M<br>66-4517 15M<br>41-4520 HLY<br>85-0570 HLY<br>41-4517 HLY | 85-0570 HLY<br>41-4517 HLY<br>41-4517 DLY |
| TX    | JACKSONVILLE      | 41-4525 | 31.9622  | -95.2736  | 561           | 0          | 0      | 75    |   |  | 41-4524 DLY<br>41-4525 DLY                |
| TX    | JARRELL           | 41-4556 | 30.8472  | -97.5994  | 850           | 0          | 0      | 83    |   |  | 41-4556 DLY                               |
| TX    | JASPER            | 41-4563 | 30.9153  | -94.0097  | 207           | 0          | 0      | 66    |   |  | 41-4563 DLY                               |
| TX    | JAYTON            | 41-4570 | 33.2544  | -100.5725 | 2011          | 37         | 64     | 79    | 66-4570 15M<br>41-4570 15M                | 66-4570 15M<br>41-4570 HLY   | 41-4570 HLY<br>41-4570 DLY                |
| TX    | JEDDO 3S          | 41-4575 | 29.7664  | -97.3164  | 417           | 0          | 0      | 77    |   |  | 41-4575 DLY                               |
| TX    | JEFFERSON         | 41-4577 | 32.7692  | -94.3558  | 207           | 0          | 31     | 95    |   | 41-4577 HLY  | 41-4577 DLY                               |
| TX    | JEWETT            | 41-4591 | 31.3500  | -96.1500  | 509           | 0          | 46     | 61    |   | 41-4591 HLY  | 41-4591 HLY<br>41-4591 DLY                |

| State | Name                     | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |  |
|-------|--------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|--|
|       |                          |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily  |
| TX    | JOE POOL LAKE            | 41-4597 | 32.6406  | -96.9747  | 591           | 0          | 0      | 33    |                            |                            | 41-4597 HLY<br>41-4597 DLY                               |
| TX    | JOHNSON CITY             | 41-4605 | 30.2861  | -98.4089  | 1188          | 0          | 29     | 48    |                            | 63-0165 HLY                | 63-0165 HLY<br>41-4605 DLY                               |
| TX    | JOLLYVILLE 2 SW          | 63-0187 | 30.4208  | -97.7975  | 731           | 31         | 31     | 31    | 65-0097 15M<br>63-0187 15M | 65-0097 15M<br>63-0187 15M | 65-0097 15M<br>63-0187 15M                               |
| TX    | JOURDANTON               | 41-4647 | 28.9122  | -98.5425  | 518           | 0          | 0      | 64    |                            |                            | 69-0574 DLY<br>41-4647 DLY                               |
| TX    | JUNCTION 4SSW            | 41-4670 | 30.4453  | -99.8045  | 1749          | 34         | 62     | 109   | 66-4670 15M<br>41-4670 15M | 66-4670 15M<br>41-4670 HLY | 41-4670 HLY<br>41-4670 DLY                               |
| TX    | JUNCTION KIMBLE CO<br>AP | 79-0094 | 30.5108  | -99.7664  | 1749          | 0          | 0      | 41    |                            |                            | 55-0089 HLY<br>56-0166 HLY<br>79-0094 DLY                |
| TX    | JUSTIN                   | 41-4679 | 33.0806  | -97.2967  | 640           | 38         | 53     | 58    | 66-4679 15M<br>41-4679 15M | 66-4679 15M<br>41-4679 HLY | 41-4679 HLY<br>41-4679 DLY                               |
| TX    | KARNACK                  | 41-4693 | 32.6664  | -94.1781  | 256           | 0          | 0      | 72    |                            |                            | 85-0379 HLY<br>76-0035 HLY<br>41-4693 DLY                |
| TX    | KARNES CITY 2N           | 41-4696 | 28.9069  | -97.8756  | 449           | 0          | 0      | 77    |                            |                            | 41-4696 DLY  |
| TX    | KATY CITY                | 41-4704 | 29.8025  | -95.8197  | 154           | 28         | 34     | 68    | 60-0124 15M                | 60-0124 15M<br>41-4704 HLY | 41-4704 HLY<br>41-4704 DLY                               |
| TX    | KAUFMAN 3 SE             | 41-4705 | 32.5589  | -96.2725  | 420           | 0          | 0      | 113   |                            |                            | 69-1823 DLY<br>41-4705 DLY                               |
| TX    | KENT 8SE                 | 41-4770 | 31.0158  | -104.1108 | 4603          | 0          | 0      | 59    |                            |                            | 41-4767 DLY<br>41-4770 DLY                               |
| TX    | KERRVILLE 3 NNE          | 41-4782 | 30.0747  | -99.1081  | 1785          | 0          | 0      | 121   |                            |                            | 99-4780 DLY<br>41-4780 DLY<br>41-4782 DLY                |
| TX    | KILLEEN                  | 41-4792 | 31.0658  | -97.6919  | 814           | 0          | 24     | 64    |                            | 64-0337 HLY<br>41-4792 HLY | 41-4791 DLY<br>64-0337 DLY<br>79-0021 DLY<br>41-4792 DLY |
| TX    | KINGSVILLE               | 41-4810 | 27.5311  | -97.8497  | 56            | 0          | 0      | 81    |                            |                            | 41-4810 DLY  |

| State | Name                              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |  |
|-------|-----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|--|
|       |                                   |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily  |
| TX    | KINGSVILLE 6.5 SSE                | 69-1828 | 27.4214  | -97.8236  | 59            | 0          | 0      | 68    |                            |   | 41-7580 DLY<br>69-1828 DLY                               |
| TX    | KINGSVILLE NAAS                   | 79-0051 | 27.5000  | -97.8167  | 56            | 0          | 0      | 64    |                            |   | 79-0051 DLY  |
| TX    | KIRBYVILLE                        | 41-4819 | 30.6167  | -93.9167  | 200           | 0          | 0      | 66    |                            |   | 69-1806 DLY<br>41-4819 DLY                               |
| TX    | KNAPP 2 SW                        | 41-4841 | 32.6258  | -101.1503 | 2290          | 0          | 0      | 74    |                            |   | 41-4841 DLY  |
| TX    | KNICKERBOCKER                     | 41-4848 | 31.2667  | -100.6333 | 2051          | 0          | 0      | 36    |                            |   | 69-2393 DLY<br>41-4848 DLY                               |
| TX    | KNOX CITY                         | 41-4852 | 33.4167  | -99.8167  | 1532          | 0          | 0      | 31    |                            |   | 41-4852 DLY  |
| TX    | KOPPERL 5 NNE                     | 41-4866 | 32.1347  | -97.4786  | 620           | 24         | 57     | 65    | 41-4866 15M                | 41-4866 HLY                               | 41-4866 HLY<br>41-4866 DLY                               |
| TX    | KOUNTZE                           | 41-4878 | 30.3750  | -94.2994  | 62            | 0          | 38     | 65    |                            | 41-4876 HLY<br>41-4878 HLY                | 41-4878 HLY<br>41-4878 DLY                               |
| TX    | KRESS                             | 41-4880 | 34.3708  | -101.7483 | 3480          | 35         | 74     | 72    | 66-4880 15M<br>41-4880 15M | 66-4880 15M<br>41-4880 HLY                | 66-4880 15M<br>41-4880 HLY                               |
| TX    | L.B.J. NATIONAL<br>GRASSLANDS     | 54-0219 | 33.3917  | -97.6397  | 1024          | 0          | 0      | 28    |                            |   | 54-0219 DLY  |
| TX    | LA GRANGE                         | 41-4903 | 29.9175  | -96.8769  | 358           | 0          | 28     | 105   |                            | 63-0222 15M<br>76-0072 HLY<br>63-0222 HLY | 63-0222 15M<br>76-0072 HLY<br>63-0222 HLY<br>41-4903 DLY |
| TX    | LA JOYA                           | 41-4911 | 26.2422  | -98.3992  | 180           | 0          | 0      | 102   |                            |   | 41-5972 DLY<br>41-4911 DLY                               |
| TX    | LA PRYOR                          | 41-4920 | 28.9831  | -99.8686  | 758           | 35         | 59     | 85    | 66-4920 15M<br>41-4920 15M | 66-4920 15M<br>41-4920 HLY                | 41-4920 DLY  |
| TX    | LA TUNA 1 S                       | 41-4931 | 31.9800  | -106.5975 | 3799          | 0          | 0      | 69    |                            |   | 69-1312 DLY<br>41-4931 DLY                               |
| TX    | LACKLAND AIR FORCE<br>BASE (KELL) | 64-0301 | 29.3830  | -98.5830  | 690           | 0          | 0      | 54    |                            |   | 41-4731 HLY<br>56-0103 HLY<br>79-0037 DLY<br>64-0301 DLY |
| TX    | LAJITAS                           | 41-4950 | 29.2694  | -103.7575 | 2402          | 0          | 0      | 37    |                            |   | 41-4950 DLY  |
| TX    | LAKE ABILENE STATE<br>PARK        | 41-4960 | 32.2403  | -99.8792  | 1972          | 0          | 0      | 50    |                            |   | 41-4960 DLY  |

| State | Name                              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |  |   |
|-------|-----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|--|---|
|       |                                   |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly   | daily   |
| TX    | LAKE ALAN HENRY                   | 41-4967 | 33.0642  | -101.0489 | 2280          | 0          | 0      | 48    |   |  | 41-7146 DLY<br>41-4967 DLY  |
| TX    | LAKE BOB SANDLIN                  | 53-0001 | 33.0826  | -95.0008  | 338           | 0          | 0      | 22    |   |  | 53-0001 DLY   |
| TX    | LAKE BRIDGEPORT<br>DAM            | 41-4972 | 33.2250  | -97.8317  | 869           | 36         | 62     | 70    | 66-4972 15M<br>83-0021 15M<br>41-4972 15M | 66-4972 15M<br>83-0021 15M<br>41-4972 HLY  | 41-4972 HLY<br>41-4972 DLY  |
| TX    | LAKE COLORADO CITY                | 41-4974 | 32.3333  | -100.9167 | 2100          | 0          | 27     | 35    |   | 41-4974 HLY  | 41-4974 HLY<br>41-4974 DLY  |
| TX    | LAKE CROCKETT                     | 41-4975 | 33.7411  | -95.9217  | 530           | 28         | 36     | 38    | 41-4975 15M                               | 85-0389 HLY<br>76-0037 HLY<br>41-4975 HLY  | 85-0389 HLY<br>76-0037 HLY<br>41-4975 HLY                               |
| TX    | LAKE JUNE BRANCH -<br>ST AUGUSTIN | 81-0021 | 32.7361  | -96.6567  | 469           | 22         | 23     | 21    | 81-0021 15M                               | 81-0021 15M  | 81-0021 15M   |
| TX    | LAKE KEMP                         | 41-4982 | 33.7542  | -99.1442  | 1168          | 21         | 32     | 47    | 66-4982 15M<br>41-4982 15M                | 66-4982 15M<br>41-4982 HLY   | 41-4982 HLY<br>41-4982 DLY  |
| TX    | LAKE LBJ AT 1431<br>BRIDGE        | 63-0069 | 30.6576  | -98.4276  | 840           | 0          | 22     | 21    |   | 63-0069 HLY  | 63-0069 HLY   |
| TX    | LAKE TAWAKONI                     | 41-4980 | 32.8522  | -95.8864  | 449           | 0          | 0      | 42    |   |  | 41-4483 DLY<br>41-4980 DLY  |
| TX    | LAMESA 1 SSE                      | 41-5013 | 32.7228  | -101.9456 | 2966          | 0          | 0      | 105   |   |  | 41-5013 DLY   |
| TX    | LAMPASAS                          | 41-5018 | 31.0717  | -98.1847  | 1033          | 0          | 0      | 115   |   |  | 69-2052 DLY<br>41-5018 DLY  |
| TX    | LAMPASAS RIVER<br>NEAR KEMPER     | 85-0588 | 31.0817  | -98.0164  | 902           | 0          | 22     | 21    |   | 85-0588 HLY  | 85-0588 HLY   |
| TX    | LANGTRY                           | 41-5048 | 29.8097  | -101.5603 | 1289          | 38         | 65     | 84    | 66-5048 15M<br>41-5048 15M                | 66-5048 15M<br>41-5049 HLY<br>41-5048 HLY  | 41-5049 HLY<br>41-5049 DLY<br>41-5048 HLY<br>41-5048 DLY                |
| TX    | LAREDO 2                          | 41-5060 | 27.5683  | -99.4983  | 430           | 0          | 44     | 103   |   | 64-0286 HLY<br>85-0606 HLY<br>41-5060 HLY<br>41-5058 HLY<br>56-0102 HLY<br>41-5057 HLY | 79-0044 DLY<br>41-5056 DLY<br>56-0102 HLY<br>79-0036 DLY<br>41-5060 DLY |



| State | Name                    | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |  |
|-------|-------------------------|---------|----------|-----------|---------------|------------|--------|-------|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--|--|--|
|       |                         |         |          |           |               | <1hr       | hourly | daily | <1hr                  | hourly      | daily       |             |             |             |             |             |             |             |             |             |             |             |  |  |  |
| TX    | LATEX                   | 41-5081 | 32.3500  | -94.1000  | 302           | 0          | 29     | 55    | 41-6788 HLY           | 16-3877 DLY | 16-0786 HLY | 41-6788 HLY | 41-5081 HLY | 16-0786 HLY | 41-5081 HLY | 16-0786 DLY | 41-0715 DLY | 41-6788 HLY | 16-0786 HLY | 41-5081 HLY | 41-5081 HLY | 41-5081 DLY |  |  |  |
| TX    | LAUGHLIN AFB<br>AIRPORT | 64-0375 | 29.3670  | -100.7830 | 1082          | 0          | 0      | 34    |                       |             |             | 79-0098 DLY | 64-0375 DLY |             |             |             |             |             |             |             |             |             |  |  |  |
| TX    | LAVON DAM               | 41-5094 | 33.0353  | -96.4861  | 509           | 23         | 42     | 68    | 41-5094 15M           | 41-5094 HLY |             | 41-5094 HLY | 41-5094 DLY |             |             |             |             |             |             |             |             |             |  |  |  |
| TX    | LAWN                    | 41-5097 | 32.1414  | -99.7528  | 1949          | 0          | 0      | 60    |                       |             |             | 41-5097 DLY |             |             |             |             |             |             |             |             |             |             |  |  |  |
| TX    | LEAKEY                  | 41-5113 | 29.7392  | -99.7611  | 1621          | 26         | 52     | 65    | 66-5113 15M           | 66-5113 15M | 66-5113 15M | 41-5113 15M | 41-5113 HLY | 41-5114 DLY | 41-5113 HLY | 41-5113 DLY |             |             |             |             |             |             |  |  |  |
| TX    | LEANDER 5 SW            | 63-0180 | 30.5384  | -97.9289  | 1105          | 0          | 24     | 24    |                       |             | 63-0180 HLY | 63-0180 HLY |             |             |             |             |             |             |             |             |             |             |  |  |  |
| TX    | LEFORS                  | 87-0043 | 35.4333  | -100.8000 | 2831          | 0          | 28     | 28    |                       |             | 85-0608 HLY | 85-0608 HLY | 87-0043 HLY | 87-0043 HLY |             |             |             |             |             |             |             |             |  |  |  |
| TX    | LENORAH                 | 41-5158 | 32.3081  | -101.8775 | 2844          | 0          | 0      | 69    |                       |             |             | 41-5158 DLY |             |             |             |             |             |             |             |             |             |             |  |  |  |
| TX    | LEVELLAND               | 41-5183 | 33.5500  | -102.3758 | 3514          | 0          | 0      | 76    |                       |             |             | 41-5183 DLY |             |             |             |             |             |             |             |             |             |             |  |  |  |
| TX    | LEWISVILLE DAM          | 41-5192 | 33.0694  | -97.0094  | 558           | 20         | 53     | 65    | 66-5192 15M           | 66-5192 15M | 41-5191 DLY | 41-5192 15M | 41-3476 HLY | 41-3476 HLY | 41-5192 HLY | 41-3476 DLY | 41-5192 DLY |             |             |             |             |             |  |  |  |
| TX    | LEXINGTON               | 41-5193 | 30.4064  | -97.0136  | 466           | 33         | 68     | 77    | 66-5193 15M           | 66-5193 15M | 41-5193 HLY | 41-5193 15M | 41-5193 HLY | 41-5193 DLY |             |             |             |             |             |             |             |             |  |  |  |
| TX    | LIBERTY                 | 41-5196 | 30.0592  | -94.7950  | 36            | 15         | 16     | 112   | 60-0243 15M           | 60-0243 15M | 41-5196 DLY |             |             |             |             |             |             |             |             |             |             |             |  |  |  |
| TX    | LILLIAN 3 W             | 41-5218 | 32.5000  | -97.2333  | 745           | 0          | 0      | 34    |                       |             | 41-5216 DLY | 41-5218 DLY |             |             |             |             |             |             |             |             |             |             |  |  |  |

| State | Name                    | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |  |
|-------|-------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|--|
|       |                         |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily  |
| TX    | LINDALE 5 SE            | 41-5228 | 32.4500  | -95.3667  | 449           | 0          | 0      | 34    |                            |                            | 41-5228 DLY  |
| TX    | LINDEN                  | 41-5229 | 33.0161  | -94.3675  | 417           | 0          | 0      | 69    |                            |                            | 41-5229 DLY  |
| TX    | LIPAN 4NW               | 41-5243 | 32.5683  | -98.0819  | 988           | 0          | 0      | 64    |                            |                            | 41-5243 DLY  |
| TX    | LIPSCOMB                | 41-5247 | 36.2358  | -100.2675 | 2451          | 26         | 52     | 74    | 41-5247 15M                | 41-5247 HLY                | 41-5247 HLY<br>41-5247 DLY                               |
| TX    | LITTLEFIELD             | 41-5265 | 33.9378  | -102.3447 | 3576          | 0          | 0      | 86    |                            |                            | 41-5263 DLY<br>41-5265 DLY                               |
| TX    | LIVINGSTON 2 NNE        | 41-5271 | 30.7394  | -94.9256  | 177           | 0          | 0      | 75    |                            |                            | 41-5271 DLY  |
| TX    | LLANO                   | 41-5272 | 30.7425  | -98.6542  | 1020          | 0          | 29     | 120   |                            | 63-0114 HLY                | 63-0114 HLY<br>41-5272 DLY                               |
| TX    | LLANO RIVER NR<br>MASON | 63-0094 | 30.6601  | -99.1085  | 1269          | 0          | 29     | 29    |                            | 63-0094 HLY                | 63-0094 HLY  |
| TX    | LOCKHART 2SW            | 41-5285 | 29.8569  | -97.6958  | 489           | 0          | 0      | 71    |                            |                            | 41-5284 DLY<br>41-5285 DLY                               |
| TX    | LOMA ALTA               | 41-5303 | 29.9173  | -100.7794 | 1903          | 0          | 20     | 20    |                            | 41-5303 HLY                | 41-5303 HLY  |
| TX    | LONDON 3N               | 41-5312 | 30.7131  | -99.5681  | 1801          | 25         | 53     | 60    | 41-5312 15M                | 41-1053 HLY<br>41-5312 HLY | 41-1053 HLY<br>41-5312 HLY<br>41-5312 HLY<br>41-5312 DLY |
| TX    | LONGVIEW                | 41-5341 | 32.4725  | -94.7172  | 331           | 0          | 0      | 114   |                            |                            | 41-5344 DLY<br>41-5341 DLY                               |
| TX    | LONGVIEW WSMO           | 79-0027 | 32.3500  | -94.6500  | 407           | 32         | 31     | 42    | 66-5348 15M<br>41-5348 15M | 66-5348 15M<br>41-5348 HLY | 79-0027 DLY  |
| TX    | LOOP                    | 41-5351 | 32.9000  | -102.4167 | 3245          | 0          | 0      | 42    |                            |                            | 41-5351 DLY  |
| TX    | LORAINE                 | 41-5358 | 32.4167  | -100.7167 | 2270          | 0          | 32     | 34    |                            | 41-5358 HLY                | 41-5358 HLY  |
| TX    | LORENZO                 | 41-5363 | 33.6667  | -101.5333 | 3169          | 0          | 0      | 36    |                            |                            | 41-5363 DLY  |
| TX    | LOVELADY                | 41-5398 | 31.1333  | -95.4500  | 302           | 0          | 44     | 44    |                            | 41-5398 HLY                | 41-5398 HLY<br>41-5398 DLY                               |
| TX    | LUBBOCK                 | 79-0114 | 33.6542  | -101.8136 | 3258          | 0          | 62     | 73    |                            | 56-0181 HLY<br>41-5411 HLY | 41-5411 HLY<br>79-0114 DLY                               |
| TX    | LUBBOCK 9 N             | 41-5410 | 33.6897  | -101.8219 | 3245          | 41         | 65     | 104   | 66-5410 15M<br>41-5410 15M | 66-5410 15M<br>41-5410 HLY | 41-5410 HLY<br>41-5410 DLY                               |
| TX    | LUFKIN 11 NW            | 41-5415 | 31.4269  | -94.8942  | 217           | 0          | 0      | 33    |                            |                            | 41-5415 DLY  |

| State | Name                     | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |  |
|-------|--------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|--|
|       |                          |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily  |
| TX    | LUFKIN ANGELINA CO<br>AP | 79-0159 | 31.2361  | -94.7544  | 289           | 0          | 0      | 104   |                            |   | 79-0159 DLY  |
| TX    | LULING                   | 41-5429 | 29.6756  | -97.6578  | 400           | 0          | 20     | 116   |                            | 41-5429 HLY                               | 41-5429 DLY  |
| TX    | LYTLE 3W                 | 41-5454 | 29.2358  | -98.8433  | 722           | 0          | 0      | 52    |                            |   | 69-2152 DLY<br>41-6205 DLY<br>41-5454 DLY                |
| TX    | MABANK 4 SW              | 41-5463 | 32.3317  | -96.1506  | 360           | 26         | 60     | 60    | 66-5463 15M<br>41-5463 15M | 66-5463 15M<br>41-5461 HLY<br>41-5463 HLY | 66-5463 15M<br>41-5461 HLY<br>41-5463 HLY                |
| TX    | MADISONVILLE             | 41-5477 | 30.9392  | -95.9203  | 253           | 0          | 0      | 82    |                            |   | 41-5477 DLY  |
| TX    | MALONE 3ENE              | 41-5528 | 31.9442  | -96.8464  | 485           | 0          | 29     | 34    |                            | 85-0674 HLY<br>41-5528 HLY                | 85-0674 HLY<br>41-5528 HLY                               |
| TX    | MANCHACA                 | 41-5538 | 30.1333  | -97.8333  | 702           | 31         | 31     | 49    | 65-0071 15M<br>63-0199 15M | 65-0071 15M<br>63-0199 15M                | 65-0071 15M<br>63-0199 15M<br>41-5538 DLY                |
| TX    | MARATHON                 | 41-5579 | 30.1925  | -103.2717 | 3990          | 0          | 0      | 70    |                            |   | 41-5579 DLY  |
| TX    | MARBLE FALLS             | 41-5580 | 30.5667  | -98.2833  | 771           | 0          | 0      | 58    |                            |   | 63-0139 HLY<br>41-5580 DLY                               |
| TX    | MARBLE FALLS 10 SSW      | 63-0141 | 30.4476  | -98.3379  | 1364          | 0          | 24     | 24    |                            | 63-0141 HLY                               | 63-0141 HLY  |
| TX    | MARBLE FALLS 4 WSW       | 63-0137 | 30.5545  | -98.3368  | 790           | 0          | 26     | 26    |                            | 63-0137 HLY                               | 63-0137 HLY  |
| TX    | MARBLE FALLS 6 ENE       | 63-0145 | 30.5993  | -98.1709  | 982           | 0          | 23     | 25    |                            | 63-0145 HLY                               | 63-0145 HLY  |
| TX    | MARFA 3W                 | 41-5596 | 30.3125  | -104.0722 | 4790          | 27         | 31     | 44    | 41-5596 15M                | 41-5596 HLY                               | 41-5596 HLY<br>41-5596 DLY                               |
| TX    | MARFA CHARCO M R         | 41-5591 | 30.4833  | -104.1167 | 5300          | 0          | 25     | 26    |                            | 41-8400 HLY<br>41-5591 HLY                | 41-8400 HLY<br>41-5591 HLY                               |
| TX    | MARLIN 3 NE              | 41-5611 | 31.3336  | -96.8581  | 384           | 0          | 0      | 85    |                            |   | 41-5611 DLY  |
| TX    | MARSHALL                 | 41-5618 | 32.5403  | -94.3508  | 351           | 0          | 0      | 109   |                            |   | 41-5618 DLY  |
| TX    | MASON                    | 41-5650 | 30.7478  | -99.2306  | 1549          | 0          | 0      | 69    |                            |   | 41-5650 DLY  |
| TX    | MATADOR                  | 41-5658 | 34.0044  | -100.8250 | 2415          | 36         | 63     | 75    | 41-5656 15M                | 41-5658 HLY<br>41-5656 HLY                | 41-5658 HLY<br>41-5656 HLY<br>41-5658 HLY<br>41-5658 DLY |
| TX    | MATAGORDA NO 2           | 41-5659 | 28.6836  | -95.9733  | 10            | 0          | 0      | 103   |                            |   | 41-5659 DLY  |

| State | Name                              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |  |
|-------|-----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|--|
|       |                                   |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily  |
| TX    | MATHIS 4 SSW                      | 41-5661 | 28.0372  | -97.8725  | 138           | 0          | 0      | 52    |   |   | 41-5661 DLY  |
| TX    | MAUD                              | 41-5667 | 33.3322  | -94.3436  | 305           | 0          | 0      | 68    |   |   | 41-5667 DLY  |
| TX    | MAYHAW BAYOU -<br>WILBER ROAD     | 82-7000 | 29.8075  | -94.2619  | 9             | 23         | 24     | 23    | 82-7000 15M                               | 82-7000 15M                               | 82-7000 15M  |
| TX    | MAYPEARL                          | 41-5695 | 32.3114  | -97.0158  | 548           | 0          | 42     | 51    |   | 41-5695 HLY                               | 41-5695 HLY<br>41-5695 DLY                               |
| TX    | MC LEAN                           | 41-5770 | 35.2361  | -100.5922 | 2872          | 36         | 63     | 77    | 80-0049 15M<br>66-5770 15M<br>41-5770 15M | 80-0049 15M<br>66-5770 15M<br>41-5770 HLY | 80-0049 15M<br>66-5770 15M<br>41-5770 HLY<br>41-5770 DLY |
| TX    | MCALLEN MILLER<br>INTL AP         | 79-0060 | 26.1839  | -98.2539  | 102           | 0          | 21     | 76    |   | 55-0051 HLY<br>78-0059 15M<br>41-5702 HLY | 41-5701 DLY<br>79-0060 DLY                               |
| TX    | MCCAMEY                           | 41-5707 | 31.1331  | -102.2217 | 2461          | 0          | 0      | 83    |   |   | 41-5707 DLY  |
| TX    | MCCOOK                            | 41-5721 | 26.4842  | -98.3907  | 220           | 0          | 0      | 67    |   |   | 41-5721 DLY  |
| TX    | MCCREE BRANCH -<br>WHITE ROCK TRA | 81-0004 | 32.8717  | -96.7286  | 475           | 22         | 22     | 21    | 81-0004 15M                               | 81-0004 15M                               | 81-0004 15M  |
| TX    | MCGREGOR                          | 41-5757 | 31.4350  | -97.4011  | 722           | 0          | 0      | 101   |   |   | 41-5757 DLY  |
| TX    | MCKINNEY<br>MUNICIPAL AIRPORT     | 41-5766 | 33.1835  | -96.5895  | 587           | 0          | 0      | 99    |   |   | 56-0207 HLY<br>41-5766 DLY                               |
| TX    | MEDINA 1NE                        | 41-5742 | 29.8100  | -99.2497  | 1487          | 0          | 0      | 48    |   |   | 41-5742 DLY  |
| TX    | MEMPHIS                           | 41-5821 | 34.7261  | -100.5372 | 2090          | 0          | 0      | 103   |   |   | 41-5821 DLY  |
| TX    | MENARD                            | 41-5822 | 30.9044  | -99.7864  | 1982          | 0          | 0      | 106   |   |   | 41-5822 DLY  |
| TX    | MERCEDES 6 SSE                    | 41-5836 | 26.0619  | -97.8997  | 75            | 0          | 0      | 62    |   |   | 41-5836 DLY  |
| TX    | MERIDIAN                          | 41-5845 | 31.9300  | -97.6608  | 771           | 0          | 0      | 45    |   |   | 41-5847 DLY<br>41-5845 DLY                               |
| TX    | MERTZON                           | 41-5859 | 31.2667  | -100.8167 | 2228          | 0          | 0      | 42    |   |   | 41-5859 DLY  |
| TX    | MEXIA                             | 41-5869 | 31.6181  | -96.4497  | 502           | 0          | 0      | 99    |   |   | 41-5869 DLY  |
| TX    | MIAMI                             | 41-5875 | 35.6936  | -100.6392 | 2746          | 0          | 0      | 97    |   |   | 41-5875 DLY  |
| TX    | MIDLAND 4 ENE                     | 41-5891 | 32.0186  | -102.0258 | 2776          | 0          | 0      | 95    |   |   | 99-5891 DLY<br>41-5891 DLY                               |
| TX    | MIDLAND ODESSA                    | 79-0109 | 31.9433  | -102.1889 | 2867          | 0          | 69     | 87    |   | 56-0177 HLY<br>41-5890 HLY                | 79-0109 DLY  |

| State | Name                | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |  |   |
|-------|---------------------|---------|----------|-----------|---------------|------------|--------|-------|---|--|---|
|       |                     |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly   | daily                                     |
| TX    | MIDLOTHIAN          | 41-5897 | 32.4842  | -96.9942  | 751           | 30         | 31     | 62    | 66-5897 15M<br>41-5897 15M                | 66-5897 15M<br>41-5897 HLY                               | 41-5896 DLY<br>41-5897 HLY<br>41-5897 DLY |
| TX    | MIDWAY 4 NE         | 41-5904 | 31.0706  | -95.7150  | 236           | 0          | 0      | 35    |   |  | 41-5904 DLY                               |
| TX    | MINEOLA             | 41-5954 | 32.6350  | -95.4822  | 367           | 0          | 0      | 65    |   |  | 41-5954 DLY                               |
| TX    | MINEOLA 8 ENE       | 41-5956 | 32.7167  | -95.3667  | 384           | 0          | 0      | 32    |   |  | 41-5956 DLY                               |
| TX    | MINERAL WELLS 1 SSW | 41-5957 | 32.7864  | -98.1183  | 845           | 32         | 47     | 48    | 66-5957 15M<br>41-5957 15M                | 66-5957 15M<br>41-5957 15M<br>41-5957 HLY                | 66-5957 15M<br>41-5957 15M<br>41-5957 HLY |
| TX    | MINERAL WELLS AP    | 79-0157 | 32.7817  | -98.0603  | 972           | 0          | 22     | 61    |   | 56-0275 HLY<br>55-0174 HLY<br>41-5958 HLY                | 79-0157 DLY                               |
| TX    | MOBEETIE            | 41-5987 | 35.5333  | -100.4333 | 2680          | 0          | 0      | 40    |   |  | 52-5987 DLY<br>41-5987 DLY                |
| TX    | MOLINE              | 41-5996 | 31.3933  | -98.3081  | 1385          | 22         | 55     | 60    | 41-5996 15M                               | 41-5996 HLY  | 41-5996 HLY                               |
| TX    | MONAHANS            | 41-5999 | 31.5414  | -102.9122 | 2546          | 0          | 0      | 45    |   |  | 41-5999 DLY                               |
| TX    | MONTELL             | 41-6019 | 29.5333  | -100.0167 | 1302          | 0          | 0      | 31    |   |  | 41-6019 DLY                               |
| TX    | MONTGOMERY          | 41-6024 | 30.3908  | -95.6969  | 322           | 0          | 0      | 64    |   |  | 41-6024 HLY<br>41-6024 DLY                |
| TX    | MORGAN              | 41-6058 | 32.0139  | -97.6131  | 728           | 0          | 0      | 50    |   |  | 41-6058 DLY                               |
| TX    | MORGAN MILL         | 41-6060 | 32.3842  | -98.1703  | 1056          | 0          | 0      | 58    |   |  | 41-6060 DLY                               |
| TX    | MORSE               | 41-6070 | 36.0608  | -101.4747 | 3179          | 0          | 0      | 48    |   |  | 41-6070 DLY                               |
| TX    | MORTON              | 41-6074 | 33.7183  | -102.7586 | 3773          | 0          | 0      | 69    |   |  | 41-6074 DLY                               |
| TX    | MT LOCKE            | 41-6104 | 30.6716  | -104.0225 | 6791          | 28         | 64     | 83    | 66-6104 15M<br>41-6104 15M                | 66-6104 15M<br>41-5737 HLY<br>41-6104 HLY                | 41-6104 DLY                               |
| TX    | MT PLEASANT         | 41-6108 | 33.1689  | -95.0056  | 427           | 27         | 48     | 97    | 41-6108 15M                               | 41-6108 HLY  | 41-6108 DLY                               |
| TX    | MT VERNON           | 41-6119 | 33.1964  | -95.2236  | 446           | 0          | 0      | 51    |   |  | 41-6119 DLY                               |
| TX    | MUENSTER            | 41-6130 | 33.6564  | -97.3769  | 1037          | 0          | 0      | 74    |   |  | 41-6130 DLY                               |
| TX    | MULESHOE #1         | 41-6135 | 34.2192  | -102.7328 | 3829          | 41         | 63     | 96    | 66-6136 15M<br>80-0054 15M<br>41-6136 15M | 66-6136 15M<br>80-0054 15M<br>41-6136 15M<br>41-6136 HLY | 41-6136 HLY<br>41-6135 DLY                |

| State | Name                            | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |                            |
|-------|---------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|----------------------------|
|       |                                 |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily                      |
| TX    | MULESHOE 19 S                   | 79-0007 | 33.9558  | -102.7739 | 3743          | 0          | 0      | 38    |                            |                            | 41-6137 DLY<br>79-0007 DLY |
| TX    | MULLIN                          | 41-6140 | 31.5833  | -98.6667  | 1493          | 0          | 0      | 50    |                            |                            | 41-6140 DLY                |
| TX    | MUNDAY 1W                       | 41-6147 | 33.4500  | -99.6364  | 1486          | 0          | 0      | 98    |                            |                            | 41-6146 DLY<br>41-6147 DLY |
| TX    | N FORK RED RIVER NR<br>SHAMROCK | 87-0032 | 35.2642  | -100.2414 | 2217          | 0          | 23     | 21    |                            | 87-0032 HLY                | 87-0032 HLY                |
| TX    | NACOGDOCHES                     | 41-6177 | 31.6164  | -94.6431  | 436           | 24         | 49     | 116   | 41-6177 15M                | 41-6176 HLY<br>41-6177 HLY | 41-6176 DLY<br>41-6177 DLY |
| TX    | NAPLES 5 NE                     | 41-6195 | 33.2425  | -94.6736  | 289           | 0          | 0      | 86    |                            |                            | 41-6190 DLY<br>41-6195 DLY |
| TX    | NAVARRO MILLS DAM               | 41-6210 | 31.9611  | -96.6881  | 453           | 37         | 50     | 55    | 66-6210 15M<br>41-6210 15M | 66-6210 15M<br>41-6210 HLY | 41-6210 HLY<br>41-6210 DLY |
| TX    | NEGLEY 4 SSW                    | 41-6247 | 33.7042  | -95.0700  | 404           | 0          | 0      | 52    |                            |                            | 41-6247 DLY                |
| TX    | NEUVILLE                        | 41-6265 | 31.6503  | -94.1519  | 479           | 0          | 0      | 45    |                            |                            | 41-6265 DLY                |
| TX    | NEW BOSTON                      | 41-6270 | 33.4547  | -94.4089  | 344           | 37         | 35     | 44    | 66-6270 15M<br>41-6270 15M | 66-6270 15M<br>41-6270 HLY | 41-6270 HLY<br>41-6270 DLY |
| TX    | NEW BRAUNFELS                   | 41-6276 | 29.7192  | -98.1189  | 620           | 0          | 0      | 115   |                            |                            | 69-1087 DLY<br>41-6276 DLY |
| TX    | NEW CANEY 2 E                   | 41-6280 | 30.1375  | -95.1783  | 73            | 0          | 0      | 64    |                            |                            | 41-6280 DLY                |
| TX    | NEW GULF                        | 41-6286 | 29.2667  | -95.8950  | 72            | 0          | 0      | 50    |                            |                            | 41-6286 DLY                |
| TX    | NEW SUMMERFIELD<br>2W           | 41-6335 | 31.9747  | -95.1381  | 371           | 25         | 40     | 53    | 66-6335 15M<br>41-6335 15M | 66-6335 15M<br>41-6335 HLY | 41-6335 HLY<br>41-6335 DLY |
| TX    | NEWPORT 1SW                     | 41-6331 | 33.4561  | -98.0253  | 1060          | 0          | 0      | 54    |                            |                            | 41-6331 DLY                |
| TX    | NEWTON                          | 41-6341 | 30.8331  | -93.7369  | 151           | 0          | 0      | 35    |                            |                            | 41-6339 DLY<br>41-6341 DLY |
| TX    | NIX STORE 1 W                   | 41-6367 | 31.1081  | -98.3794  | 1362          | 0          | 0      | 58    |                            |                            | 41-6367 DLY                |
| TX    | NIXON                           | 41-6368 | 29.2828  | -97.7675  | 341           | 0          | 0      | 87    |                            |                            | 41-6368 DLY                |
| TX    | NORTHFIELD                      | 41-6433 | 34.2606  | -100.6014 | 2070          | 0          | 0      | 67    |                            |                            | 80-0056 15M<br>41-6433 DLY |
| TX    | NORTHINGTON RCH                 | 41-6448 | 29.8642  | -98.6581  | 1526          | 0          | 0      | 31    |                            |                            | 41-6448 DLY                |
| TX    | NOTLA 3 SE                      | 41-6477 | 36.1014  | -100.5894 | 2900          | 0          | 0      | 69    |                            |                            | 41-6477 DLY                |

| State | Name             | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |   |
|-------|------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|---|
|       |                  |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily                                     |
| TX    | O C FISHER DAM   | 41-6499 | 31.4539  | -100.4933 | 1965          | 0          | 0      | 55    |   |   | 69-2400 DLY<br>41-7940 DLY<br>41-6499 DLY |
| TX    | O DONNELL        | 41-6504 | 32.9711  | -101.8247 | 3046          | 41         | 70     | 71    | 66-6504 15M<br>80-0058 15M<br>41-6504 15M | 66-6504 15M<br>80-0058 15M<br>41-6504 HLY | 66-6504 15M<br>80-0058 15M<br>41-6504 HLY |
| TX    | OAKWOOD          | 41-6496 | 31.5914  | -95.8442  | 285           | 0          | 0      | 80    |   |   | 69-1355 DLY<br>41-5327 DLY<br>41-6496 DLY |
| TX    | ODESSA           | 41-6502 | 31.8797  | -102.3592 | 2910          | 0          | 0      | 65    |   |   | 41-6502 DLY                               |
| TX    | OLNEY            | 41-6636 | 33.3733  | -98.7664  | 1194          | 0          | 0      | 50    |   |   | 41-6636 DLY                               |
| TX    | OLNEY 5 NNW      | 41-6641 | 33.4372  | -98.7806  | 1184          | 0          | 0      | 59    |   |   | 41-6641 DLY                               |
| TX    | OLTON            | 41-6644 | 34.1797  | -102.1356 | 3642          | 0          | 0      | 61    |   |   | 41-6644 DLY                               |
| TX    | ORANGE           | 41-6664 | 30.0858  | -93.7417  | 10            | 0          | 0      | 107   |   |   | 99-6664 DLY<br>41-6664 DLY                |
| TX    | ORANGE 9 N       | 41-6680 | 30.2264  | -93.7394  | 20            | 0          | 0      | 63    |   |   | 41-2436 DLY<br>41-6680 DLY                |
| TX    | OVERTON          | 41-6722 | 32.2667  | -94.9833  | 499           | 0          | 0      | 55    |   |   | 89-0038 DLY<br>41-6722 DLY                |
| TX    | OZONA            | 41-6734 | 30.7169  | -101.2061 | 2346          | 0          | 0      | 64    |   |   | 41-6734 HLY<br>41-6734 DLY                |
| TX    | OZONA 8 WSW      | 41-6736 | 30.6819  | -101.3375 | 2550          | 28         | 49     | 49    | 41-6736 15M                               | 41-6736 HLY                               | 41-6736 HLY                               |
| TX    | PADUCAH          | 41-6740 | 34.0067  | -100.2989 | 1900          | 0          | 0      | 99    |   |   | 41-6743 DLY<br>41-6740 HLY<br>41-6740 DLY |
| TX    | PADUCAH 10S      | 41-6745 | 33.8758  | -100.3831 | 1949          | 0          | 0      | 43    |   |   | 41-5086 DLY<br>41-6745 DLY                |
| TX    | PADUCAH 15 S     | 41-6742 | 33.8083  | -100.2981 | 1831          | 0          | 0      | 44    |   |   | 41-6742 DLY                               |
| TX    | PAINT ROCK       | 41-6747 | 31.5536  | -99.8500  | 1588          | 0          | 0      | 89    |   |   | 41-6747 DLY                               |
| TX    | PALACIOS MUNI AP | 79-0054 | 28.7247  | -96.2536  | 13            | 0          | 0      | 75    |   |   | 79-0054 DLY                               |
| TX    | PALESTINE 2 NE   | 79-0153 | 31.7831  | -95.6039  | 466           | 0          | 60     | 133   |   | 66-6757 15M<br>41-6757 HLY                | 99-6757 DLY<br>41-6757 HLY<br>79-0153 DLY |

| State | Name                      | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |  |
|-------|---------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|--|
|       |                           |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily  |
| TX    | PALO PINTO                | 41-6766 | 32.7664  | -98.3083  | 1040          | 0          | 0      | 62    |                            |   | 41-6766 DLY  |
| TX    | PAMPA 2                   | 41-6776 | 35.5544  | -100.9736 | 3150          | 33         | 61     | 91    | 66-6776 15M<br>41-6776 15M | 66-6776 15M<br>41-6775 HLY<br>41-6776 HLY | 41-6775 HLY<br>79-0119 DLY<br>41-6776 HLY<br>41-6776 DLY |
| TX    | PANDALE 1 N               | 41-6780 | 30.2061  | -101.5575 | 1690          | 0          | 0      | 62    |                            |   | 99-6780 DLY<br>41-6780 DLY                               |
| TX    | PANHANDLE                 | 41-6785 | 35.3514  | -101.3897 | 3465          | 0          | 0      | 88    |                            |   | 41-6785 DLY  |
| TX    | PANTHER JUNCTION          | 41-6792 | 29.3272  | -103.2061 | 3740          | 34         | 55     | 62    | 41-6792 15M                | 85-0722 HLY<br>76-0089 HLY<br>41-6792 HLY | 41-6792 DLY  |
| TX    | PARIS                     | 41-6794 | 33.6744  | -95.5586  | 541           | 0          | 0      | 113   |                            |   | 41-6794 DLY  |
| TX    | PEARSALL                  | 41-6879 | 28.8889  | -99.0897  | 636           | 0          | 0      | 107   |                            |   | 41-6879 DLY  |
| TX    | PECAN BAYOU NR<br>MULLIN  | 63-0022 | 31.5172  | -98.7414  | 1244          | 0          | 29     | 29    |                            | 85-0675 HLY<br>63-0022 HLY                | 85-0675 HLY<br>63-0022 HLY                               |
| TX    | PECOS                     | 41-6892 | 31.4167  | -103.5000 | 2612          | 0          | 0      | 67    |                            |   | 41-6892 DLY  |
| TX    | PECOS 8W                  | 41-6893 | 31.3783  | -103.6331 | 2723          | 35         | 49     | 56    | 66-6893 15M<br>41-6893 15M | 66-6893 15M<br>41-6893 HLY                | 66-6893 15M<br>41-6893 HLY<br>41-6893 DLY                |
| TX    | PENWELL                   | 41-6932 | 31.7356  | -102.5897 | 2933          | 0          | 0      | 65    |                            |   | 41-4661 DLY<br>41-6932 DLY                               |
| TX    | PEP                       | 41-6935 | 33.8153  | -102.5578 | 3660          | 42         | 59     | 57    | 66-6935 15M<br>41-6935 15M | 66-6935 15M<br>41-6935 15M<br>41-6935 HLY | 66-6935 15M<br>41-6935 15M<br>41-6935 HLY                |
| TX    | PERRYTON                  | 41-6950 | 36.3897  | -100.8239 | 2943          | 0          | 0      | 103   |                            |   | 41-6950 DLY  |
| TX    | PERRYTON 11 WNW           | 41-6953 | 36.4408  | -100.9961 | 3009          | 0          | 0      | 73    |                            |   | 41-6953 DLY  |
| TX    | PERRYTON 21 S             | 41-6952 | 36.1017  | -100.7394 | 2986          | 0          | 0      | 37    |                            |   | 41-6952 DLY  |
| TX    | PERSIMMON GAP             | 41-6959 | 29.6603  | -103.1736 | 2864          | 0          | 0      | 34    |                            |   | 41-6959 DLY  |
| TX    | PFLUGERVILLE              | 41-6992 | 30.4333  | -97.6167  | 679           | 31         | 31     | 49    | 65-0041 15M<br>63-0202 15M | 65-0041 15M<br>63-0202 15M                | 65-0041 15M<br>63-0202 15M<br>41-6992 DLY                |
| TX    | PILOT POINT ISL DU<br>BOI | 41-7028 | 33.3658  | -97.0122  | 689           | 0          | 0      | 80    |                            |   | 41-7028 DLY  |



| State | Name                    | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |  |
|-------|-------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|--|
|       |                         |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily  |
| TX    | PINE SPRINGS            | 41-7044 | 31.8903  | -104.8078 | 5591          | 0          | 0      | 39    |   |   | 54-0213 DLY<br>80-0034 15M<br>76-0091 HLY<br>41-7044 DLY |
| TX    | PINELAND                | 41-7040 | 31.2447  | -93.9658  | 220           | 0          | 0      | 40    |   |   | 41-7040 DLY  |
| TX    | PITCHFORK RCH           | 41-7060 | 33.5992  | -100.5319 | 1946          | 0          | 25     | 37    |   | 66-7060 15M<br>41-7060 HLY                | 41-7060 DLY  |
| TX    | PITTSBURG 5 SSE         | 41-7066 | 32.9264  | -94.9392  | 364           | 0          | 46     | 63    |   | 41-7066 HLY                               | 41-7066 DLY  |
| TX    | PLAINS                  | 41-7074 | 33.1869  | -102.8281 | 3675          | 40         | 64     | 81    | 80-0067 15M<br>66-7074 15M<br>41-7074 15M | 80-0067 15M<br>66-7074 15M<br>41-7074 HLY | 80-0067 15M<br>41-7074 HLY<br>41-7074 DLY                |
| TX    | PLAINVIEW               | 41-7079 | 34.1892  | -101.7022 | 3369          | 0          | 0      | 108   |   |   | 41-7079 DLY  |
| TX    | PLEMONS                 | 41-7116 | 35.7667  | -101.3333 | 2802          | 0          | 0      | 30    |   |   | 41-7116 HLY<br>41-7116 DLY                               |
| TX    | POINT COMFORT           | 41-7140 | 28.6575  | -96.5553  | 20            | 29         | 50     | 57    | 66-7140 15M<br>41-7140 15M                | 66-7140 15M<br>41-7140 HLY                | 41-7140 DLY  |
| TX    | PORT ARANSAS            | 41-7170 | 27.8381  | -97.0592  | 13            | 0          | 0      | 31    |   |   | 41-7170 DLY  |
| TX    | PORT ARTHUR SE TX<br>AP | 79-0041 | 29.9506  | -94.0206  | 16            | 0          | 65     | 70    |   | 56-0106 HLY<br>41-7174 HLY                | 79-0041 DLY  |
| TX    | PORT ARTHUR WB<br>CITY  | 41-7173 | 29.8691  | -93.9343  | 10            | 0          | 35     | 97    |   | 99-7173 HLY<br>41-7173 HLY                | 99-7173 HLY<br>41-7172 DLY<br>41-7173 HLY<br>41-7173 DLY |
| TX    | PORT ISABEL             | 41-7179 | 26.0942  | -97.3094  | 16            | 0          | 0      | 75    |   |   | 69-1119 DLY<br>41-7179 DLY                               |
| TX    | PORT LAVACA             | 41-7183 | 28.6078  | -96.6417  | 20            | 0          | 0      | 60    |   |   | 41-7182 DLY<br>41-7183 DLY                               |
| TX    | PORT MANSFIELD          | 41-7184 | 26.5578  | -97.4264  | 10            | 0          | 0      | 61    |   |   | 41-7184 DLY  |
| TX    | PORT O'CONNOR           | 41-7186 | 28.4342  | -96.4278  | 7             | 0          | 0      | 42    |   |   | 41-7186 DLY  |
| TX    | POSSUM KINGDOM<br>DAM   | 41-7205 | 32.8667  | -98.4333  | 902           | 0          | 0      | 35    |   |   | 41-7205 DLY  |
| TX    | POST                    | 41-7206 | 33.1986  | -101.3744 | 2612          | 0          | 0      | 102   |   |   | 41-7206 DLY  |
| TX    | POTEET                  | 41-7215 | 29.0283  | -98.5686  | 427           | 0          | 0      | 71    |   |   | 41-7215 DLY  |

| State | Name                         | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |  |
|-------|------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|--|
|       |                              |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily  |
| TX    | POYNOR 1 NE                  | 41-7230 | 32.0833  | -95.5833  | 531           | 0          | 0      | 30    |                            |   | 41-7230 DLY  |
| TX    | PRADE RCH                    | 41-7232 | 29.9167  | -99.7908  | 2051          | 0          | 0      | 53    |                            |   | 41-7232 DLY  |
| TX    | PRAIRIE MTN                  | 41-7243 | 30.5767  | -98.8767  | 1447          | 33         | 69     | 66    | 63-0106 15M<br>41-7243 15M | 63-0106 HLY<br>41-7243 15M<br>41-7243 HLY | 63-0106 HLY<br>41-7243 15M<br>41-7243 HLY<br>41-7243 DLY |
| TX    | PRESIDIO 2                   | 41-7264 | 29.5600  | -104.3728 | 2569          | 0          | 0      | 79    |                            |   | 41-7262 DLY<br>41-7264 DLY                               |
| TX    | PRESTON ROAD -<br>OLIVE TREE | 81-0008 | 33.0128  | -96.7958  | 679           | 23         | 22     | 22    | 81-0008 15M                | 81-0008 15M                               | 81-0008 15M  |
| TX    | PRICE 2 SW                   | 41-7271 | 32.1167  | -94.9667  | 371           | 0          | 0      | 34    |                            |   | 41-7271 DLY  |
| TX    | PROCTOR RSVR                 | 41-7300 | 31.9633  | -98.4942  | 1220          | 19         | 31     | 54    | 41-7300 15M                | 41-7300 HLY                               | 41-7300 DLY  |
| TX    | PUTNAM                       | 41-7327 | 32.3664  | -99.1925  | 1631          | 0          | 0      | 106   |                            |   | 41-7327 DLY  |
| TX    | QUANAH 2 SW                  | 41-7336 | 34.2761  | -99.7578  | 1601          | 0          | 0      | 101   |                            |   | 41-7336 DLY  |
| TX    | QUITAQUE                     | 41-7361 | 34.3667  | -101.0500 | 2572          | 0          | 0      | 44    |                            |   | 85-0380 HLY<br>41-1441 HLY<br>76-0036 HLY<br>41-7361 DLY |
| TX    | QUITMAN 2                    | 41-7365 | 32.7931  | -95.4350  | 413           | 0          | 0      | 52    |                            |   | 41-7363 DLY<br>41-7365 DLY                               |
| TX    | RAINBOW                      | 41-7388 | 32.2619  | -97.7064  | 650           | 0          | 0      | 77    |                            |   | 41-7388 DLY  |
| TX    | RANDOLPH AFB                 | 79-0039 | 29.5439  | -98.2736  | 761           | 37         | 68     | 72    | 66-7422 15M<br>41-7422 15M | 66-7422 15M<br>41-7422 HLY                | 66-7422 15M<br>41-7422 HLY<br>69-1425 DLY<br>79-0039 DLY |
| TX    | RANGER 1 W                   | 41-7426 | 32.4667  | -98.7000  | 1542          | 0          | 0      | 33    |                            |   | 41-7425 DLY<br>41-7426 DLY                               |
| TX    | RANKIN                       | 41-7431 | 31.2286  | -101.9461 | 2615          | 22         | 52     | 55    | 41-7431 15M                | 41-7431 HLY                               | 41-7431 HLY<br>41-7431 DLY                               |
| TX    | RAYMONDVILLE                 | 41-7458 | 26.7069  | -97.7833  | 30            | 0          | 0      | 101   |                            |   | 41-7458 DLY  |
| TX    | RED BLUFF CROSSING           | 41-7480 | 31.2175  | -98.5833  | 1234          | 0          | 28     | 62    |                            | 63-0043 HLY                               | 63-0043 HLY<br>41-7480 DLY                               |

| State | Name               | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |   |
|-------|--------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|---|
|       |                    |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily                                     |
| TX    | RED BLUFF DAM      | 41-7481 | 31.8950  | -103.9183 | 2848          | 0          | 49     | 56    |                            | 41-7481 HLY                               | 41-7481 HLY<br>41-7481 DLY                |
| TX    | RED ROCK           | 41-7497 | 29.9667  | -97.4500  | 522           | 0          | 0      | 34    |                            |   | 41-7497 HLY<br>41-7497 DLY                |
| TX    | RED SPRINGS 3 N    | 41-7499 | 33.6494  | -99.4042  | 1351          | 30         | 53     | 58    | 41-7499 15M                | 41-7499 HLY                               | 41-7499 HLY                               |
| TX    | REESE AFB          | 79-0108 | 33.6000  | -102.0500 | 3327          | 0          | 0      | 46    |                            |   | 64-0405 DLY<br>80-0071 15M<br>79-0108 DLY |
| TX    | REFUGIO            | 41-7529 | 28.3000  | -97.2833  | 49            | 0          | 0      | 64    |                            |   | 99-7530 DLY<br>41-7530 DLY<br>41-7529 DLY |
| TX    | RENO               | 41-7556 | 32.9536  | -97.5739  | 770           | 28         | 54     | 53    | 41-7556 15M                | 41-7556 HLY                               | 41-7556 HLY                               |
| TX    | RG75A              | 94-0008 | 31.4706  | -96.8833  | 556           | 77         | 76     | 77    | 94-0010 15M<br>94-0008 15M | 94-0010 15M<br>94-0008 15M                | 94-0010 15M<br>94-0008 15M                |
| TX    | RICHARDS           | 41-7586 | 30.5381  | -95.8458  | 315           | 0          | 0      | 47    |                            |   | 41-7586 DLY                               |
| TX    | RICHARDSON         | 41-7588 | 32.9964  | -96.7428  | 679           | 0          | 0      | 67    |                            |   | 41-7588 DLY                               |
| TX    | RICHLAND SPRINGS   | 41-7593 | 31.2700  | -98.9486  | 1381          | 0          | 0      | 55    |                            |   | 41-7593 DLY                               |
| TX    | RICHMOND           | 41-7594 | 29.5839  | -95.7553  | 102           | 0          | 49     | 83    |                            | 41-2073 HLY<br>41-7596 HLY<br>41-7594 HLY | 99-7594 DLY<br>41-7594 HLY<br>41-7594 DLY |
| TX    | RINGGOLD           | 41-7614 | 33.8167  | -97.9333  | 896           | 0          | 0      | 48    |                            |   | 41-7614 DLY                               |
| TX    | RIO GRANDE CITY    | 41-7622 | 26.3769  | -98.8117  | 171           | 0          | 0      | 132   |                            |   | 52-7623 DLY<br>52-7622 DLY<br>41-7622 DLY |
| TX    | RIO GRANDE VILLAGE | 41-7624 | 29.1853  | -102.9622 | 1857          | 0          | 0      | 63    |                            |   | 41-4299 DLY<br>41-0950 DLY<br>41-7624 DLY |
| TX    | RIOMEDINA          | 41-7628 | 29.4417  | -98.8800  | 850           | 0          | 0      | 90    |                            |   | 41-7628 DLY                               |
| TX    | RISING STAR 1S     | 41-7633 | 32.0817  | -98.9658  | 1634          | 0          | 0      | 62    |                            |   | 41-7633 DLY                               |
| TX    | RIVERSIDE          | 41-7651 | 30.8500  | -95.4000  | 240           | 0          | 0      | 46    |                            |   | 60-0194 15M<br>85-0763 HLY<br>41-7651 DLY |
| TX    | ROANOKE            | 41-7659 | 33.0050  | -97.2331  | 640           | 0          | 0      | 75    |                            |   | 41-7659 DLY                               |

| State | Name                      | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations |                            |  |
|-------|---------------------------|---------|----------|-----------|---------------|------------|--------|-------|-----------------------|----------------------------|--|
|       |                           |         |          |           |               | <1hr       | hourly | daily | <1hr                  | hourly                     | daily  |
| TX    | ROBERT LEE                | 41-7669 | 31.8836  | -100.5358 | 1916          | 0          | 0      | 63    |                       |                            | 69-0931 DLY<br>41-7669 DLY                               |
| TX    | ROBSTOWN                  | 41-7677 | 27.7894  | -97.6619  | 85            | 0          | 0      | 69    |                       |                            | 41-7677 DLY  |
| TX    | ROBY                      | 41-7678 | 32.7333  | -100.3833 | 1982          | 0          | 0      | 54    |                       |                            | 41-7678 DLY  |
| TX    | ROCKDALE                  | 41-7685 | 30.6431  | -97.0372  | 528           | 0          | 0      | 52    |                       |                            | 69-2164 DLY<br>41-7685 DLY                               |
| TX    | ROCKLAND 2 NW             | 41-7700 | 31.0167  | -94.4000  | 89            | 0          | 32     | 75    |                       | 41-7700 HLY                | 99-7700 DLY<br>41-7700 HLY<br>41-7700 DLY                |
| TX    | ROCKPORT                  | 41-7704 | 28.0286  | -97.0567  | 10            | 0          | 0      | 77    |                       |                            | 41-7705 DLY<br>41-7704 DLY                               |
| TX    | ROCKPORT ARANSAS<br>CO AP | 79-0065 | 28.0836  | -97.0464  | 23            | 0          | 21     | 21    |                       | 55-0057 HLY<br>56-0129 HLY | 55-0057 HLY<br>79-0065 DLY                               |
| TX    | ROCKSPRINGS               | 41-7706 | 30.0239  | -100.2119 | 2382          | 28         | 53     | 73    | 41-7706 15M           | 41-7718 HLY<br>41-7706 HLY | 41-7706 HLY<br>41-7706 DLY                               |
| TX    | ROCKSPRINGS 18 SW         | 41-7712 | 29.7902  | -100.4151 | 1726          | 0          | 0      | 37    |                       |                            | 69-1221 DLY<br>41-7712 DLY                               |
| TX    | ROCKWALL                  | 41-7707 | 32.9331  | -96.4647  | 545           | 0          | 0      | 73    |                       |                            | 89-0089 DLY<br>69-2315 DLY<br>41-7708 DLY<br>41-7707 DLY |
| TX    | ROSCOE                    | 41-7743 | 32.4481  | -100.5264 | 2379          | 0          | 0      | 81    |                       |                            | 41-7743 DLY  |
| TX    | ROSEBUD                   | 41-7744 | 31.0736  | -96.9789  | 410           | 0          | 0      | 36    |                       |                            | 41-7744 DLY  |
| TX    | ROSSER                    | 41-7773 | 32.4611  | -96.4494  | 364           | 0          | 0      | 73    |                       |                            | 41-7773 DLY  |
| TX    | ROTAN                     | 41-7782 | 32.8556  | -100.4611 | 1936          | 0          | 0      | 88    |                       |                            | 41-7782 DLY  |
| TX    | ROUND MTN                 | 41-7787 | 30.4247  | -98.3492  | 1289          | 0          | 0      | 50    |                       |                            | 41-7787 DLY  |
| TX    | ROUND ROCK 3 NE           | 41-7791 | 30.5414  | -97.6350  | 722           | 0          | 0      | 47    |                       |                            | 41-7791 DLY  |
| TX    | RUNGE                     | 41-7836 | 28.8297  | -97.7133  | 295           | 0          | 0      | 115   |                       |                            | 41-7836 DLY  |
| TX    | RUSK                      | 41-7841 | 31.8092  | -95.1428  | 696           | 0          | 0      | 74    |                       |                            | 41-7841 DLY  |
| TX    | SABINAL                   | 41-7873 | 29.3283  | -99.4653  | 955           | 0          | 0      | 104   |                       |                            | 41-7873 DLY  |
| TX    | SALT FLAT                 | 41-7920 | 31.7456  | -105.0806 | 3724          | 0          | 0      | 30    |                       |                            | 41-7922 HLY<br>79-0122 DLY<br>41-7920 DLY                |

| State | Name                      | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |  |   |
|-------|---------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|--|---|
|       |                           |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly   | daily   |
| TX    | SAM RAYBURN DAM           | 41-7936 | 31.0619  | -94.1011  | 190           | 24         | 29     | 50    | 66-7936 15M<br>41-7936 15M | 66-7936 15M<br>41-7936 HLY                               | 41-7936 DLY   |
| TX    | SAN ANGELO WFO            | 41-7944 | 31.3706  | -100.4942 | 1900          | 0          | 69     | 106   |                            | 66-7944 15M<br>56-0179 HLY<br>55-0100 HLY<br>41-7943 HLY | 79-0110 DLY<br>41-7944 DLY  |
| TX    | SAN ANTONIO INTL AP       | 79-0045 | 29.5442  | -98.4839  | 791           | 0          | 114    | 134   |                            | 99-0002 HLY<br>78-0068 15M<br>41-7945 HLY                | 99-0002 HLY<br>78-0068 15M<br>41-7945 HLY<br>52-7954 DLY<br>52-7950 DLY<br>41-7945 HLY<br>79-0045 DLY |
| TX    | SAN ANTONIO<br>STINSON AP | 79-0063 | 29.3389  | -98.4719  | 571           | 0          | 40     | 73    |                            | 41-7948 HLY<br>56-0127 HLY<br>55-0055 HLY<br>41-8653 HLY | 41-7948 HLY<br>41-7948 DLY<br>79-0063 DLY   |
| TX    | SAN AUGUSTINE             | 41-7951 | 31.5069  | -94.1072  | 312           | 0          | 0      | 55    |                            |  | 41-7951 HLY<br>41-7951 DLY  |
| TX    | SAN BENITO                | 41-7952 | 26.1333  | -97.6333  | 39            | 0          | 0      | 48    |                            |  | 69-1126 DLY<br>41-7952 DLY  |
| TX    | SAN MARCOS                | 41-7983 | 29.8833  | -97.9494  | 666           | 0          | 0      | 118   |                            |  | 99-7983 DLY<br>41-7983 DLY  |
| TX    | SAN SABA                  | 41-7992 | 31.1966  | -98.7164  | 1194          | 0          | 29     | 82    |                            | 85-0814 HLY<br>63-0041 HLY                               | 85-0814 HLY<br>63-0041 HLY<br>69-2376 DLY<br>69-2377 DLY<br>41-7992 DLY                               |
| TX    | SAN SABA 15 ESE           | 63-0053 | 31.1577  | -98.4725  | 1326          | 0          | 24     | 25    |                            | 63-0053 HLY  | 63-0053 HLY   |
| TX    | SANDERSON                 | 41-8022 | 30.1414  | -102.3917 | 2789          | 0          | 0      | 75    |                            |  | 41-8022 HLY<br>41-8022 DLY  |
| TX    | SANDERSON 5 NNW           | 41-8023 | 30.2156  | -102.4164 | 3081          | 20         | 51     | 53    | 41-8023 15M                | 41-8023 HLY  | 41-8023 HLY<br>41-8023 DLY  |
| TX    | SANDY CRK NR<br>KINGSLAND | 63-0133 | 30.5577  | -98.4722  | 875           | 0          | 27     | 29    |                            | 63-0133 HLY  | 63-0133 HLY   |

| State | Name                          | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |  |
|-------|-------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|--|
|       |                               |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily  |
| TX    | SANGER                        | 41-8043 | 33.3633  | -97.1744  | 676           | 0          | 0      | 43    |                            |                            | 69-1191 DLY<br>41-8043 DLY                               |
| TX    | SANTA ANNA                    | 41-8047 | 31.7428  | -99.3106  | 1745          | 29         | 60     | 67    | 66-8047 15M<br>41-8047 15M | 66-8047 15M<br>41-8047 HLY | 66-8047 15M<br>41-8047 HLY                               |
| TX    | SARITA 7 E                    | 41-8081 | 27.2169  | -97.6956  | 39            | 27         | 60     | 113   | 66-8081 15M<br>41-8081 15M | 66-8081 15M<br>41-8081 HLY | 66-8081 15M<br>41-8081 15M<br>41-8081 HLY<br>41-8081 DLY |
| TX    | SCHULENBURG                   | 41-8126 | 29.6825  | -96.8564  | 289           | 0          | 0      | 89    |                            |                            | 41-8126 DLY  |
| TX    | SEALY 0.3 WNW                 | 69-0550 | 29.7757  | -96.1581  | 194           | 0          | 0      | 86    |                            |                            | 41-8160 DLY<br>69-0550 DLY                               |
| TX    | SECO CREEK AT<br>MILLER RANCH | 87-0031 | 29.5731  | -99.4028  | 1283          | 0          | 21     | 20    |                            | 62-0098 HLY<br>85-0816 HLY | 62-0098 HLY<br>85-0816 HLY<br>87-0031 DLY                |
| TX    | SEGUIN 1 SSW                  | 41-8187 | 29.5519  | -97.9697  | 502           | 0          | 0      | 74    |                            |                            | 41-8186 DLY<br>41-8187 DLY                               |
| TX    | SEMINOLE                      | 41-8201 | 32.7131  | -102.6597 | 3337          | 0          | 0      | 88    |                            |                            | 41-8201 DLY  |
| TX    | SEYMOUR 3NW                   | 41-8221 | 33.6325  | -99.2897  | 1302          | 0          | 0      | 97    |                            |                            | 80-0076 15M<br>41-8221 DLY                               |
| TX    | SHAMROCK                      | 41-8235 | 35.2000  | -100.2500 | 2323          | 0          | 0      | 88    |                            |                            | 41-8236 DLY<br>41-8235 DLY                               |
| TX    | SHEFFIELD                     | 41-8252 | 30.6886  | -101.8272 | 2175          | 31         | 61     | 68    | 41-8252 15M                | 41-8252 HLY                | 41-8252 HLY<br>41-8252 DLY                               |
| TX    | SHEPHERD 2 SE                 | 41-8265 | 30.4833  | -95.0000  | 180           | 0          | 22     | 23    |                            | 41-8265 HLY                | 41-8265 HLY  |
| TX    | SHERMAN                       | 41-8274 | 33.7033  | -96.6419  | 860           | 0          | 0      | 115   |                            |                            | 41-8274 DLY  |
| TX    | SIERRA BLANCA 2 E             | 41-8305 | 31.1831  | -105.3542 | 4590          | 0          | 42     | 50    |                            | 41-8305 HLY                | 69-1574 DLY<br>41-8305 HLY<br>41-8305 DLY                |
| TX    | SILVER VALLEY                 | 41-8326 | 31.9550  | -99.5439  | 2011          | 0          | 0      | 69    |                            |                            | 41-6484 DLY<br>41-8326 DLY                               |
| TX    | SILVERTON                     | 41-8323 | 34.4722  | -101.3006 | 3281          | 0          | 0      | 73    |                            |                            | 41-8323 DLY  |
| TX    | SIMMS 4 WNW                   | 41-8335 | 33.3667  | -94.5667  | 322           | 0          | 27     | 28    |                            | 41-8335 HLY                | 41-8333 DLY<br>41-8335 HLY<br>41-8335 DLY                |

| State | Name                              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |  |  |
|-------|-----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|--|--|
|       |                                   |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly   | daily  |
| TX    | SINTON                            | 41-8354 | 28.0353  | -97.4972  | 52            | 0          | 0      | 78    |   |  | 41-8354 DLY  |
| TX    | SISTERDALE                        | 41-8358 | 29.9756  | -98.7217  | 1325          | 0          | 0      | 25    |   |  | 69-1875 DLY<br>41-8358 DLY                               |
| TX    | SLATON                            | 41-8373 | 33.4367  | -101.6472 | 3081          | 0          | 0      | 64    |   |  | 41-8373 DLY  |
| TX    | SLIDELL                           | 41-8378 | 33.3583  | -97.3933  | 984           | 0          | 0      | 52    |   |  | 41-8378 DLY  |
| TX    | SLOAN                             | 41-8382 | 31.1561  | -98.9173  | 1302          | 0          | 0      | 40    |   |  | 41-8382 DLY  |
| TX    | SMITHVILLE                        | 41-8415 | 30.0067  | -97.1689  | 341           | 0          | 21     | 94    |   | 63-0220 15M<br>41-1186 HLY<br>63-0220 HLY                | 41-8415 DLY  |
| TX    | SNYDER                            | 41-8433 | 32.7100  | -100.9111 | 2320          | 0          | 0      | 98    |   |  | 41-8433 DLY  |
| TX    | SOMERVILLE DAM                    | 41-8446 | 30.3367  | -96.5403  | 262           | 0          | 63     | 92    |   | 85-0802 HLY<br>41-8445 HLY<br>41-8446 HLY                | 41-8445 HLY<br>41-8445 DLY<br>41-8446 HLY<br>41-8446 DLY |
| TX    | SONORA                            | 41-8449 | 30.5831  | -100.6503 | 2139          | 0          | 0      | 71    |   |  | 41-8449 DLY  |
| TX    | SONORA                            | 54-0210 | 30.2613  | -100.5551 | 2283          | 0          | 0      | 60    |   |  | 41-8721 DLY<br>41-8450 DLY<br>54-0210 DLY                |
| TX    | SOUTH WICHITA RIVER<br>NR BENJAMI | 85-0328 | 33.6500  | -99.8000  | 1358          | 0          | 22     | 21    |   | 85-0328 HLY  | 85-0328 HLY  |
| TX    | SPEAKS 2                          | 41-8519 | 29.2728  | -96.6858  | 144           | 0          | 0      | 70    |   |  | 41-7299 DLY<br>41-8519 DLY                               |
| TX    | SPEARMAN                          | 41-8523 | 36.1981  | -101.1847 | 3094          | 0          | 0      | 81    |   |  | 41-8523 DLY  |
| TX    | SPICEWOOD                         | 41-8531 | 30.4828  | -98.1597  | 850           | 27         | 43     | 50    | 66-8531 15M<br>63-0147 15M<br>41-8531 15M | 66-8531 15M<br>63-0147 HLY<br>41-8531 15M<br>41-8531 HLY | 41-8531 15M<br>41-8531 HLY<br>41-8531 DLY                |
| TX    | SPRING BRANCH 2SE                 | 41-8544 | 29.8653  | -98.3797  | 1004          | 22         | 42     | 59    | 66-8544 15M<br>41-8544 15M                | 66-8544 15M<br>41-1432 HLY<br>41-8544 HLY                | 41-8544 DLY  |
| TX    | SPRINGTOWN 4 S                    | 41-8563 | 32.9086  | -97.6786  | 1053          | 31         | 33     | 34    | 66-8563 15M<br>41-8563 15M                | 66-8563 15M<br>41-8563 HLY                               | 66-8563 15M<br>41-8563 HLY                               |

| State | Name                              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |  |
|-------|-----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|--|
|       |                                   |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily  |
| TX    | SPUR                              | 41-8566 | 33.4792  | -100.8761 | 2297          | 0          | 33     | 82    |   | 41-8567 HLY<br>80-0080 15M<br>41-8566 HLY | 80-0080 15M<br>41-8566 DLY   |
| TX    | STAMFORD 1                        | 41-8583 | 32.9403  | -99.8036  | 1640          | 30         | 61     | 97    | 66-8583 15M<br>41-8584 15M<br>41-8583 15M | 66-8583 15M<br>41-8584 HLY<br>41-8583 HLY | 41-8583 HLY<br>41-8583 DLY   |
| TX    | STATE HIGHWAY 365 -<br>GREEN POND | 82-5400 | 29.9453  | -94.3261  | 20            | 25         | 26     | 25    | 82-5400 15M                               | 82-5400 15M                               | 82-5400 15M  |
| TX    | STATE HWY 124 -<br>HILLEBRANDT BA | 82-2300 | 30.0358  | -94.1489  | 16            | 26         | 25     | 26    | 82-2400 15M<br>82-2300 15M                | 82-2400 15M<br>82-2300 15M                | 82-2400 15M<br>82-2300 15M   |
| TX    | STEPHENVILLE                      | 79-0028 | 32.2314  | -98.2319  | 1289          | 30         | 37     | 76    | 66-8623 15M<br>41-8623 15M                | 66-8623 15M<br>41-8623 HLY                | 41-8623 HLY<br>79-0028 DLY   |
| TX    | STEPHENVILLE 7 WSW                | 41-8625 | 32.1667  | -98.3167  | 1450          | 0          | 27     | 27    |   | 41-8625 HLY                               | 41-8625 HLY  |
| TX    | STERLING CITY                     | 41-8630 | 31.8347  | -100.9828 | 2280          | 26         | 30     | 84    | 66-8630 15M<br>41-8630 15M                | 66-8630 15M<br>41-8630 HLY                | 41-8630 DLY  |
| TX    | STERLING CITY 8 NE                | 41-8631 | 31.9186  | -100.8786 | 2710          | 0          | 25     | 54    |   | 41-3462 HLY<br>41-8631 HLY                | 41-3462 HLY<br>41-8631 HLY<br>41-8631 DLY  |
| TX    | STILLHOUSE HOLLOW<br>DAM          | 41-8646 | 31.0372  | -97.5283  | 705           | 28         | 47     | 54    | 66-8646 15M<br>41-8646 15M                | 66-8646 15M<br>41-8646 HLY                | 41-8646 DLY  |
| TX    | STINNETT                          | 41-8647 | 35.8185  | -101.4425 | 3130          | 0          | 26     | 30    |   | 41-8647 HLY                               | 41-8647 HLY<br>41-8647 DLY   |
| TX    | STOCKDALE 6N                      | 41-8658 | 29.3258  | -97.9753  | 531           | 0          | 0      | 41    |   |   | 41-8658 DLY  |
| TX    | STRATFORD                         | 41-8692 | 36.4414  | -102.0775 | 3602          | 0          | 0      | 87    |   |   | 41-8692 DLY  |
| TX    | STRAWN 8 NNE                      | 41-8696 | 32.6592  | -98.4678  | 1181          | 0          | 0      | 68    |   |   | 41-8696 DLY  |
| TX    | SUGAR LAND                        | 41-8728 | 29.6219  | -95.6567  | 85            | 0          | 0      | 112   |   |   | 69-1325 DLY<br>64-0315 HLY<br>60-0169 15M<br>60-0160 15M<br>55-0061 HLY<br>56-0134 HLY<br>79-0069 DLY<br>41-8728 DLY |
| TX    | SULPHUR SPRINGS                   | 41-8743 | 33.1481  | -95.6269  | 495           | 23         | 57     | 104   | 41-8743 15M                               | 41-8743 HLY                               | 41-8743 DLY  |



| State | Name                            | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |  |   |
|-------|---------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|--|---|
|       |                                 |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly   | daily   |
| TX    | SUNRAY 4 SW                     | 41-8761 | 35.9667  | -101.8667 | 3543          | 0          | 27     | 34    |                            | 41-2619 HLY<br>41-8761 HLY                               | 41-2619 HLY<br>41-8761 HLY<br>41-8761 HLY<br>41-8761 DLY                |
| TX    | SWAN 4 NW                       | 41-8778 | 32.4561  | -95.4231  | 450           | 36         | 47     | 48    | 66-8778 15M<br>41-8778 15M | 66-8778 15M<br>41-8778 15M<br>41-8778 HLY                | 66-8778 15M<br>41-8778 15M<br>41-8778 HLY                               |
| TX    | SWEETWATER CREEK<br>NEAR KELTON | 87-0038 | 35.4667  | -100.1206 | 2276          | 0          | 29     | 29    |                            | 85-0597 HLY<br>87-0038 HLY                               | 85-0597 HLY<br>87-0038 HLY  |
| TX    | TAHOKA                          | 41-8818 | 33.1714  | -101.7981 | 3120          | 0          | 0      | 87    |                            |  | 41-8818 DLY   |
| TX    | TAMPICO                         | 41-8833 | 34.4667  | -100.8167 | 2251          | 0          | 0      | 41    |                            |  | 41-8833 DLY   |
| TX    | TARPLEY                         | 41-8845 | 29.6675  | -99.2883  | 1391          | 28         | 59     | 76    | 41-8845 15M                | 41-8845 HLY  | 99-8845 DLY<br>41-8845 HLY<br>41-8845 DLY                               |
| TX    | TATUM                           | 41-8859 | 32.3000  | -94.5167  | 269           | 0          | 32     | 32    |                            | 41-8859 HLY  | 41-8859 HLY   |
| TX    | TAYLOR 1NW                      | 41-8862 | 30.5844  | -97.4156  | 571           | 0          | 32     | 116   |                            | 99-8861 HLY  | 99-8861 HLY<br>41-8861 DLY<br>41-8862 DLY                               |
| TX    | TAYLOR RCH                      | 41-8863 | 30.9731  | -98.9433  | 1831          | 0          | 0      | 63    |                            |  | 41-5930 DLY<br>41-8863 DLY  |
| TX    | TEAGUE RCH                      | 41-8877 | 30.4333  | -98.8097  | 1719          | 0          | 0      | 74    |                            |  | 99-7612 DLY<br>41-7612 DLY<br>41-8877 DLY                               |
| TX    | TELEGRAPH                       | 41-8897 | 30.3289  | -99.9067  | 1868          | 0          | 0      | 65    |                            |  | 63-0078 HLY<br>41-8897 DLY  |
| TX    | TEMPLE                          | 41-8910 | 31.0781  | -97.3183  | 636           | 0          | 33     | 119   |                            | 85-0842 HLY<br>41-8907 HLY<br>41-8911 HLY<br>76-0102 HLY | 85-0842 HLY<br>41-8907 HLY<br>41-8911 HLY<br>76-0102 HLY<br>41-8910 DLY |
| TX    | TERLINGUA                       | 41-8924 | 29.3486  | -103.5950 | 2635          | 0          | 0      | 39    |                            |  | 41-8714 DLY<br>41-8924 HLY<br>41-8924 DLY                               |
| TX    | TERRELL                         | 41-8929 | 32.7336  | -96.3225  | 495           | 0          | 0      | 66    |                            |  | 79-0141 DLY<br>41-8929 DLY  |

| State | Name                    | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |   |
|-------|-------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|---|
|       |                         |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily                                     |
| TX    | TESCO                   | 41-8939 | 32.5000  | -100.2500 | 2001          | 0          | 0      | 31    |   |   | 41-9853 DLY<br>41-8939 DLY                |
| TX    | TEXARKANA               | 41-8942 | 33.4367  | -94.0772  | 390           | 32         | 31     | 49    | 41-8942 15M                               | 41-8942 HLY                               | 41-8942 DLY                               |
| TX    | THOMPSONS 3 WSW         | 41-8996 | 29.4822  | -95.6314  | 69            | 0          | 42     | 59    |   | 41-8996 HLY                               | 41-8996 DLY                               |
| TX    | THORNDALE               | 41-9001 | 30.6147  | -97.2086  | 476           | 0          | 0      | 50    |   |   | 41-9001 DLY                               |
| TX    | THORNTON 1SSE           | 41-9004 | 31.3917  | -96.5656  | 476           | 0          | 0      | 72    |   |   | 41-9004 DLY                               |
| TX    | THROCKMORTON            | 41-9014 | 33.1806  | -99.1897  | 1371          | 0          | 0      | 69    |   |   | 41-9014 DLY                               |
| TX    | TILDEN 4 SSE            | 41-9031 | 28.4114  | -98.5294  | 344           | 0          | 0      | 51    |   |   | 41-9031 DLY                               |
| TX    | TINNIN RCH              | 41-9037 | 31.3167  | -103.9833 | 3232          | 0          | 24     | 26    |   | 41-9037 HLY                               | 41-9037 HLY                               |
| TX    | TOMBALL                 | 41-9076 | 30.1003  | -95.6114  | 210           | 0          | 0      | 71    |   |   | 69-1652 DLY<br>41-9076 DLY                |
| TX    | TORNILLO 2 SSE          | 41-9088 | 31.4028  | -106.0581 | 3524          | 0          | 0      | 32    |   |   | 41-9088 DLY                               |
| TX    | TOW                     | 41-9099 | 30.8836  | -98.4708  | 1027          | 0          | 0      | 38    |   |   | 41-9099 DLY                               |
| TX    | TOWN BLUFF DAM          | 41-9101 | 30.7931  | -94.1819  | 213           | 0          | 0      | 64    |   |   | 41-8568 DLY<br>41-9101 DLY                |
| TX    | TOYAH                   | 41-9106 | 31.3000  | -103.8000 | 2945          | 0          | 0      | 30    |   |   | 41-9106 DLY                               |
| TX    | TRENT                   | 41-9122 | 32.4906  | -100.1197 | 1909          | 0          | 0      | 62    |   |   | 41-9122 DLY                               |
| TX    | TRENTON                 | 41-9125 | 33.4311  | -96.3397  | 755           | 0          | 0      | 65    |   |   | 41-9125 DLY                               |
| TX    | TRINIDAD PWR PLT        | 41-9137 | 32.1333  | -96.1000  | 292           | 0          | 0      | 54    |   |   | 85-0833 HLY<br>41-9136 DLY<br>41-9137 DLY |
| TX    | TROY                    | 41-9153 | 31.2061  | -97.2956  | 699           | 0          | 0      | 73    |   |   | 69-0598 DLY<br>41-9153 DLY                |
| TX    | TRUSCOTT 3 W            | 41-9163 | 33.7569  | -99.8617  | 1572          | 25         | 58     | 68    | 66-9163 15M<br>41-9163 15M                | 66-9163 15M<br>41-9163 HLY                | 41-9163 HLY<br>41-9163 DLY                |
| TX    | TULIA                   | 41-9175 | 34.5475  | -101.7614 | 3481          | 0          | 0      | 69    |   |   | 41-9175 DLY                               |
| TX    | TULIA 6 NE              | 41-9176 | 34.6000  | -101.7000 | 3504          | 0          | 0      | 38    |   |   | 41-9176 DLY                               |
| TX    | TURKEY                  | 41-9191 | 34.3956  | -100.8972 | 2329          | 0          | 0      | 64    |   |   | 41-9191 DLY                               |
| TX    | TURKEY CK AT FM<br>1959 | 60-0019 | 29.5845  | -95.1869  | 28            | 30         | 31     | 30    | 60-0098 15M<br>60-0020 15M<br>60-0019 15M | 60-0098 15M<br>60-0020 15M<br>60-0019 15M | 60-0098 15M<br>60-0020 15M<br>60-0019 15M |
| TX    | TYLER                   | 41-9207 | 32.3067  | -95.2969  | 551           | 0          | 0      | 34    |   |   | 41-9207 DLY                               |

| State | Name             | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |   |
|-------|------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|---|
|       |                  |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily   |
| TX    | TYLER POUNDS FLD | 79-0093 | 32.3542  | -95.4025  | 545           | 0          | 0      | 35    |                            |   | 55-0088 HLY<br>79-0093 DLY  |
| TX    | UMBARGER         | 41-9224 | 34.9578  | -102.1044 | 3747          | 0          | 0      | 69    |                            |   | 41-9224 DLY   |
| TX    | UVALDE           | 41-9265 | 29.2167  | -99.7667  | 912           | 0          | 0      | 94    |                            |   | 41-9268 DLY<br>41-9265 DLY  |
| TX    | VALENTINE        | 41-9270 | 30.5908  | -104.4914 | 4439          | 28         | 49     | 57    | 41-9270 15M                | 41-9270 HLY                               | 41-9270 HLY<br>41-9270 DLY  |
| TX    | VALENTINE 10 WSW | 41-9275 | 30.5525  | -104.6467 | 4393          | 0          | 0      | 80    |                            |   | 41-9275 DLY   |
| TX    | VALLEY JUNCTION  | 41-9280 | 30.8333  | -96.6333  | 269           | 0          | 12     | 91    |                            | 55-0149 HLY<br>64-0042 HLY<br>56-0235 HLY | 99-9280 DLY<br>55-0149 HLY<br>64-0042 HLY<br>56-0235 HLY<br>41-9280 DLY |
| TX    | VALLEY VIEW      | 41-9286 | 33.4869  | -97.1572  | 725           | 0          | 0      | 53    |                            |   | 41-9286 DLY   |
| TX    | VAN HORN         | 41-9295 | 31.0417  | -104.8372 | 4065          | 0          | 0      | 68    |                            |   | 41-9295 DLY   |
| TX    | VANDERPOOL 10 N  | 41-9312 | 29.8451  | -99.5516  | 2264          | 0          | 0      | 45    |                            |   | 41-9813 DLY<br>99-9312 DLY<br>41-9312 DLY                               |
| TX    | VEGA 2NW         | 41-9330 | 35.2775  | -102.4633 | 3999          | 0          | 0      | 73    |                            |   | 41-9330 DLY   |
| TX    | VERNON           | 41-9346 | 34.1517  | -99.3256  | 1211          | 0          | 0      | 80    |                            |   | 41-9346 DLY   |
| TX    | VICTORIA CP&L    | 41-9365 | 28.7875  | -97.0106  | 62            | 0          | 31     | 89    |                            | 41-9363 HLY<br>85-0859 HLY                | 79-0046 DLY<br>69-2646 DLY<br>85-0859 HLY<br>41-9365 DLY                |
| TX    | VICTORIA RGNL AP | 79-0040 | 28.8614  | -96.9303  | 115           | 0          | 61     | 67    |                            | 56-0105 HLY<br>41-9364 HLY                | 41-9364 HLY<br>79-0040 DLY  |
| TX    | VOSS 1 WSW       | 41-9410 | 31.6167  | -99.5833  | 1650          | 0          | 0      | 31    |                            |   | 41-9410 DLY   |
| TX    | WACO             | 41-9421 | 31.5333  | -97.0667  | 381           | 0          | 0      | 53    |                            |   | 41-9421 DLY   |
| TX    | WACO DAM         | 41-9417 | 31.6003  | -97.2169  | 495           | 26         | 42     | 52    | 66-9417 15M<br>41-9417 15M | 66-9417 15M<br>41-9417 HLY                | 41-9417 HLY<br>41-9417 DLY  |
| TX    | WACO RGNL AP     | 79-0087 | 31.6189  | -97.2283  | 499           | 0          | 76     | 77    |                            | 56-0160 HLY<br>41-9419 HLY                | 79-0087 DLY   |
| TX    | WAELDER 7 S      | 41-9424 | 29.6000  | -97.3167  | 341           | 0          | 0      | 40    |                            |   | 41-9424 DLY   |

| State | Name                         | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |   |
|-------|------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|---|
|       |                              |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily   |
| TX    | WALLER                       | 41-9448 | 30.0486  | -95.9250  | 144           | 30         | 30     | 73    | 60-0089 15M<br>60-0091 15M | 60-0089 15M<br>60-0091 15M                | 60-0089 15M<br>60-0091 15M<br>41-9448 DLY                               |
| TX    | WASHINGTON SP                | 41-9491 | 30.3236  | -96.1594  | 217           | 23         | 48     | 67    | 66-9491 15M<br>41-9491 15M | 66-9491 15M<br>41-9491 15M<br>41-9491 HLY | 41-9491 DLY   |
| TX    | WATER VALLEY                 | 41-9499 | 31.6725  | -100.7283 | 2119          | 35         | 54     | 69    | 66-9499 15M<br>41-9499 15M | 66-9499 15M<br>41-9499 HLY                | 41-9499 HLY<br>41-9499 DLY  |
| TX    | WATER VALLEY 11<br>NNE       | 41-9501 | 31.8136  | -100.6286 | 2454          | 0          | 0      | 56    |                            |   | 41-9501 DLY   |
| TX    | WATSON                       | 41-9504 | 30.9328  | -98.0197  | 1004          | 0          | 0      | 50    |                            |   | 41-9504 DLY   |
| TX    | WAXAHACHIE                   | 41-9522 | 32.4281  | -96.8422  | 627           | 0          | 0      | 107   |                            |   | 41-9522 DLY   |
| TX    | WAYSIDE                      | 41-9527 | 34.7933  | -101.5483 | 3400          | 32         | 48     | 52    | 66-9527 15M<br>41-9527 15M | 66-9527 15M<br>41-9527 HLY                | 66-9527 15M<br>41-9527 HLY  |
| TX    | WEATHERFORD                  | 41-9532 | 32.7483  | -97.7700  | 955           | 36         | 60     | 120   | 66-9532 15M<br>41-9532 15M | 66-9532 15M<br>41-9532 HLY                | 99-9532 DLY<br>41-9532 DLY  |
| TX    | WELDER WILDLIFE<br>FNDN      | 41-9559 | 28.1136  | -97.4178  | 49            | 0          | 0      | 47    |                            |   | 41-9559 DLY   |
| TX    | WELLINGTON                   | 41-9565 | 34.8422  | -100.2103 | 2041          | 27         | 44     | 70    | 41-9570 15M<br>41-9565 15M | 41-9570 HLY<br>41-9565 HLY                | 41-9565 DLY   |
| TX    | WESLACO                      | 41-9588 | 26.1781  | -97.9708  | 75            | 24         | 48     | 104   | 66-9588 15M<br>41-9588 15M | 66-9588 15M<br>88-2205 HLY<br>41-9588 HLY | 41-5274 DLY<br>66-9588 15M<br>88-2205 HLY<br>41-9588 HLY<br>41-9588 DLY |
| TX    | WF TRINITY R NR<br>JACKSBORO | 85-0568 | 33.2933  | -98.0786  | 915           | 0          | 22     | 22    |                            | 85-0568 HLY                               | 85-0568 HLY   |
| TX    | WHARTON                      | 41-9655 | 29.3178  | -96.0847  | 112           | 0          | 0      | 73    |                            |   | 85-0879 HLY<br>63-0234 HLY<br>41-9655 DLY                               |
| TX    | WHEELOCK                     | 41-9665 | 30.9003  | -96.3953  | 420           | 23         | 57     | 63    | 41-9665 15M                | 41-9665 HLY                               | 41-9665 HLY   |
| TX    | WHITNEY DAM                  | 41-9715 | 31.8611  | -97.3750  | 574           | 33         | 56     | 68    | 66-9715 15M<br>41-9715 15M | 66-9715 15M<br>41-9715 HLY                | 41-9715 DLY   |

| State | Name                      | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |  |   |
|-------|---------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|--|---|
|       |                           |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly   | daily   |
| TX    | WHITSETT                  | 41-9717 | 28.6611  | -98.2553  | 259           | 0          | 0      | 94    |                            |  | 41-9716 DLY<br>41-9717 DLY  |
| TX    | WICHITA FALLS MUNI<br>AP  | 79-0092 | 33.9786  | -98.4928  | 1017          | 0          | 77     | 111   |                            | 56-0164 HLY<br>41-9729 HLY                               | 79-0092 DLY   |
| TX    | WILBARGER CRK NR<br>ELGIN | 63-0209 | 30.2318  | -97.4327  | 373           | 0          | 23     | 23    |                            | 63-0209 HLY  | 63-0209 HLY   |
| TX    | WILDWOOD                  | 41-9754 | 30.5347  | -94.4456  | 200           | 0          | 0      | 75    |                            |  | 41-4397 DLY<br>41-9480 DLY<br>41-9754 DLY                               |
| TX    | WILLS POINT               | 41-9800 | 32.7019  | -96.0150  | 522           | 0          | 0      | 94    |                            |  | 41-9800 DLY   |
| TX    | WIMBERLEY 1 NW            | 41-9815 | 30.0017  | -98.1047  | 906           | 25         | 25     | 33    | 66-9815 15M<br>41-9815 15M | 66-9815 15M<br>41-9815 HLY                               | 41-9815 DLY   |
| TX    | WINCHELL 1 WNW            | 41-9816 | 31.4833  | -99.1833  | 1381          | 32         | 48     | 55    | 63-0006 15M<br>41-9817 15M | 63-0006 HLY<br>41-5840 HLY<br>41-9816 HLY<br>41-9817 HLY | 63-0006 HLY<br>41-5840 HLY<br>41-9816 HLY<br>41-9817 HLY<br>41-9816 DLY |
| TX    | WINGATE                   | 41-9847 | 32.0444  | -100.1069 | 2008          | 0          | 0      | 45    |                            |  | 41-9847 DLY   |
| TX    | WINK                      | 41-9829 | 31.7667  | -103.1500 | 2790          | 18         | 44     | 47    | 41-9829 15M                | 41-9829 HLY  | 41-9829 HLY   |
| TX    | WINKLER CO AP             | 79-0112 | 31.7800  | -103.2017 | 2808          | 0          | 21     | 73    |                            | 56-0180 HLY<br>55-0101 HLY<br>41-9830 HLY                | 79-0112 DLY   |
| TX    | WINNSBORO 6 SW            | 41-9836 | 32.8892  | -95.3331  | 430           | 0          | 0      | 69    |                            |  | 69-2728 DLY<br>99-9836 DLY<br>41-9836 DLY                               |
| TX    | WINTERS 9 NNE             | 41-9845 | 32.1000  | -99.9000  | 1972          | 0          | 0      | 36    |                            |  | 41-9845 DLY   |
| TX    | WOLF CREEK DAM            | 41-9858 | 36.2333  | -100.6667 | 2703          | 0          | 31     | 32    |                            | 41-9858 HLY  | 41-9858 HLY<br>41-9858 DLY  |
| TX    | WOLFE CITY                | 41-9859 | 33.3675  | -96.0675  | 659           | 0          | 0      | 58    |                            |  | 41-9859 DLY   |
| TX    | WOODSBORO                 | 41-9892 | 28.2333  | -97.3333  | 49            | 0          | 0      | 46    |                            |  | 41-9892 DLY   |
| TX    | WOODSON                   | 41-9893 | 33.0178  | -99.0539  | 1263          | 27         | 64     | 74    | 66-9893 15M<br>41-9893 15M | 66-9893 15M<br>41-9893 HLY                               | 41-9893 HLY<br>41-9893 DLY  |
| TX    | WORLDS END RCH            | 41-9904 | 29.9828  | -99.4290  | 1923          | 0          | 0      | 36    |                            |  | 41-5449 DLY<br>41-9904 DLY  |

| State | Name                     | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations |                            |   |
|-------|--------------------------|---------|----------|-----------|---------------|------------|--------|-------|-----------------------|----------------------------|---|
|       |                          |         |          |           |               | <1hr       | hourly | daily | <1hr                  | hourly                     | daily                                     |
| TX    | WRIGHT PATMAN DM<br>& LK | 41-9916 | 33.3039  | -94.1583  | 282           | 22         | 36     | 67    | 41-9916 15M           | 41-8944 HLY<br>41-9916 HLY | 41-5710 DLY<br>41-8944 DLY<br>41-9916 DLY |
| TX    | YOAKUM                   | 41-9952 | 29.2739  | -97.1556  | 295           | 0          | 0      | 87    |                       |                            | 41-9952 DLY                               |
| TX    | YORKTOWN                 | 41-9953 | 28.9803  | -97.5186  | 259           | 0          | 0      | 67    |                       |                            | 41-9953 DLY                               |
| TX    | YSLETA                   | 41-9966 | 31.6953  | -106.3217 | 3671          | 0          | 0      | 90    |                       |                            | 69-1274 DLY<br>41-8435 DLY<br>41-9966 DLY |
| TX    | ZAPATA 1 S               | 41-9976 | 26.8706  | -99.2536  | 322           | 26         | 57     | 65    | 41-9976 15M           | 41-9976 HLY                | 41-9976 HLY<br>41-9976 DLY                |

Table A.1.2. Same as Table A.1.1, but for locations in Arkansas (AR), Colorado (CO), Kansas (KS), Louisiana (LA), New Mexico (NM), and in the United Mexican States (MX).

| State | Name             | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |   |
|-------|------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|---|
|       |                  |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily                                     |
| AR    | AMITY 1N         | 03-0150 | 34.2808  | -93.4614  | 459           | 0          | 0      | 97    |                            |   | 03-0150 DLY                               |
| AR    | ANTOINE          | 03-0178 | 34.0292  | -93.4211  | 285           | 25         | 52     | 69    | 66-0178 15M<br>03-0178 15M | 66-0178 15M<br>03-0178 HLY                | 03-0178 DLY                               |
| AR    | ASHDOWN 4 SSE    | 03-0286 | 33.6194  | -94.0994  | 322           | 0          | 0      | 66    |                            |   | 03-0286 DLY                               |
| AR    | ATHENS           | 03-0300 | 34.3253  | -93.9811  | 961           | 0          | 0      | 60    |                            |   | 03-0300 DLY                               |
| AR    | BIG FORK 1 SSE   | 03-0664 | 34.4653  | -93.9932  | 1200          | 0          | 0      | 69    |                            |   | 03-0664 DLY                               |
| AR    | BLUFF CITY 3 SW  | 03-0800 | 33.6919  | -93.1622  | 361           | 0          | 0      | 69    |                            |   | 76-0001 HLY<br>03-0800 DLY                |
| AR    | BONNERDALE 1 ESE | 03-0820 | 34.3811  | -93.3497  | 682           | 0          | 0      | 50    |                            |   | 03-0820 DLY                               |
| AR    | BOUGHTON         | 03-0848 | 33.8667  | -93.3333  | 249           | 0          | 0      | 47    |                            |   | 03-0848 DLY                               |
| AR    | COSSATOT RIVER   | 85-0005 | 34.0500  | -94.2167  | 394           | 0          | 23     | 23    |                            | 85-0005 HLY                               | 85-0005 HLY                               |
| AR    | COVE             | 03-1666 | 34.4314  | -94.4175  | 1060          | 0          | 0      | 68    |                            |   | 03-1666 DLY                               |
| AR    | DAISY            | 03-1814 | 34.2500  | -93.7333  | 630           | 0          | 26     | 24    |                            | 03-1814 HLY                               | 03-1814 DLY                               |
| AR    | DE QUEEN DAM     | 03-1952 | 34.1003  | -94.3725  | 558           | 27         | 40     | 41    | 78-0027 15M<br>03-1952 15M | 55-0124 HLY<br>56-0208 HLY<br>03-1952 HLY | 79-0144 DLY<br>03-1952 HLY<br>03-1952 DLY |
| AR    | DEQUEEN          | 03-1948 | 34.0464  | -94.3481  | 407           | 0          | 0      | 81    |                            |   | 03-1948 DLY                               |
| AR    | DIERKS           | 03-2015 | 34.1267  | -94.0172  | 469           | 0          | 0      | 55    |                            |   | 03-2015 DLY                               |
| AR    | DIERKS DAM       | 03-2020 | 34.1475  | -94.0889  | 686           | 0          | 26     | 35    |                            | 03-2020 HLY                               | 69-0041 DLY<br>03-2020 HLY<br>03-2020 DLY |
| AR    | FOREMAN          | 03-2544 | 33.7222  | -94.3975  | 423           | 0          | 45     | 64    |                            | 03-2544 HLY                               | 03-2544 HLY<br>03-2544 DLY                |
| AR    | FULTON           | 03-2670 | 33.6128  | -93.8136  | 259           | 0          | 0      | 91    |                            |   | 03-2670 DLY                               |
| AR    | GILLHAM DAM      | 03-2810 | 34.2056  | -94.2464  | 520           | 24         | 27     | 32    | 03-2810 15M                | 03-2810 HLY                               | 03-2810 HLY                               |
| AR    | GLENWOOD         | 03-2842 | 34.3347  | -93.5503  | 581           | 0          | 0      | 77    |                            |   | 03-2842 DLY                               |
| AR    | GRANNIS          | 03-2908 | 34.2500  | -94.3333  | 922           | 0          | 0      | 34    |                            |   | 03-2908 DLY                               |
| AR    | GURDON           | 03-3074 | 33.9167  | -93.1333  | 220           | 0          | 0      | 35    |                            |   | 03-3074 DLY                               |
| AR    | HOPE 3 NE        | 03-3428 | 33.7092  | -93.5564  | 374           | 0          | 0      | 103   |                            |   | 03-3428 DLY                               |

| State | Name                | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |                            |
|-------|---------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|----------------------------|
|       |                     |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily                      |
| AR    | HORATIO             | 03-3442 | 33.9353  | -94.3597  | 338           | 0          | 0      | 66    |   |   | 03-3442 DLY                |
| AR    | LANGLEY             | 03-4060 | 34.3244  | -93.8464  | 771           | 0          | 0      | 61    |   |   | 03-4060 DLY                |
| AR    | LEWISVILLE          | 03-4185 | 33.3614  | -93.5675  | 341           | 35         | 35     | 69    | 03-6804 15M<br>66-4185 15M<br>03-4185 15M | 03-6804 HLY<br>66-4185 15M<br>03-4185 HLY | 03-6804 DLY<br>03-4185 DLY |
| AR    | MAGNOLIA            | 03-4548 | 33.2950  | -93.2325  | 325           | 31         | 46     | 68    | 03-4550 15M<br>03-4548 15M                | 03-4550 HLY<br>03-4548 HLY                | 69-0003 DLY<br>03-4548 DLY |
| AR    | MENA                | 03-4756 | 34.5731  | -94.2494  | 1129          | 25         | 60     | 119   | 66-4756 15M<br>03-4756 15M                | 66-4756 15M<br>03-4756 HLY                | 03-4756 DLY                |
| AR    | MILLWOOD DAM        | 03-4839 | 33.6772  | -93.9903  | 316           | 22         | 36     | 42    | 03-4839 15M                               | 03-4839 HLY                               | 03-4839 HLY                |
| AR    | MURFREESBORO 1W     | 03-5079 | 34.0783  | -93.7019  | 459           | 0          | 0      | 52    |   |   | 03-5078 DLY<br>03-5079 DLY |
| AR    | NARROWS DAM         | 03-5110 | 34.1453  | -93.7139  | 436           | 39         | 54     | 60    | 66-5110 15M<br>03-5110 15M                | 66-5110 15M<br>03-5110 HLY                | 03-5110 HLY<br>03-5110 DLY |
| AR    | NASHVILLE           | 03-5112 | 33.9294  | -93.8583  | 400           | 36         | 56     | 78    | 66-5112 15M<br>03-5112 15M                | 66-5112 15M<br>03-5114 HLY<br>03-5112 HLY | 03-5112 DLY                |
| AR    | NEWHOPE 3 E         | 03-5174 | 34.2284  | -93.8300  | 850           | 0          | 0      | 40    |   |   | 03-5174 DLY                |
| AR    | NEWHOPE 6 S         | 03-5177 | 34.1469  | -93.8936  | 630           | 0          | 0      | 67    |   |   | 03-5158 DLY<br>03-5177 DLY |
| AR    | OKAY                | 03-5376 | 33.7667  | -93.9167  | 299           | 0          | 0      | 67    |   |   | 03-5376 DLY                |
| AR    | PINEY GROVE         | 03-5770 | 34.1728  | -93.2050  | 381           | 0          | 0      | 36    |   |   | 03-5770 DLY                |
| AR    | PRESCOTT 2 NNW      | 03-5908 | 33.8203  | -93.3878  | 308           | 28         | 56     | 120   | 66-5908 15M<br>03-5908 15M                | 66-5908 15M<br>03-5910 HLY<br>03-5908 HLY | 03-5908 DLY                |
| AR    | RAVANA              | 03-6016 | 33.0667  | -94.0333  | 249           | 0          | 20     | 20    |   | 03-6016 HLY                               | 03-6016 HLY                |
| AR    | SALINE RIVER        | 85-0017 | 33.9667  | -94.0667  | 348           | 0          | 23     | 23    |   | 85-0017 HLY                               | 85-0017 HLY                |
| AR    | SITE 2-LITTLE RIVER | 85-0014 | 33.9181  | -94.3897  | 335           | 0          | 22     | 22    |   | 85-0014 HLY                               | 85-0014 HLY                |
| AR    | TAYLOR              | 03-7038 | 33.0986  | -93.4647  | 249           | 0          | 0      | 55    |   |   | 03-7038 DLY                |



| State | Name                  | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |  |   |
|-------|-----------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|--|---|
|       |                       |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly   | daily   |
| AR    | TEXARKANA WEBB<br>FLD | 79-0096 | 33.4536  | -94.0075  | 361           | 0          | 43     | 118   |                            | 55-0091 HLY<br>56-0168 HLY<br>78-0078 15M<br>03-7048 HLY | 55-0091 HLY<br>56-0168 HLY<br>78-0078 15M<br>03-7048 HLY<br>79-0096 DLY |
| AR    | WHITE CLIFFS          | 03-7812 | 33.8000  | -94.0667  | 392           | 0          | 0      | 53    |                            |  | 03-7812 DLY   |
| CO    | CAMPO 7 S             | 05-1268 | 37.0158  | -102.5550 | 4117          | 0          | 0      | 55    |                            |  | 05-1268 DLY   |
| CO    | KIM 10SSE             | 05-4546 | 37.1150  | -103.2986 | 5299          | 0          | 0      | 73    |                            |  | 05-8468 DLY<br>05-4546 DLY  |
| CO    | KIM 15 NNE            | 05-4538 | 37.4536  | -103.3219 | 5190          | 39         | 60     | 64    | 66-4538 15M<br>05-4538 15M | 66-4538 15M<br>05-4538 HLY                               | 05-4538 HLY<br>05-4538 DLY  |
| CO    | SPRINGFIELD           | 05-7862 | 37.4000  | -102.6167 | 4413          | 0          | 0      | 74    |                            |  | 69-0043 DLY<br>69-0052 DLY<br>05-7862 DLY                               |
| CO    | SPRINGFIELD 7 WSW     | 05-7866 | 37.3694  | -102.7428 | 4623          | 22         | 26     | 58    | 05-7866 15M                | 05-7866 HLY  | 05-6705 DLY<br>05-7871 DLY<br>05-7866 DLY                               |
| CO    | SPRINGFIELD 8 S       | 05-7867 | 37.2823  | -102.6417 | 4505          | 0          | 41     | 43    |                            | 55-0002 HLY<br>56-0054 HLY<br>05-7867 HLY                | 79-0002 DLY<br>05-7867 HLY<br>05-7867 DLY                               |
| CO    | STONINGTON            | 05-7992 | 37.2931  | -102.1864 | 3802          | 0          | 0      | 56    |                            |  | 05-7992 DLY   |
| CO    | WALSH 1 W             | 05-8793 | 37.3822  | -102.2986 | 3980          | 0          | 0      | 50    |                            |  | 05-8793 DLY   |
| KS    | ASHLAND               | 14-0365 | 37.1942  | -99.7633  | 1972          | 0          | 0      | 118   |                            |  | 14-0365 DLY   |
| KS    | CIMARRON RIVER        | 85-0028 | 37.0314  | -100.2100 | 2195          | 0          | 23     | 22    |                            | 85-0028 HLY  | 85-0028 HLY   |
| KS    | COLDWATER             | 14-1704 | 37.2733  | -99.3289  | 2116          | 0          | 0      | 113   |                            |  | 14-1704 DLY   |
| KS    | ELKHART               | 14-2432 | 37.0058  | -101.8867 | 3599          | 21         | 46     | 104   | 14-2432 15M                | 14-2437 HLY<br>14-2432 HLY                               | 14-2432 DLY   |
| KS    | ENGLEWOOD 1 NW        | 14-2560 | 37.0458  | -99.9964  | 1972          | 21         | 52     | 69    | 14-2560 15M                | 14-2560 HLY  | 14-2560 HLY<br>14-2560 DLY  |
| KS    | FOWLER 3 NNE          | 14-2855 | 37.4167  | -100.1833 | 2480          | 0          | 0      | 40    |                            |  | 14-2855 DLY   |
| KS    | HUGOTON               | 14-3855 | 37.1639  | -101.3400 | 3110          | 0          | 0      | 107   |                            |  | 14-3855 DLY   |
| KS    | KISMET NEAR           | 14-4363 | 37.3333  | -100.8833 | 2908          | 0          | 0      | 36    |                            |  | 69-0087 DLY<br>14-4363 DLY  |

| State | Name                        | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |   |
|-------|-----------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|---|
|       |                             |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily                                     |
| KS    | LIBERAL                     | 14-4695 | 37.0222  | -100.9294 | 2835          | 0          | 0      | 109   |                            |   | 14-4695 DLY                               |
| KS    | MEADE                       | 14-5171 | 37.2850  | -100.3450 | 2477          | 0          | 0      | 67    |                            |   | 14-5171 DLY                               |
| KS    | MINNEOLA                    | 14-5371 | 37.4500  | -100.0167 | 2552          | 0          | 0      | 57    |                            |   | 69-0063 DLY<br>14-5371 DLY                |
| KS    | PLAINS                      | 14-6427 | 37.2667  | -100.6000 | 2762          | 0          | 0      | 68    |                            |   | 69-0078 DLY<br>69-0075 DLY<br>14-6427 DLY |
| KS    | RICHFIELD                   | 14-6808 | 37.2633  | -101.7886 | 3386          | 0          | 0      | 105   |                            |   | 14-6808 DLY                               |
| KS    | RICHFIELD 10 WSW            | 14-6813 | 37.2294  | -101.9511 | 3530          | 0          | 0      | 75    |                            |   | 14-6813 DLY                               |
| KS    | SUBLETTE 7WSW               | 14-7922 | 37.4414  | -100.9792 | 2949          | 31         | 37     | 96    | 66-7922 15M<br>14-7922 15M | 66-7922 15M<br>14-7922 HLY                | 14-7922 DLY                               |
| KS    | WILMORE 16SE                | 14-8914 | 37.1317  | -99.0556  | 1699          | 0          | 0      | 31    |                            |   | 14-8914 DLY                               |
| LA    | ALEXANDRIA                  | 16-0098 | 31.3206  | -92.4611  | 89            | 20         | 33     | 122   | 16-0098 15M                | 16-0098 HLY                               | 16-0098 DLY                               |
| LA    | ALEXANDRIA 5 SSE            | 16-0103 | 31.2489  | -92.4489  | 85            | 0          | 0      | 55    |                            |   | 16-0101 DLY<br>16-7825 DLY<br>16-0103 DLY |
| LA    | ALEXANDRIA INTL AP          | 79-0154 | 31.3347  | -92.5586  | 85            | 0          | 41     | 54    |                            | 64-0505 HLY<br>78-0004 15M<br>56-0264 HLY | 64-0505 DLY<br>79-0080 DLY<br>79-0154 DLY |
| LA    | ARCADIA                     | 16-0277 | 32.5511  | -92.9186  | 400           | 0          | 0      | 56    |                            |   | 16-0277 DLY                               |
| LA    | ASHLAND                     | 16-0349 | 32.1292  | -93.1164  | 240           | 0          | 0      | 67    |                            |   | 16-0349 DLY                               |
| LA    | BARKSDALE AIR<br>FORCE BASE | 64-0265 | 32.5000  | -93.6670  | 166           | 0          | 0      | 43    |                            |   | 79-0082 DLY<br>64-0265 DLY                |
| LA    | BEAVER FIRE TWR             | 16-0617 | 30.7925  | -92.4953  | 105           | 0          | 0      | 38    |                            |   | 16-0617 DLY                               |
| LA    | BIENVILLE 3 NE              | 16-0800 | 32.3744  | -92.9433  | 308           | 0          | 0      | 68    |                            |   | 16-5365 DLY<br>16-0800 DLY                |
| LA    | BOYCE 3 WNW                 | 16-1232 | 31.3944  | -92.7164  | 112           | 0          | 0      | 42    |                            |   | 16-1232 DLY                               |
| LA    | COLFAX                      | 16-1941 | 31.5183  | -92.7142  | 112           | 0          | 0      | 45    |                            |   | 16-1941 DLY                               |
| LA    | CONVERSE                    | 16-2023 | 31.7500  | -93.7000  | 220           | 0          | 0      | 33    |                            |   | 16-2023 DLY                               |
| LA    | COTTON VALLEY<br>5 NNW      | 16-2121 | 32.8869  | -93.4569  | 259           | 0          | 0      | 62    |                            |   | 16-2121 DLY                               |

| State | Name                     | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |  |
|-------|--------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|--|
|       |                          |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily  |
| LA    | COUSHATTA 1 SE           | 16-2140 | 32.0167  | -93.3333  | 151           | 0          | 0      | 37    |                            |                            | 16-2145 DLY<br>16-2143 DLY<br>16-2140 HLY<br>16-2140 DLY |
| LA    | DE QUINCY                | 16-2361 | 30.4347  | -93.4692  | 82            | 0          | 0      | 56    |                            |                            | 16-2361 DLY  |
| LA    | DE RIDDER                | 16-2367 | 30.8428  | -93.2869  | 190           | 0          | 0      | 90    |                            |                            | 16-2367 DLY  |
| LA    | ELIZABETH                | 16-2800 | 30.8500  | -92.7833  | 151           | 0          | 0      | 78    |                            |                            | 16-2800 DLY  |
| LA    | GORUM FIRE TWR           | 16-3741 | 31.4358  | -92.8828  | 308           | 0          | 0      | 46    |                            |                            | 16-3741 DLY  |
| LA    | GRAND CANE FIRE<br>TWR   | 16-3794 | 32.1333  | -93.8000  | 269           | 0          | 0      | 75    |                            |                            | 16-4800 DLY<br>16-3657 DLY<br>16-3794 DLY                |
| LA    | HACKBERRY 8 SSW          | 16-3979 | 29.8894  | -93.4019  | 7             | 0          | 0      | 73    |                            |                            | 16-3979 DLY  |
| LA    | HANNA 4 SSE              | 16-4050 | 31.9158  | -93.3183  | 118           | 0          | 0      | 54    |                            |                            | 16-5081 DLY<br>16-4050 DLY                               |
| LA    | HAYNESVILLE              | 16-4131 | 32.9683  | -93.1297  | 302           | 0          | 0      | 46    |                            |                            | 16-4131 DLY  |
| LA    | HODGES GARDENS           | 16-4288 | 31.3747  | -93.3911  | 420           | 0          | 0      | 63    |                            |                            | 16-4384 DLY<br>16-4288 DLY                               |
| LA    | HOMER 1N                 | 16-4355 | 32.8100  | -93.0625  | 217           | 0          | 0      | 69    |                            |                            | 16-4355 DLY  |
| LA    | HOSSTON                  | 16-4398 | 32.8867  | -93.8733  | 246           | 0          | 0      | 70    |                            |                            | 16-4398 DLY  |
| LA    | JENNINGS                 | 16-4700 | 30.2003  | -92.6642  | 26            | 30         | 31     | 118   | 16-4702 15M<br>16-4700 15M | 16-4702 HLY<br>16-4700 HLY | 16-4700 DLY  |
| LA    | KEITHVILLE               | 16-4816 | 32.3550  | -93.8619  | 200           | 0          | 26     | 77    |                            | 16-4816 HLY                | 16-4816 DLY  |
| LA    | KINDER 3 W               | 16-4884 | 30.5000  | -92.9000  | 49            | 0          | 0      | 43    |                            |                            | 16-4884 DLY  |
| LA    | KORAN                    | 16-4931 | 32.4169  | -93.4428  | 174           | 0          | 0      | 66    |                            |                            | 16-4931 DLY  |
| LA    | LAKE ARTHUR 7 SW         | 16-5065 | 30.0206  | -92.7681  | 10            | 0          | 0      | 90    |                            |                            | 16-5065 DLY  |
| LA    | LAKE CHARLES             | 79-0022 | 30.1250  | -93.2158  | 13            | 0          | 56     | 57    |                            | 56-0087 HLY<br>16-5078 HLY | 79-0022 DLY  |
| LA    | LAKE CHARLES 2 N         | 16-5074 | 30.2544  | -93.2186  | 7             | 0          | 0      | 55    |                            |                            | 16-5075 DLY<br>16-5074 DLY                               |
| LA    | LAKE CHARLES<br>CHENAULT | 79-0081 | 30.2167  | -93.1500  | 16            | 0          | 21     | 67    |                            | 99-5077 HLY<br>16-5077 HLY | 99-5077 HLY<br>79-0081 DLY                               |
| LA    | LEESVILLE                | 16-5266 | 31.1417  | -93.2397  | 265           | 0          | 41     | 92    |                            | 16-5266 HLY                | 16-5266 DLY  |

| State | Name                         | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |  |   |
|-------|------------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|--|---|
|       |                              |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly   | daily                                     |
| LA    | LEESVILLE 6 SSW              | 16-5287 | 31.0517  | -93.2789  | 259           | 0          | 0      | 46    |   |  | 16-1446 DLY<br>16-5287 DLY                |
| LA    | LOGANSFORT 4 ENE             | 16-5527 | 31.9833  | -93.9500  | 210           | 20         | 35     | 112   | 16-5527 15M                               | 16-5527 HLY  | 16-5522 DLY<br>16-5527 HLY<br>16-5527 DLY |
| LA    | LONGVILLE                    | 16-5584 | 30.6000  | -93.2333  | 115           | 0          | 0      | 43    |   |  | 16-5584 DLY                               |
| LA    | LSU DEAN LEE RSCH<br>STN     | 16-5630 | 31.1783  | -92.4108  | 69            | 0          | 0      | 37    |   |  | 16-5630 DLY                               |
| LA    | MANSFIELD                    | 16-5874 | 32.0389  | -93.7053  | 394           | 0          | 0      | 54    |   |  | 16-5874 DLY                               |
| LA    | MANY                         | 16-5892 | 31.5769  | -93.4817  | 256           | 0          | 0      | 59    |   |  | 16-5890 HLY<br>16-5892 DLY                |
| LA    | MERMENTAU                    | 16-6142 | 30.1900  | -92.5906  | 16            | 0          | 0      | 48    |   |  | 16-6144 DLY<br>16-6142 DLY                |
| LA    | MINDEN                       | 16-6244 | 32.6053  | -93.2947  | 184           | 39         | 57     | 119   | 66-6244 15M<br>16-6244 15M                | 66-6244 15M<br>16-6245 HLY<br>16-6246 HLY<br>16-6244 HLY | 16-6244 DLY                               |
| LA    | MITTIE 2 SE                  | 16-6271 | 30.7000  | -92.8833  | 121           | 0          | 0      | 30    |   |  | 16-6271 DLY                               |
| LA    | MONTGOMERY                   | 16-6324 | 31.6667  | -92.9000  | 102           | 0          | 20     | 24    |   | 16-6324 HLY  | 16-6324 HLY<br>16-6324 DLY                |
| LA    | MOORINGSFORT 1 N             | 16-6364 | 32.7053  | -93.9603  | 200           | 0          | 0      | 41    |   |  | 16-6364 DLY                               |
| LA    | NATCHITOCHEs #2              | 16-6584 | 31.8142  | -93.0856  | 141           | 32         | 37     | 93    | 16-6582 15M<br>66-6584 15M<br>16-6584 15M | 16-6582 HLY<br>66-6584 15M<br>16-6584 HLY                | 16-6582 DLY<br>16-3804 DLY<br>16-6584 DLY |
| LA    | OAKDALE                      | 16-6836 | 30.8214  | -92.6697  | 112           | 0          | 0      | 59    |   |  | 16-6836 DLY                               |
| LA    | OBERLIN FIRE TWR             | 16-6938 | 30.6036  | -92.7739  | 66            | 0          | 0      | 65    |   |  | 16-6938 DLY                               |
| LA    | PLAIN DEALING                | 16-7344 | 32.8919  | -93.6944  | 253           | 0          | 0      | 114   |   |  | 16-7344 DLY                               |
| LA    | POLLOCK FOREST<br>NURSERY    | 16-7421 | 31.5000  | -92.4667  | 230           | 0          | 0      | 31    |   |  | 16-7421 DLY                               |
| LA    | RED RIVER - LOCK &<br>DAM #4 | 85-0085 | 31.9394  | -93.2756  | 112           | 0          | 21     | 22    |   | 85-0085 HLY  | 85-0085 HLY                               |
| LA    | RED RIVER RSCH STN           | 16-7738 | 32.4219  | -93.6381  | 154           | 32         | 41     | 52    | 66-7738 15M<br>16-2235 15M<br>16-7738 15M | 66-7738 15M<br>16-2235 HLY<br>16-7738 HLY                | 16-2235 DLY<br>16-7738 DLY                |

| State | Name                     | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations |                            |                            |
|-------|--------------------------|---------|----------|-----------|---------------|------------|--------|-------|-----------------------|----------------------------|----------------------------|
|       |                          |         |          |           |               | <1hr       | hourly | daily | <1hr                  | hourly                     | daily                      |
| LA    | ROBELINE                 | 16-7905 | 31.6833  | -93.3000  | 151           | 0          | 0      | 59    |                       |                            | 16-7905 DLY                |
| LA    | ROBSON                   | 16-7924 | 32.3556  | -93.6425  | 161           | 0          | 0      | 49    |                       |                            | 16-7924 DLY                |
| LA    | ROCKEFELLER WL<br>REFUGE | 16-7932 | 29.7286  | -92.8181  | 3             | 0          | 22     | 53    |                       | 16-7932 HLY                | 16-7932 DLY                |
| LA    | ROSEPINE RSCH STN        | 16-8046 | 30.9461  | -93.2789  | 240           | 0          | 0      | 40    |                       |                            | 16-8046 DLY                |
| LA    | SAILES FIRE TWR          | 16-8094 | 32.3625  | -93.1400  | 276           | 0          | 0      | 44    |                       |                            | 16-4590 DLY<br>16-8094 DLY |
| LA    | SHREVEPORT               | 79-0085 | 32.4506  | -93.8411  | 272           | 0          | 62     | 146   |                       | 78-0070 15M<br>16-8440 HLY | 79-0085 DLY                |
| LA    | SHREVEPORT DWTN          | 16-8436 | 32.5158  | -93.7447  | 180           | 0          | 0      | 39    |                       |                            | 16-8436 DLY                |
| LA    | SPRINGHILL               | 16-8683 | 32.9922  | -93.4417  | 240           | 0          | 0      | 53    |                       |                            | 16-8263 DLY<br>16-8683 DLY |
| LA    | SUGARTOWN                | 16-8828 | 30.8500  | -93.0167  | 171           | 0          | 0      | 54    |                       |                            | 16-8828 DLY                |
| LA    | SULPHUR                  | 16-8831 | 30.2383  | -93.3447  | 10            | 0          | 0      | 44    |                       |                            | 69-0099 DLY<br>16-8831 DLY |
| LA    | TOLEDO BEND LAKE         | 16-9074 | 31.2022  | -93.5725  | 180           | 0          | 0      | 41    |                       |                            | 41-9068 DLY<br>16-9074 DLY |
| LA    | VERNON                   | 76-0011 | 31.0167  | -93.1869  | 350           | 0          | 18     | 18    |                       | 85-0069 HLY<br>76-0011 HLY | 85-0069 HLY<br>76-0011 HLY |
| LA    | VINTON                   | 16-9375 | 30.1922  | -93.5811  | 13            | 0          | 0      | 31    |                       |                            | 16-9375 DLY                |
| LA    | VIVIAN                   | 16-9392 | 32.9033  | -93.9819  | 220           | 0          | 0      | 69    |                       |                            | 16-7950 DLY<br>16-9392 DLY |
| LA    | WOODWORTH 2 SE           | 16-9865 | 31.1167  | -92.4667  | 115           | 0          | 0      | 56    |                       |                            | 16-9860 DLY<br>16-9865 DLY |
| MX    | ALLENDE                  | 90-0001 | 28.3300  | -100.8300 | 1227          | 0          | 0      | 36    |                       |                            | 90-0001 DLY                |
| MX    | ALLENDE (SMN)            | 61-0214 | 28.3333  | -100.8333 | 1227          | 0          | 0      | 44    |                       |                            | 61-0214 DLY                |
| MX    | ALLENDE II (DGE)         | 61-0268 | 28.3478  | -100.8536 | 1247          | 0          | 0      | 30    |                       |                            | 61-0268 DLY                |
| MX    | ANAHUAC                  | 61-0339 | 27.2383  | -100.1314 | 636           | 0          | 0      | 74    |                       |                            | 61-0339 DLY                |
| MX    | CERRALVO (DGE)           | 61-0327 | 26.0900  | -99.6175  | 919           | 0          | 0      | 41    |                       |                            | 61-0327 DLY                |
| MX    | EJIDO MARIN              | 61-0418 | 25.8586  | -100.0222 | 1322          | 0          | 0      | 32    |                       |                            | 61-0418 DLY                |
| MX    | EJIDO SAN MIGUEL         | 61-0223 | 28.6367  | -102.9483 | 3478          | 0          | 0      | 35    |                       |                            | 61-0223 DLY                |
| MX    | EL CUCHILLO              | 61-0333 | 25.7181  | -99.2558  | 476           | 0          | 0      | 68    |                       |                            | 61-0333 DLY                |

| State | Name                                | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations |        |  |
|-------|-------------------------------------|---------|----------|-----------|---------------|------------|--------|-------|-----------------------|--------|--|
|       |                                     |         |          |           |               | <1hr       | hourly | daily | <1hr                  | hourly | daily  |
| MX    | EL CUCHILLO                         | 90-0011 | 25.7300  | -99.2500  | 430           | 0          | 0      | 44    |                       |        | 90-0011 DLY  |
| MX    | FRANCISCO<br>GONZALEZ<br>VILLARREAL | 61-0519 | 25.3661  | -97.9792  | 43            | 0          | 0      | 38    |                       |        | 61-0519 DLY  |
| MX    | GARZA AYALA                         | 61-0337 | 26.4914  | -100.0583 | 843           | 0          | 0      | 35    |                       |        | 61-0337 DLY  |
| MX    | GENERAL BRAVO                       | 90-0012 | 25.8000  | -99.1800  | 407           | 0          | 0      | 33    |                       |        | 90-0012 DLY  |
| MX    | GENERAL BRAVO<br>(SMN)              | 61-0388 | 25.7928  | -99.1808  | 423           | 0          | 0      | 39    |                       |        | 61-0388 DLY  |
| MX    | HIGUERAS (SMN)                      | 61-0340 | 25.9500  | -100.0167 | 1706          | 0          | 0      | 32    |                       |        | 61-0340 DLY  |
| MX    | JUAREZ                              | 61-0252 | 27.6139  | -100.7250 | 919           | 0          | 0      | 59    |                       |        | 61-0252 DLY  |
| MX    | LAMPAZOS (SMN)                      | 61-0343 | 27.0781  | -100.4908 | 935           | 0          | 0      | 70    |                       |        | 61-0343 DLY  |
| MX    | LAS ENRAMADAS                       | 61-0353 | 25.5014  | -99.5214  | 755           | 0          | 0      | 50    |                       |        | 61-0353 DLY  |
| MX    | LOS ALDAMAS                         | 61-0354 | 26.0644  | -99.1967  | 338           | 0          | 0      | 36    |                       |        | 61-0354 DLY  |
| MX    | LOS HERRERAS                        | 61-0355 | 25.8975  | -99.4008  | 459           | 0          | 0      | 45    |                       |        | 90-0013 DLY<br>61-0355 DLY                               |
| MX    | LOS RAMONES                         | 61-0356 | 25.6914  | -99.6306  | 689           | 0          | 0      | 62    |                       |        | 61-0356 DLY  |
| MX    | LOS RAMONES                         | 90-0014 | 25.7000  | -99.6300  | 682           | 0          | 0      | 37    |                       |        | 90-0014 DLY  |
| MX    | LUIS L. LEON                        | 61-0043 | 28.9786  | -105.3117 | 3543          | 0          | 0      | 45    |                       |        | 61-0043 DLY  |
| MX    | NUEVA ROSITA                        | 61-0229 | 27.9167  | -101.2500 | 1211          | 0          | 0      | 41    |                       |        | 61-0229 DLY  |
| MX    | OJINAGA (DGE)                       | 61-0182 | 29.5500  | -104.4000 | 2625          | 0          | 0      | 80    |                       |        | 61-0027 DLY<br>90-0007 DLY<br>61-0021 DLY<br>61-0182 DLY |
| MX    | PALESTINA (DGE)                     | 61-0231 | 29.1586  | -100.9883 | 1115          | 0          | 0      | 64    |                       |        | 61-0265 DLY<br>90-0002 DLY<br>61-0231 DLY                |
| MX    | PARAS                               | 61-0385 | 26.4933  | -99.5242  | 492           | 0          | 0      | 35    |                       |        | 61-0385 DLY  |
| MX    | PRESA VENUSTIANO<br>CARRANZA        | 61-0238 | 27.5189  | -100.6197 | 892           | 0          | 0      | 57    |                       |        | 61-0238 DLY  |
| MX    | SABINAS (DGE)                       | 61-0241 | 27.8467  | -101.1228 | 1112          | 0          | 0      | 67    |                       |        | 90-0004 DLY<br>61-0241 DLY                               |
| MX    | SALINILLAS                          | 61-0369 | 27.4292  | -100.3739 | 787           | 0          | 0      | 65    |                       |        | 61-0369 DLY  |

| State | Name                  | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |  |
|-------|-----------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|--|
|       |                       |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily  |
| MX    | SALINILLAS            | 90-0015 | 27.4500  | -100.1200 | 741           | 0          | 0      | 40    |                            |                            | 90-0015 DLY  |
| MX    | SAMALAYUCA            | 61-0105 | 31.3425  | -106.4764 | 4088          | 0          | 0      | 51    |                            |                            | 61-0105 DLY  |
| MX    | SOMBRERETILLO         | 61-0374 | 26.3414  | -99.9400  | 1017          | 0          | 0      | 30    |                            |                            | 61-0374 DLY  |
| MX    | VALLECILLO (DGE)      | 61-0377 | 26.6581  | -99.9864  | 869           | 0          | 0      | 43    |                            |                            | 61-0377 DLY  |
| MX    | VALLECILLO (SMN)      | 61-0390 | 26.6597  | -99.9869  | 873           | 0          | 0      | 42    |                            |                            | 61-0390 DLY  |
| MX    | VILLA AHUMADA         | 61-0134 | 30.6186  | -106.5122 | 3937          | 0          | 0      | 64    |                            |                            | 61-0134 DLY  |
| MX    | VILLA JUAREZ          | 90-0006 | 27.6200  | -100.7200 | 900           | 0          | 0      | 36    |                            |                            | 90-0006 DLY  |
| MX    | ZARAGOZA              | 90-0005 | 28.5000  | -100.9200 | 1173          | 0          | 0      | 33    |                            |                            | 90-0005 DLY  |
| MX    | ZARAGOZA (SMN)        | 61-0249 | 28.4917  | -100.9286 | 1181          | 0          | 0      | 32    |                            |                            | 61-0249 DLY  |
| NM    | ABBOTT 1 SE           | 29-0022 | 36.3028  | -104.2497 | 6152          | 0          | 0      | 91    |                            |                            | 29-0022 DLY  |
| NM    | AFTON 6 NE            | 29-0125 | 32.1167  | -106.8667 | 4190          | 0          | 0      | 51    |                            |                            | 29-0125 DLY  |
| NM    | ALAMOGORDO            | 29-0199 | 32.9181  | -105.9550 | 4380          | 0          | 39     | 102   |                            | 29-0208 HLY<br>29-0199 HLY | 69-0406 DLY<br>69-0393 DLY<br>29-0199 HLY<br>29-0199 DLY |
| NM    | ALAMOGORDO 1          | 29-0200 | 32.8667  | -105.9333 | 4576          | 0          | 0      | 49    |                            |                            | 69-0376 DLY<br>29-0200 DLY                               |
| NM    | ALEMAN RCH            | 29-0268 | 32.9308  | -106.9328 | 4521          | 0          | 0      | 48    |                            |                            | 29-0268 DLY  |
| NM    | AMISTAD 5 SSW         | 29-0377 | 35.8742  | -103.1819 | 4446          | 0          | 0      | 88    |                            |                            | 29-0377 DLY  |
| NM    | ARTESIA 6S            | 29-0600 | 32.7547  | -104.3836 | 3366          | 37         | 63     | 106   | 66-0600 15M<br>29-0600 15M | 66-0600 15M<br>29-0600 HLY | 29-0600 DLY  |
| NM    | BELL RANCH            | 29-0858 | 35.5297  | -104.0936 | 4330          | 0          | 0      | 104   |                            |                            | 29-0858 DLY  |
| NM    | BRANTLEY DAM          | 29-1153 | 32.5433  | -104.3807 | 3254          | 0          | 0      | 32    |                            |                            | 29-4747 DLY<br>29-1153 DLY                               |
| NM    | BUEYEROS 4 NW         | 29-1269 | 36.0167  | -103.7333 | 4682          | 0          | 0      | 32    |                            |                            | 29-1269 DLY  |
| NM    | CAMBRAY               | 29-1309 | 32.2333  | -107.3333 | 4232          | 0          | 0      | 48    |                            |                            | 69-0352 DLY<br>29-1309 DLY                               |
| NM    | CAMERON               | 29-1332 | 34.9039  | -103.4428 | 4747          | 0          | 0      | 58    |                            |                            | 29-1332 DLY  |
| NM    | CANNON AFB<br>AIRPORT | 64-0408 | 34.3830  | -103.3170 | 4295          | 0          | 0      | 38    |                            |                            | 79-0105 DLY<br>64-0408 DLY                               |
| NM    | CANTON                | 29-1423 | 34.2753  | -104.1636 | 4055          | 0          | 0      | 62    |                            |                            | 29-1423 DLY  |

| State | Name                       | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |  |  |
|-------|----------------------------|---------|----------|-----------|---------------|------------|--------|-------|---|--|--|
|       |                            |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly   | daily  |
| NM    | CAPROCK                    | 29-1445 | 33.3433  | -103.6783 | 4350          | 0          | 27     | 34    |   | 29-1446 HLY<br>29-1445 HLY                               | 29-1446 HLY<br>29-1446 DLY<br>29-1445 DLY                |
| NM    | CAPROCK                    | 76-0014 | 32.9278  | -103.8567 | 4210          | 0          | 27     | 27    |   | 85-0155 HLY<br>76-0014 HLY                               | 85-0155 HLY<br>76-0014 HLY                               |
| NM    | CAPULIN 6 SSE              | 29-1452 | 36.6667  | -103.9500 | 6771          | 0          | 0      | 39    |   |  | 29-1452 DLY  |
| NM    | CARLSBAD                   | 29-1469 | 32.3478  | -104.2225 | 3120          | 31         | 58     | 114   | 66-1469 15M<br>29-1469 15M                | 66-1469 15M<br>29-1469 HLY                               | 29-1469 DLY  |
| NM    | CARLSBAD 3.4 N             | 69-0306 | 32.4539  | -104.2378 | 3136          | 0          | 0      | 74    |   |  | 29-4736 DLY<br>69-0306 DLY                               |
| NM    | CARLSBAD CAVERN<br>CITY AP | 79-0148 | 32.3336  | -104.2581 | 3232          | 0          | 0      | 71    |   |  | 79-0148 DLY  |
| NM    | CARLSBAD CAVERNS           | 29-1480 | 32.1783  | -104.4433 | 4436          | 0          | 20     | 80    |   | 85-0151 HLY<br>76-0012 HLY                               | 85-0151 HLY<br>76-0012 HLY<br>29-1480 DLY                |
| NM    | CLAYTON 9 SSE              | 29-1881 | 36.3333  | -103.1000 | 4720          | 0          | 0      | 32    |   |  | 29-1881 DLY  |
| NM    | CLAYTON MUNI AIR<br>PK     | 79-0118 | 36.4486  | -103.1539 | 4961          | 22         | 64     | 111   | 29-1887 15M<br>78-0017 15M                | 56-0185 HLY<br>29-1887 HLY                               | 29-1887 HLY<br>79-0118 DLY                               |
| NM    | CLOUDCROFT                 | 29-1931 | 32.9544  | -105.7353 | 8678          | 0          | 0      | 95    |   |  | 69-0387 DLY<br>29-1927 DLY<br>29-1931 DLY                |
| NM    | CLOVIS                     | 29-1939 | 34.4289  | -103.1992 | 4295          | 25         | 53     | 99    | 29-1939 15M                               | 29-1956 HLY<br>29-1939 HLY                               | 69-0134 DLY<br>29-1939 DLY                               |
| NM    | CLOVIS 13 N                | 29-1963 | 34.5989  | -103.2161 | 4436          | 32         | 57     | 67    | 29-1963 15M                               | 29-1963 HLY  | 29-1963 DLY  |
| NM    | COLUMBUS                   | 79-0121 | 31.8297  | -107.6389 | 4065          | 26         | 55     | 98    | 29-2024 15M                               | 29-2024 HLY  | 79-0121 DLY  |
| NM    | CONCHAS DAM                | 29-2030 | 35.4072  | -104.1906 | 4245          | 37         | 58     | 81    | 29-2030 15M                               | 29-2030 HLY  | 29-2030 DLY  |
| NM    | CROSSROADS 2               | 29-2207 | 33.5133  | -103.3403 | 4137          | 25         | 27     | 66    | 29-2203 15M<br>29-2207 15M                | 29-2203 15M<br>29-2207 HLY                               | 29-2207 HLY<br>29-2207 DLY                               |
| NM    | DEMING                     | 29-2436 | 32.2531  | -107.7531 | 4301          | 35         | 51     | 120   | 78-0030 15M<br>29-2440 15M<br>29-2436 15M | 29-2436 15M<br>55-0109 HLY<br>56-0188 HLY<br>29-2440 HLY | 64-0426 DLY<br>79-0124 DLY<br>69-0350 DLY<br>29-2436 DLY |
| NM    | DES MOINES                 | 29-2453 | 36.7500  | -103.8333 | 6621          | 0          | 0      | 76    |   |  | 29-2453 DLY  |
| NM    | DRIPPING SPRINGS           | 76-0015 | 32.3233  | -106.5867 | 6172          | 0          | 22     | 21    |   | 76-0015 HLY  | 76-0015 HLY  |



| State | Name              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |  |
|-------|-------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|--|
|       |                   |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily  |
| NM    | ELIDA             | 29-2854 | 33.9403  | -103.6572 | 4396          | 0          | 0      | 94    |   |   | 29-2854 DLY  |
| NM    | ELK               | 29-2865 | 32.9161  | -105.3381 | 5935          | 0          | 0      | 67    |   |   | 29-2865 DLY  |
| NM    | ELKINS            | 29-2871 | 33.7000  | -104.0667 | 4032          | 0          | 0      | 32    |   |   | 29-2871 DLY  |
| NM    | FLORIDA           | 29-3225 | 32.4333  | -107.4833 | 4449          | 0          | 42     | 49    |   | 29-3225 HLY                               | 29-3225 DLY  |
| NM    | FLOYD             | 29-3231 | 34.2167  | -103.5500 | 4120          | 0          | 0      | 30    |   |   | 29-3231 DLY  |
| NM    | FLYING H          | 29-3237 | 33.0000  | -105.1000 | 5102          | 0          | 0      | 46    |   |   | 29-3174 DLY<br>29-3237 DLY                               |
| NM    | FT SUMNER         | 29-3294 | 34.4667  | -104.2319 | 4026          | 0          | 0      | 91    |   |   | 29-3294 DLY  |
| NM    | FT SUMNER 5 S     | 29-3296 | 34.3942  | -104.2503 | 4049          | 0          | 0      | 68    |   |   | 29-3296 DLY  |
| NM    | GRENVILLE         | 29-3706 | 36.5939  | -103.6192 | 6001          | 0          | 0      | 72    |   |   | 29-3706 DLY  |
| NM    | HATCH             | 29-3855 | 32.6775  | -107.1958 | 4075          | 0          | 0      | 77    |   |   | 29-3855 DLY  |
| NM    | HOBBS             | 29-4026 | 32.7264  | -103.1314 | 3661          | 0          | 0      | 86    |   |   | 29-4026 DLY  |
| NM    | HOBBS 13W         | 29-4030 | 32.7125  | -103.3539 | 3835          | 27         | 53     | 92    | 66-4030 15M<br>29-6659 15M<br>29-4030 15M | 29-6659 HLY<br>66-4030 15M<br>29-4030 HLY | 29-6659 HLY<br>29-6659 DLY<br>66-4030 15M<br>29-4030 DLY |
| NM    | HOOSIER RCH       | 29-4106 | 35.8667  | -104.1667 | 5682          | 0          | 0      | 36    |   |   | 29-4106 DLY  |
| NM    | HOPE              | 29-4112 | 32.8111  | -104.7386 | 4085          | 33         | 38     | 69    | 66-4112 15M<br>29-4112 15M                | 66-4112 15M<br>29-4112 HLY                | 29-4112 HLY<br>29-4112 DLY                               |
| NM    | HOUSE             | 29-4175 | 34.6344  | -103.8903 | 4700          | 0          | 0      | 75    |   |   | 69-0421 DLY<br>29-4175 DLY                               |
| NM    | IONE              | 29-4306 | 35.7500  | -103.3000 | 4705          | 0          | 0      | 48    |   |   | 29-4306 DLY  |
| NM    | JAL               | 29-4346 | 32.1103  | -103.1872 | 3054          | 0          | 0      | 78    |   |   | 29-4346 DLY  |
| NM    | JORNADA EXP RANGE | 29-4426 | 32.6161  | -106.7403 | 4318          | 40         | 67     | 94    | 66-4426 15M<br>29-4426 15M                | 66-4426 15M<br>64-0600 HLY<br>29-4426 HLY | 64-0600 HLY<br>29-4426 HLY<br>29-4426 DLY                |
| NM    | LOVINGTON 2 WNW   | 29-5204 | 32.9667  | -103.3833 | 3904          | 0          | 0      | 49    |   |   | 69-0334 DLY<br>69-0333 DLY<br>29-5204 DLY                |
| NM    | MALJAMAR          | 29-5370 | 32.8567  | -103.7625 | 4154          | 28         | 52     | 63    | 29-5370 15M                               | 29-5370 HLY                               | 29-5370 HLY<br>29-5370 DLY                               |

| State | Name           | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations |                            |   |
|-------|----------------|---------|----------|-----------|---------------|------------|--------|-------|-----------------------|----------------------------|---|
|       |                |         |          |           |               | <1hr       | hourly | daily | <1hr                  | hourly                     | daily                                     |
| NM    | MAYHILL        | 54-0197 | 32.9096  | -105.4710 | 6634          | 0          | 0      | 86    |                       |                            | 69-0383 DLY<br>29-5502 DLY<br>54-0197 DLY |
| NM    | MCCARTY RCH    | 29-5516 | 35.6022  | -103.3644 | 4409          | 0          | 0      | 41    |                       |                            | 29-7451 DLY<br>29-5516 DLY                |
| NM    | MELROSE        | 29-5617 | 34.4278  | -103.6250 | 4600          | 0          | 0      | 99    |                       |                            | 29-5617 DLY                               |
| NM    | MONTOYA 10 SE  | 29-5874 | 35.0000  | -103.9333 | 4344          | 0          | 0      | 33    |                       |                            | 29-5874 DLY                               |
| NM    | MOSQUERO 1 NE  | 29-5937 | 35.8022  | -103.9439 | 5466          | 0          | 0      | 93    |                       |                            | 29-5931 DLY<br>29-5937 DLY                |
| NM    | MTN PARK       | 29-5960 | 32.9539  | -105.8225 | 6804          | 0          | 0      | 93    |                       |                            | 29-5960 DLY                               |
| NM    | NARA VISA      | 29-6040 | 35.6167  | -103.1000 | 4193          | 0          | 0      | 34    |                       |                            | 29-6040 DLY                               |
| NM    | NEWKIRK        | 29-6115 | 35.0700  | -104.2575 | 4564          | 0          | 0      | 75    |                       |                            | 29-6115 DLY                               |
| NM    | OBAR           | 29-6258 | 35.5500  | -103.2000 | 4104          | 0          | 0      | 38    |                       |                            | 29-6258 DLY                               |
| NM    | OCHOA          | 29-6281 | 32.1664  | -103.4250 | 3399          | 0          | 0      | 62    |                       |                            | 29-6281 DLY                               |
| NM    | OROGRANDE      | 29-6435 | 32.3789  | -106.0925 | 4222          | 25         | 53     | 101   | 29-6435 15M           | 29-6435 HLY                | 29-6435 HLY<br>29-6435 DLY                |
| NM    | PADUCA         | 76-0019 | 32.1797  | -103.7217 | 3510          | 0          | 27     | 27    |                       | 85-0171 HLY<br>76-0019 HLY | 85-0171 HLY<br>76-0019 HLY                |
| NM    | PALO VERDE (1) | 29-6540 | 35.9667  | -104.1833 | 5879          | 0          | 0      | 34    |                       |                            | 29-6540 DLY                               |
| NM    | PASAMONTE      | 29-6619 | 36.2994  | -103.7408 | 5650          | 0          | 0      | 102   |                       |                            | 29-6619 DLY                               |
| NM    | PENNINGTON     | 29-6728 | 36.3167  | -103.5833 | 5604          | 0          | 0      | 33    |                       |                            | 29-6728 DLY                               |
| NM    | PORTALES       | 29-7008 | 34.1742  | -103.3519 | 4009          | 0          | 0      | 100   |                       |                            | 29-7008 DLY                               |
| NM    | PORTER 2 E     | 29-7026 | 35.2333  | -103.2833 | 4078          | 0          | 0      | 54    |                       |                            | 29-7026 DLY                               |
| NM    | PRAIRIEVIEW    | 29-7054 | 33.1167  | -103.2000 | 3855          | 0          | 0      | 30    |                       |                            | 29-7054 DLY                               |
| NM    | QUAY 2 S       | 29-7168 | 34.9000  | -103.7500 | 4304          | 0          | 0      | 31    |                       |                            | 29-7168 DLY                               |
| NM    | QUEEN          | 29-7172 | 32.1936  | -104.7403 | 5840          | 0          | 0      | 27    |                       |                            | 29-7176 DLY<br>69-0315 DLY<br>29-7172 DLY |
| NM    | RAGLAND 3 SSW  | 29-7226 | 34.7800  | -103.7492 | 4867          | 0          | 0      | 79    |                       |                            | 29-7226 DLY                               |

| State | Name                    | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |   |  |
|-------|-------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|---|--|
|       |                         |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                                    | daily  |
| NM    | RATON 26 ESE            | 79-0013 | 36.7778  | -103.9817 | 7231          | 0          | 0      | 46    |                            |   | 29-1450 DLY<br>29-1454 DLY<br>54-0199 DLY<br>79-0013 DLY |
| NM    | ROY                     | 29-7638 | 35.9450  | -104.1981 | 5889          | 29         | 52     | 100   | 29-7638 15M                | 29-7638 HLY                               | 29-7638 DLY  |
| NM    | SACRAMENTO              | 29-7735 | 32.7924  | -105.5620 | 7316          | 24         | 55     | 69    | 29-7736 15M                | 29-7735 HLY<br>29-7736 HLY                | 29-7735 HLY<br>29-7736 HLY<br>29-7735 HLY<br>29-7735 DLY |
| NM    | SAN JON                 | 29-7867 | 35.1086  | -103.3283 | 4034          | 0          | 0      | 109   |                            |   | 29-7867 DLY  |
| NM    | SEDAN 7 NW              | 29-8187 | 36.2000  | -103.2167 | 4774          | 0          | 0      | 53    |                            |   | 69-0442 DLY<br>29-8187 DLY                               |
| NM    | ST VRAIN                | 29-7741 | 34.4167  | -103.5000 | 4452          | 0          | 0      | 30    |                            |   | 29-7741 DLY  |
| NM    | STATE UNIV              | 29-8535 | 32.2822  | -106.7597 | 3888          | 32         | 62     | 125   | 66-8535 15M<br>29-8535 15M | 66-8535 15M<br>29-0131 HLY<br>29-8535 HLY | 29-0131 DLY<br>29-8535 DLY                               |
| NM    | TATUM                   | 29-8713 | 33.2422  | -103.3611 | 4012          | 0          | 0      | 90    |                            |   | 29-8713 DLY  |
| NM    | TUCUMCARI               | 29-9148 | 35.1667  | -103.7000 | 4042          | 0          | 0      | 45    |                            |   | 29-9148 DLY  |
| NM    | TUCUMCARI 4 NE          | 29-9156 | 35.2006  | -103.6867 | 4085          | 36         | 58     | 112   | 66-9156 15M<br>29-9156 15M | 66-9156 15M<br>29-9156 HLY                | 29-9156 DLY  |
| NM    | TUCUMCARI MUNI AP       | 79-0117 | 35.1822  | -103.6031 | 4065          | 0          | 0      | 44    |                            |   | 79-0117 DLY  |
| NM    | UTE DAM                 | 29-9284 | 35.3600  | -103.4433 | 3825          | 0          | 0      | 65    |                            |   | 29-5056 DLY<br>29-9284 DLY                               |
| NM    | WHITE SANDS NATL<br>MON | 29-9686 | 32.7822  | -106.1758 | 4006          | 30         | 63     | 75    | 66-9686 15M<br>29-9686 15M | 66-9686 15M<br>29-9686 HLY                | 29-9686 DLY  |
| OK    | ACME_4WNW               | 86-0136 | 34.8083  | -98.0233  | 1302          | 21         | 21     | 23    | 86-0136 15M                | 86-0136 15M                               | 86-0136 DLY  |
| OK    | ADA_2NNE                | 86-0137 | 34.7985  | -96.6691  | 972           | 21         | 24     | 107   | 86-0137 15M                | 34-0017 HLY<br>86-0137 15M<br>56-0211 HLY | 34-0017 DLY<br>86-0137 DLY                               |
| OK    | ALTUS 3S MESONET        | 34-0180 | 34.5872  | -99.3381  | 1365          | 37         | 36     | 100   | 86-0138 15M<br>34-0179 15M | 86-0138 15M<br>34-0179 HLY                | 34-0179 DLY<br>34-0180 DLY                               |
| OK    | ALTUS AFB AIRPORT       | 64-0436 | 34.6500  | -99.2670  | 1382          | 0          | 0      | 35    |                            |   | 79-0071 DLY<br>64-0436 DLY                               |

| State | Name         | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations   |   |   |
|-------|--------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|---|
|       |              |         |          |           |               | <1hr       | hourly | daily | <1hr  | hourly  | daily   |
| OK    | ALTUS DAM    | 34-0184 | 34.8847  | -99.2964  | 1526          | 0          | 23     | 66    |   | 87-0001 HLY   | 34-0184 DLY   |
| OK    | ANADARKO 3 E | 34-0224 | 35.0619  | -98.1989  | 1168          | 0          | 0      | 81    |   |   | 34-0224 DLY   |
| OK    | ANTHON 6 W   | 34-0242 | 35.7500  | -99.1000  | 1821          | 0          | 20     | 22    |   | 34-0242 HLY   | 34-0242 HLY   |
| OK    | ANTLERS      | 34-0256 | 34.2208  | -95.6150  | 469           | 38         | 59     | 93    | 86-0142 15M<br>86-0141 15M<br>34-0256 15M                               | 86-0142 15M<br>86-0141 15M<br>34-0256 HLY   | 86-0142 DLY<br>86-0141 DLY<br>34-0256 HLY<br>34-0256 DLY                |
| OK    | APACHE       | 34-0260 | 34.8892  | -98.3592  | 1306          | 0          | 0      | 95    |   |   | 86-0143 DLY<br>69-0461 DLY<br>34-0260 DLY                               |
| OK    | ARAPAHO      | 34-0277 | 35.5833  | -98.9667  | 1667          | 0          | 0      | 34    |   |   | 34-0277 DLY   |
| OK    | ARDMORE      | 34-0292 | 34.1772  | -97.1617  | 840           | 44         | 53     | 114   | 66-0292 15M<br>86-0145 15M<br>86-0144 15M<br>34-0293 15M<br>34-0292 15M | 86-0145 15M<br>86-0144 15M<br>34-0293 15M<br>66-0292 15M<br>56-0210 HLY<br>86-0145 15M<br>86-0144 15M<br>34-0293 HLY<br>34-0292 HLY | 56-0210 HLY<br>86-0145 15M<br>86-0144 15M<br>34-0293 HLY<br>34-0292 DLY |
| OK    | ARNETT 3NE   | 34-0332 | 36.1669  | -99.7214  | 2428          | 0          | 0      | 82    |   |   | 34-0332 DLY   |
| OK    | ARNETT_8WSW  | 86-0146 | 36.0720  | -99.9031  | 2352          | 21         | 21     | 24    | 86-0146 15M   | 86-0146 15M   | 34-0338 DLY<br>86-0146 DLY  |
| OK    | ATOKA        | 34-0391 | 34.3983  | -96.1400  | 564           | 0          | 0      | 48    |   |   | 34-0391 DLY   |
| OK    | ATOKA DAM    | 34-0394 | 34.4500  | -96.0667  | 594           | 0          | 0      | 33    |   |   | 34-0394 DLY   |
| OK    | BATTIEST     | 34-0567 | 34.3850  | -94.8981  | 777           | 0          | 0      | 40    |   |   | 34-1873 DLY<br>34-0562 DLY<br>34-0567 DLY                               |
| OK    | BEAR MTN TWR | 34-0584 | 34.1394  | -94.9519  | 801           | 0          | 0      | 44    |   |   | 34-0584 DLY   |
| OK    | BEAVER       | 34-0593 | 36.8125  | -100.5308 | 2464          | 20         | 20     | 92    | 86-0148 15M   | 86-0148 15M   | 34-0593 DLY   |
| OK    | BENGAL 4 NNW | 34-0670 | 34.8822  | -95.0906  | 666           | 34         | 55     | 64    | 34-0670 15M   | 34-0670 HLY   | 34-0670 HLY<br>34-0670 DLY  |

| State | Name            | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |  |  |
|-------|-----------------|---------|----------|-----------|---------------|------------|--------|-------|---|--|--|
|       |                 |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly   | daily  |
| OK    | BESSIE_4WNW     | 86-0150 | 35.4019  | -99.0585  | 1681          | 20         | 20     | 23    | 86-0150 15M                               | 86-0150 15M  | 34-0684 DLY<br>86-0150 DLY                               |
| OK    | BOISE CITY 2 E  | 34-0908 | 36.7236  | -102.4806 | 4134          | 32         | 58     | 91    | 86-0153 15M<br>66-0908 15M<br>34-0908 15M | 86-0153 15M<br>66-0908 15M<br>34-0912 HLY<br>34-0908 HLY | 34-0908 DLY  |
| OK    | BOSWELL 1 S     | 34-0980 | 34.0211  | -95.8722  | 551           | 0          | 0      | 49    |   |  | 34-0980 DLY  |
| OK    | BROKEN BOW 1 N  | 34-1162 | 34.0497  | -94.7381  | 476           | 0          | 0      | 78    |   |  | 85-0192 HLY<br>76-0021 HLY<br>34-1162 DLY                |
| OK    | BROKEN BOW DAM  | 34-1168 | 34.1333  | -94.7000  | 443           | 0          | 29     | 30    |   | 34-1168 HLY  | 34-1168 DLY  |
| OK    | BROKEN BOW_6.5E | 86-0157 | 34.0433  | -94.6244  | 375           | 20         | 20     | 22    | 86-0147 15M<br>86-0157 15M                | 86-0147 15M<br>86-0157 15M                               | 86-0147 DLY<br>86-0157 DLY                               |
| OK    | BUFFALO_0.5SW   | 86-0158 | 36.8313  | -99.6410  | 1832          | 21         | 21     | 99    | 86-0158 15M                               | 86-0158 15M  | 34-1243 DLY<br>34-1240 DLY<br>86-0158 DLY                |
| OK    | BUTLER_5SW      | 86-0161 | 35.5915  | -99.2706  | 1704          | 21         | 21     | 24    | 86-0161 15M                               | 86-0161 15M  | 34-1270 DLY<br>86-0161 DLY                               |
| OK    | BYARS_3ESE      | 86-0162 | 34.8497  | -97.0033  | 1137          | 21         | 21     | 24    | 86-0162 15M                               | 86-0162 15M  | 34-1283 DLY<br>86-0162 DLY                               |
| OK    | CAMARGO         | 34-1396 | 36.0167  | -99.2833  | 1942          | 0          | 0      | 72    |   |  | 34-1404 DLY<br>86-0164 DLY<br>34-1396 DLY                |
| OK    | CANEY 1 E       | 34-1437 | 34.2300  | -96.1950  | 564           | 0          | 44     | 54    |   | 34-1437 15M<br>34-1436 HLY                               | 34-1436 HLY<br>34-1436 DLY<br>34-1437 15M<br>34-1437 DLY |
| OK    | CARNASAW TWR    | 34-1499 | 34.1442  | -94.6378  | 1001          | 0          | 0      | 51    |   |  | 34-1499 DLY  |
| OK    | CARNEGIE 5 NE   | 34-1504 | 35.1756  | -98.5794  | 1480          | 0          | 0      | 82    |   |  | 34-1504 DLY  |
| OK    | CARTER TWR      | 34-1544 | 34.2505  | -94.7812  | 1301          | 26         | 52     | 67    | 34-1544 15M                               | 34-1544 HLY  | 34-1544 DLY  |
| OK    | CENTRAHOMA_1E   | 86-0167 | 34.6090  | -96.3331  | 687           | 21         | 21     | 24    | 86-0167 15M                               | 86-0167 15M  | 34-1644 DLY<br>86-0167 DLY                               |
| OK    | CHATTANOOGA     | 34-1706 | 34.4225  | -98.6497  | 1148          | 0          | 0      | 108   |   |  | 34-1706 DLY  |

| State | Name                     | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |   |
|-------|--------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|---|
|       |                          |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily                                     |
| OK    | CHEYENNE                 | 34-1738 | 35.6000  | -99.6833  | 2005          | 0          | 25     | 81    |                            | 87-0044 HLY                | 87-0044 HLY<br>34-1738 DLY                |
| OK    | CHEYENNE_6SW             | 86-0170 | 35.5461  | -99.7279  | 2267          | 20         | 20     | 24    | 86-0170 15M                | 86-0170 15M                | 34-1743 DLY<br>86-0170 DLY                |
| OK    | CHICKASAW NRA            | 34-1745 | 34.5019  | -96.9717  | 1056          | 0          | 0      | 99    |                            |                            | 34-8587 DLY<br>34-1745 DLY                |
| OK    | CHICKASHA EXP<br>STATION | 34-1750 | 35.0489  | -97.9158  | 1086          | 36         | 49     | 114   | 66-1750 15M<br>34-1750 15M | 66-1750 15M<br>34-1750 HLY | 34-1747 DLY<br>34-1750 DLY                |
| OK    | CHRISTS 40 ACRE<br>CAMP  | 85-0237 | 34.5283  | -94.9311  | 896           | 0          | 22     | 22    |                            | 85-0237 HLY                | 85-0237 HLY                               |
| OK    | CLINTON                  | 34-1909 | 35.5014  | -98.9772  | 1572          | 0          | 0      | 75    |                            |                            | 69-0520 DLY<br>34-1909 DLY                |
| OK    | CLINTON SHERMAN<br>AP    | 79-0020 | 35.3400  | -99.2000  | 1910          | 0          | 21     | 32    |                            | 55-0021 HLY<br>56-0085 HLY | 55-0021 HLY<br>56-0085 HLY<br>79-0020 DLY |
| OK    | CLOUD CHIEF 2 SE         | 34-1927 | 35.2333  | -98.8167  | 1503          | 0          | 0      | 71    |                            |                            | 34-1927 DLY                               |
| OK    | CLOUDY_5SSE              | 86-0174 | 34.2232  | -95.2487  | 735           | 21         | 21     | 22    | 86-0174 15M                | 86-0174 15M                | 86-0174 DLY                               |
| OK    | COALGATE 1 WNW           | 34-1954 | 34.5500  | -96.2333  | 610           | 0          | 0      | 42    |                            |                            | 34-1954 DLY                               |
| OK    | COMANCHE                 | 34-2054 | 34.3622  | -97.9736  | 1024          | 0          | 0      | 62    |                            |                            | 34-2054 DLY                               |
| OK    | CORDELL                  | 34-2125 | 35.3008  | -98.9958  | 1565          | 0          | 0      | 72    |                            |                            | 69-0521 DLY<br>34-2125 DLY                |
| OK    | COX CITY 2 NE            | 34-2196 | 34.7422  | -97.7039  | 1234          | 0          | 0      | 30    |                            |                            | 34-2196 DLY                               |
| OK    | CUSTER CITY 3 SE         | 34-2334 | 35.6472  | -98.8281  | 1755          | 23         | 22     | 23    | 34-2334 15M                | 34-2334 HLY                | 34-2334 HLY                               |
| OK    | DAISY 4 ENE              | 34-2354 | 34.5433  | -95.6764  | 755           | 0          | 0      | 69    |                            |                            | 34-2354 DLY                               |
| OK    | DUNCAN                   | 34-2660 | 34.5011  | -97.9592  | 1125          | 24         | 50     | 77    | 34-2654 15M                | 34-2654 15M<br>34-2665 HLY | 34-2654 15M<br>34-2660 DLY                |
| OK    | DUNCAN 10 W              | 34-2668 | 34.4933  | -98.1419  | 1115          | 0          | 0      | 64    |                            |                            | 34-0466 DLY<br>34-2668 DLY                |
| OK    | DURANT                   | 34-2678 | 34.0000  | -96.3686  | 600           | 0          | 0      | 108   |                            |                            | 34-2678 DLY                               |
| OK    | DURANT_6SSE              | 86-0178 | 33.9207  | -96.3203  | 656           | 21         | 21     | 22    | 86-0178 15M                | 86-0178 15M                | 86-0178 DLY                               |
| OK    | ELDORADO                 | 34-2836 | 34.4667  | -99.6500  | 1460          | 0          | 0      | 38    |                            |                            | 34-2836 DLY                               |
| OK    | ELK CITY 4 W             | 34-2849 | 35.3925  | -99.5064  | 2119          | 24         | 45     | 78    | 34-2849 15M                | 34-2849 HLY                | 34-2849 DLY                               |

| State | Name              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |   |
|-------|-------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|---|
|       |                   |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily   |
| OK    | ELMORE CITY 3 SW  | 34-2872 | 34.6100  | -97.4222  | 1020          | 0          | 0      | 31    |   |   | 34-2872 DLY   |
| OK    | ERICK             | 34-2944 | 35.2164  | -99.8628  | 2060          | 0          | 0      | 99    |   |   | 34-2944 DLY   |
| OK    | ERICK_4ESE        | 86-0181 | 35.2049  | -99.8034  | 1980          | 20         | 24     | 24    | 86-0181 15M                               | 86-0181 15M<br>85-0216 HLY                | 86-0181 15M<br>85-0216 HLY<br>86-0181 DLY                               |
| OK    | EVA               | 34-3002 | 36.7975  | -101.9075 | 3574          | 23         | 55     | 54    | 66-3002 15M<br>34-3002 15M                | 66-3002 15M<br>34-3002 HLY                | 66-3002 15M<br>34-3002 HLY  |
| OK    | FARGO             | 34-3070 | 36.3736  | -99.6244  | 2116          | 0          | 0      | 67    |   |   | 34-3070 DLY   |
| OK    | FLASHMAN TWR      | 34-3182 | 34.4796  | -95.0101  | 1752          | 0          | 0      | 39    |   |   | 34-3182 DLY   |
| OK    | FORT SILL         | 34-3300 | 34.6667  | -98.3833  | 1201          | 0          | 0      | 76    |   |   | 34-5068 DLY<br>79-0083 DLY<br>64-0446 DLY<br>52-3300 DLY<br>34-3300 DLY |
| OK    | FREDERICK         | 34-3353 | 34.3861  | -99.0200  | 1286          | 0          | 0      | 100   |   |   | 34-3353 DLY   |
| OK    | FREEDOM           | 34-3358 | 36.7647  | -99.1128  | 1516          | 0          | 0      | 64    |   |   | 34-3358 DLY   |
| OK    | FT COBB           | 34-3281 | 35.1036  | -98.4428  | 1286          | 35         | 61     | 76    | 86-0187 15M<br>34-3281 15M                | 86-0187 15M<br>34-3281 HLY                | 86-0187 DLY<br>69-0468 DLY<br>34-3281 HLY<br>34-3281 DLY                |
| OK    | FT SUPPLY 3SE     | 34-3304 | 36.5442  | -99.5350  | 2031          | 0          | 52     | 91    |   | 34-3304 HLY                               | 34-8627 DLY<br>69-0525 DLY<br>34-3304 DLY                               |
| OK    | GAGE AP           | 79-0095 | 36.2967  | -99.7689  | 2192          | 0          | 21     | 75    |   | 56-0167 HLY<br>55-0090 HLY<br>34-3407 HLY | 79-0095 DLY   |
| OK    | GATE              | 34-3489 | 36.8500  | -100.0569 | 2251          | 0          | 0      | 57    |   |   | 34-3489 DLY   |
| OK    | GLOVER RIVER      | 85-0230 | 34.1014  | -94.9061  | 427           | 0          | 22     | 20    |   | 85-0230 HLY                               | 85-0230 HLY   |
| OK    | GOODWELL RSCH STN | 34-3628 | 36.5914  | -101.6181 | 3278          | 38         | 67     | 95    | 86-0188 15M<br>66-3628 15M<br>34-3628 15M | 86-0188 15M<br>66-3628 15M<br>34-3628 HLY | 54-0204 DLY<br>34-3628 DLY  |
| OK    | GRANDFIELD_3.3W   | 86-0189 | 34.2394  | -98.7436  | 1121          | 21         | 21     | 72    | 86-0190 15M<br>86-0189 15M                | 86-0190 15M<br>86-0189 15M                | 34-3709 DLY<br>86-0190 DLY<br>86-0189 DLY                               |

| State | Name                 | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |   |  |
|-------|----------------------|---------|----------|-----------|---------------|------------|--------|-------|---|---|--|
|       |                      |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly                                    | daily  |
| OK    | GUYMON MUNI AP       | 79-0003 | 36.6817  | -101.5053 | 3123          | 0          | 0      | 47    |   |   | 34-3835 DLY<br>79-0003 DLY                               |
| OK    | HAMMON 3 SSW         | 34-3871 | 35.5850  | -99.3953  | 1821          | 0          | 0      | 78    |   |   | 34-3871 DLY  |
| OK    | HEALDTON 3 E         | 34-4001 | 34.2333  | -97.4203  | 902           | 0          | 0      | 99    |   |   | 34-4001 DLY  |
| OK    | HEE MTN TWR          | 34-4017 | 34.3413  | -94.6572  | 1503          | 0          | 0      | 37    |   |   | 34-4017 DLY  |
| OK    | HENNEPIN 5 N         | 34-4052 | 34.5797  | -97.3511  | 965           | 38         | 63     | 67    | 34-4051 15M<br>66-4052 15M<br>34-4052 15M | 34-4051 HLY<br>66-4052 15M<br>34-4052 HLY | 34-4051 HLY<br>34-4051 DLY<br>34-4052 HLY<br>34-4052 DLY |
| OK    | HOBART               | 34-4202 | 35.0258  | -99.1058  | 1552          | 37         | 51     | 59    | 34-4202 15M                               | 34-4202 HLY                               | 34-4202 HLY<br>34-4202 DLY                               |
| OK    | HOBART MUNI AP       | 79-0158 | 34.9894  | -99.0525  | 1555          | 24         | 28     | 107   | 86-0195 15M<br>78-0045 15M                | 86-0195 15M<br>56-0276 HLY<br>34-4204 HLY | 86-0195 15M<br>56-0276 HLY<br>34-4204 HLY<br>79-0158 DLY |
| OK    | HOLLIS_3W            | 86-0197 | 34.6855  | -99.8333  | 1637          | 20         | 20     | 93    | 86-0197 15M                               | 86-0197 15M                               | 34-4249 DLY<br>34-4250 DLY<br>86-0197 DLY                |
| OK    | HOOKER_1W            | 86-0198 | 36.8552  | -101.2255 | 2993          | 20         | 21     | 98    | 86-0198 15M                               | 86-0198 15M                               | 34-4298 DLY<br>86-0198 DLY                               |
| OK    | HUGO                 | 34-4384 | 34.0211  | -95.5381  | 522           | 42         | 66     | 100   | 86-0199 15M<br>34-4384 15M                | 86-0199 15M<br>34-4384 HLY                | 86-0199 DLY<br>34-4384 DLY                               |
| OK    | HUGO DAM             | 34-4386 | 34.0000  | -95.4000  | 466           | 0          | 38     | 38    |   | 85-0235 HLY<br>34-4386 HLY                | 85-0235 HLY<br>34-4386 HLY                               |
| OK    | IDABEL               | 34-4451 | 33.9336  | -94.8278  | 364           | 0          | 0      | 91    |   |   | 34-4451 DLY  |
| OK    | IDABEL_5SW           | 86-0200 | 33.8301  | -94.8803  | 368           | 21         | 21     | 22    | 86-0200 15M                               | 86-0200 15M                               | 86-0200 DLY  |
| OK    | KENTON               | 34-4766 | 36.9031  | -102.9650 | 4350          | 0          | 0      | 86    |   |   | 34-4766 DLY  |
| OK    | KENTON_5SE           | 86-0203 | 36.8294  | -102.8782 | 4342          | 21         | 21     | 22    | 86-0203 15M                               | 86-0203 15M                               | 86-0203 DLY  |
| OK    | KETCHUM<br>RANCH_7NW | 86-0204 | 34.5289  | -97.7648  | 1122          | 21         | 21     | 24    | 86-0204 15M                               | 86-0204 15M                               | 34-9130 DLY<br>86-0204 DLY                               |
| OK    | KINGSTON 5 SSE       | 34-4865 | 33.9300  | -96.6961  | 686           | 18         | 52     | 63    | 34-4865 15M                               | 34-4865 HLY                               | 69-0498 DLY<br>34-4865 HLY<br>34-4865 DLY                |



| State | Name              | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations                     |  |   |
|-------|-------------------|---------|----------|-----------|---------------|------------|--------|-------|---|--|---|
|       |                   |         |          |           |               | <1hr       | hourly | daily | <1hr                                      | hourly   | daily   |
| OK    | LANE_1WNW         | 86-0208 | 34.3088  | -95.9972  | 599           | 21         | 21     | 24    | 86-0208 15M                               | 86-0208 15M  | 34-5020 DLY<br>86-0208 DLY  |
| OK    | LAVERNE           | 34-5045 | 36.6992  | -99.8967  | 2116          | 0          | 0      | 67    |   |  | 34-5045 DLY   |
| OK    | LAWTON            | 34-5063 | 34.6097  | -98.4572  | 1152          | 0          | 0      | 102   |   |  | 34-5063 DLY   |
| OK    | LAWTON MUNI AP    | 79-0026 | 34.5583  | -98.4172  | 1070          | 0          | 21     | 21    |   | 55-0024 HLY<br>56-0089 HLY                               | 55-0024 HLY<br>79-0026 DLY  |
| OK    | LEEDEY            | 34-5090 | 35.8781  | -99.3433  | 2080          | 0          | 0      | 67    |   |  | 34-5090 DLY   |
| OK    | LEHIGH 4 SW       | 34-5108 | 34.4339  | -96.2717  | 696           | 23         | 54     | 75    | 66-5108 15M<br>34-5108 15M                | 66-5108 15M<br>34-5108 HLY                               | 34-5108 HLY<br>34-5108 DLY  |
| OK    | LINDSAY 2 W       | 34-5216 | 34.8261  | -97.6386  | 981           | 0          | 0      | 63    |   |  | 34-5216 DLY   |
| OK    | MACKIE 4 NNW      | 34-5463 | 35.7481  | -99.8178  | 2149          | 22         | 46     | 47    | 34-1744 15M<br>34-5463 15M                | 34-7714 HLY<br>34-1744 HLY<br>34-7588 HLY<br>34-5463 HLY | 34-7714 HLY<br>34-1744 HLY<br>34-1744 DLY<br>34-7588 HLY<br>34-5463 HLY<br>34-5463 HLY<br>34-5463 DLY |
| OK    | MADILL            | 34-5468 | 34.0919  | -96.7708  | 771           | 0          | 0      | 74    |   |  | 34-5468 DLY   |
| OK    | MADILL_4.5NNW     | 86-0209 | 34.0358  | -96.9439  | 765           | 20         | 20     | 23    | 86-0209 15M                               | 86-0209 15M  | 34-5474 DLY<br>86-0209 DLY  |
| OK    | MANGUM            | 34-5509 | 34.8911  | -99.5017  | 1594          | 0          | 0      | 85    |   |  | 34-5509 DLY   |
| OK    | MANGUM_5SE        | 86-0210 | 34.8359  | -99.4240  | 1511          | 20         | 20     | 24    | 86-0210 15M                               | 86-0210 15M  | 34-5514 DLY<br>86-0210 DLY  |
| OK    | MARIETTA 5SW      | 34-5563 | 33.8761  | -97.1642  | 801           | 0          | 0      | 78    |   |  | 34-5563 DLY   |
| OK    | MARLOW 1 WSW      | 34-5581 | 34.6367  | -97.9786  | 1263          | 0          | 0      | 117   |   |  | 34-5581 DLY   |
| OK    | MAY RANCH_16NNE   | 86-0213 | 36.9871  | -99.0111  | 1823          | 21         | 20     | 24    | 86-0213 15M                               | 86-0213 15M  | 34-3660 DLY<br>86-0213 DLY  |
| OK    | MAYFIELD          | 34-5648 | 35.3392  | -99.8769  | 2005          | 41         | 62     | 62    | 66-5648 15M<br>34-5648 15M                | 66-5648 15M<br>34-5648 HLY                               | 66-5648 15M<br>34-5648 HLY  |
| OK    | MCALESTER RGNL AP | 79-0156 | 34.8822  | -95.7831  | 771           | 36         | 35     | 98    | 86-0214 15M<br>34-5664 15M<br>78-0060 15M | 86-0214 15M<br>34-5664 15M<br>78-0060 15M                | 79-0156 DLY   |

| State | Name                             | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |   |
|-------|----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|---|
|       |                                  |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily                                     |
| OK    | MCGEE CREEK DAM                  | 34-5713 | 34.3097  | -95.8675  | 673           | 0          | 0      | 66    |                            |                            | 34-3083 DLY<br>34-5713 DLY                |
| OK    | MEDICINE PARK_3W                 | 86-0216 | 34.7292  | -98.5694  | 1607          | 21         | 21     | 24    | 86-0216 15M                | 86-0216 15M                | 34-5775 DLY<br>86-0216 DLY                |
| OK    | MORAVIA 2 NNE                    | 34-6035 | 35.1464  | -99.4956  | 1690          | 0          | 0      | 71    |                            |                            | 34-6035 DLY                               |
| OK    | MUTUAL                           | 34-6139 | 36.2283  | -99.1700  | 1890          | 0          | 0      | 94    |                            |                            | 34-6139 DLY                               |
| OK    | N FORK RED RIVER AT<br>CARTER    | 87-0006 | 35.1681  | -99.5069  | 1680          | 0          | 22     | 21    |                            | 87-0006 HLY                | 87-0006 DLY                               |
| OK    | N. CANADIAN RIVER                | 85-0259 | 36.1833  | -98.9167  | 1729          | 0          | 23     | 22    |                            | 85-0259 HLY                | 85-0259 HLY                               |
| OK    | NINNEKAH_2NNW                    | 86-0223 | 34.9677  | -97.9520  | 1172          | 21         | 29     | 34    | 86-0223 15M                | 86-0223 15M<br>34-6328 HLY | 86-0223 15M<br>34-6328 HLY<br>86-0223 DLY |
| OK    | NORTH FORK RED<br>RIVER NR SAYRE | 87-0029 | 35.2847  | -99.6217  | 1783          | 0          | 24     | 21    |                            | 87-0029 HLY                | 87-0029 HLY                               |
| OK    | OPTIMA LAKE                      | 34-6740 | 36.6500  | -101.1333 | 2835          | 0          | 20     | 35    |                            | 34-6740 HLY                | 34-3902 DLY<br>34-6740 HLY<br>34-6740 DLY |
| OK    | PAOLI 2 W                        | 34-6859 | 34.8231  | -97.2850  | 931           | 36         | 57     | 62    | 66-6859 15M<br>34-6859 15M | 66-6859 15M<br>34-6859 HLY | 66-6859 15M<br>34-6859 HLY                |
| OK    | PINE CREEK DAM                   | 34-7080 | 34.1167  | -95.0833  | 489           | 0          | 25     | 29    |                            | 34-7080 HLY                | 34-7080 HLY<br>34-7080 DLY                |
| OK    | PONTOTOC                         | 34-7214 | 34.4997  | -96.6275  | 1024          | 0          | 0      | 67    |                            |                            | 34-7214 DLY                               |
| OK    | PUTNAM_3N                        | 86-0239 | 35.8990  | -98.9604  | 1934          | 21         | 21     | 24    | 86-0239 15M                | 86-0239 15M                | 34-7343 DLY<br>86-0239 DLY                |
| OK    | RANDLETT 9 E                     | 34-7403 | 34.1578  | -98.3108  | 997           | 0          | 0      | 47    |                            |                            | 34-7403 DLY                               |
| OK    | RANGE                            | 34-7412 | 36.5447  | -101.0842 | 2710          | 31         | 59     | 61    | 66-7412 15M<br>34-7412 15M | 66-7412 15M<br>34-7412 HLY | 66-7412 15M<br>34-7412 HLY<br>34-7412 DLY |
| OK    | RED RIVER                        | 85-0266 | 33.8833  | -97.9333  | 869           | 0          | 23     | 23    |                            | 85-0266 HLY                | 85-0266 HLY                               |
| OK    | REGNIER                          | 34-7534 | 36.9425  | -102.6314 | 4019          | 0          | 0      | 63    |                            |                            | 34-7534 DLY                               |
| OK    | RETROP_10ENE                     | 86-0241 | 35.1228  | -99.3600  | 1766          | 20         | 20     | 35    | 86-0241 15M                | 86-0241 15M                | 34-7565 DLY<br>34-7570 DLY<br>86-0241 DLY |

| State | Name                             | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |                            |  |
|-------|----------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|----------------------------|--|
|       |                                  |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly                     | daily  |
| OK    | REYDON 2SSE                      | 34-7579 | 35.6256  | -99.9106  | 2385          | 0          | 0      | 57    |                            |                            | 34-7579 DLY  |
| OK    | RIVERSIDE 4 W                    | 34-7660 | 36.7889  | -100.4183 | 2450          | 27         | 52     | 49    | 66-7660 15M<br>34-7660 15M | 66-7660 15M<br>34-7660 HLY | 66-7660 15M<br>34-7660 HLY                               |
| OK    | ROFF 2 WNW                       | 34-7705 | 34.6372  | -96.8822  | 1257          | 34         | 55     | 58    | 66-7705 15M<br>34-7705 15M | 66-7705 15M<br>34-7705 HLY | 66-7705 15M<br>34-7705 HLY<br>34-7705 DLY                |
| OK    | ROOSEVELT                        | 34-7727 | 34.8511  | -99.0208  | 1463          | 0          | 0      | 72    |                            |                            | 34-7727 DLY  |
| OK    | SAYRE                            | 34-7952 | 35.3061  | -99.6275  | 1900          | 0          | 0      | 80    |                            |                            | 34-7952 DLY  |
| OK    | SEILING_7WNW                     | 86-0244 | 36.1903  | -99.0403  | 1788          | 20         | 20     | 23    | 86-0244 15M                | 86-0244 15M                | 34-8027 DLY<br>86-0244 DLY                               |
| OK    | SHATTUCK 1NW                     | 34-8101 | 36.2892  | -99.8933  | 2195          | 32         | 56     | 61    | 66-8101 15M<br>34-8101 15M | 66-8101 15M<br>34-8101 HLY | 66-8101 15M<br>34-8092 DLY<br>34-8101 HLY<br>34-8101 DLY |
| OK    | SLAPOUT_8W                       | 86-0247 | 36.5975  | -100.2619 | 2546          | 21         | 20     | 22    | 86-0247 15M                | 86-0247 15M                | 86-0247 DLY  |
| OK    | SMITHVILLE                       | 34-8285 | 34.4660  | -94.6589  | 823           | 0          | 0      | 72    |                            |                            | 34-8285 DLY  |
| OK    | SNYDER 1 N                       | 34-8299 | 34.6867  | -98.9483  | 1371          | 0          | 0      | 72    |                            |                            | 34-8299 DLY  |
| OK    | SOBOL TWR                        | 34-8305 | 34.1335  | -95.2389  | 751           | 0          | 0      | 34    |                            |                            | 34-8305 DLY  |
| OK    | STUART_3SE                       | 86-0251 | 34.8764  | -96.0698  | 841           | 21         | 21     | 22    | 86-0251 15M                | 86-0251 15M                | 86-0251 DLY  |
| OK    | SULPHUR_4NNE                     | 86-0252 | 34.5661  | -96.9505  | 1049          | 20         | 21     | 24    | 86-0252 15M                | 86-0252 15M                | 34-8570 DLY<br>86-0252 DLY                               |
| OK    | TALIHINA_4SE                     | 86-0255 | 34.7107  | -95.0115  | 679           | 20         | 20     | 21    | 86-0255 15M                | 86-0255 15M                | 86-0255 DLY  |
| OK    | TALOGA                           | 34-8708 | 36.0381  | -98.9592  | 1706          | 24         | 26     | 72    | 34-8708 15M                | 34-8708 15M<br>34-8708 HLY | 34-8711 DLY<br>34-8708 DLY                               |
| OK    | TIPTON 4S MESONET                | 34-8879 | 34.4397  | -99.1375  | 1270          | 20         | 27     | 63    | 86-0256 15M                | 86-0256 15M<br>34-8879 HLY | 86-0256 DLY<br>34-8879 DLY                               |
| OK    | TISHOMINGO NATL<br>WR            | 34-8884 | 34.1925  | -96.6442  | 643           | 0          | 0      | 111   |                            |                            | 34-8884 DLY  |
| OK    | TOM STEED RSVR<br>(MTN PARK DAM) | 87-0040 | 34.7381  | -98.9881  | 1408          | 0          | 26     | 27    |                            | 85-0250 HLY<br>87-0040 HLY | 85-0250 HLY<br>87-0040 HLY                               |
| OK    | TURPIN 4 SSE                     | 34-9017 | 36.8136  | -100.8636 | 2707          | 0          | 0      | 32    |                            |                            | 69-0454 DLY<br>34-9017 DLY                               |

| State | Name                           | SID     | Latitude | Longitude | Elev.<br>(ft) | Data years |        |       | Contributing stations      |  |   |
|-------|--------------------------------|---------|----------|-----------|---------------|------------|--------|-------|----------------------------|--|---|
|       |                                |         |          |           |               | <1hr       | hourly | daily | <1hr                       | hourly   | daily                                     |
| OK    | TUSKAHOMA                      | 34-9023 | 34.6147  | -95.2803  | 600           | 31         | 63     | 95    | 86-0173 15M<br>34-9023 15M | 86-0173 15M<br>34-9023 15M<br>34-9023 HLY                | 86-0173 DLY<br>34-9023 HLY<br>34-9023 DLY |
| OK    | VALLIANT 3 W                   | 34-9118 | 33.9981  | -95.1433  | 476           | 0          | 0      | 71    |                            |  | 34-9118 DLY                               |
| OK    | VICI                           | 34-9172 | 36.1508  | -99.3003  | 2264          | 0          | 0      | 56    |                            |  | 34-9172 DLY                               |
| OK    | VINSON                         | 34-9212 | 34.9003  | -99.8614  | 1880          | 0          | 0      | 67    |                            |  | 34-9212 DLY                               |
| OK    | WALTERS_4NW                    | 86-0263 | 34.3996  | -98.3457  | 1051          | 21         | 21     | 93    | 86-0264 15M<br>86-0263 15M | 86-0264 15M<br>86-0263 15M                               | 34-9278 DLY<br>86-0264 DLY<br>86-0263 DLY |
| OK    | WASHINGTON_6SSW                | 86-0265 | 34.9822  | -97.5211  | 1131          | 0          | 0      | 35    |                            |  | 54-0202 DLY<br>34-9346 DLY<br>86-0265 DLY |
| OK    | WASHITA RIVER                  | 85-0198 | 35.5317  | -98.9658  | 1499          | 0          | 23     | 23    |                            | 85-0198 HLY  | 85-0198 HLY                               |
| OK    | WASHITA RIVER<br>NEAR ANADARKO | 87-0002 | 35.0850  | -98.2431  | 1157          | 0          | 26     | 25    |                            | 85-0183 HLY<br>87-0002 HLY                               | 85-0183 HLY<br>87-0002 HLY                |
| OK    | WAURIKA 1ENE<br>MESONET        | 34-9400 | 34.1678  | -97.9883  | 928           | 20         | 21     | 103   | 86-0267 15M                | 86-0267 15M  | 34-9395 DLY<br>34-9400 DLY                |
| OK    | WAYNOKA                        | 34-9404 | 36.5758  | -98.8797  | 1509          | 22         | 55     | 79    | 66-9404 15M<br>34-9404 15M | 66-9404 15M<br>34-9404 HLY                               | 34-9404 HLY<br>34-9404 DLY                |
| OK    | WICHITA MTN WR                 | 34-9629 | 34.7325  | -98.7125  | 1667          | 23         | 64     | 104   | 66-9629 15M<br>34-9629 15M | 85-0273 HLY<br>76-0023 HLY<br>66-9629 15M<br>34-9629 HLY | 34-9629 DLY                               |
| OK    | WILBURTON 9 ENE                | 34-9634 | 34.9458  | -95.1546  | 636           | 0          | 0      | 57    |                            |  | 34-9634 DLY                               |
| OK    | WILLOW                         | 34-9668 | 35.0522  | -99.5125  | 1745          | 0          | 0      | 35    |                            |  | 34-9668 DLY                               |
| OK    | WOODWARD                       | 34-9760 | 36.4408  | -99.3817  | 1886          | 0          | 0      | 107   |                            |  | 34-9760 DLY                               |
| OK    | WOODWARD FLD STN               | 34-9762 | 36.4167  | -99.4000  | 1991          | 20         | 50     | 53    | 86-0274 15M                | 86-0274 15M<br>34-9762 HLY                               | 86-0274 DLY<br>34-9762 HLY<br>34-9762 DLY |
| OK    | ZOE 1 S                        | 34-9985 | 34.7500  | -94.6333  | 640           | 0          | 0      | 35    |                            |  | 34-8462 DLY<br>34-9985 DLY                |

Table A.1.3. Metadata for Texas stations whose data were used in this Volume showing each station's state, name, station identification number (SID), formatting interval (see Table 4.2.2), latitude, longitude, elevation, dataset identifier (see Table 4.2.1), and the period of record.

| State | Station name             | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | 11100 HWY 71 WEST        | 65-0032 | 15M                 | 30.2890  | -97.9177  | 925       | COA     | 1987-2015        |
| TX    | 12W LUBBOCK (REESE)      | 80-0071 | 15M                 | 33.6076  | -102.0460 | 3343      | WTM     | 2000-2018        |
| TX    | 1E MCLEAN                | 80-0049 | 15M                 | 35.2372  | -100.5749 | 2863      | WTM     | 2005-2017        |
| TX    | 1N O'DONNELL             | 80-0058 | 15M                 | 32.9799  | -101.8322 | 3054      | WTM     | 2001-2018        |
| TX    | 1S NORTHFIELD            | 80-0056 | 15M                 | 34.2730  | -100.6044 | 2088      | WTM     | 2008-2017        |
| TX    | 1W SPUR                  | 80-0080 | 15M                 | 33.4809  | -100.8764 | 2287      | WTM     | 2002-2017        |
| TX    | 1WNW BIG LAKE            | 80-0011 | 15M                 | 31.1931  | -101.4694 | 2701      | WTM     | 2011-2018        |
| TX    | 2 ESE GAIL               | 80-0031 | 15M                 | 32.7551  | -101.4144 | 2547      | WTM     | 2001-2018        |
| TX    | 2E ANDREWS               | 80-0008 | 15M                 | 32.3201  | -102.5167 | 3169      | WTM     | 2006-2018        |
| TX    | 2NW HEREFORD             | 80-0037 | 15M                 | 34.8308  | -102.4248 | 3863      | WTM     | 2004-2018        |
| TX    | 2SSW MULESHOE            | 80-0054 | 15M                 | 34.2064  | -102.7424 | 3806      | WTM     | 2001-2017        |
| TX    | 3N PLAINS                | 80-0067 | 15M                 | 33.2281  | -102.8394 | 3711      | WTM     | 2001-2018        |
| TX    | 3NW SEYMOUR              | 80-0076 | 15M                 | 33.6323  | -99.2910  | 1302      | WTM     | 2009-2018        |
| TX    | 5400 HWY 183 SOUTH       | 65-0091 | 15M                 | 30.1773  | -97.6898  | 491       | COA     | 1987-2015        |
| TX    | ABERNATHY                | 41-0012 | DLY                 | 33.8400  | -101.8581 | 3360      | NCEI    | 1943-2017        |
| TX    | ABILENE                  | 99-0017 | HLY                 | 32.4499  | -99.7391  | 1728      | NCEI    | 1905-1940        |
| TX    | ABILENE REGIONAL AIRPORT | 55-0086 | HLY                 | 32.4103  | -99.6817  | 1790      | NCEI    | 1996-2007        |
| TX    | ABILENE REGIONAL AIRPORT | 56-0163 | HLY                 | 32.4105  | -99.6822  | 1790      | NCEI    | 2007-2017        |
| TX    | ABILENE RGNL AP          | 41-0016 | HLY                 | 32.4106  | -99.6822  | 1790      | NCEI    | 1940-2013        |
| TX    | ABILENE RGNL AP          | 79-0090 | DLY                 | 32.4106  | -99.6822  | 1791      | NCEI    | 1948-2017        |
| TX    | ACKER RCH                | 41-0025 | DLY                 | 28.1569  | -98.5142  | 436       | NCEI    | 1978-2005        |
| TX    | ACKERLY 4SE              | 41-0034 | DLY                 | 32.4899  | -101.6635 | 2765      | NCEI    | 1940-2002        |
| TX    | ADAMSVILLE               | 41-0050 | HLY                 | 31.2833  | -98.1500  | 1030      | NCEI    | 1963-1985        |
| TX    | ADAMSVILLE               | 41-0050 | DLY                 | 31.2833  | -98.1500  | 1030      | NCEI    | 1963-1987        |
| TX    | ADDICKS                  | 41-0054 | HLY                 | 29.7667  | -95.6500  | 102       | NCEI    | 1947-1948        |
| TX    | ADDICKS DAM              | 60-0006 | 15M                 | 29.7913  | -95.6236  | 82        | HCFCDD  | 2000-2017        |
| TX    | ALBANY                   | 41-0120 | DLY                 | 32.7047  | -99.3011  | 1440      | NCEI    | 1893-2017        |
| TX    | ALEDO 2.9 SW             | 69-2294 | DLY                 | 32.6640  | -97.6370  | 892       | NCEI    | 2011-2017        |
| TX    | ALEDO 4 SE               | 41-0129 | DLY                 | 32.6444  | -97.5617  | 791       | NCEI    | 1960-2002        |
| TX    | ALICE                    | 41-0144 | DLY                 | 27.7283  | -98.0678  | 200       | NCEI    | 1893-2008        |

| State | Station name                   | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | ALICE INTERNATIONAL ARPT       | 55-0047 | HLY                 | 27.7411  | -98.0247  | 170       | NCEI    | 2001-2007        |
| TX    | ALICE INTERNATIONAL ARPT       | 56-0116 | HLY                 | 27.7410  | -98.0270  | 180       | NCEI    | 2007-2017        |
| TX    | ALICE INTL AP                  | 79-0053 | DLY                 | 27.7411  | -98.0247  | 174       | NCEI    | 1948-2017        |
| TX    | ALPINE                         | 41-0174 | 15M                 | 30.3764  | -103.6600 | 4450      | NCEI    | 1978-2006        |
| TX    | ALPINE                         | 41-0174 | HLY                 | 30.3764  | -103.6600 | 4450      | NCEI    | 1971-2006        |
| TX    | ALPINE                         | 41-0174 | DLY                 | 30.3764  | -103.6600 | 4449      | NCEI    | 1900-2017        |
| TX    | ALTO 5 SW                      | 41-0190 | DLY                 | 31.6094  | -95.1342  | 279       | NCEI    | 1941-2008        |
| TX    | ALVARADO                       | 41-0201 | DLY                 | 32.4167  | -97.2167  | 689       | NCEI    | 1940-1964        |
| TX    | ALVARADO 4NE                   | 41-0202 | HLY                 | 32.4644  | -97.1831  | 706       | NCEI    | 1977-1987        |
| TX    | ALVARADO 4NE                   | 41-0202 | DLY                 | 32.4644  | -97.1831  | 705       | NCEI    | 1987-2017        |
| TX    | ALVIN                          | 41-0204 | DLY                 | 29.3653  | -95.2336  | 30        | NCEI    | 1898-2013        |
| TX    | ALVIN 1.6 SW                   | 69-0719 | DLY                 | 29.4176  | -95.2673  | 43        | NCEI    | 2012-2017        |
| TX    | ALVORD 3 N                     | 66-0206 | 15M                 | 33.3866  | -97.7163  | 1010      | NCEI    | 2013-2017        |
| TX    | ALVORD 3 N                     | 41-0206 | 15M                 | 33.3869  | -97.7164  | 856       | NCEI    | 1971-2013        |
| TX    | ALVORD 3 N                     | 41-0206 | HLY                 | 33.3869  | -97.7164  | 856       | NCEI    | 1942-2013        |
| TX    | ALVORD 3 N                     | 41-0206 | DLY                 | 33.3869  | -97.7164  | 856       | NCEI    | 1948-2017        |
| TX    | AMARILLO                       | 99-0212 | HLY                 | 35.2063  | -101.8358 | 3663      | NCEI    | 1902-1940        |
| TX    | AMARILLO                       | 79-0116 | DLY                 | 35.2333  | -101.7089 | 3586      | NCEI    | 1947-2017        |
| TX    | AMARILLO INTL AP               | 78-0007 | 15M                 | 35.2295  | -101.7042 | 3604      | NCEI    | 2000-2017        |
| TX    | AMARILLO RICK HUSBAND INTL AIR | 56-0183 | HLY                 | 35.2295  | -101.7042 | 3604      | NCEI    | 2007-2017        |
| TX    | AMARILLO WSO AP                | 41-0211 | HLY                 | 35.2294  | -101.7042 | 3604      | NCEI    | 1941-2013        |
| TX    | AMISTAD DAM                    | 41-0225 | DLY                 | 29.4608  | -101.0286 | 1158      | NCEI    | 1964-2017        |
| TX    | ANAHUAC                        | 41-0235 | DLY                 | 29.7878  | -94.6342  | 23        | NCEI    | 1909-2017        |
| TX    | ANDERSON                       | 41-0244 | DLY                 | 30.4833  | -95.9833  | 351       | NCEI    | 1914-1972        |
| TX    | ANDICE 2 SW                    | 41-0246 | DLY                 | 30.7569  | -97.8619  | 1060      | NCEI    | 1968-2017        |
| TX    | ANDREWS                        | 41-0248 | 15M                 | 32.3483  | -102.5517 | 3192      | NCEI    | 1972-2010        |
| TX    | ANDREWS                        | 41-0248 | HLY                 | 32.3483  | -102.5517 | 3192      | NCEI    | 1942-2010        |
| TX    | ANDREWS                        | 41-0248 | DLY                 | 32.3483  | -102.5517 | 3192      | NCEI    | 1914-2010        |
| TX    | ANDREWS 2                      | 66-0250 | 15M                 | 32.3123  | -102.5606 | 3216      | NCEI    | 2013-2017        |
| TX    | ANGLETON 1.3 E                 | 69-0721 | DLY                 | 29.1696  | -95.4068  | 23        | NCEI    | 2012-2017        |
| TX    | ANGLETON 2 W                   | 41-0257 | DLY                 | 29.1572  | -95.4592  | 26        | NCEI    | 1895-2017        |
| TX    | ANNA                           | 41-0262 | HLY                 | 33.3500  | -96.5167  | 680       | NCEI    | 1946-1995        |
| TX    | ANNA                           | 41-0262 | DLY                 | 33.3500  | -96.5167  | 679       | NCEI    | 1898-1995        |

| State | Station name                  | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|-------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | ANNA 3.7 SSW                  | 69-0988 | DLY                 | 33.3076  | -96.5853  | 581       | NCEI    | 2008-2017        |
| TX    | ANSON                         | 41-0268 | DLY                 | 32.7667  | -99.8900  | 1719      | NCEI    | 1898-2017        |
| TX    | ANTELOPE                      | 41-0271 | DLY                 | 33.4414  | -98.3689  | 1024      | NCEI    | 1910-2017        |
| TX    | ANTHONY 1.0 ENE               | 69-1312 | DLY                 | 31.9989  | -106.5750 | 3967      | NCEI    | 2013-2017        |
| TX    | ARANSAS                       | 76-0025 | HLY                 | 28.3044  | -96.8233  | 0         | RAWS    | 1999-2015        |
| TX    | ARANSAS COUNTY AIRPORT        | 55-0057 | HLY                 | 28.0840  | -97.0460  | 19        | NCEI    | 1996-2007        |
| TX    | ARANSAS COUNTY AIRPORT        | 56-0129 | HLY                 | 28.0836  | -97.0464  | 19        | NCEI    | 2007-2017        |
| TX    | ARANSAS PASS 2                | 41-0302 | DLY                 | 27.9167  | -97.1333  | 20        | NCEI    | 1897-1971        |
| TX    | ARANSAS PASS 6.1 NNW          | 69-0543 | DLY                 | 27.9727  | -97.1349  | 20        | NCEI    | 2012-2017        |
| TX    | ARANSAS WILDLIFE REF          | 41-0437 | DLY                 | 28.2667  | -96.8000  | 20        | NCEI    | 1940-1970        |
| TX    | ARANSAS WR                    | 41-0305 | DLY                 | 28.3081  | -96.8047  | 16        | NCEI    | 1971-2013        |
| TX    | ARCHER CITY 1E                | 41-0313 | DLY                 | 33.5947  | -98.6117  | 1053      | NCEI    | 1910-2017        |
| TX    | ARLINGTON 3.0 NNW             | 69-2419 | DLY                 | 32.7321  | -97.1539  | 541       | NCEI    | 2007-2014        |
| TX    | ARLINGTON SIX FLAGS           | 41-0337 | DLY                 | 32.7572  | -97.0736  | 535       | NCEI    | 1893-2017        |
| TX    | ARMAND BYU AT GENOARED BLF RD | 60-0022 | 15M                 | 29.6345  | -95.1123  | 15        | HCFC    | 1986-2017        |
| TX    | ARTHUR CITY                   | 41-0367 | DLY                 | 33.8756  | -95.5022  | 427       | NCEI    | 1891-1970        |
| TX    | ASPERMONT                     | 41-0394 | DLY                 | 33.1525  | -100.2333 | 1670      | NCEI    | 1911-2017        |
| TX    | ATHENS                        | 41-0404 | DLY                 | 32.1633  | -95.8300  | 449       | NCEI    | 1903-2017        |
| TX    | ATLANTA                       | 41-0408 | DLY                 | 33.1244  | -94.1661  | 315       | NCEI    | 1930-2017        |
| TX    | AUSTIN                        | 52-0420 | DLY                 | 30.2678  | -97.7433  | 493       | FORTS   | 1856-1892        |
| TX    | AUSTIN                        | 52-0434 | DLY                 | 30.2708  | -97.7422  | 512       | FORTS   | 1859-1867        |
| TX    | AUSTIN                        | 52-0438 | DLY                 | 30.2778  | -97.7378  | 530       | FORTS   | 1890-1892        |
| TX    | AUSTIN                        | 52-7207 | DLY                 | 30.2792  | -97.7750  | 495       | FORTS   | 1849-1875        |
| TX    | AUSTIN                        | 41-0420 | DLY                 | 30.2682  | -97.7426  | 523       | NCEI    | 1893-1942        |
| TX    | AUSTIN (CITY)                 | 99-0420 | HLY                 | 30.2682  | -97.7426  | 496       | NCEI    | 1926-1940        |
| TX    | AUSTIN BERGSTROM              | 41-0429 | HLY                 | 30.1831  | -97.6800  | 480       | NCEI    | 1940-2013        |
| TX    | AUSTIN BERGSTROM AP           | 78-0010 | 15M                 | 30.1831  | -97.6799  | 480       | NCEI    | 2005-2017        |
| TX    | AUSTIN BERGSTROM AP           | 79-0073 | DLY                 | 30.1831  | -97.6800  | 479       | NCEI    | 1948-2017        |
| TX    | AUSTIN MONTOPOLIS BRG         | 41-0432 | DLY                 | 30.2500  | -97.6833  | 512       | NCEI    | 1903-1963        |
| TX    | AUSTIN SAN ANTONIO            | 79-0064 | DLY                 | 29.7036  | -98.0281  | 633       | NCEI    | 1998-2017        |
| TX    | AUSTIN-BERGSTROM INTL AIRPORT | 64-0309 | HLY                 | 30.1830  | -97.6800  | 480       | NCEI    | 1999-2016        |
| TX    | AUSTIN-BERGSTROM INTL APT     | 55-0073 | HLY                 | 30.1831  | -97.6799  | 495       | NCEI    | 1997-2007        |
| TX    | AUSTIN-CAMP MABRY             | 78-0009 | 15M                 | 30.3208  | -97.7604  | 670       | NCEI    | 2000-2017        |

| State | Station name                   | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | AUSTIN-CAMP MABRY              | 41-0428 | HLY                 | 30.3208  | -97.7603  | 670       | NCEI    | 1942-2013        |
| TX    | AUSTIN-CAMP MABRY              | 79-0086 | DLY                 | 30.3208  | -97.7603  | 669       | NCEI    | 1938-2017        |
| TX    | AUSTIN-CAMP MABRY ARMY NATIONA | 56-0159 | HLY                 | 30.3208  | -97.7604  | 658       | NCEI    | 2007-2017        |
| TX    | AUSTWELL                       | 41-0436 | DLY                 | 28.3889  | -96.8389  | 23        | NCEI    | 1897-2017        |
| TX    | AVALON                         | 41-0440 | DLY                 | 32.2067  | -96.7958  | 531       | NCEI    | 1964-2003        |
| TX    | AYISH BAYOU                    | 85-0308 | HLY                 | 31.3961  | -94.1508  | 230       | HADS    | 1995-2017        |
| TX    | BACKBONE CRK AT MARBLE FALLS   | 63-0139 | HLY                 | 30.5837  | -98.2841  | 767       | LCRA    | 1995-2018        |
| TX    | BADE RCH                       | 41-0463 | HLY                 | 31.8333  | -101.1667 | 2432      | NCEI    | 1943-1949        |
| TX    | BAKERS CROSSING                | 41-0479 | DLY                 | 29.9500  | -101.1500 | 1509      | NCEI    | 1981-1987        |
| TX    | BAKERSFIELD                    | 41-0482 | DLY                 | 30.8878  | -102.3008 | 2546      | NCEI    | 1942-2017        |
| TX    | BALLINGER 2 NW                 | 41-0493 | DLY                 | 31.7414  | -99.9764  | 1755      | NCEI    | 1897-2017        |
| TX    | BALMORHEA                      | 41-0498 | DLY                 | 30.9844  | -103.7403 | 3222      | NCEI    | 1923-2017        |
| TX    | BANDERA 0.2 N                  | 69-0640 | DLY                 | 29.7284  | -99.0735  | 1257      | NCEI    | 1998-2017        |
| TX    | BANDERA 3.2 W                  | 69-0634 | DLY                 | 29.7202  | -99.1262  | 1362      | NCEI    | 2009-2017        |
| TX    | BANKERSMITH                    | 41-0509 | 15M                 | 30.1400  | -98.8189  | 1750      | NCEI    | 1976-2012        |
| TX    | BANKERSMITH                    | 41-0509 | HLY                 | 30.1400  | -98.8189  | 1750      | NCEI    | 1940-2012        |
| TX    | BANKERSMITH                    | 41-0509 | DLY                 | 30.1400  | -98.8189  | 1749      | NCEI    | 1948-2012        |
| TX    | BARDWELL DAM                   | 41-0518 | 15M                 | 32.2631  | -96.6369  | 461       | NCEI    | 1975-2013        |
| TX    | BARDWELL DAM                   | 41-0518 | HLY                 | 32.2631  | -96.6369  | 461       | NCEI    | 1965-2013        |
| TX    | BARDWELL DAM                   | 41-0518 | DLY                 | 32.2631  | -96.6369  | 463       | NCEI    | 1965-2017        |
| TX    | BARKER DAM                     | 60-0005 | 15M                 | 29.7697  | -95.6466  | 101       | HCFC    | 2000-2017        |
| TX    | BARTON CRK AT LOOP 360, AUSTIN | 63-0192 | 15M                 | 30.2442  | -97.8021  | 527       | LCRA    | 2005-2018        |
| TX    | BARTON CRK AT SH 71 N OAK HILL | 63-0191 | 15M                 | 30.2963  | -97.9256  | 763       | LCRA    | 2005-2018        |
| TX    | BATESVILLE                     | 41-0560 | DLY                 | 28.9567  | -99.6228  | 745       | NCEI    | 1965-2001        |
| TX    | BAY CITY 2 N                   | 41-0572 | HLY                 | 29.0000  | -95.9667  | 49        | NCEI    | 1947-1965        |
| TX    | BAY CITY WTR WKS               | 41-0569 | 15M                 | 28.9797  | -95.9750  | 52        | NCEI    | 1977-2013        |
| TX    | BAY CITY WTR WKS               | 41-0569 | HLY                 | 28.9797  | -95.9750  | 52        | NCEI    | 1940-2013        |
| TX    | BAY CITY WTR WKS               | 41-0569 | DLY                 | 28.9797  | -95.9750  | 52        | NCEI    | 1909-2017        |
| TX    | BAYTOWN                        | 41-0586 | DLY                 | 29.7917  | -95.0436  | 26        | NCEI    | 1946-2017        |
| TX    | BAYTOWN 2                      | 41-0587 | HLY                 | 29.7500  | -95.0167  | 30        | NCEI    | 1947-1969        |
| TX    | BEAMER DITCH AT HUGHES RD      | 60-0020 | 15M                 | 29.5919  | -95.2221  | 27        | HCFC    | 1986-2017        |
| TX    | BEAUMONT CITY                  | 41-0611 | DLY                 | 30.0969  | -94.0997  | 20        | NCEI    | 1901-2017        |
| TX    | BEAUMONT RSCH CTR              | 41-0613 | DLY                 | 30.0689  | -94.2928  | 26        | NCEI    | 1947-2017        |



| State | Station name                  | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|-------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | BEDIAS                        | 41-0635 | DLY                 | 30.7833  | -95.9500  | 335       | NCEI    | 1940-1985        |
| TX    | BEEVILLE 5 NE                 | 66-0639 | 15M                 | 28.4575  | -97.7061  | 255       | NCEI    | 2013-2017        |
| TX    | BEEVILLE 5 NE                 | 41-0639 | 15M                 | 28.4575  | -97.7061  | 255       | NCEI    | 1971-2013        |
| TX    | BEEVILLE 5 NE                 | 41-0639 | HLY                 | 28.4575  | -97.7061  | 255       | NCEI    | 1953-2013        |
| TX    | BEEVILLE 5 NE                 | 41-0639 | DLY                 | 28.4575  | -97.7061  | 256       | NCEI    | 1894-2017        |
| TX    | BEEVILLE CHASE NAAS           | 79-0049 | DLY                 | 28.3667  | -97.6667  | 197       | NCEI    | 1945-1992        |
| TX    | BELTON 2.3 NNW                | 69-0596 | DLY                 | 31.0984  | -97.4816  | 669       | NCEI    | 2010-2017        |
| TX    | BELTON DAM                    | 41-0665 | HLY                 | 31.1000  | -97.4833  | 664       | NCEI    | 1951-1992        |
| TX    | BELTON DAM                    | 41-0665 | DLY                 | 31.1000  | -97.4833  | 663       | NCEI    | 1951-1992        |
| TX    | BEN WHEELER 3.9 ESE           | 69-2672 | DLY                 | 32.4312  | -95.6385  | 518       | NCEI    | 2014-2017        |
| TX    | BENAVIDES                     | 41-0689 | 15M                 | 27.6000  | -98.4167  | 381       | NCEI    | 1976-1984        |
| TX    | BENAVIDES                     | 41-0689 | HLY                 | 27.6000  | -98.4167  | 381       | NCEI    | 1940-1984        |
| TX    | BENAVIDES 2                   | 66-0690 | 15M                 | 27.5969  | -98.4162  | 380       | NCEI    | 2013-2017        |
| TX    | BENAVIDES 2                   | 41-0690 | 15M                 | 27.5969  | -98.4161  | 380       | NCEI    | 1982-2013        |
| TX    | BENAVIDES 2                   | 41-0690 | HLY                 | 27.5969  | -98.4161  | 380       | NCEI    | 1982-2013        |
| TX    | BENAVIDES 2                   | 41-0690 | DLY                 | 27.5969  | -98.4161  | 381       | NCEI    | 1962-2017        |
| TX    | BENBROOK DAM                  | 66-0691 | 15M                 | 32.6475  | -97.4439  | 790       | NCEI    | 2013-2017        |
| TX    | BENBROOK DAM                  | 41-0691 | 15M                 | 32.6475  | -97.4439  | 790       | NCEI    | 1984-2013        |
| TX    | BENBROOK DAM                  | 41-0691 | HLY                 | 32.6475  | -97.4439  | 790       | NCEI    | 1949-2013        |
| TX    | BENBROOK DAM                  | 41-0691 | DLY                 | 32.6475  | -97.4439  | 791       | NCEI    | 1949-2017        |
| TX    | BENJAMIN 4 SSE                | 41-0704 | DLY                 | 33.5333  | -99.7667  | 1401      | NCEI    | 1940-1975        |
| TX    | BERGSTROM AFB/AUSTI           | 64-0319 | DLY                 | 30.2000  | -97.6830  | 541       | NCEI    | 1971-1993        |
| TX    | BERTRAM 3 ENE                 | 66-0738 | 15M                 | 30.7625  | -98.0213  | 1129      | NCEI    | 2013-2017        |
| TX    | BERTRAM 3 ENE                 | 41-0738 | 15M                 | 30.7603  | -98.0164  | 1139      | NCEI    | 1984-2013        |
| TX    | BERTRAM 3 ENE                 | 41-0738 | HLY                 | 30.7603  | -98.0164  | 1139      | NCEI    | 1968-2013        |
| TX    | BERTRAM 3 ENE                 | 41-0738 | DLY                 | 30.7603  | -98.0164  | 1138      | NCEI    | 1968-2017        |
| TX    | BETHANY                       | 41-0715 | DLY                 | 32.3833  | -94.0500  | 371       | NCEI    | 1983-1988        |
| TX    | BIG ISLE SLGH AT FAIRMNT PKWY | 60-0024 | 15M                 | 29.6516  | -95.0760  | 19        | HCFC    | 1986-2017        |
| TX    | BIG LAKE 2                    | 41-0779 | 15M                 | 31.2000  | -101.4625 | 2734      | NCEI    | 1990-2013        |
| TX    | BIG LAKE 2                    | 41-0779 | HLY                 | 31.2000  | -101.4625 | 2734      | NCEI    | 1990-2013        |
| TX    | BIG LAKE 2                    | 41-0779 | DLY                 | 31.2000  | -101.4625 | 2733      | NCEI    | 1963-2017        |
| TX    | BIG LAKE LCRA 140             | 41-0776 | 15M                 | 31.2000  | -101.4667 | 2690      | NCEI    | 1975-1990        |
| TX    | BIG LAKE LCRA 140             | 41-0776 | HLY                 | 31.2000  | -101.4667 | 2690      | NCEI    | 1940-1990        |

| State | Station name                   | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | BIG SPRING                     | 41-0786 | HLY                 | 32.2442  | -101.4536 | 2510      | NCEI    | 1940-1953        |
| TX    | BIG SPRING                     | 99-0786 | DLY                 | 32.2442  | -101.4536 | 2510      | NCEI    | 1899-1950        |
| TX    | BIG SPRING                     | 79-0113 | DLY                 | 32.2442  | -101.4536 | 2510      | NCEI    | 1948-2017        |
| TX    | BIG SPRING FLD STN             | 66-0784 | 15M                 | 32.2683  | -101.4858 | 2509      | NCEI    | 2013-2017        |
| TX    | BIG SPRING FLD STN             | 41-0784 | 15M                 | 32.2683  | -101.4858 | 2509      | NCEI    | 1971-2013        |
| TX    | BIG SPRING FLD STN             | 41-0784 | HLY                 | 32.2683  | -101.4858 | 2509      | NCEI    | 1953-2013        |
| TX    | BIG SPRING FLD STN             | 41-0784 | DLY                 | 32.2683  | -101.4858 | 2510      | NCEI    | 2011-2017        |
| TX    | BIG WELLS 2W                   | 41-0787 | DLY                 | 28.5731  | -99.6044  | 541       | NCEI    | 1916-2006        |
| TX    | BISHOP                         | 41-0805 | DLY                 | 27.5842  | -97.8031  | 66        | NCEI    | 1934-2012        |
| TX    | BISHOP 0.4 ENE                 | 69-2228 | DLY                 | 27.5861  | -97.7908  | 62        | NCEI    | 2001-2016        |
| TX    | BLACKLAND EXPERIMENTAL STATION | 41-8907 | HLY                 | 31.0500  | -97.3500  | 640       | NCEI    | 1940-1946        |
| TX    | BLANCO                         | 41-0832 | DLY                 | 30.1061  | -98.4286  | 1381      | NCEI    | 1896-2017        |
| TX    | BLOYS CAMPGROUND               | 41-0861 | DLY                 | 30.5333  | -104.1333 | 5764      | NCEI    | 1968-1978        |
| TX    | BOERNE                         | 41-0902 | DLY                 | 29.7986  | -98.7353  | 1444      | NCEI    | 1893-2017        |
| TX    | BOERNE 12.4 N                  | 69-1875 | DLY                 | 29.9717  | -98.6992  | 1283      | NCEI    | 2011-2017        |
| TX    | BON WIER                       | 41-0917 | HLY                 | 30.7333  | -93.6500  | 89        | NCEI    | 1940-1974        |
| TX    | BON WIER                       | 41-0917 | DLY                 | 30.7333  | -93.6500  | 89        | NCEI    | 1914-1988        |
| TX    | BONHAM 3NNE                    | 41-0923 | DLY                 | 33.6403  | -96.1661  | 591       | NCEI    | 1903-2017        |
| TX    | BONITA 4NW                     | 41-0926 | DLY                 | 33.8472  | -97.6528  | 984       | NCEI    | 1948-2017        |
| TX    | BONITA 7NW                     | 66-0926 | 15M                 | 33.8186  | -97.7336  | 980       | NCEI    | 2013-2017        |
| TX    | BONITA 7NW                     | 41-0926 | 15M                 | 33.8186  | -97.7336  | 980       | NCEI    | 1978-2013        |
| TX    | BONITA 7NW                     | 41-0926 | HLY                 | 33.8186  | -97.7336  | 980       | NCEI    | 1940-2013        |
| TX    | BOOKER                         | 41-0944 | DLY                 | 36.4533  | -100.5394 | 2749      | NCEI    | 1922-2017        |
| TX    | BOQUILLAS RS                   | 41-0950 | DLY                 | 29.1853  | -102.9622 | 1857      | NCEI    | 1910-2006        |
| TX    | BORGER                         | 41-0958 | DLY                 | 35.6364  | -101.4542 | 3211      | NCEI    | 1949-2017        |
| TX    | BOWIE                          | 41-0984 | DLY                 | 33.5511  | -97.8472  | 1079      | NCEI    | 1897-2017        |
| TX    | BOXELDER 3 NNE                 | 41-0991 | DLY                 | 33.5164  | -94.8608  | 440       | NCEI    | 1949-2002        |
| TX    | BOYD                           | 83-0010 | 15M                 | 33.0853  | -97.5583  | 702       | TRWD    | 2003-2016        |
| TX    | BOYD                           | 41-0996 | DLY                 | 33.0800  | -97.5639  | 732       | NCEI    | 1946-1999        |
| TX    | BOYS RANCH                     | 41-1000 | DLY                 | 35.5303  | -102.2564 | 3192      | NCEI    | 1964-2017        |
| TX    | BRACKETTVILLE                  | 41-1007 | DLY                 | 29.3167  | -100.4144 | 1119      | NCEI    | 1900-2017        |
| TX    | BRACKETTVILLE 22 N             | 66-1013 | 15M                 | 29.6101  | -100.4520 | 1760      | NCEI    | 2013-2017        |
| TX    | BRACKETTVILLE 22 N             | 41-1013 | HLY                 | 29.6100  | -100.4519 | 1760      | NCEI    | 1995-2013        |

| State | Station name               | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|----------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | BRACKETTVILLE 22 N         | 41-1013 | DLY                 | 29.6100  | -100.4519 | 1759      | NCEI    | 1978-2017        |
| TX    | BRACKETTVILLE              | 99-1007 | DLY                 | 29.3167  | -100.4144 | 1119      | NCEI    | 1877-1881        |
| TX    | BRADY                      | 66-1017 | 15M                 | 31.1444  | -99.3491  | 1710      | NCEI    | 2013-2018        |
| TX    | BRADY                      | 41-1017 | 15M                 | 31.1444  | -99.3492  | 1710      | NCEI    | 1973-2013        |
| TX    | BRADY                      | 41-1017 | HLY                 | 31.1444  | -99.3492  | 1710      | NCEI    | 1940-2013        |
| TX    | BRADY                      | 41-1017 | DLY                 | 31.1444  | -99.3492  | 1709      | NCEI    | 1893-2017        |
| TX    | BRADY CREEK AT BRADY       | 85-0354 | HLY                 | 31.1381  | -99.3347  | 1686      | HADS    | 2007-2017        |
| TX    | BRAVO                      | 41-1033 | DLY                 | 35.6200  | -103.0072 | 4075      | NCEI    | 1941-2017        |
| TX    | BRAYS BYU AT BELLAIRE BLVD | 60-0039 | 15M                 | 29.7039  | -95.5657  | 66        | HCFC    | 1999-2017        |
| TX    | BRAYS BYU AT BELLE PARK DR | 60-0038 | 15M                 | 29.7090  | -95.5826  | 56        | HCFC    | 1986-2017        |
| TX    | BRAZOS                     | 41-1035 | DLY                 | 32.6489  | -98.1336  | 840       | NCEI    | 1908-2013        |
| TX    | BRECKENRIDGE               | 41-1042 | DLY                 | 32.7500  | -98.9017  | 1171      | NCEI    | 1898-2017        |
| TX    | BRECKENRIDGE 2 WNW         | 41-1043 | DLY                 | 32.7667  | -98.9333  | 1332      | NCEI    | 1973-1975        |
| TX    | BREMOND                    | 41-1045 | DLY                 | 31.1589  | -96.6825  | 469       | NCEI    | 1963-2017        |
| TX    | BRENHAM                    | 99-1048 | DLY                 | 30.1592  | -96.3972  | 312       | NCEI    | 1885-1947        |
| TX    | BRENHAM                    | 41-1048 | DLY                 | 30.1592  | -96.3972  | 312       | NCEI    | 1897-2017        |
| TX    | BREWERS STORE 5 SW         | 41-1053 | HLY                 | 30.6833  | -99.5500  | 1762      | NCEI    | 1940-1956        |
| TX    | BRICE 2 S                  | 41-1057 | HLY                 | 34.6833  | -100.9000 | 2228      | NCEI    | 1941-1982        |
| TX    | BRIDGEPORT                 | 41-1063 | DLY                 | 33.2064  | -97.7761  | 768       | NCEI    | 1908-2017        |
| TX    | BRIGGS                     | 41-1068 | HLY                 | 30.8833  | -97.9333  | 1090      | NCEI    | 1940-1998        |
| TX    | BRIGHTON                   | 41-1073 | DLY                 | 27.6500  | -97.3000  | 10        | NCEI    | 1893-1920        |
| TX    | BRITTON                    | 41-1081 | HLY                 | 32.5500  | -97.0667  | 561       | NCEI    | 1946-1974        |
| TX    | BRITTON                    | 41-1081 | DLY                 | 32.5500  | -97.0667  | 561       | NCEI    | 1940-1952        |
| TX    | BROADDUS                   | 41-1089 | DLY                 | 31.3050  | -94.2703  | 246       | NCEI    | 1977-2010        |
| TX    | BROADDUS                   | 41-4523 | DLY                 | 31.3167  | -94.2833  | 269       | NCEI    | 1942-1976        |
| TX    | BRONSON                    | 41-1094 | DLY                 | 31.3500  | -94.0167  | 322       | NCEI    | 1924-1979        |
| TX    | BRONTE 11 NNE              | 79-0009 | DLY                 | 32.0408  | -100.2494 | 1998      | NCEI    | 2006-2017        |
| TX    | BROWNFIELD                 | 41-1127 | DLY                 | 33.1833  | -102.2667 | 3383      | NCEI    | 1914-1954        |
| TX    | BROWNFIELD #2              | 41-1128 | DLY                 | 33.1908  | -102.2681 | 3301      | NCEI    | 1953-2017        |
| TX    | BROWNSVILLE                | 99-1137 | HLY                 | 25.9025  | -97.4994  | 35        | NCEI    | 1922-1942        |
| TX    | BROWNSVILLE                | 99-0003 | DLY                 | 25.9025  | -97.4994  | 35        | NCEI    | 1878-1900        |
| TX    | BROWNSVILLE                | 41-1133 | DLY                 | 25.9008  | -97.5039  | 20        | NCEI    | 1906-2005        |
| TX    | BROWNSVILLE                | 79-0043 | DLY                 | 25.9156  | -97.4186  | 23        | NCEI    | 1898-2017        |

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|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | BROWNSVILLE INTL AP            | 41-1136 | HLY                 | 25.9142  | -97.4231  | 24        | NCEI    | 1942-2013        |
| TX    | BROWNSVILLE/S PADRE ISLAND INT | 56-0108 | HLY                 | 25.9060  | -97.4260  | 22        | NCEI    | 2007-2017        |
| TX    | BROWNWOOD 2ENE                 | 41-1138 | DLY                 | 31.7383  | -98.9456  | 1401      | NCEI    | 1893-2017        |
| TX    | BUCHANAN DAM                   | 41-1165 | HLY                 | 30.7500  | -98.4167  | 1020      | NCEI    | 1946-1964        |
| TX    | BUCHANAN DAM                   | 41-1165 | DLY                 | 30.7500  | -98.4167  | 1020      | NCEI    | 1943-1964        |
| TX    | BUCHANAN DAM 1 ENE             | 63-0067 | 15M                 | 30.7443  | -98.4177  | 1017      | LCRA    | 2012-2018        |
| TX    | BUCHANAN DAM 2 NNW             | 63-0066 | 15M                 | 30.7648  | -98.4526  | 1024      | LCRA    | 2005-2012        |
| TX    | BUCKNERS CRK NR MULDOON        | 63-0224 | 15M                 | 29.8452  | -97.0447  | 299       | LCRA    | 2005-2018        |
| TX    | BUCKNERS CRK NR MULDOON        | 63-0224 | HLY                 | 29.8452  | -97.0447  | 299       | LCRA    | 1994-2018        |
| TX    | BUDA AT FM 967                 | 65-0071 | 15M                 | 30.0867  | -97.8486  | 687       | COA     | 1987-2015        |
| TX    | BUENAVISTA 2 NNW               | 41-1185 | HLY                 | 31.2500  | -102.6667 | 2384      | NCEI    | 1942-1963        |
| TX    | BUENAVISTA 2 NNW               | 41-1185 | DLY                 | 31.2500  | -102.6667 | 2384      | NCEI    | 1912-1951        |
| TX    | BUESCHER LAKE GAGE 2           | 41-1186 | HLY                 | 30.0500  | -97.1500  | 380       | NCEI    | 1941-1943        |
| TX    | BUFFALO                        | 41-1188 | DLY                 | 31.4667  | -96.0500  | 358       | NCEI    | 1940-1988        |
| TX    | BUFFALO BYU AT MILAM STREET    | 60-0135 | 15M                 | 29.7651  | -95.3612  | 1         | HCFC    | 1986-2017        |
| TX    | BUFFALO BYU AT TURNING BASIN   | 60-0134 | 15M                 | 29.7494  | -95.2911  | 10        | HCFC    | 1988-2017        |
| TX    | BUFFALO BYU AT US 90           | 60-0124 | 15M                 | 29.7857  | -95.8270  | 134       | HCFC    | 1988-2017        |
| TX    | BULER 4 NNW                    | 41-1203 | DLY                 | 36.1833  | -100.8333 | 2972      | NCEI    | 1941-1977        |
| TX    | BULL CREEK DAM                 | 65-0097 | 15M                 | 30.4220  | -97.8104  | 789       | COA     | 1987-2017        |
| TX    | BULVERDE                       | 41-1215 | DLY                 | 29.7386  | -98.4522  | 1079      | NCEI    | 1940-2017        |
| TX    | BUNKER HILL                    | 41-1224 | DLY                 | 36.1500  | -102.9333 | 4347      | NCEI    | 1941-1990        |
| TX    | BURKETT                        | 41-1239 | DLY                 | 31.9917  | -99.2203  | 1555      | NCEI    | 1948-2017        |
| TX    | BURLESON                       | 66-1246 | 15M                 | 32.5066  | -97.3444  | 762       | NCEI    | 2013-2017        |
| TX    | BURLESON                       | 41-1246 | 15M                 | 32.5067  | -97.3444  | 762       | NCEI    | 1982-2013        |
| TX    | BURLESON                       | 41-1246 | HLY                 | 32.5067  | -97.3444  | 762       | NCEI    | 1982-2013        |
| TX    | BURLESON                       | 41-1246 | DLY                 | 32.5067  | -97.3444  | 761       | NCEI    | 1985-2017        |
| TX    | BURLESON 2 SSW                 | 41-1245 | HLY                 | 32.5167  | -97.3333  | 771       | NCEI    | 1957-1957        |
| TX    | BURLESON 2 SSW                 | 41-1245 | DLY                 | 32.5167  | -97.3333  | 771       | NCEI    | 1943-1985        |
| TX    | BURNET                         | 41-1250 | DLY                 | 30.7586  | -98.2339  | 1286      | NCEI    | 1893-2017        |
| TX    | BURNET 1 WSW                   | 63-0143 | HLY                 | 30.7568  | -98.2353  | 1309      | LCRA    | 1999-2018        |
| TX    | BURNET 6 SSE                   | 63-0142 | HLY                 | 30.6686  | -98.2110  | 1101      | LCRA    | 1991-2018        |
| TX    | BURNET 9 WSW                   | 41-1253 | DLY                 | 30.7247  | -98.3842  | 889       | NCEI    | 2000-2011        |
| TX    | CADDO                          | 76-0037 | HLY                 | 33.7411  | -95.9219  | 800       | RAWS    | 2000-2015        |

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|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | CADDO LAKE                     | 76-0035 | HLY                 | 32.6583  | -94.1164  | 200       | RAWS    | 2002-2015        |
| TX    | CADDO LAKE                     | 85-0379 | HLY                 | 32.6583  | -94.1164  | 0         | HADS    | 2003-2017        |
| TX    | CADDO WILDLIFE MANAGEMENT AREA | 85-0389 | HLY                 | 33.7458  | -95.9261  | 541       | HADS    | 2005-2017        |
| TX    | CALDWELL                       | 41-1314 | DLY                 | 30.5328  | -96.7022  | 364       | NCEI    | 1936-2017        |
| TX    | CALLIHAM                       | 41-1337 | DLY                 | 28.4658  | -98.3539  | 217       | NCEI    | 1978-2017        |
| TX    | CAMERON                        | 41-1348 | DLY                 | 30.8458  | -96.9700  | 364       | NCEI    | 1908-2009        |
| TX    | CAMP MABRY ARMY NATL GRDB      | 55-0082 | HLY                 | 30.3208  | -97.7604  | 658       | NCEI    | 1996-2007        |
| TX    | CAMP VERDE                     | 99-1395 | DLY                 | 29.8947  | -99.1050  | 1604      | NCEI    | 1979-1997        |
| TX    | CAMP VERDE                     | 41-1395 | DLY                 | 29.8947  | -99.1050  | 1604      | NCEI    | 1997-2017        |
| TX    | CAMP WOOD                      | 41-1398 | DLY                 | 29.6703  | -100.0097 | 1480      | NCEI    | 1944-2013        |
| TX    | CAMPBELL FLD-CORSICANA MU      | 55-0121 | HLY                 | 32.0311  | -96.3989  | 443       | NCEI    | 1998-2007        |
| TX    | CAMPBELL FLD-CORSICANA MU      | 56-0206 | HLY                 | 32.0270  | -96.3980  | 446       | NCEI    | 2007-2017        |
| TX    | CANADIAN                       | 89-0087 | DLY                 | 35.9128  | -100.3820 | 2424      | TEN     | 2012-2016        |
| TX    | CANADIAN                       | 41-1412 | DLY                 | 35.9092  | -100.3883 | 2300      | NCEI    | 1906-2001        |
| TX    | CANDELARIA                     | 41-1416 | DLY                 | 30.1383  | -104.6822 | 2877      | NCEI    | 1940-2011        |
| TX    | CANTON 5 W                     | 41-1425 | DLY                 | 32.5669  | -95.9578  | 486       | NCEI    | 1944-2001        |
| TX    | CANYON                         | 41-1430 | DLY                 | 34.9806  | -101.9264 | 3589      | NCEI    | 1923-2017        |
| TX    | CANYON DAM                     | 66-1429 | 15M                 | 29.8607  | -98.1959  | 1000      | NCEI    | 2013-2017        |
| TX    | CANYON DAM                     | 41-1429 | 15M                 | 29.8608  | -98.1958  | 1000      | NCEI    | 1984-2013        |
| TX    | CANYON DAM                     | 41-1429 | HLY                 | 29.8608  | -98.1958  | 1000      | NCEI    | 1978-2013        |
| TX    | CANYON DAM                     | 41-1429 | DLY                 | 29.8608  | -98.1958  | 1010      | NCEI    | 1961-2017        |
| TX    | CANYON DAM #1                  | 41-1431 | HLY                 | 29.8617  | -98.2919  | 980       | NCEI    | 1961-2002        |
| TX    | CANYON DAM #1                  | 41-1431 | DLY                 | 29.8617  | -98.2919  | 981       | NCEI    | 1996-2002        |
| TX    | CANYON DAM #3                  | 41-1433 | HLY                 | 29.9464  | -98.3969  | 1235      | NCEI    | 1961-2004        |
| TX    | CANYON DAM #3                  | 41-1433 | DLY                 | 29.9464  | -98.3969  | 1234      | NCEI    | 2004-2017        |
| TX    | CANYON DAM #4                  | 66-1434 | 15M                 | 29.9111  | -98.3713  | 1168      | NCEI    | 2013-2017        |
| TX    | CANYON DAM #4                  | 41-1434 | 15M                 | 29.9111  | -98.3714  | 1168      | NCEI    | 1984-2013        |
| TX    | CANYON DAM #4                  | 41-1434 | HLY                 | 29.9111  | -98.3714  | 1168      | NCEI    | 1961-2013        |
| TX    | CANYON DAM #4                  | 41-1434 | DLY                 | 29.9111  | -98.3714  | 1168      | NCEI    | 2009-2017        |
| TX    | CANYON DAM #6                  | 41-1436 | 15M                 | 29.9469  | -98.3011  | 1137      | NCEI    | 1984-2008        |
| TX    | CANYON DAM #6                  | 41-1436 | HLY                 | 29.9469  | -98.3011  | 1137      | NCEI    | 1961-2008        |
| TX    | CANYON DAM 2                   | 41-1432 | HLY                 | 29.8333  | -98.3500  | 1194      | NCEI    | 1961-1989        |
| TX    | CANYON LAKE 2.8 N              | 69-1037 | DLY                 | 29.9150  | -98.2644  | 1010      | NCEI    | 2008-2017        |

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|-------|----------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | CANYON WEATHER             | 85-0382 | HLY                 | 29.8611  | -98.1958  | 1007      | HADS    | 2009-2017        |
| TX    | CAPROCK                    | 76-0036 | HLY                 | 34.4106  | -101.0492 | 2561      | RAWS    | 2004-2015        |
| TX    | CAPROCK CANYON SP          | 41-1441 | HLY                 | 34.4125  | -101.0678 | 2645      | NCEI    | 2010-2013        |
| TX    | CAPROCK CANYONS STATE PARK | 85-0380 | HLY                 | 34.4106  | -101.0492 | 2589      | HADS    | 2004-2017        |
| TX    | CARR RCH                   | 41-1481 | DLY                 | 30.1667  | -99.1167  | 2001      | NCEI    | 1920-1961        |
| TX    | CARRIZO SPRINGS 3S         | 41-1486 | DLY                 | 28.4894  | -99.8733  | 614       | NCEI    | 1912-2017        |
| TX    | CARROLLTON                 | 41-1490 | DLY                 | 32.9850  | -96.9258  | 545       | NCEI    | 1923-2001        |
| TX    | CARTA VALLEY               | 41-1492 | HLY                 | 29.7908  | -100.6742 | 1851      | NCEI    | 1963-1995        |
| TX    | CARTA VALLEY               | 41-1492 | DLY                 | 29.7908  | -100.6742 | 1850      | NCEI    | 1963-2014        |
| TX    | CARTHAGE                   | 41-1500 | DLY                 | 32.1614  | -94.3397  | 305       | NCEI    | 1908-2017        |
| TX    | CASE RCH 3 S               | 41-1511 | DLY                 | 31.6333  | -101.0333 | 2478      | NCEI    | 1948-1983        |
| TX    | CASTOLON                   | 41-1524 | DLY                 | 29.1344  | -103.5150 | 2169      | NCEI    | 1947-2017        |
| TX    | CATARINA                   | 41-1528 | HLY                 | 28.3392  | -99.6328  | 560       | NCEI    | 1960-2003        |
| TX    | CATARINA                   | 41-1528 | DLY                 | 28.3392  | -99.6328  | 561       | NCEI    | 1959-2001        |
| TX    | CEDAR BYU AT SH 146        | 60-0119 | 15M                 | 29.7701  | -94.9167  | 0         | HCFC    | 1986-2017        |
| TX    | CEDAR BYU AT US 90         | 60-0121 | 15M                 | 29.9729  | -94.9855  | 48        | HCFC    | 1986-2017        |
| TX    | CEDAR CREEK 5 S            | 41-1541 | 15M                 | 30.0164  | -97.4786  | 436       | NCEI    | 2001-2013        |
| TX    | CEDAR CREEK 5 S            | 41-1541 | HLY                 | 30.0164  | -97.4786  | 436       | NCEI    | 2001-2013        |
| TX    | CEDAR CREEK 5 S            | 41-1541 | DLY                 | 30.0164  | -97.4786  | 436       | NCEI    | 1978-2013        |
| TX    | CELINA                     | 41-1573 | DLY                 | 33.3167  | -96.8000  | 679       | NCEI    | 1946-1983        |
| TX    | CELINA 4.4 WSW             | 69-1189 | DLY                 | 33.2955  | -96.8550  | 610       | NCEI    | 2008-2017        |
| TX    | CENTER                     | 41-1578 | DLY                 | 31.8075  | -94.1642  | 325       | NCEI    | 1922-2017        |
| TX    | CENTER CITY                | 41-1580 | DLY                 | 31.4683  | -98.4106  | 1365      | NCEI    | 1963-2012        |
| TX    | CENTERVILLE                | 41-1596 | DLY                 | 31.2581  | -95.9744  | 322       | NCEI    | 1937-2017        |
| TX    | CHALK MTN                  | 41-1625 | DLY                 | 32.1561  | -97.9369  | 1132      | NCEI    | 1963-2013        |
| TX    | CHANNING                   | 41-1646 | 15M                 | 35.6869  | -102.3342 | 3800      | NCEI    | 1971-2013        |
| TX    | CHANNING                   | 41-1646 | HLY                 | 35.6869  | -102.3342 | 3800      | NCEI    | 1941-2013        |
| TX    | CHANNING                   | 41-1646 | DLY                 | 35.6869  | -102.3342 | 3799      | NCEI    | 1904-1951        |
| TX    | CHANNING 2                 | 41-1649 | DLY                 | 35.6831  | -102.3300 | 3789      | NCEI    | 1967-2008        |
| TX    | CHAPMAN RCH                | 41-1651 | DLY                 | 27.5892  | -97.4547  | 26        | NCEI    | 1959-2003        |
| TX    | CHARLOTTE 5 NNW            | 41-1663 | DLY                 | 28.9275  | -98.7494  | 440       | NCEI    | 1962-2012        |
| TX    | CHEAPSIDE                  | 66-1671 | 15M                 | 29.3091  | -97.4062  | 368       | NCEI    | 2013-2017        |
| TX    | CHEAPSIDE                  | 41-1671 | 15M                 | 29.3092  | -97.4061  | 368       | NCEI    | 1976-2013        |

| State | Station name              | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|---------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | CHEAPSIDE                 | 41-1671 | HLY                 | 29.3092  | -97.4061  | 368       | NCEI    | 1940-2013        |
| TX    | CHEAPSIDE                 | 41-1671 | DLY                 | 29.3092  | -97.4061  | 367       | NCEI    | 1948-2017        |
| TX    | CHEROKEE                  | 41-1680 | HLY                 | 30.9833  | -98.7167  | 1490      | NCEI    | 1941-1972        |
| TX    | CHEROKEE 2 NNW            | 63-0051 | HLY                 | 31.0167  | -98.7221  | 1540      | LCRA    | 1991-2018        |
| TX    | CHEROKEE 4 SSE            | 63-0113 | HLY                 | 30.9232  | -98.6846  | 1443      | LCRA    | 1991-2018        |
| TX    | CHEROKEE 8 NNE            | 63-0046 | HLY                 | 31.0648  | -98.6030  | 1600      | LCRA    | 1991-2018        |
| TX    | CHILDRESS 3 W             | 41-1696 | HLY                 | 34.4333  | -100.2500 | 1972      | NCEI    | 1940-1975        |
| TX    | CHILDRESS 3 W             | 41-1696 | DLY                 | 34.4333  | -100.2500 | 1972      | NCEI    | 1893-1946        |
| TX    | CHILDRESS MUNI AP         | 78-0018 | 15M                 | 34.4272  | -100.2831 | 1951      | NCEI    | 2005-2017        |
| TX    | CHILDRESS MUNI AP         | 41-1698 | 15M                 | 34.4272  | -100.2831 | 1951      | NCEI    | 1975-1999        |
| TX    | CHILDRESS MUNI AP         | 41-1698 | HLY                 | 34.4272  | -100.2831 | 1951      | NCEI    | 1947-2013        |
| TX    | CHILDRESS MUNI AP         | 79-0104 | DLY                 | 34.4272  | -100.2831 | 1952      | NCEI    | 1948-2017        |
| TX    | CHILDRESS MUNICIPAL ARPT  | 55-0095 | HLY                 | 34.4340  | -100.2880 | 1943      | NCEI    | 1996-2007        |
| TX    | CHILDRESS MUNICIPAL ARPT  | 56-0174 | HLY                 | 34.4272  | -100.2831 | 1952      | NCEI    | 2007-2017        |
| TX    | CHILLICOTHE               | 41-1701 | DLY                 | 34.2500  | -99.5167  | 1401      | NCEI    | 1895-1975        |
| TX    | CHISOS BASIN              | 41-1715 | DLY                 | 29.2703  | -103.3003 | 5299      | NCEI    | 1943-2017        |
| TX    | CHOKE CANYON DAM          | 41-1720 | DLY                 | 28.4675  | -98.2525  | 230       | NCEI    | 1983-2017        |
| TX    | CIBOLO CREEK              | 41-1741 | DLY                 | 29.0167  | -97.9333  | 312       | NCEI    | 1944-1982        |
| TX    | CLARENDON                 | 79-0123 | DLY                 | 34.9325  | -100.8903 | 2700      | NCEI    | 1904-2017        |
| TX    | CLARKSVILLE (NEAR) SCS #5 | 41-1774 | HLY                 | 33.6167  | -95.0667  | 457       | NCEI    | 1942-1946        |
| TX    | CLARKSVILLE 1W            | 66-1773 | 15M                 | 33.6108  | -95.0716  | 426       | NCEI    | 2013-2017        |
| TX    | CLARKSVILLE 1W            | 41-1773 | 15M                 | 33.6108  | -95.0717  | 426       | NCEI    | 1971-2013        |
| TX    | CLARKSVILLE 1W            | 41-1773 | HLY                 | 33.6108  | -95.0717  | 426       | NCEI    | 1940-2013        |
| TX    | CLARKSVILLE 1W            | 41-1773 | DLY                 | 33.6108  | -95.0717  | 427       | NCEI    | 1948-2010        |
| TX    | CLARKSVILLE 2NE           | 41-1772 | DLY                 | 33.6164  | -95.0717  | 436       | NCEI    | 1903-2010        |
| TX    | CLAUDE                    | 41-1778 | DLY                 | 35.1100  | -101.3619 | 3396      | NCEI    | 1904-2001        |
| TX    | CLEAR CK AT BAY AREA BLVD | 60-0011 | 15M                 | 29.4977  | -95.1599  | 2         | HCFC    | 1999-2017        |
| TX    | CLEAR CK AT FM 528        | 60-0010 | 15M                 | 29.5181  | -95.1788  | 0         | HCFC    | 1986-2017        |
| TX    | CLEBURNE                  | 41-1800 | DLY                 | 32.3139  | -97.4061  | 784       | NCEI    | 1907-2017        |
| TX    | CLEVELAND                 | 41-1810 | DLY                 | 30.3636  | -95.0839  | 197       | NCEI    | 1954-2017        |
| TX    | CLIFTON 10 E              | 41-1823 | DLY                 | 31.8000  | -97.4333  | 669       | NCEI    | 1911-1975        |
| TX    | COLDSPRING 5 SSW          | 41-1870 | DLY                 | 30.5333  | -95.1500  | 354       | NCEI    | 1954-2002        |
| TX    | COLDWATER                 | 41-1874 | DLY                 | 36.4000  | -102.5667 | 4131      | NCEI    | 1893-1983        |

| State | Station name                   | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | COLEMAN                        | 41-1875 | DLY                 | 31.8281  | -99.4339  | 1732      | NCEI    | 1894-2017        |
| TX    | COLLEGE STN                    | 79-0017 | DLY                 | 30.5892  | -96.3647  | 305       | NCEI    | 1951-2017        |
| TX    | COLLEGE STN 6 SW               | 41-1888 | DLY                 | 30.5333  | -96.4167  | 174       | NCEI    | 1882-1984        |
| TX    | COLORADO CITY                  | 41-1903 | DLY                 | 32.3978  | -100.8594 | 2110      | NCEI    | 1898-2009        |
| TX    | COLORADO RIVER ABOVE LA GRANGE | 63-0222 | 15M                 | 29.9125  | -96.8969  | 262       | LCRA    | 2005-2018        |
| TX    | COLORADO RIVER ABOVE LA GRANGE | 63-0222 | HLY                 | 29.9125  | -96.8969  | 262       | LCRA    | 1988-2018        |
| TX    | COLORADO RIVER AT BASTROP      | 63-0212 | HLY                 | 30.1047  | -97.3192  | 316       | LCRA    | 1988-2018        |
| TX    | COLORADO RIVER AT BAY CITY     | 63-0236 | 15M                 | 28.9748  | -96.0107  | 49        | LCRA    | 2005-2018        |
| TX    | COLORADO RIVER AT BAY CITY     | 63-0236 | HLY                 | 28.9748  | -96.0107  | 49        | LCRA    | 1991-2018        |
| TX    | COLORADO RIVER AT COLUMBUS     | 63-0229 | HLY                 | 29.7064  | -96.5374  | 201       | LCRA    | 1988-2018        |
| TX    | COLORADO RIVER AT SMITHVILLE   | 63-0220 | 15M                 | 30.0120  | -97.1622  | 318       | LCRA    | 2005-2018        |
| TX    | COLORADO RIVER AT SMITHVILLE   | 63-0220 | HLY                 | 30.0120  | -97.1622  | 318       | LCRA    | 1994-2018        |
| TX    | COLORADO RIVER AT WHARTON      | 63-0234 | HLY                 | 29.3095  | -96.1035  | 101       | LCRA    | 1988-2018        |
| TX    | COLORADO RIVER AT WHARTON      | 85-0879 | HLY                 | 29.3089  | -96.1036  | 121       | HADS    | 1998-2017        |
| TX    | COLORADO RIVER AT WINCHELL     | 63-0006 | 15M                 | 31.4686  | -99.1623  | 1330      | LCRA    | 2005-2018        |
| TX    | COLORADO RIVER AT WINCHELL     | 63-0006 | HLY                 | 31.4686  | -99.1623  | 1330      | LCRA    | 1988-2018        |
| TX    | COLORADO RIVER NR SAN SABA     | 63-0043 | HLY                 | 31.2179  | -98.5636  | 1168      | LCRA    | 1988-2018        |
| TX    | COLUMBUS                       | 41-1911 | DLY                 | 29.6989  | -96.5731  | 226       | NCEI    | 1903-2017        |
| TX    | COMANCHE                       | 76-0045 | HLY                 | 31.9242  | -98.5972  | 1312      | RAWS    | 2007-2015        |
| TX    | COMANCHE                       | 41-1914 | DLY                 | 31.8983  | -98.6033  | 1385      | NCEI    | 1901-2015        |
| TX    | COMFORT 2                      | 41-1920 | HLY                 | 29.9614  | -98.8944  | 1433      | NCEI    | 1990-2013        |
| TX    | COMFORT 2                      | 41-1920 | DLY                 | 29.9614  | -98.8944  | 1434      | NCEI    | 1985-2017        |
| TX    | COMMERCE 4SW                   | 66-1921 | 15M                 | 33.1997  | -95.9283  | 550       | NCEI    | 2013-2017        |
| TX    | COMMERCE 4SW                   | 41-1921 | 15M                 | 33.1997  | -95.9283  | 550       | NCEI    | 1975-2013        |
| TX    | COMMERCE 4SW                   | 41-1921 | HLY                 | 33.1997  | -95.9283  | 550       | NCEI    | 1948-2013        |
| TX    | COMMERCE 4SW                   | 41-1921 | DLY                 | 33.1997  | -95.9283  | 551       | NCEI    | 1948-2017        |
| TX    | CONCORD                        | 41-1937 | HLY                 | 31.9167  | -94.5833  | 541       | NCEI    | 1962-1983        |
| TX    | CONLEN                         | 41-1946 | DLY                 | 36.2353  | -102.2406 | 3819      | NCEI    | 1941-2017        |
| TX    | CONROE                         | 41-1956 | 15M                 | 30.3303  | -95.4831  | 245       | NCEI    | 1978-2013        |
| TX    | CONROE                         | 76-0046 | HLY                 | 30.2364  | -95.4828  | 120       | RAWS    | 1995-2015        |
| TX    | CONROE                         | 85-0402 | HLY                 | 30.2364  | -95.4828  | 187       | HADS    | 2005-2017        |
| TX    | CONROE                         | 41-1956 | HLY                 | 30.3303  | -95.4831  | 245       | NCEI    | 1947-2013        |
| TX    | CONROE                         | 41-1956 | DLY                 | 30.3303  | -95.4831  | 246       | NCEI    | 1897-2017        |



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| TX    | CONROE 0.7 E                   | 69-2190 | DLY                 | 30.3227  | -95.4596  | 197       | NCEI    | 2012-2017        |
| TX    | CONROE MONTGOMERY CO AP        | 78-0025 | 15M                 | 30.3567  | -95.4139  | 230       | NCEI    | 2005-2017        |
| TX    | COOPER                         | 41-1970 | DLY                 | 33.3744  | -95.6933  | 486       | NCEI    | 1944-2017        |
| TX    | COPE RCH                       | 41-1974 | DLY                 | 31.5333  | -101.2842 | 2480      | NCEI    | 1948-2017        |
| TX    | COPPERAS COVE                  | 41-1984 | DLY                 | 31.1167  | -97.9000  | 1070      | NCEI    | 1915-1983        |
| TX    | COPPERAS COVE 0.8 ESE          | 69-1151 | DLY                 | 31.1129  | -97.8900  | 1093      | NCEI    | 2013-2017        |
| TX    | COPPERAS COVE 2                | 41-1986 | DLY                 | 31.1214  | -97.9225  | 1240      | NCEI    | 1966-1970        |
| TX    | COPPERAS COVE 5 NW             | 41-1990 | DLY                 | 31.1603  | -97.9564  | 1230      | NCEI    | 1983-2017        |
| TX    | CORINTH ST INTAKE - WEST LEVEE | 81-0041 | 15M                 | 32.7547  | -96.8033  | 411       | COD     | 1991-2016        |
| TX    | CORNUDAS 0.1 N                 | 69-1570 | DLY                 | 31.7809  | -105.4716 | 4314      | NCEI    | 2012-2015        |
| TX    | CORNUDAS SVC STN               | 41-2012 | DLY                 | 31.7800  | -105.4700 | 4308      | NCEI    | 1940-2007        |
| TX    | CORPUS CHRISTI                 | 99-2014 | HLY                 | 27.7969  | -97.3951  | 7         | NCEI    | 1901-1941        |
| TX    | CORPUS CHRISTI                 | 41-2014 | HLY                 | 27.7969  | -97.3951  | 10        | NCEI    | 1940-1948        |
| TX    | CORPUS CHRISTI                 | 52-2011 | DLY                 | 27.7978  | -97.3936  | 6         | FORTS   | 1846-1892        |
| TX    | CORPUS CHRISTI                 | 41-2014 | DLY                 | 27.8000  | -97.4000  | 10        | NCEI    | 1946-1980        |
| TX    | CORPUS CHRISTI                 | 79-0048 | DLY                 | 27.7839  | -97.5108  | 46        | NCEI    | 1948-2017        |
| TX    | CORPUS CHRISTI 9.1 NW          | 69-2229 | DLY                 | 27.8029  | -97.3932  | 4         | NCEI    | 2007-2017        |
| TX    | CORPUS CHRISTI AP              | 41-2015 | HLY                 | 27.7742  | -97.5122  | 44        | NCEI    | 1947-2013        |
| TX    | CORPUS CHRISTI INTERNATIONAL A | 56-0112 | HLY                 | 27.7730  | -97.5130  | 44        | NCEI    | 2007-2017        |
| TX    | CORPUS CHRISTI NAS             | 79-0050 | DLY                 | 27.6833  | -97.2833  | 20        | NCEI    | 1945-2017        |
| TX    | CORRIGAN 1 ENE                 | 41-2017 | DLY                 | 31.0033  | -94.8161  | 200       | NCEI    | 1992-2012        |
| TX    | CORSICANA                      | 41-2019 | DLY                 | 32.1225  | -96.4867  | 449       | NCEI    | 1893-2017        |
| TX    | CORSICANA 8 E                  | 99-2020 | DLY                 | 32.1183  | -96.3256  | 377       | NCEI    | 1955-1989        |
| TX    | CORSICANA 8 E                  | 41-2020 | DLY                 | 32.1183  | -96.3256  | 377       | NCEI    | 1992-2007        |
| TX    | CORSICANA CAMPBELL FLD         | 79-0142 | DLY                 | 32.0311  | -96.3989  | 449       | NCEI    | 1998-2017        |
| TX    | CORYELL CITY                   | 41-2024 | HLY                 | 31.5500  | -97.6167  | 973       | NCEI    | 1944-1989        |
| TX    | COTTONWOOD                     | 41-2040 | DLY                 | 30.1606  | -99.1356  | 2123      | NCEI    | 1962-2017        |
| TX    | COTULLA                        | 99-2048 | DLY                 | 28.4567  | -99.2183  | 476       | NCEI    | 1901-2002        |
| TX    | COTULLA LA SALLE CO AP         | 78-0021 | 15M                 | 28.4567  | -99.2183  | 476       | NCEI    | 2005-2017        |
| TX    | COTULLA LA SALLE CO AP         | 41-2048 | 15M                 | 28.4567  | -99.2183  | 476       | NCEI    | 1975-2003        |
| TX    | COTULLA LA SALLE CO AP         | 41-2048 | HLY                 | 28.4567  | -99.2183  | 476       | NCEI    | 1956-2013        |
| TX    | COTULLA LA SALLE CO AP         | 79-0058 | DLY                 | 28.4567  | -99.2183  | 476       | NCEI    | 1949-2017        |
| TX    | COTULLA-LA SALLE CO ARPT       | 55-0049 | HLY                 | 28.4580  | -99.2200  | 469       | NCEI    | 2001-2007        |

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| TX    | COTULLA-LA SALLE CO ARPT | 56-0120 | HLY                 | 28.4567  | -99.2183  | 479       | NCEI    | 2007-2017        |
| TX    | CRABB 2 W                | 41-2073 | HLY                 | 29.5333  | -95.7500  | 112       | NCEI    | 1948-1964        |
| TX    | CRANDALL                 | 41-2080 | DLY                 | 32.6297  | -96.4581  | 430       | NCEI    | 1960-1994        |
| TX    | CRANDALL 1.6 SSE         | 69-1815 | DLY                 | 32.6088  | -96.4428  | 427       | NCEI    | 2007-2009        |
| TX    | CRANE                    | 41-2082 | 15M                 | 31.4072  | -102.3578 | 2554      | NCEI    | 1975-2013        |
| TX    | CRANE                    | 41-2082 | HLY                 | 31.4072  | -102.3578 | 2554      | NCEI    | 1943-2013        |
| TX    | CRANE                    | 41-2082 | DLY                 | 31.4072  | -102.3578 | 2556      | NCEI    | 1928-2017        |
| TX    | CRANFILLS GAP            | 66-2086 | 15M                 | 31.7716  | -97.8238  | 979       | NCEI    | 2013-2016        |
| TX    | CRANFILLS GAP            | 41-2086 | 15M                 | 31.7717  | -97.8239  | 979       | NCEI    | 1975-2013        |
| TX    | CRANFILLS GAP            | 41-2086 | HLY                 | 31.7717  | -97.8239  | 979       | NCEI    | 1940-2013        |
| TX    | CRANFILLS GAP            | 41-2086 | DLY                 | 31.7717  | -97.8239  | 978       | NCEI    | 1948-2017        |
| TX    | CRESSON                  | 66-2096 | 15M                 | 32.5286  | -97.6188  | 1039      | NCEI    | 2013-2017        |
| TX    | CRESSON                  | 41-2096 | 15M                 | 32.5286  | -97.6189  | 1039      | NCEI    | 1980-2013        |
| TX    | CRESSON                  | 41-2096 | HLY                 | 32.5286  | -97.6189  | 1039      | NCEI    | 1946-2013        |
| TX    | CRESSON                  | 41-2096 | DLY                 | 32.5286  | -97.6189  | 1040      | NCEI    | 1948-2017        |
| TX    | CRIDER RCH               | 41-2104 | DLY                 | 30.0667  | -99.7333  | 2199      | NCEI    | 1940-1975        |
| TX    | CROCKETT                 | 41-2114 | DLY                 | 31.3072  | -95.4508  | 348       | NCEI    | 1904-2017        |
| TX    | CROSBYTON                | 41-2121 | DLY                 | 33.6517  | -101.2450 | 3009      | NCEI    | 1893-2017        |
| TX    | CROSS PLAINS             | 41-2128 | HLY                 | 32.1167  | -99.1667  | 1742      | NCEI    | 1940-1947        |
| TX    | CROSS PLAINS             | 41-2128 | DLY                 | 32.1167  | -99.1667  | 1742      | NCEI    | 1939-1976        |
| TX    | CROSS PLAINS #2          | 66-2131 | 15M                 | 32.1266  | -99.1605  | 1790      | NCEI    | 2013-2017        |
| TX    | CROSS PLAINS #2          | 41-2131 | 15M                 | 32.1267  | -99.1606  | 1790      | NCEI    | 1971-2013        |
| TX    | CROSS PLAINS #2          | 41-2131 | HLY                 | 32.1267  | -99.1606  | 1790      | NCEI    | 1947-2013        |
| TX    | CROWELL                  | 41-2142 | DLY                 | 33.9900  | -99.7303  | 1480      | NCEI    | 1916-2017        |
| TX    | CRYSTAL CITY             | 41-2160 | DLY                 | 28.6794  | -99.8311  | 581       | NCEI    | 1941-2008        |
| TX    | CRYSTAL CITY 0.5 ESE     | 69-2922 | DLY                 | 28.6859  | -99.8185  | 604       | NCEI    | 2008-2017        |
| TX    | CUERO                    | 41-2173 | DLY                 | 29.0892  | -97.3433  | 213       | NCEI    | 1901-2017        |
| TX    | CUMMINS CRK NR FRELSBURG | 63-0228 | 15M                 | 29.8258  | -96.5807  | 228       | LCRA    | 2005-2018        |
| TX    | CUMMINS CRK NR FRELSBURG | 63-0228 | HLY                 | 29.8258  | -96.5807  | 228       | LCRA    | 1994-2018        |
| TX    | CYPRESS                  | 66-2206 | 15M                 | 30.0210  | -95.7069  | 150       | NCEI    | 2013-2018        |
| TX    | CYPRESS                  | 41-2206 | 15M                 | 30.0211  | -95.7069  | 150       | NCEI    | 1991-2013        |
| TX    | CYPRESS                  | 41-2206 | HLY                 | 30.0211  | -95.7069  | 150       | NCEI    | 1991-2013        |
| TX    | CYPRESS                  | 41-2206 | DLY                 | 30.0211  | -95.7069  | 151       | NCEI    | 1943-2017        |

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| TX    | CYPRESS CK AT GRANT RD        | 60-0085 | 15M                 | 29.9736  | -95.5987  | 116       | HCFC    | 1986-2017        |
| TX    | CYPRESS CK AT HUFFMEISTER RD  | 60-0087 | 15M                 | 29.9616  | -95.6310  | 128       | HCFC    | 1988-2017        |
| TX    | CYPRESS CK AT KATY-HOCKLEY RD | 60-0089 | 15M                 | 29.9500  | -95.8084  | 160       | HCFC    | 1986-2017        |
| TX    | CYPRESS CK AT KUYKENDAHL RD   | 60-0082 | 15M                 | 30.0244  | -95.4764  | 85        | HCFC    | 1996-2017        |
| TX    | CYPRESS CK AT STUEBNER AIR RD | 60-0083 | 15M                 | 30.0066  | -95.5119  | 92        | HCFC    | 1986-2017        |
| TX    | DACUS                         | 41-2218 | DLY                 | 30.4364  | -95.7919  | 240       | NCEI    | 1954-2012        |
| TX    | DAINGERFIELD 9 S              | 41-2225 | DLY                 | 32.9203  | -94.7225  | 299       | NCEI    | 1944-2017        |
| TX    | DAL-FTW WSCMO AP              | 78-0028 | 15M                 | 32.8978  | -97.0189  | 560       | NCEI    | 2000-2017        |
| TX    | DAL-FTW WSCMO AP              | 41-2242 | HLY                 | 32.8978  | -97.0189  | 560       | NCEI    | 1974-2013        |
| TX    | DALHART                       | 41-2238 | HLY                 | 36.0606  | -102.5211 | 3984      | NCEI    | 1941-1946        |
| TX    | DALHART EXP STN               | 41-2239 | DLY                 | 36.0167  | -102.5833 | 4003      | NCEI    | 1905-1953        |
| TX    | DALHART FAA AP                | 41-2240 | HLY                 | 36.0167  | -102.5500 | 3990      | NCEI    | 1950-2013        |
| TX    | DALHART MUNI AP               | 79-0149 | DLY                 | 36.0167  | -102.5500 | 3990      | NCEI    | 1948-2017        |
| TX    | DALHART MUNICIPAL AIRPORT     | 55-0162 | HLY                 | 36.0230  | -102.5470 | 3989      | NCEI    | 2000-2007        |
| TX    | DALHART MUNICIPAL AIRPORT     | 56-0259 | HLY                 | 36.0230  | -102.5470 | 3994      | NCEI    | 2007-2017        |
| TX    | DALLAS                        | 41-2243 | DLY                 | 32.7744  | -96.8214  | 371       | NCEI    | 1897-1916        |
| TX    | DALLAS EXECUTIVE AIRPORT      | 55-0028 | HLY                 | 32.6810  | -96.8680  | 657       | NCEI    | 1998-2007        |
| TX    | DALLAS EXECUTIVE AIRPORT      | 56-0092 | HLY                 | 32.6808  | -96.8681  | 671       | NCEI    | 2007-2017        |
| TX    | DALLAS FAA AP                 | 78-0026 | 15M                 | 32.8519  | -96.8555  | 440       | NCEI    | 2000-2017        |
| TX    | DALLAS FAA AP                 | 41-2244 | 15M                 | 32.8519  | -96.8556  | 440       | NCEI    | 1975-2001        |
| TX    | DALLAS FAA AP                 | 41-2244 | HLY                 | 32.8519  | -96.8556  | 440       | NCEI    | 1940-2013        |
| TX    | DALLAS FT WORTH AP            | 79-0018 | DLY                 | 32.8978  | -97.0189  | 561       | NCEI    | 1948-2017        |
| TX    | DALLAS HENSLEY FLD NAS        | 79-0150 | DLY                 | 32.7333  | -96.9667  | 492       | NCEI    | 1945-1997        |
| TX    | DALLAS LOVE FIELD             | 55-0084 | HLY                 | 32.8470  | -96.8510  | 476       | NCEI    | 1997-2007        |
| TX    | DALLAS LOVE FIELD AIRPORT     | 56-0161 | HLY                 | 32.8470  | -96.8510  | 488       | NCEI    | 2007-2017        |
| TX    | DALLAS LOVE FLD               | 79-0088 | DLY                 | 32.8519  | -96.8556  | 440       | NCEI    | 1939-2017        |
| TX    | DALLAS REDBIRD AP             | 78-0066 | 15M                 | 32.6808  | -96.8681  | 658       | NCEI    | 2005-2017        |
| TX    | DALLAS REDBIRD AP             | 79-0029 | DLY                 | 32.6808  | -96.8681  | 659       | NCEI    | 1998-2017        |
| TX    | DALLAS WB CITY                | 99-2243 | HLY                 | 32.7847  | -96.7986  | 457       | NCEI    | 1913-1940        |
| TX    | DALLAS WBO                    | 79-0155 | DLY                 | 32.7667  | -96.7833  | 435       | NCEI    | 1913-1940        |
| TX    | DALLAS WFAA                   | 41-2247 | DLY                 | 32.7667  | -96.7833  | 479       | NCEI    | 1941-1951        |
| TX    | DANEVANG 1 W                  | 41-2266 | DLY                 | 29.0567  | -96.2319  | 69        | NCEI    | 1896-2017        |
| TX    | DARROUZETT                    | 41-2282 | DLY                 | 36.4453  | -100.3264 | 2539      | NCEI    | 1941-2017        |

| State | Station name                  | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
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| TX    | DAVILLA 2N                    | 41-2295 | DLY                 | 30.8014  | -97.2689  | 558       | NCEI    | 1943-2017        |
| TX    | DE KALB 0.1 SE                | 69-0786 | DLY                 | 33.5077  | -94.6161  | 410       | NCEI    | 2009-2011        |
| TX    | DECATUR                       | 41-2334 | HLY                 | 33.2733  | -97.5769  | 977       | NCEI    | 1945-1948        |
| TX    | DECATUR                       | 41-2334 | DLY                 | 33.2733  | -97.5769  | 978       | NCEI    | 1904-2017        |
| TX    | DECKER POWER PLANT            | 65-0100 | 15M                 | 30.3036  | -97.6143  | 562       | COA     | 1987-2017        |
| TX    | DECKER POWER PLANT            | 65-0100 | DLY                 | 30.3036  | -97.6143  | 562       | COA     | 1987-2017        |
| TX    | DEKALB                        | 41-2352 | DLY                 | 33.4797  | -94.6175  | 341       | NCEI    | 1944-2017        |
| TX    | DEL RIO                       | 41-2361 | HLY                 | 29.3842  | -100.9094 | 1064      | NCEI    | 1996-2013        |
| TX    | DEL RIO 4 SW                  | 41-2364 | DLY                 | 29.3317  | -100.9297 | 869       | NCEI    | 1923-1949        |
| TX    | DEL RIO AP                    | 41-2360 | 15M                 | 29.3783  | -100.9269 | 999       | NCEI    | 1984-1996        |
| TX    | DEL RIO AP                    | 41-2360 | HLY                 | 29.3783  | -100.9269 | 999       | NCEI    | 1951-2013        |
| TX    | DEL RIO INTERNATIONAL AIRPORT | 56-0171 | HLY                 | 29.3670  | -100.9220 | 1027      | NCEI    | 2007-2017        |
| TX    | DEL RIO INTERNATIONAL ARPT    | 55-0093 | HLY                 | 29.3784  | -100.9270 | 1027      | NCEI    | 1996-2007        |
| TX    | DEL RIO INTL AP               | 78-0031 | 15M                 | 29.3784  | -100.9270 | 999       | NCEI    | 2000-2017        |
| TX    | DEL RIO INTL AP               | 79-0100 | DLY                 | 29.3783  | -100.9269 | 1001      | NCEI    | 1951-2017        |
| TX    | DEL RIO LAUGHLIN AFB          | 79-0098 | DLY                 | 29.3667  | -100.7833 | 1073      | NCEI    | 1953-1970        |
| TX    | DEL RIO WB CITY               | 99-2357 | HLY                 | 29.3667  | -100.9000 | 961       | NCEI    | 1905-1940        |
| TX    | DEL RIO WB CITY               | 41-2357 | HLY                 | 29.3667  | -100.9000 | 961       | NCEI    | 1940-1951        |
| TX    | DEL RIO WB CITY               | 79-0099 | DLY                 | 29.3667  | -100.9000 | 961       | NCEI    | 1946-2004        |
| TX    | DELL CITY 1.4 SW              | 69-1573 | DLY                 | 31.9231  | -105.2180 | 3737      | NCEI    | 2012-2017        |
| TX    | DELL CITY 5SSW                | 41-2354 | DLY                 | 31.8769  | -105.2369 | 3796      | NCEI    | 1979-2017        |
| TX    | DENISON DAM                   | 41-2394 | HLY                 | 33.8167  | -96.5667  | 613       | NCEI    | 1940-1997        |
| TX    | DENISON DAM                   | 41-2394 | DLY                 | 33.8167  | -96.5667  | 614       | NCEI    | 1940-1997        |
| TX    | DENISON HWY 60 BRG            | 41-2397 | DLY                 | 33.8167  | -96.5333  | 551       | NCEI    | 1906-1949        |
| TX    | DENTON                        | 41-2403 | DLY                 | 33.2333  | -97.1333  | 659       | NCEI    | 1949-1965        |
| TX    | DENTON 2 SE                   | 66-2404 | 15M                 | 33.1991  | -97.1049  | 630       | NCEI    | 2013-2017        |
| TX    | DENTON 2 SE                   | 41-2404 | 15M                 | 33.1992  | -97.1050  | 630       | NCEI    | 1984-2013        |
| TX    | DENTON 2 SE                   | 41-2404 | HLY                 | 33.1992  | -97.1050  | 630       | NCEI    | 1946-2013        |
| TX    | DENTON 2 SE                   | 41-2404 | DLY                 | 33.1992  | -97.1050  | 630       | NCEI    | 1913-2017        |
| TX    | DENTON MUNI AP                | 79-0031 | DLY                 | 33.2061  | -97.1989  | 643       | NCEI    | 1998-2017        |
| TX    | DENTON MUNICIPAL              | 55-0032 | HLY                 | 33.2061  | -97.1989  | 642       | NCEI    | 1996-2007        |
| TX    | DENTON MUNICIPAL AIRPORT      | 56-0098 | HLY                 | 33.2060  | -97.1990  | 642       | NCEI    | 2007-2017        |
| TX    | DEPORT 4 NW                   | 41-2415 | HLY                 | 33.5639  | -95.3742  | 436       | NCEI    | 1944-2001        |

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| TX    | DEPORT 4 NW                    | 41-2415 | DLY                 | 33.5639  | -95.3742  | 436       | NCEI    | 1948-2001        |
| TX    | DERBY 1 S                      | 41-2417 | DLY                 | 28.7528  | -99.1353  | 489       | NCEI    | 1978-2016        |
| TX    | DEVINE                         | 41-2430 | DLY                 | 29.1500  | -98.9000  | 689       | NCEI    | 1893-1954        |
| TX    | DEVINE 0.4 S                   | 69-2146 | DLY                 | 29.1400  | -98.9053  | 650       | NCEI    | 2010-2017        |
| TX    | DEVINE 6.7 NNE                 | 69-2152 | DLY                 | 29.2376  | -98.8686  | 748       | NCEI    | 2012-2017        |
| TX    | DEWEYVILLE 5 S                 | 41-2436 | DLY                 | 30.2333  | -93.7333  | 20        | NCEI    | 1954-1986        |
| TX    | DIALVILLE 2 W                  | 41-2444 | DLY                 | 31.8614  | -95.2619  | 617       | NCEI    | 1897-2017        |
| TX    | DILLEY                         | 41-2458 | DLY                 | 28.6806  | -99.1833  | 551       | NCEI    | 1910-2008        |
| TX    | DIME BOX                       | 66-2462 | 15M                 | 30.3561  | -96.8288  | 335       | NCEI    | 2013-2017        |
| TX    | DIME BOX                       | 41-2462 | 15M                 | 30.3561  | -96.8289  | 335       | NCEI    | 1984-2013        |
| TX    | DIME BOX                       | 41-2462 | HLY                 | 30.3561  | -96.8289  | 335       | NCEI    | 1981-2013        |
| TX    | DIME BOX                       | 41-2462 | DLY                 | 30.3561  | -96.8289  | 335       | NCEI    | 1941-2017        |
| TX    | DIMMITT 2 N                    | 41-2464 | DLY                 | 34.5858  | -102.3120 | 3852      | NCEI    | 1959-2017        |
| TX    | DIMMITT 6 E                    | 41-2463 | DLY                 | 34.5500  | -102.2167 | 3812      | NCEI    | 1923-1985        |
| TX    | DITCH A 22 - BURNEY ROAD       | 60-0160 | 15M                 | 29.6295  | -95.6340  | 76        | HCFC    | 2001-2017        |
| TX    | DRIPPING SPRINGS 8 W           | 63-0169 | HLY                 | 30.1963  | -98.2227  | 1341      | LCRA    | 1999-2018        |
| TX    | DRY DEVILS RVR N COMSTOCK 22NE | 85-0424 | HLY                 | 29.8767  | -100.8967 | 1467      | HADS    | 1995-2017        |
| TX    | DRYER 1 NW                     | 41-2595 | DLY                 | 29.3833  | -97.2667  | 302       | NCEI    | 1940-1975        |
| TX    | DUBLIN 2SE                     | 41-2598 | DLY                 | 32.0628  | -98.3047  | 1467      | NCEI    | 1898-2011        |
| TX    | DUMAS                          | 41-2617 | DLY                 | 35.8731  | -101.9725 | 3655      | NCEI    | 1937-2017        |
| TX    | DUMAS 8 NE                     | 41-2619 | HLY                 | 35.9500  | -101.8833 | 3553      | NCEI    | 1947-1955        |
| TX    | DUMONT                         | 66-2621 | 15M                 | 33.8094  | -100.5169 | 2010      | NCEI    | 2013-2018        |
| TX    | DUMONT                         | 41-2621 | 15M                 | 33.8094  | -100.5169 | 2010      | NCEI    | 1984-2013        |
| TX    | DUMONT                         | 41-2621 | HLY                 | 33.8094  | -100.5169 | 2010      | NCEI    | 1971-2013        |
| TX    | DUMONT                         | 41-2621 | DLY                 | 33.8094  | -100.5169 | 2011      | NCEI    | 1971-2017        |
| TX    | DUNCAN WILSON RCH              | 41-2630 | DLY                 | 30.8000  | -100.1667 | 2119      | NCEI    | 1966-1996        |
| TX    | DUNDEE 6 NNW                   | 41-2633 | DLY                 | 33.8158  | -98.9317  | 1050      | NCEI    | 1922-2013        |
| TX    | E FORK SAN JACINTO AT FM 1485  | 60-0068 | 15M                 | 30.1453  | -95.1245  | 58        | HCFC    | 1988-2017        |
| TX    | EAGLE LAKE                     | 41-2675 | 15M                 | 29.6000  | -96.3333  | 177       | NCEI    | 1976-1986        |
| TX    | EAGLE LAKE                     | 41-2675 | HLY                 | 29.6000  | -96.3333  | 177       | NCEI    | 1965-1986        |
| TX    | EAGLE LAKE RESCH CTR           | 66-2676 | 15M                 | 29.6212  | -96.3660  | 176       | NCEI    | 2013-2018        |
| TX    | EAGLE LAKE RESCH CTR           | 41-2676 | 15M                 | 29.6211  | -96.3661  | 176       | NCEI    | 1986-2013        |
| TX    | EAGLE LAKE RESCH CTR           | 41-2676 | HLY                 | 29.6211  | -96.3661  | 176       | NCEI    | 1986-2013        |

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| TX    | EAGLE LAKE RESCH CTR           | 41-2676 | DLY                 | 29.6211  | -96.3661  | 177       | NCEI    | 2011-2017        |
| TX    | EAGLE MOUNTAIN RESERVOIR ABOVE | 85-0462 | HLY                 | 32.8775  | -97.4747  | 673       | HADS    | 1997-2017        |
| TX    | EAGLE MTN LAKE                 | 41-2677 | DLY                 | 32.8692  | -97.4497  | 761       | NCEI    | 1978-2002        |
| TX    | EAGLE MTN LAKE DAM             | 41-2678 | DLY                 | 32.8833  | -97.4667  | 679       | NCEI    | 1940-1975        |
| TX    | EAGLE PASS 3N                  | 66-2679 | 15M                 | 28.7570  | -100.4792 | 812       | NCEI    | 2013-2017        |
| TX    | EAGLE PASS 3N                  | 41-2679 | 15M                 | 28.7569  | -100.4792 | 812       | NCEI    | 1971-2013        |
| TX    | EAGLE PASS 3N                  | 41-2679 | HLY                 | 28.7569  | -100.4792 | 812       | NCEI    | 1941-2013        |
| TX    | EAGLE PASS 3N                  | 41-2679 | DLY                 | 28.7569  | -100.4792 | 814       | NCEI    | 1891-2017        |
| TX    | EAGLEMTNLAKE                   | 83-0015 | 15M                 | 32.8775  | -97.4747  | 673       | TRWD    | 2003-2016        |
| TX    | EASTERWOOD FIELD               | 55-0018 | HLY                 | 30.5880  | -96.3640  | 328       | NCEI    | 1997-2007        |
| TX    | EASTERWOOD FIELD AIRPORT       | 56-0082 | HLY                 | 30.5880  | -96.3640  | 328       | NCEI    | 2007-2017        |
| TX    | EASTLAND                       | 41-2715 | 15M                 | 32.3989  | -98.8175  | 1438      | NCEI    | 1984-2010        |
| TX    | EASTLAND                       | 41-2715 | HLY                 | 32.3989  | -98.8175  | 1438      | NCEI    | 1961-2010        |
| TX    | EASTLAND                       | 41-2715 | DLY                 | 32.3989  | -98.8175  | 1437      | NCEI    | 1893-2010        |
| TX    | EDEN                           | 41-2741 | DLY                 | 31.2208  | -99.8494  | 2051      | NCEI    | 1923-2017        |
| TX    | EDEN 2                         | 41-2744 | 15M                 | 31.2167  | -99.8500  | 2070      | NCEI    | 1972-1987        |
| TX    | EDEN 2                         | 41-2744 | HLY                 | 31.2167  | -99.8500  | 2070      | NCEI    | 1940-1987        |
| TX    | EDEN 3 S                       | 63-0032 | 15M                 | 31.1708  | -99.8479  | 2051      | LCRA    | 2007-2018        |
| TX    | EDEN 3 S                       | 63-0032 | HLY                 | 31.1708  | -99.8479  | 2051      | LCRA    | 2007-2018        |
| TX    | EDNA 3 SW                      | 41-2769 | DLY                 | 28.9500  | -96.6833  | 69        | NCEI    | 1909-1968        |
| TX    | EDNA HWY 59 BRG                | 41-2768 | DLY                 | 28.9667  | -96.6833  | 69        | NCEI    | 1968-1995        |
| TX    | EDOM                           | 41-2772 | DLY                 | 32.3656  | -95.6089  | 509       | NCEI    | 1940-2013        |
| TX    | EL CAMPO                       | 41-2786 | DLY                 | 29.2000  | -96.2653  | 112       | NCEI    | 1941-2017        |
| TX    | EL CAMPO 1.0 NW                | 69-2734 | DLY                 | 29.2061  | -96.2890  | 105       | NCEI    | 2008-2017        |
| TX    | EL INDIO 7ESE                  | 41-2824 | DLY                 | 28.4747  | -100.2147 | 807       | NCEI    | 1978-2017        |
| TX    | EL PASO                        | 99-2870 | HLY                 | 31.7587  | -106.4843 | 3711      | NCEI    | 1881-1939        |
| TX    | EL PASO                        | 52-2799 | DLY                 | 31.7586  | -106.4889 | 3717      | FORTS   | 1850-1892        |
| TX    | EL PASO                        | 79-0125 | DLY                 | 31.7587  | -106.4843 | 3773      | NCEI    | 1921-1942        |
| TX    | EL PASO (CITY)                 | 41-2870 | HLY                 | 31.7587  | -106.4843 | 3975      | NCEI    | 1942-1942        |
| TX    | EL PASO AP                     | 41-2797 | HLY                 | 31.8111  | -106.3758 | 3918      | NCEI    | 1942-2013        |
| TX    | EL PASO INTERNATIONAL AIRPORT  | 56-0182 | HLY                 | 31.8110  | -106.3760 | 3916      | NCEI    | 2007-2017        |
| TX    | EL PASO INTL AP                | 79-0115 | DLY                 | 31.8111  | -106.3758 | 3917      | NCEI    | 1942-2017        |
| TX    | EL PASO UTEP                   | 75-0009 | HLY                 | 31.7683  | -106.5013 | 3856      | TCEQ    | 1998-2017        |

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| TX    | ELAM CREEK - LAKE JUNE RD     | 81-0022 | 15M                 | 32.7344  | -96.6950  | 460       | COD     | 1991-2016        |
| TX    | ELDORADO                      | 41-2809 | DLY                 | 30.8694  | -100.5994 | 2441      | NCEI    | 2003-2017        |
| TX    | ELDORADO 1 N                  | 41-2811 | HLY                 | 30.8833  | -100.6000 | 2419      | NCEI    | 1940-1995        |
| TX    | ELECTRA                       | 41-2818 | DLY                 | 34.0308  | -98.9117  | 1217      | NCEI    | 1945-2005        |
| TX    | ELECTRA 0.1 SE                | 69-2903 | DLY                 | 34.0295  | -98.9175  | 1230      | NCEI    | 2008-2013        |
| TX    | ELGIN                         | 41-2820 | DLY                 | 30.3492  | -97.3683  | 581       | NCEI    | 1962-2017        |
| TX    | EMORY                         | 41-2902 | DLY                 | 32.8711  | -95.7797  | 486       | NCEI    | 1897-2012        |
| TX    | ENCINAL                       | 41-2906 | DLY                 | 27.9775  | -99.3847  | 545       | NCEI    | 1907-2017        |
| TX    | ENNIS                         | 41-2925 | DLY                 | 32.3333  | -96.6333  | 525       | NCEI    | 1940-1991        |
| TX    | ENNIS 0.7 SSW                 | 69-1250 | DLY                 | 32.3282  | -96.6315  | 535       | NCEI    | 2013-2017        |
| TX    | EVADALE                       | 41-3000 | DLY                 | 30.3333  | -94.0833  | 33        | NCEI    | 1944-2004        |
| TX    | EVANT 1SSW                    | 41-3005 | 15M                 | 31.4625  | -98.1619  | 1245      | NCEI    | 1977-2010        |
| TX    | EVANT 1SSW                    | 41-3005 | HLY                 | 31.4625  | -98.1619  | 1245      | NCEI    | 1943-2010        |
| TX    | EVANT 1SSW                    | 41-3005 | DLY                 | 31.4625  | -98.1619  | 1247      | NCEI    | 1941-2009        |
| TX    | EVANT HIGH SCHOOL             | 85-0470 | HLY                 | 31.4739  | -98.1517  | 1263      | HADS    | 2007-2017        |
| TX    | F.M.1406 - NORTH FORK TAYLORS | 82-5500 | 15M                 | 29.9478  | -94.4003  | 31        | DD6     | 1991-2017        |
| TX    | FABENS                        | 41-3033 | HLY                 | 31.5000  | -106.1500 | 3612      | NCEI    | 1953-1977        |
| TX    | FABENS                        | 41-3033 | DLY                 | 31.5000  | -106.1500 | 3612      | NCEI    | 1939-1977        |
| TX    | FAIR OAKS RANCH 2.2 NNW       | 69-1841 | DLY                 | 29.7667  | -98.6465  | 1339      | NCEI    | 2007-2017        |
| TX    | FAIR OAKS RCH                 | 41-3038 | DLY                 | 29.7500  | -98.6333  | 1302      | NCEI    | 1946-1973        |
| TX    | FAIRFIELD 3W                  | 41-3047 | DLY                 | 31.7322  | -96.2078  | 433       | NCEI    | 1941-2007        |
| TX    | FALCON DAM                    | 41-3060 | DLY                 | 26.5581  | -99.1372  | 322       | NCEI    | 1962-2017        |
| TX    | FALFURRIAS                    | 41-3063 | DLY                 | 27.1353  | -98.1203  | 138       | NCEI    | 1907-2017        |
| TX    | FALLS CITY 7 WSW              | 41-3065 | DLY                 | 28.9614  | -98.1103  | 344       | NCEI    | 1946-2017        |
| TX    | FARMERSVILLE                  | 41-3080 | DLY                 | 33.1414  | -96.2933  | 627       | NCEI    | 1946-2016        |
| TX    | FAWCETT RCH                   | 41-3103 | HLY                 | 29.8667  | -100.9000 | 1503      | NCEI    | 1946-1949        |
| TX    | FEDOR                         | 41-3112 | DLY                 | 30.3164  | -97.0545  | 482       | NCEI    | 1963-2017        |
| TX    | FERRIS                        | 66-3133 | 15M                 | 32.5338  | -96.6608  | 470       | NCEI    | 2013-2017        |
| TX    | FERRIS                        | 41-3133 | 15M                 | 32.5339  | -96.6608  | 470       | NCEI    | 1984-2013        |
| TX    | FERRIS                        | 41-3133 | HLY                 | 32.5339  | -96.6608  | 470       | NCEI    | 1946-2013        |
| TX    | FERRIS                        | 41-3133 | DLY                 | 32.5339  | -96.6608  | 469       | NCEI    | 1940-2017        |
| TX    | FIFE                          | 41-3142 | DLY                 | 31.3833  | -99.3667  | 1391      | NCEI    | 1941-1975        |
| TX    | FISCHERS STORE                | 66-3156 | 15M                 | 29.9745  | -98.2670  | 1180      | NCEI    | 2013-2017        |

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| TX    | FISCHERS STORE               | 41-3156 | 15M                 | 29.9756  | -98.2647  | 1160      | NCEI    | 1995-2013        |
| TX    | FISCHERS STORE               | 41-3156 | HLY                 | 29.9756  | -98.2647  | 1160      | NCEI    | 1995-2013        |
| TX    | FISCHERS STORE               | 41-3156 | DLY                 | 29.9756  | -98.2647  | 1161      | NCEI    | 1887-2017        |
| TX    | FLAT                         | 41-3171 | 15M                 | 31.3089  | -97.6306  | 850       | NCEI    | 1984-2008        |
| TX    | FLAT                         | 41-3171 | HLY                 | 31.3089  | -97.6306  | 850       | NCEI    | 1950-2008        |
| TX    | FLAT                         | 41-3171 | DLY                 | 31.3089  | -97.6306  | 850       | NCEI    | 1951-2007        |
| TX    | FLATONIA 4SE                 | 41-3183 | DLY                 | 29.6339  | -97.0644  | 469       | NCEI    | 1908-2017        |
| TX    | FLINT                        | 41-3192 | DLY                 | 32.2000  | -95.3500  | 479       | NCEI    | 1910-1949        |
| TX    | FLOMOT 4 NE                  | 41-3196 | DLY                 | 34.2675  | -100.9336 | 2359      | NCEI    | 1946-2017        |
| TX    | FLORENCE                     | 41-3199 | DLY                 | 30.8392  | -97.7925  | 988       | NCEI    | 1963-2017        |
| TX    | FLORESVILLE                  | 41-3201 | DLY                 | 29.1333  | -98.1628  | 400       | NCEI    | 1916-2017        |
| TX    | FLOUR BLUFF 1.6 SW           | 69-2225 | DLY                 | 27.6613  | -97.3031  | 16        | NCEI    | 2007-2017        |
| TX    | FLOYDADA                     | 41-3214 | DLY                 | 33.9850  | -101.3339 | 3222      | NCEI    | 1911-2017        |
| TX    | FLOYDADA 9 SE                | 41-3215 | DLY                 | 33.8761  | -101.2464 | 3130      | NCEI    | 1947-2017        |
| TX    | FOLLETT                      | 41-3225 | DLY                 | 36.4328  | -100.1369 | 2583      | NCEI    | 1930-2017        |
| TX    | FORESTBURG 5 S               | 41-3247 | DLY                 | 33.4773  | -97.5598  | 1109      | NCEI    | 1893-2017        |
| TX    | FORSAN                       | 41-3253 | DLY                 | 32.1117  | -101.3642 | 2749      | NCEI    | 1949-2008        |
| TX    | FORT BROWN                   | 99-1137 | DLY                 | 25.9025  | -97.4994  | 35        | NCEI    | 1849-1877        |
| TX    | FORT CLARK                   | 99-3260 | DLY                 | 29.3000  | -100.4500 | 1102      | NCEI    | 1852-1900        |
| TX    | FORT ELLIOTT                 | 52-5987 | DLY                 | 35.5103  | -100.4417 | 2630      | FORTS   | 1879-1890        |
| TX    | FORT GRIFFON                 | 52-0248 | DLY                 | 32.9328  | -99.2292  | 1211      | FORTS   | 1877-1882        |
| TX    | FORT GRIFFON                 | 52-3265 | DLY                 | 32.9272  | -99.2328  | 1284      | FORTS   | 1869-1880        |
| TX    | FORT MCKAVETT                | 52-3257 | DLY                 | 30.8269  | -100.1075 | 2172      | FORTS   | 1877-1883        |
| TX    | FORT MCKAVETT                | 41-3270 | DLY                 | 30.9303  | -100.1125 | 2215      | NCEI    | 1852-1880        |
| TX    | FORT RINGGOLD                | 52-7623 | DLY                 | 26.3761  | -98.8078  | 166       | FORTS   | 1849-1893        |
| TX    | FORT STOCKTON                | 52-3280 | DLY                 | 30.8881  | -102.8747 | 2952      | FORTS   | 1859-1886        |
| TX    | FORT STOCKTON-PECOS CO APT   | 55-0110 | HLY                 | 30.9119  | -102.9167 | 3010      | NCEI    | 1996-2007        |
| TX    | FORT STOCKTON-PECOS CO APT   | 56-0189 | HLY                 | 30.9119  | -102.9167 | 3010      | NCEI    | 2007-2017        |
| TX    | FORT WORTH 12.5 NW           | 69-2454 | DLY                 | 32.8746  | -97.4433  | 686       | NCEI    | 2011-2017        |
| TX    | FORT WORTH NAVAL AIR STATION | 64-0363 | DLY                 | 32.7670  | -97.4500  | 608       | NCEI    | 1971-2016        |
| TX    | FOWLERTON                    | 41-3299 | DLY                 | 28.5033  | -98.8392  | 299       | NCEI    | 1913-2013        |
| TX    | FRANKLIN                     | 41-3321 | DLY                 | 31.0328  | -96.4889  | 466       | NCEI    | 1962-2013        |
| TX    | FREDERICKSBURG               | 41-3329 | HLY                 | 30.2392  | -98.9089  | 1685      | NCEI    | 1940-1975        |



| State | Station name          | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|-----------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | FREDERICKSBURG        | 41-3329 | DLY                 | 30.2392  | -98.9089  | 1686      | NCEI    | 1896-2017        |
| TX    | FREDERICKSBURG 10 SSE | 63-0154 | 15M                 | 30.1429  | -98.8069  | 1795      | LCRA    | 2005-2018        |
| TX    | FREDERICKSBURG 10 SSE | 63-0154 | HLY                 | 30.1429  | -98.8069  | 1795      | LCRA    | 2001-2018        |
| TX    | FREEPORT              | 99-3340 | DLY                 | 28.9844  | -95.3808  | 7         | NCEI    | 1920-1930        |
| TX    | FREEPORT 2 NW         | 41-3340 | DLY                 | 28.9844  | -95.3808  | 7         | NCEI    | 1931-2017        |
| TX    | FREER                 | 41-3341 | DLY                 | 27.8722  | -98.6175  | 561       | NCEI    | 1947-2017        |
| TX    | FRIONA                | 41-3368 | DLY                 | 34.6400  | -102.7231 | 4009      | NCEI    | 1927-2017        |
| TX    | FRISCO                | 66-3370 | 15M                 | 33.1924  | -96.7930  | 747       | NCEI    | 2013-2017        |
| TX    | FRISCO                | 41-3370 | HLY                 | 33.1925  | -96.7931  | 747       | NCEI    | 1966-2013        |
| TX    | FRISCO                | 41-3370 | DLY                 | 33.1925  | -96.7931  | 748       | NCEI    | 1966-2017        |
| TX    | FROST                 | 41-3379 | DLY                 | 32.0833  | -96.8000  | 522       | NCEI    | 1946-1985        |
| TX    | FROST 1.3 WNW         | 69-2254 | DLY                 | 32.0838  | -96.8293  | 509       | NCEI    | 2007-2016        |
| TX    | FT DAVIS              | 41-3262 | DLY                 | 30.5997  | -103.8869 | 4865      | NCEI    | 1902-2017        |
| TX    | FT GRIFFIN            | 41-3265 | DLY                 | 32.9236  | -99.2225  | 1227      | NCEI    | 1989-2017        |
| TX    | FT HANCOCK 8SSE       | 41-3266 | DLY                 | 31.1853  | -105.7414 | 3502      | NCEI    | 1966-2017        |
| TX    | FT HOOD               | 79-0021 | DLY                 | 31.1333  | -97.7167  | 925       | NCEI    | 1961-2014        |
| TX    | FT MC INTOSH          | 41-3267 | HLY                 | 27.5000  | -99.5167  | 459       | NCEI    | 1940-1943        |
| TX    | FT MC INTOSH          | 41-3267 | DLY                 | 27.5000  | -99.5167  | 459       | NCEI    | 1897-1931        |
| TX    | FT MCKAVETT           | 41-3257 | DLY                 | 30.8275  | -100.1103 | 2168      | NCEI    | 1877-2017        |
| TX    | FT MCKAVETT 7 N       | 66-3270 | 15M                 | 30.9302  | -100.1125 | 2215      | NCEI    | 2013-2017        |
| TX    | FT MCKAVETT 7 N       | 41-3270 | 15M                 | 30.9303  | -100.1125 | 2215      | NCEI    | 1971-2013        |
| TX    | FT MCKAVETT 7 N       | 41-3270 | HLY                 | 30.9303  | -100.1125 | 2215      | NCEI    | 1961-2013        |
| TX    | FT STOCKTON           | 41-3280 | HLY                 | 30.9072  | -102.9153 | 3038      | NCEI    | 1955-1960        |
| TX    | FT STOCKTON           | 41-3280 | DLY                 | 30.9072  | -102.9153 | 3038      | NCEI    | 1940-2017        |
| TX    | FT STOCKTON 1         | 41-3277 | DLY                 | 30.8833  | -102.8833 | 3051      | NCEI    | 1897-1948        |
| TX    | FT STOCKTON 35 SSW    | 41-3278 | HLY                 | 30.3833  | -103.0333 | 4393      | NCEI    | 1958-1987        |
| TX    | FT STOCKTON PECOS AP  | 79-0126 | DLY                 | 30.9119  | -102.9167 | 3009      | NCEI    | 1998-2017        |
| TX    | FT WORTH BOTANIC GDN  | 41-3290 | DLY                 | 32.7342  | -97.3678  | 591       | NCEI    | 2009-2017        |
| TX    | FT WORTH MEACHAM      | 99-3284 | HLY                 | 32.8192  | -97.3614  | 687       | NCEI    | 1940-1942        |
| TX    | FT WORTH MEACHAM FLD  | 78-0038 | 15M                 | 32.8192  | -97.3614  | 687       | NCEI    | 2005-2017        |
| TX    | FT WORTH MEACHAM FLD  | 41-3284 | 15M                 | 32.8192  | -97.3614  | 687       | NCEI    | 1971-2001        |
| TX    | FT WORTH MEACHAM FLD  | 41-3284 | HLY                 | 32.8192  | -97.3614  | 687       | NCEI    | 1940-2013        |
| TX    | FT WORTH MEACHAM FLD  | 79-0089 | DLY                 | 32.8192  | -97.3614  | 686       | NCEI    | 1946-2017        |

| State | Station name                   | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | FT WORTH MEACHAM INTL ARPT     | 55-0085 | HLY                 | 32.8190  | -97.3610  | 706       | NCEI    | 1997-2007        |
| TX    | FT WORTH MEACHAM INTL ARPT     | 56-0162 | HLY                 | 32.8190  | -97.3610  | 706       | NCEI    | 2007-2017        |
| TX    | FT WORTH NAS                   | 79-0077 | DLY                 | 32.7667  | -97.4500  | 607       | NCEI    | 1949-2017        |
| TX    | FT WORTH VICKERY BLV           | 41-3286 | DLY                 | 32.7333  | -97.3333  | 659       | NCEI    | 1953-1966        |
| TX    | FT WORTH WB AP                 | 41-3283 | HLY                 | 32.8333  | -97.0500  | 574       | NCEI    | 1940-1984        |
| TX    | FT WORTH WB CITY               | 99-0001 | HLY                 | 32.7493  | -97.3334  | 624       | NCEI    | 1899-1940        |
| TX    | FT WORTH WSFO                  | 66-3285 | 15M                 | 32.8338  | -97.2975  | 644       | NCEI    | 2013-2017        |
| TX    | FT WORTH WSFO                  | 41-3285 | 15M                 | 32.8339  | -97.2975  | 644       | NCEI    | 1971-2013        |
| TX    | FT WORTH WSFO                  | 41-3285 | HLY                 | 32.8339  | -97.2975  | 644       | NCEI    | 1948-2013        |
| TX    | FT WORTH WSFO                  | 41-3285 | DLY                 | 32.8339  | -97.2975  | 643       | NCEI    | 1948-2017        |
| TX    | FUNK RCH                       | 41-3401 | DLY                 | 31.4775  | -100.7978 | 2070      | NCEI    | 1948-2004        |
| TX    | G BUSH INTERCONTINENTAL AP/HO  | 64-0236 | HLY                 | 29.9800  | -95.3600  | 95        | NCEI    | 1972-2016        |
| TX    | G BUSH INTERCONTINENTAL AP/HOU | 56-0124 | HLY                 | 29.9800  | -95.3600  | 105       | NCEI    | 2007-2017        |
| TX    | GAGEBY 3 WNW                   | 66-3410 | 15M                 | 35.6317  | -100.3923 | 2778      | NCEI    | 2013-2017        |
| TX    | GAGEBY 3 WNW                   | 41-3410 | 15M                 | 35.6317  | -100.3922 | 2778      | NCEI    | 1971-2013        |
| TX    | GAGEBY 3 WNW                   | 41-3410 | HLY                 | 35.6317  | -100.3922 | 2778      | NCEI    | 1941-2013        |
| TX    | GAIL                           | 41-3411 | DLY                 | 32.7744  | -101.4539 | 2530      | NCEI    | 1897-2017        |
| TX    | GAINESVILLE                    | 66-3415 | 15M                 | 33.6358  | -97.1447  | 780       | NCEI    | 2014-2017        |
| TX    | GAINESVILLE                    | 41-3415 | 15M                 | 33.6358  | -97.1447  | 780       | NCEI    | 1971-2013        |
| TX    | GAINESVILLE                    | 41-3415 | HLY                 | 33.6358  | -97.1447  | 780       | NCEI    | 1941-2013        |
| TX    | GAINESVILLE                    | 41-3415 | DLY                 | 33.6358  | -97.1447  | 781       | NCEI    | 1897-1987        |
| TX    | GALVESTON                      | 99-3430 | HLY                 | 29.3048  | -94.7934  | 4         | NCEI    | 1892-1948        |
| TX    | GALVESTON                      | 41-3430 | HLY                 | 29.3048  | -94.7934  | 10        | NCEI    | 1940-2011        |
| TX    | GALVESTON                      | 41-3431 | HLY                 | 29.2733  | -94.8592  | 5         | NCEI    | 1948-2013        |
| TX    | GALVESTON                      | 52-3430 | DLY                 | 29.3072  | -94.7917  | 6         | FORTS   | 1865-1892        |
| TX    | GALVESTON                      | 79-0055 | DLY                 | 29.3048  | -94.7934  | 7         | NCEI    | 1897-2011        |
| TX    | GALVESTON SCHOLLES FLD         | 79-0047 | DLY                 | 29.2733  | -94.8592  | 7         | NCEI    | 1946-2017        |
| TX    | GARDEN CITY                    | 41-3445 | DLY                 | 31.8667  | -101.4814 | 2654      | NCEI    | 1912-2013        |
| TX    | GARDEN CITY 16 E               | 41-3446 | HLY                 | 31.8333  | -101.2000 | 2461      | NCEI    | 1949-1973        |
| TX    | GARLINGTON RCH                 | 41-3462 | HLY                 | 31.9167  | -100.8833 | 2621      | NCEI    | 1943-1949        |
| TX    | GARNERS BYU AT BELTWAY 8       | 60-0116 | 15M                 | 29.9344  | -95.2341  | 38        | HCFC    | 1986-2017        |
| TX    | GATESVILLE                     | 41-3485 | DLY                 | 31.4144  | -97.7019  | 827       | NCEI    | 1900-2017        |
| TX    | GATESVILLE 12.0 SE             | 69-1150 | DLY                 | 31.3371  | -97.5704  | 764       | NCEI    | 2011-2017        |

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|-------|------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | GEORGE WEST 2 SSW      | 41-3508 | DLY                 | 28.3064  | -98.1222  | 226       | NCEI    | 1916-2017        |
| TX    | GEORGETOWN             | 41-3506 | DLY                 | 30.6333  | -97.6833  | 748       | NCEI    | 1896-1983        |
| TX    | GEORGETOWN LAKE        | 66-3507 | 15M                 | 30.6763  | -97.7208  | 874       | NCEI    | 2013-2017        |
| TX    | GEORGETOWN LAKE        | 41-3507 | 15M                 | 30.6764  | -97.7208  | 874       | NCEI    | 1984-2013        |
| TX    | GEORGETOWN LAKE        | 41-3507 | HLY                 | 30.6764  | -97.7208  | 874       | NCEI    | 1981-2013        |
| TX    | GEORGETOWN LAKE        | 41-3507 | DLY                 | 30.6836  | -97.7172  | 840       | NCEI    | 1981-2017        |
| TX    | GIDDINGS 5E            | 41-3525 | DLY                 | 30.1872  | -96.8594  | 436       | NCEI    | 1940-2017        |
| TX    | GILLELAND CRK NR MANOR | 63-0203 | 15M                 | 30.2978  | -97.5681  | 460       | LCRA    | 2005-2018        |
| TX    | GILMER                 | 76-0058 | HLY                 | 32.7017  | -94.9447  | 500       | RAWS    | 2002-2015        |
| TX    | GILMER (RAWS)          | 85-0512 | HLY                 | 32.7017  | -94.9447  | 390       | HADS    | 2002-2017        |
| TX    | GILMER 4 WNW           | 41-3546 | 15M                 | 32.7464  | -95.0497  | 390       | NCEI    | 1979-2012        |
| TX    | GILMER 4 WNW           | 41-3546 | HLY                 | 32.7464  | -95.0497  | 390       | NCEI    | 1941-2013        |
| TX    | GILMER 4 WNW           | 41-3546 | DLY                 | 32.7464  | -95.0497  | 390       | NCEI    | 1929-2012        |
| TX    | GLADEWATER 3 WSW       | 41-3565 | DLY                 | 32.5269  | -94.9600  | 243       | NCEI    | 1946-1976        |
| TX    | GLEN ROSE 2 W          | 41-3591 | DLY                 | 32.2342  | -97.7853  | 656       | NCEI    | 1963-2000        |
| TX    | GOLD                   | 41-3605 | DLY                 | 30.3481  | -98.6861  | 1640      | NCEI    | 1948-2017        |
| TX    | GOLDTHWAITE 1 WSW      | 41-3614 | DLY                 | 31.4403  | -98.5903  | 1506      | NCEI    | 1923-2017        |
| TX    | GOLDTHWAITE 10 ENE     | 63-0249 | HLY                 | 31.4744  | -98.4118  | 1424      | LCRA    | 2006-2018        |
| TX    | GOLIAD                 | 41-3618 | DLY                 | 28.6617  | -97.3850  | 141       | NCEI    | 1912-2014        |
| TX    | GOLIAD 1 E             | 41-3620 | DLY                 | 28.6703  | -97.3778  | 171       | NCEI    | 1949-2005        |
| TX    | GONZALES 1N            | 99-3622 | DLY                 | 29.5175  | -97.4597  | 381       | NCEI    | 1904-1939        |
| TX    | GONZALES 1N            | 41-3622 | DLY                 | 29.5175  | -97.4597  | 381       | NCEI    | 1915-2017        |
| TX    | GOOSE CREEK            | 41-3640 | DLY                 | 29.7333  | -94.9667  | 23        | NCEI    | 1921-1956        |
| TX    | GORDON 1SW             | 41-3639 | DLY                 | 32.5408  | -98.3814  | 1020      | NCEI    | 1991-2013        |
| TX    | GORDONVILLE            | 41-3642 | 15M                 | 33.7953  | -96.8531  | 722       | NCEI    | 1977-2013        |
| TX    | GORDONVILLE            | 41-3642 | HLY                 | 33.7953  | -96.8531  | 722       | NCEI    | 1942-2013        |
| TX    | GORDONVILLE            | 41-3642 | DLY                 | 33.7953  | -96.8531  | 722       | NCEI    | 1948-2013        |
| TX    | GORDONVILLE 3.3 NNW    | 69-1377 | DLY                 | 33.8364  | -96.8817  | 689       | NCEI    | 2013-2017        |
| TX    | GORMAN 2 NNE           | 41-3646 | HLY                 | 32.2422  | -98.6631  | 1380      | NCEI    | 1951-1999        |
| TX    | GORMAN 2 NNE           | 41-3646 | DLY                 | 32.2422  | -98.6631  | 1381      | NCEI    | 1951-1999        |
| TX    | GRAHAM                 | 41-3668 | DLY                 | 33.1203  | -98.5669  | 1079      | NCEI    | 1897-2015        |
| TX    | GRANDFALLS 3SSE        | 41-3680 | DLY                 | 31.3028  | -102.8222 | 2425      | NCEI    | 1909-2015        |
| TX    | GRANGER                | 41-3685 | DLY                 | 30.7150  | -97.4483  | 571       | NCEI    | 1968-2012        |

| State | Station name                   | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | GRANGER DAM                    | 66-3686 | 15M                 | 30.7188  | -97.3211  | 555       | NCEI    | 2013-2017        |
| TX    | GRANGER DAM                    | 41-3686 | 15M                 | 30.7189  | -97.3211  | 555       | NCEI    | 1984-2013        |
| TX    | GRANGER DAM                    | 41-3686 | HLY                 | 30.7189  | -97.3211  | 555       | NCEI    | 1980-2013        |
| TX    | GRANGER DAM                    | 41-3686 | DLY                 | 30.7189  | -97.3211  | 554       | NCEI    | 1980-2017        |
| TX    | GRAPELAND                      | 41-3689 | DLY                 | 31.4833  | -95.4833  | 479       | NCEI    | 1935-1975        |
| TX    | GRAPEVINE DAM                  | 66-3691 | 15M                 | 32.9506  | -97.0553  | 585       | NCEI    | 2013-2017        |
| TX    | GRAPEVINE DAM                  | 41-3691 | 15M                 | 32.9506  | -97.0553  | 585       | NCEI    | 1971-2013        |
| TX    | GRAPEVINE DAM                  | 41-3691 | HLY                 | 32.9506  | -97.0553  | 585       | NCEI    | 1949-2013        |
| TX    | GRAPEVINE DAM                  | 41-3691 | DLY                 | 32.9506  | -97.0553  | 584       | NCEI    | 1897-2017        |
| TX    | GREENS BYU AT MT HOUSTON PKWY  | 60-0104 | 15M                 | 29.8920  | -95.2380  | 24        | HCFC    | 1992-2017        |
| TX    | GREENVILLE KGV L RADIO         | 41-3734 | DLY                 | 33.1678  | -96.0983  | 545       | NCEI    | 1900-2017        |
| TX    | GROESBECK                      | 41-3770 | DLY                 | 31.5167  | -96.5333  | 469       | NCEI    | 1963-1975        |
| TX    | GROESBECK 2                    | 41-3771 | 15M                 | 31.5253  | -96.5306  | 465       | NCEI    | 1977-2013        |
| TX    | GROESBECK 2                    | 41-3771 | HLY                 | 31.5253  | -96.5306  | 465       | NCEI    | 1977-2013        |
| TX    | GROVETON                       | 41-3778 | DLY                 | 31.0611  | -95.1344  | 351       | NCEI    | 1923-2004        |
| TX    | GRUVER                         | 41-3787 | DLY                 | 36.2631  | -101.4050 | 3169      | NCEI    | 1941-2017        |
| TX    | GUADALUPE BOWL RAW S           | 85-0504 | HLY                 | 31.9250  | -104.8253 | 7874      | HADS    | 1999-2017        |
| TX    | GUADALUPE MOUNTAINS NATIONAL P | 54-0213 | DLY                 | 31.9069  | -104.8050 | 5594      | NADP    | 1984-2015        |
| TX    | GUADALUPE RIVER AT VICTORIA    | 85-0859 | HLY                 | 28.7928  | -97.0128  | 79        | HADS    | 1995-2017        |
| TX    | GUADALUPE PEAK                 | 76-0061 | HLY                 | 31.9250  | -104.8253 | 7755      | RAWS    | 1985-2015        |
| TX    | GUM GULLY AT DIAMOND HD BLVD   | 60-0122 | 15M                 | 29.9110  | -95.0904  | 15        | HCFC    | 1986-2017        |
| TX    | GUNTER 5 S                     | 41-3822 | DLY                 | 33.3750  | -96.7611  | 735       | NCEI    | 1948-2000        |
| TX    | GUTHRIE                        | 41-3828 | DLY                 | 33.6267  | -100.3369 | 1759      | NCEI    | 1947-2017        |
| TX    | HAGANSPORT                     | 41-3846 | DLY                 | 33.3361  | -95.2486  | 361       | NCEI    | 1909-2009        |
| TX    | HALL RCH                       | 41-3871 | HLY                 | 30.1333  | -99.6000  | 2280      | NCEI    | 1940-1976        |
| TX    | HALLETTSVILLE 2 N              | 41-3873 | DLY                 | 29.4706  | -96.9397  | 276       | NCEI    | 1893-2017        |
| TX    | HALLS BYU AT AIRLINE DR        | 60-0115 | 15M                 | 29.8927  | -95.3969  | 75        | HCFC    | 1986-2017        |
| TX    | HAMILTON 2E                    | 41-3884 | DLY                 | 31.7044  | -98.0853  | 1125      | NCEI    | 1915-2016        |
| TX    | HAMLIN 0.6 WSW                 | 69-1803 | DLY                 | 32.8855  | -100.1421 | 1732      | NCEI    | 2013-2017        |
| TX    | HAMLIN 1SW                     | 41-3890 | DLY                 | 32.8694  | -100.1211 | 1719      | NCEI    | 1910-2014        |
| TX    | HARLETON                       | 41-3941 | DLY                 | 32.6761  | -94.5781  | 344       | NCEI    | 1949-2013        |
| TX    | HARLETON 2.5 S                 | 69-1687 | DLY                 | 32.6407  | -94.5707  | 374       | NCEI    | 2011-2013        |
| TX    | HARLINGEN                      | 41-3943 | DLY                 | 26.2028  | -97.6728  | 39        | NCEI    | 1911-2017        |

| State | Station name                  | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|-------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | HARLINGEN RIO GRANDE AP       | 79-0034 | DLY                 | 26.2281  | -97.6542  | 33        | NCEI    | 1952-2017        |
| TX    | HARPER 1W                     | 41-3954 | DLY                 | 30.3011  | -99.2681  | 2060      | NCEI    | 1909-2017        |
| TX    | HARRY STONE PARK - MILLMAR DR | 81-0016 | 15M                 | 32.8261  | -96.6753  | 528       | COD     | 1991-2016        |
| TX    | HART                          | 41-3972 | DLY                 | 34.3697  | -102.1175 | 3665      | NCEI    | 1947-2017        |
| TX    | HARTLEY                       | 41-3979 | DLY                 | 35.8783  | -102.3850 | 3888      | NCEI    | 2005-2017        |
| TX    | HARTLEY 4 ESE                 | 41-3981 | DLY                 | 35.8656  | -102.3319 | 3904      | NCEI    | 1893-2014        |
| TX    | HASKELL                       | 41-3992 | DLY                 | 33.1497  | -99.7350  | 1578      | NCEI    | 1893-2017        |
| TX    | HAWKINS                       | 41-4020 | DLY                 | 32.5781  | -95.2033  | 335       | NCEI    | 1924-2017        |
| TX    | HAWLEY 3 NE                   | 41-4026 | DLY                 | 32.6500  | -99.7333  | 1650      | NCEI    | 1973-1994        |
| TX    | HEARNE MUNICIPAL AIRPORT      | 55-0149 | HLY                 | 30.8720  | -96.6220  | 285       | NCEI    | 2003-2007        |
| TX    | HEARNE MUNICIPAL AIRPORT      | 56-0235 | HLY                 | 30.8719  | -96.6222  | 285       | NCEI    | 2007-2017        |
| TX    | HEARNE MUNICIPAL AIRPORT      | 64-0042 | HLY                 | 30.8720  | -96.6220  | 285       | NCEI    | 2006-2016        |
| TX    | HEBBRONVILLE                  | 41-4058 | DLY                 | 27.3194  | -98.6775  | 581       | NCEI    | 1905-2017        |
| TX    | HEMPHILL                      | 41-4076 | DLY                 | 31.3500  | -93.8333  | 299       | NCEI    | 1967-1992        |
| TX    | HEMPHILL 6 NE                 | 41-4077 | DLY                 | 31.4072  | -93.7842  | 180       | NCEI    | 1992-2011        |
| TX    | HEMPSTEAD                     | 41-4080 | DLY                 | 30.1000  | -96.0833  | 253       | NCEI    | 1903-1978        |
| TX    | HENDERSON                     | 41-4081 | DLY                 | 32.1808  | -94.7964  | 420       | NCEI    | 1908-2017        |
| TX    | HENLY                         | 41-4088 | DLY                 | 30.2000  | -98.2167  | 1270      | NCEI    | 1948-1965        |
| TX    | HENRIETTA                     | 41-4093 | DLY                 | 33.8128  | -98.2003  | 932       | NCEI    | 1897-2006        |
| TX    | HEREFORD                      | 41-4098 | 15M                 | 34.8172  | -102.4003 | 3820      | NCEI    | 1971-2013        |
| TX    | HEREFORD                      | 41-4098 | HLY                 | 34.8172  | -102.4003 | 3820      | NCEI    | 1955-2013        |
| TX    | HEREFORD                      | 41-4098 | DLY                 | 34.8172  | -102.4003 | 3819      | NCEI    | 1905-2017        |
| TX    | HEREFORD 1 SE                 | 41-4100 | HLY                 | 34.8167  | -102.4000 | 3822      | NCEI    | 1941-1955        |
| TX    | HEWITT                        | 99-4122 | DLY                 | 31.4667  | -97.2000  | 659       | NCEI    | 1894-1899        |
| TX    | HEWITT                        | 41-4122 | DLY                 | 31.4667  | -97.2000  | 659       | NCEI    | 1879-2003        |
| TX    | HICO                          | 41-4137 | 15M                 | 31.9844  | -98.0311  | 1043      | NCEI    | 1977-2009        |
| TX    | HICO                          | 41-4137 | HLY                 | 31.9844  | -98.0311  | 1043      | NCEI    | 1977-2009        |
| TX    | HICO                          | 41-4137 | DLY                 | 31.9844  | -98.0311  | 1043      | NCEI    | 1910-2009        |
| TX    | HIGGINS                       | 41-4140 | DLY                 | 36.1161  | -100.0239 | 2566      | NCEI    | 1907-2017        |
| TX    | HILL'S RANCH                  | 41-4185 | DLY                 | 30.2333  | -97.6833  | 476       | NCEI    | 1916-1930        |
| TX    | HILLSBORO                     | 41-4182 | DLY                 | 32.0161  | -97.1094  | 551       | NCEI    | 1903-2017        |
| TX    | HINDES                        | 41-4191 | 15M                 | 28.7167  | -98.8000  | 360       | NCEI    | 1977-1999        |
| TX    | HINDES                        | 41-4191 | HLY                 | 28.7167  | -98.8000  | 360       | NCEI    | 1940-1999        |

| State | Station name             | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | HONDO                    | 41-4254 | DLY                 | 29.3364  | -99.1383  | 876       | NCEI    | 1899-2017        |
| TX    | HONDO MUNI AP            | 41-4256 | HLY                 | 29.3600  | -99.1742  | 920       | NCEI    | 1996-2013        |
| TX    | HONDO MUNI AP            | 79-0062 | DLY                 | 29.3600  | -99.1742  | 919       | NCEI    | 1975-2017        |
| TX    | HONDO MUNICIPAL AIRPORT  | 55-0054 | HLY                 | 29.3601  | -99.1742  | 915       | NCEI    | 1996-2007        |
| TX    | HONDO MUNICIPAL AIRPORT  | 56-0126 | HLY                 | 29.3590  | -99.1740  | 930       | NCEI    | 2007-2017        |
| TX    | HONEY GROVE              | 66-4257 | 15M                 | 33.5841  | -95.8994  | 664       | NCEI    | 2013-2017        |
| TX    | HONEY GROVE              | 41-4257 | 15M                 | 33.5842  | -95.8994  | 664       | NCEI    | 1971-2013        |
| TX    | HONEY GROVE              | 41-4257 | HLY                 | 33.5842  | -95.8994  | 664       | NCEI    | 1944-2013        |
| TX    | HONEY GROVE              | 41-4257 | DLY                 | 33.5842  | -95.8994  | 663       | NCEI    | 1898-2017        |
| TX    | HONEY GROVE 2            | 41-4258 | 15M                 | 33.5833  | -95.9000  | 659       | NCEI    | 1972-1975        |
| TX    | HONEY GROVE 2            | 41-4258 | HLY                 | 33.5833  | -95.9000  | 659       | NCEI    | 1972-1975        |
| TX    | HOOD AAF AIRPORT         | 64-0337 | HLY                 | 31.1330  | -97.7170  | 924       | NCEI    | 1999-2016        |
| TX    | HOOD AAF AIRPORT         | 64-0337 | DLY                 | 31.1330  | -97.7170  | 924       | NCEI    | 1978-2016        |
| TX    | HORDS CK LAKE            | 85-0556 | HLY                 | 31.8328  | -99.5606  | 1903      | HADS    | 1998-2017        |
| TX    | HORDS CREEK DAM          | 41-4278 | HLY                 | 31.8456  | -99.5606  | 1942      | NCEI    | 1956-2003        |
| TX    | HORDS CREEK DAM          | 41-4278 | DLY                 | 31.8456  | -99.5606  | 1942      | NCEI    | 1953-2017        |
| TX    | HORDS CRK LAKE NR VALERA | 63-0017 | HLY                 | 31.8329  | -99.5609  | 1906      | LCRA    | 2008-2018        |
| TX    | HORGER                   | 41-4280 | DLY                 | 31.0000  | -94.1667  | 112       | NCEI    | 1944-1982        |
| TX    | HOT SPRINGS              | 41-4299 | DLY                 | 29.1833  | -103.0000 | 1990      | NCEI    | 1939-1951        |
| TX    | HOUSTON ADDICKS          | 41-4309 | 15M                 | 29.7689  | -95.6439  | 91        | NCEI    | 1984-1997        |
| TX    | HOUSTON ADDICKS          | 41-4309 | HLY                 | 29.7689  | -95.6439  | 91        | NCEI    | 1943-2013        |
| TX    | HOUSTON ALIEF            | 41-4311 | 15M                 | 29.7147  | -95.5947  | 71        | NCEI    | 1984-1997        |
| TX    | HOUSTON ALIEF            | 41-4311 | HLY                 | 29.7147  | -95.5947  | 71        | NCEI    | 1940-2013        |
| TX    | HOUSTON ALIEF            | 41-4311 | DLY                 | 29.7147  | -95.5947  | 72        | NCEI    | 1948-1964        |
| TX    | HOUSTON BARKER           | 41-4313 | HLY                 | 29.8142  | -95.7275  | 127       | NCEI    | 1943-1948        |
| TX    | HOUSTON BARKER           | 41-4313 | DLY                 | 29.8142  | -95.7275  | 128       | NCEI    | 1943-2013        |
| TX    | HOUSTON BUSH INTL AP     | 41-4300 | HLY                 | 29.9800  | -95.3600  | 95        | NCEI    | 1970-2013        |
| TX    | HOUSTON DEER PARK        | 41-4315 | DLY                 | 29.7283  | -95.1306  | 36        | NCEI    | 1945-2011        |
| TX    | HOUSTON FAIRBANKS        | 41-3043 | DLY                 | 29.8000  | -95.5000  | 89        | NCEI    | 1947-1948        |
| TX    | HOUSTON FAIRBANKS        | 41-4317 | DLY                 | 29.8000  | -95.5167  | 89        | NCEI    | 1943-1954        |
| TX    | HOUSTON HEIGHTS          | 41-4321 | DLY                 | 29.7914  | -95.4261  | 66        | NCEI    | 1948-2012        |
| TX    | HOUSTON HOBBY AP         | 99-4307 | DLY                 | 29.6381  | -95.2819  | 44        | NCEI    | 1942-1946        |
| TX    | HOUSTON HOBBY AP         | 79-0042 | DLY                 | 29.6381  | -95.2819  | 43        | NCEI    | 1930-2017        |

| State | Station name                  | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|-------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | HOUSTON INDEP HTS             | 41-4323 | DLY                 | 29.8667  | -95.4167  | 92        | NCEI    | 1943-1995        |
| TX    | HOUSTON INTERCONT AP          | 79-0061 | DLY                 | 29.9800  | -95.3600  | 95        | NCEI    | 1969-2017        |
| TX    | HOUSTON NORTH HOUSTON         | 41-4327 | DLY                 | 29.8733  | -95.5275  | 112       | NCEI    | 1947-2017        |
| TX    | HOUSTON SAN JACINTO DA        | 41-4328 | DLY                 | 29.9167  | -95.1500  | 59        | NCEI    | 1954-1996        |
| TX    | HOUSTON SATSUMA               | 41-4329 | 15M                 | 29.9333  | -95.6333  | 122       | NCEI    | 1984-1990        |
| TX    | HOUSTON SATSUMA               | 41-4329 | HLY                 | 29.9333  | -95.6333  | 122       | NCEI    | 1940-1990        |
| TX    | HOUSTON SATSUMA               | 41-4329 | DLY                 | 29.9333  | -95.6333  | 121       | NCEI    | 1948-1964        |
| TX    | HOUSTON SPRING BRANCH         | 41-4331 | DLY                 | 29.8042  | -95.4914  | 92        | NCEI    | 1954-2000        |
| TX    | HOUSTON SUGARLAND MEM         | 79-0069 | DLY                 | 29.6222  | -95.6564  | 82        | NCEI    | 2000-2017        |
| TX    | HOUSTON WB CITY               | 99-4305 | HLY                 | 29.7622  | -95.3593  | 37        | NCEI    | 1909-1940        |
| TX    | HOUSTON WB CITY               | 41-4305 | HLY                 | 29.7622  | -95.3593  | 52        | NCEI    | 1940-1970        |
| TX    | HOUSTON WB CITY               | 99-4305 | DLY                 | 29.7622  | -95.3593  | 52        | NCEI    | 1883-1909        |
| TX    | HOUSTON WB CITY               | 79-0056 | DLY                 | 29.7622  | -95.3593  | 52        | NCEI    | 1883-1990        |
| TX    | HOUSTON-PORT                  | 41-4326 | DLY                 | 29.7456  | -95.2800  | 20        | NCEI    | 1991-2014        |
| TX    | HOUSTON-WESTBURY              | 41-4325 | DLY                 | 29.6600  | -95.6275  | 49        | NCEI    | 1948-2017        |
| TX    | HUCKABAY                      | 41-4343 | DLY                 | 32.3389  | -98.2972  | 1414      | NCEI    | 1963-2010        |
| TX    | HUDSPETH RIVER RANCH          | 41-4348 | DLY                 | 30.0050  | -101.1772 | 1631      | NCEI    | 1988-2017        |
| TX    | HUMBLE                        | 41-4362 | DLY                 | 30.0000  | -95.2500  | 102       | NCEI    | 1954-1985        |
| TX    | HUMBLE PUMP STN 5 WN          | 41-4363 | DLY                 | 30.3606  | -100.3056 | 2201      | NCEI    | 1948-2017        |
| TX    | HUNT 10 W                     | 66-4375 | 15M                 | 30.0627  | -99.5050  | 2010      | NCEI    | 2013-2017        |
| TX    | HUNT 10 W                     | 41-4375 | 15M                 | 30.0628  | -99.5050  | 2010      | NCEI    | 1976-2013        |
| TX    | HUNT 10 W                     | 41-4375 | DLY                 | 30.0628  | -99.5050  | 2011      | NCEI    | 1992-2017        |
| TX    | HUNT 3 SW                     | 41-4374 | DLY                 | 30.0294  | -99.3614  | 1870      | NCEI    | 1941-1999        |
| TX    | HUNTSVILLE                    | 41-4382 | DLY                 | 30.7064  | -95.5422  | 495       | NCEI    | 1903-2017        |
| TX    | HURST SPRINGS                 | 41-4390 | DLY                 | 31.6544  | -97.7086  | 1030      | NCEI    | 1963-2009        |
| TX    | HURT                          | 41-4392 | HLY                 | 33.2167  | -95.9667  | 679       | NCEI    | 1940-1948        |
| TX    | HYATT                         | 41-4397 | DLY                 | 30.5667  | -94.4000  | 112       | NCEI    | 1935-1953        |
| TX    | HYE                           | 41-4402 | DLY                 | 30.2533  | -98.5711  | 1457      | NCEI    | 1948-2017        |
| TX    | I-45 - HOV NORTH TRAVIS       | 60-0219 | 15M                 | 29.7656  | -95.3609  | 25        | HCFC    | 2000-2017        |
| TX    | I-45 - NORTH MAIN             | 60-0220 | 15M                 | 29.7891  | -95.3714  | 46        | HCFC    | 2000-2017        |
| TX    | I-45 - WEST ROAD HOV ENTRANCE | 60-0221 | 15M                 | 29.9203  | -95.4125  | 85        | HCFC    | 2000-2017        |
| TX    | IH 610 - SHIP CHANNEL         | 60-0226 | 15M                 | 29.7253  | -95.2665  | 0         | HCFC    | 2000-2017        |
| TX    | IH 610 EL N/B - CLINTON DR.   | 60-0227 | 15M                 | 29.7382  | -95.2649  | 25        | HCFC    | 2011-2017        |

| State | Station name             | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | IMPERIAL                 | 41-4425 | HLY                 | 31.2667  | -102.7000 | 2400      | NCEI    | 1963-1993        |
| TX    | IMPERIAL                 | 41-4425 | DLY                 | 31.2667  | -102.7000 | 2402      | NCEI    | 1940-1993        |
| TX    | INDIAN GAP               | 41-4440 | HLY                 | 31.6667  | -98.4167  | 1575      | NCEI    | 1951-1983        |
| TX    | INDIAN GAP               | 41-4440 | DLY                 | 31.6667  | -98.4167  | 1575      | NCEI    | 1943-1983        |
| TX    | INGRAM 8.6 WSW           | 69-1900 | DLY                 | 30.0219  | -99.3642  | 1824      | NCEI    | 2007-2017        |
| TX    | IOWA PARK EXP STN        | 41-4471 | DLY                 | 33.9167  | -98.6500  | 981       | NCEI    | 1940-1964        |
| TX    | IREDELL                  | 66-4476 | 15M                 | 31.9808  | -97.8731  | 902       | NCEI    | 2014-2017        |
| TX    | IREDELL                  | 41-4476 | 15M                 | 31.9808  | -97.8731  | 902       | NCEI    | 1975-2013        |
| TX    | IREDELL                  | 41-4476 | HLY                 | 31.9808  | -97.8731  | 902       | NCEI    | 1963-2013        |
| TX    | IRON BRG DAM             | 41-4483 | DLY                 | 32.8167  | -95.9167  | 449       | NCEI    | 1975-1993        |
| TX    | ITASCA                   | 41-4503 | DLY                 | 32.1667  | -97.1500  | 712       | NCEI    | 1940-1949        |
| TX    | ITASCA                   | 41-4505 | DLY                 | 32.1597  | -97.1422  | 705       | NCEI    | 1992-2017        |
| TX    | JACKSBORO                | 66-4517 | 15M                 | 33.2205  | -98.1561  | 1082      | NCEI    | 2013-2017        |
| TX    | JACKSBORO                | 41-4517 | 15M                 | 33.2206  | -98.1561  | 1082      | NCEI    | 2003-2013        |
| TX    | JACKSBORO                | 41-4517 | HLY                 | 33.2206  | -98.1561  | 1082      | NCEI    | 1940-2013        |
| TX    | JACKSBORO                | 41-4517 | DLY                 | 33.2206  | -98.1561  | 1083      | NCEI    | 1941-2017        |
| TX    | JACKSBORO 1 NNE          | 41-4520 | 15M                 | 33.2381  | -98.1444  | 1020      | NCEI    | 1977-2003        |
| TX    | JACKSBORO 1 NNE          | 41-4520 | HLY                 | 33.2381  | -98.1444  | 1020      | NCEI    | 1977-2003        |
| TX    | JACKSBURRO               | 85-0570 | HLY                 | 33.2219  | -98.1583  | 1102      | HADS    | 2013-2017        |
| TX    | JACKSONVILLE             | 41-4525 | DLY                 | 31.9622  | -95.2736  | 561       | NCEI    | 1953-2017        |
| TX    | JACKSONVILLE EXP STN     | 41-4524 | DLY                 | 31.9833  | -95.2833  | 659       | NCEI    | 1897-1963        |
| TX    | JARRELL                  | 41-4556 | DLY                 | 30.8472  | -97.5994  | 850       | NCEI    | 1926-2017        |
| TX    | JASPER                   | 41-4563 | DLY                 | 30.9153  | -94.0097  | 207       | NCEI    | 1878-2017        |
| TX    | JAYTON                   | 66-4570 | 15M                 | 33.2544  | -100.5724 | 2010      | NCEI    | 2013-2018        |
| TX    | JAYTON                   | 41-4570 | 15M                 | 33.2544  | -100.5725 | 2010      | NCEI    | 1971-2013        |
| TX    | JAYTON                   | 41-4570 | HLY                 | 33.2544  | -100.5725 | 2010      | NCEI    | 1940-2013        |
| TX    | JAYTON                   | 41-4570 | DLY                 | 33.2544  | -100.5725 | 2011      | NCEI    | 1910-2017        |
| TX    | JEDDO 3S                 | 41-4575 | DLY                 | 29.7664  | -97.3164  | 417       | NCEI    | 1940-2017        |
| TX    | JEFFERSON                | 41-4577 | HLY                 | 32.7692  | -94.3592  | 211       | NCEI    | 1944-1978        |
| TX    | JEFFERSON                | 41-4577 | DLY                 | 32.7692  | -94.3558  | 207       | NCEI    | 1903-2017        |
| TX    | JEFFERSON BLVD - IRA AVE | 81-0038 | 15M                 | 32.7475  | -96.9164  | 481       | COD     | 1991-2016        |
| TX    | JEWETT                   | 41-4591 | HLY                 | 31.3500  | -96.1500  | 510       | NCEI    | 1941-1991        |
| TX    | JEWETT                   | 41-4591 | DLY                 | 31.3500  | -96.1500  | 509       | NCEI    | 1904-1991        |



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|-------|-----------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | JOE POOL LAKE         | 41-4597 | HLY                 | 32.6406  | -96.9747  | 591       | NCEI    | 2007-2013        |
| TX    | JOE POOL LAKE         | 41-4597 | DLY                 | 32.6406  | -96.9747  | 591       | NCEI    | 1984-2017        |
| TX    | JOHNSON CITY          | 41-4605 | DLY                 | 30.2861  | -98.4089  | 1188      | NCEI    | 1964-2017        |
| TX    | JOLLYVILLE 2 SW       | 63-0187 | 15M                 | 30.4208  | -97.7975  | 731       | LCRA    | 2005-2018        |
| TX    | JONES CB RCH          | 41-4627 | DLY                 | 30.8167  | -100.1333 | 2090      | NCEI    | 1948-1964        |
| TX    | JOURDANTON            | 41-4647 | DLY                 | 28.9122  | -98.5425  | 518       | NCEI    | 1916-2011        |
| TX    | JOURDANTON 0.6 NW     | 69-0574 | DLY                 | 28.9202  | -98.5475  | 472       | NCEI    | 2014-2017        |
| TX    | JUDKINS               | 41-4661 | DLY                 | 31.7167  | -102.6333 | 2904      | NCEI    | 1943-1955        |
| TX    | JUNCTION 4SSW         | 66-4670 | 15M                 | 30.4452  | -99.8044  | 1747      | NCEI    | 2013-2018        |
| TX    | JUNCTION 4SSW         | 41-4670 | 15M                 | 30.4453  | -99.8044  | 1747      | NCEI    | 1971-2013        |
| TX    | JUNCTION 4SSW         | 41-4670 | HLY                 | 30.4453  | -99.8044  | 1747      | NCEI    | 1940-2013        |
| TX    | JUNCTION 4SSW         | 41-4670 | DLY                 | 30.4453  | -99.8045  | 1749      | NCEI    | 1897-2017        |
| TX    | JUNCTION KIMBLE CO AP | 79-0094 | DLY                 | 30.5108  | -99.7664  | 1749      | NCEI    | 1948-2017        |
| TX    | JUSTIN                | 66-4679 | 15M                 | 33.0805  | -97.2966  | 640       | NCEI    | 2013-2017        |
| TX    | JUSTIN                | 41-4679 | 15M                 | 33.0806  | -97.2967  | 640       | NCEI    | 1971-2013        |
| TX    | JUSTIN                | 41-4679 | HLY                 | 33.0806  | -97.2967  | 640       | NCEI    | 1954-2013        |
| TX    | JUSTIN                | 41-4679 | DLY                 | 33.0806  | -97.2967  | 640       | NCEI    | 2001-2017        |
| TX    | KARNACK               | 41-4693 | DLY                 | 32.6664  | -94.1781  | 256       | NCEI    | 1942-2008        |
| TX    | KARNES CITY 2N        | 41-4696 | DLY                 | 28.9069  | -97.8756  | 449       | NCEI    | 1919-2006        |
| TX    | KATY 6.0 ENE          | 69-1674 | DLY                 | 29.8207  | -95.7256  | 131       | NCEI    | 2013-2014        |
| TX    | KATY 6.2 ESE          | 69-1627 | DLY                 | 29.7495  | -95.7355  | 105       | NCEI    | 2009-2013        |
| TX    | KATY CITY             | 41-4704 | HLY                 | 29.8025  | -95.8197  | 153       | NCEI    | 1940-1946        |
| TX    | KATY CITY             | 41-4704 | DLY                 | 29.8025  | -95.8197  | 154       | NCEI    | 1952-2017        |
| TX    | KAUFMAN 2.9 S         | 69-1823 | DLY                 | 32.5407  | -96.3160  | 430       | NCEI    | 1998-2017        |
| TX    | KAUFMAN 3 SE          | 41-4705 | DLY                 | 32.5589  | -96.2725  | 420       | NCEI    | 1901-2012        |
| TX    | KELLY FLD             | 41-4731 | HLY                 | 29.3833  | -98.5667  | 682       | NCEI    | 1941-1942        |
| TX    | KENT 5 E              | 41-4767 | DLY                 | 31.0667  | -104.1500 | 4183      | NCEI    | 1893-1976        |
| TX    | KENT 8SE              | 41-4770 | DLY                 | 31.0158  | -104.1108 | 4603      | NCEI    | 1988-2017        |
| TX    | KERRVILLE             | 99-4780 | DLY                 | 30.0500  | -99.1500  | 1640      | NCEI    | 1895-1901        |
| TX    | KERRVILLE             | 41-4780 | DLY                 | 30.0500  | -99.1500  | 1640      | NCEI    | 1897-1974        |
| TX    | KERRVILLE 3 NNE       | 41-4782 | DLY                 | 30.0747  | -99.1081  | 1785      | NCEI    | 1974-2017        |
| TX    | KILLEEN               | 41-4792 | HLY                 | 31.0658  | -97.6919  | 815       | NCEI    | 1978-2003        |
| TX    | KILLEEN               | 41-4791 | DLY                 | 31.1167  | -97.7000  | 801       | NCEI    | 1912-1978        |

| State | Station name                   | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | KILLEEN                        | 41-4792 | DLY                 | 31.0658  | -97.6919  | 814       | NCEI    | 1978-2017        |
| TX    | KIMBLE COUNTY AIRPORT          | 55-0089 | HLY                 | 30.5110  | -99.7660  | 1693      | NCEI    | 1997-2007        |
| TX    | KIMBLE COUNTY AIRPORT          | 56-0166 | HLY                 | 30.5108  | -99.7664  | 1749      | NCEI    | 2007-2017        |
| TX    | KINGSVILLE                     | 41-4810 | DLY                 | 27.5311  | -97.8497  | 56        | NCEI    | 1902-2017        |
| TX    | KINGSVILLE 6.5 SSE             | 69-1828 | DLY                 | 27.4214  | -97.8236  | 59        | NCEI    | 2007-2017        |
| TX    | KINGSVILLE NAAS                | 79-0051 | DLY                 | 27.5000  | -97.8167  | 56        | NCEI    | 1945-2017        |
| TX    | KIRBYVILLE                     | 41-4819 | DLY                 | 30.6167  | -93.9167  | 200       | NCEI    | 1929-1999        |
| TX    | KIRBYVILLE 1.5 SE              | 69-1806 | DLY                 | 30.6405  | -93.8851  | 118       | NCEI    | 2007-2017        |
| TX    | KNAPP 2 SW                     | 41-4841 | DLY                 | 32.6258  | -101.1503 | 2290      | NCEI    | 1931-2013        |
| TX    | KNICKERBOCKER                  | 41-4848 | DLY                 | 31.2667  | -100.6333 | 2051      | NCEI    | 1904-1932        |
| TX    | KNICKERBOCKER 3.2 SW           | 69-2393 | DLY                 | 31.2467  | -100.6723 | 2087      | NCEI    | 2008-2017        |
| TX    | KNOX CITY                      | 41-4852 | DLY                 | 33.4167  | -99.8167  | 1532      | NCEI    | 1935-1965        |
| TX    | KOPPERL 5 NNE                  | 41-4866 | 15M                 | 32.1347  | -97.4786  | 620       | NCEI    | 1978-2010        |
| TX    | KOPPERL 5 NNE                  | 41-4866 | HLY                 | 32.1347  | -97.4786  | 620       | NCEI    | 1940-2010        |
| TX    | KOPPERL 5 NNE                  | 41-4866 | DLY                 | 32.1347  | -97.4786  | 620       | NCEI    | 1900-2009        |
| TX    | KOUNTZE                        | 41-4876 | HLY                 | 30.4000  | -94.3333  | 89        | NCEI    | 1980-1983        |
| TX    | KOUNTZE                        | 41-4878 | HLY                 | 30.3750  | -94.2994  | 61        | NCEI    | 1940-1979        |
| TX    | KOUNTZE                        | 41-4878 | DLY                 | 30.3750  | -94.2994  | 62        | NCEI    | 1948-2017        |
| TX    | KRESS                          | 66-4880 | 15M                 | 34.3708  | -101.7483 | 3480      | NCEI    | 2013-2018        |
| TX    | KRESS                          | 41-4880 | 15M                 | 34.3708  | -101.7483 | 3480      | NCEI    | 1978-2013        |
| TX    | KRESS                          | 41-4880 | HLY                 | 34.3708  | -101.7483 | 3480      | NCEI    | 1940-2013        |
| TX    | L.B.J. NATIONAL GRASSLANDS     | 54-0219 | DLY                 | 33.3917  | -97.6397  | 1024      | NADP    | 1983-2015        |
| TX    | LA GRANGE                      | 76-0072 | HLY                 | 29.9075  | -96.8600  | 155       | RAWS    | 2000-2015        |
| TX    | LA GRANGE                      | 41-4903 | DLY                 | 29.9175  | -96.8769  | 358       | NCEI    | 1910-2014        |
| TX    | LA JOYA                        | 41-4911 | DLY                 | 26.2422  | -98.3992  | 180       | NCEI    | 1995-2017        |
| TX    | LA PRYOR                       | 66-4920 | 15M                 | 28.9838  | -99.8684  | 782       | NCEI    | 2013-2017        |
| TX    | LA PRYOR                       | 41-4920 | 15M                 | 28.9831  | -99.8686  | 759       | NCEI    | 1976-2013        |
| TX    | LA PRYOR                       | 41-4920 | HLY                 | 28.9831  | -99.8686  | 759       | NCEI    | 1940-2013        |
| TX    | LA PRYOR                       | 41-4920 | DLY                 | 28.9831  | -99.8686  | 758       | NCEI    | 1915-2017        |
| TX    | LA TUNA 1 S                    | 41-4931 | DLY                 | 31.9800  | -106.5975 | 3799      | NCEI    | 1943-2012        |
| TX    | LACKLAND AIR FORCE BASE (KELL  | 64-0301 | DLY                 | 29.3830  | -98.5830  | 690       | NCEI    | 1971-2016        |
| TX    | LACKLAND AIR FORCE BASE (KELLY | 56-0103 | HLY                 | 29.3840  | -98.5810  | 691       | NCEI    | 2007-2017        |
| TX    | LADY BIRD LAKE NR LONGHORN DAM | 63-0193 | 15M                 | 30.2493  | -97.7203  | 440       | LCRA    | 2005-2018        |

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| TX    | LADY BIRD LAKE NR LONGHORN DAM | 63-0193 | HLY                 | 30.2493  | -97.7203  | 440       | LCRA    | 1999-2018        |
| TX    | LAGUNA VISTA 0.3 N             | 69-1119 | DLY                 | 26.1047  | -97.2927  | 10        | NCEI    | 2011-2017        |
| TX    | LAJITAS                        | 41-4950 | DLY                 | 29.2694  | -103.7575 | 2402      | NCEI    | 1978-2017        |
| TX    | LAKE ABILENE STATE PARK        | 41-4960 | DLY                 | 32.2403  | -99.8792  | 1972      | NCEI    | 1962-2017        |
| TX    | LAKE ALAN HENRY                | 41-4967 | DLY                 | 33.0642  | -101.0489 | 2280      | NCEI    | 1994-2017        |
| TX    | LAKE ANAHUAC CLCND             | 82-2250 | 15M                 | 29.7736  | -94.6871  | 5         | DD6     | 2007-2017        |
| TX    | LAKE BOB SANDLIN               | 53-0001 | DLY                 | 33.0826  | -95.0008  | 338       | TCWS    | 1992-2015        |
| TX    | LAKE BRIDGEPORT DAM            | 66-4972 | 15M                 | 33.2250  | -97.8316  | 870       | NCEI    | 2013-2017        |
| TX    | LAKE BRIDGEPORT DAM            | 41-4972 | 15M                 | 33.2250  | -97.8317  | 870       | NCEI    | 1976-2013        |
| TX    | LAKE BRIDGEPORT DAM            | 41-4972 | HLY                 | 33.2250  | -97.8317  | 870       | NCEI    | 1946-2013        |
| TX    | LAKE BRIDGEPORT DAM            | 41-4972 | DLY                 | 33.2250  | -97.8317  | 869       | NCEI    | 1940-2017        |
| TX    | LAKE COLORADO CITY             | 41-4974 | HLY                 | 32.3333  | -100.9167 | 2100      | NCEI    | 1954-1993        |
| TX    | LAKE COLORADO CITY             | 41-4974 | DLY                 | 32.3333  | -100.9167 | 2100      | NCEI    | 1954-1993        |
| TX    | LAKE CROCKETT                  | 41-4975 | 15M                 | 33.7411  | -95.9217  | 530       | NCEI    | 1973-2013        |
| TX    | LAKE CROCKETT                  | 41-4975 | HLY                 | 33.7411  | -95.9217  | 530       | NCEI    | 1973-2013        |
| TX    | LAKE GEORGETOWN                | 85-0509 | HLY                 | 30.6675  | -97.7106  | 810       | HADS    | 2000-2017        |
| TX    | LAKE JUNE BRANCH - ST AUGUSTIN | 81-0021 | 15M                 | 32.7361  | -96.6567  | 469       | COD     | 1991-2016        |
| TX    | LAKE KEMP                      | 66-4982 | 15M                 | 33.7542  | -99.1442  | 1167      | NCEI    | 2013-2017        |
| TX    | LAKE KEMP                      | 41-4982 | 15M                 | 33.7542  | -99.1442  | 1167      | NCEI    | 1984-2013        |
| TX    | LAKE KEMP                      | 41-4982 | HLY                 | 33.7542  | -99.1442  | 1167      | NCEI    | 1974-2013        |
| TX    | LAKE KEMP                      | 41-4982 | DLY                 | 33.7542  | -99.1442  | 1168      | NCEI    | 1962-2017        |
| TX    | LAKE LBJ AT 1431 BRIDGE        | 63-0069 | HLY                 | 30.6576  | -98.4276  | 840       | LCRA    | 1995-2018        |
| TX    | LAKE TAWAKONI                  | 41-4980 | DLY                 | 32.8522  | -95.8864  | 449       | NCEI    | 1994-2017        |
| TX    | LAKEBRIDGEPORT                 | 83-0021 | 15M                 | 33.2228  | -97.8317  | 246       | TRWD    | 2003-2016        |
| TX    | LAMESA 1 SSE                   | 41-5013 | DLY                 | 32.7228  | -101.9456 | 2966      | NCEI    | 1910-2017        |
| TX    | LAMPASAS                       | 41-5018 | DLY                 | 31.0717  | -98.1847  | 1033      | NCEI    | 1897-2012        |
| TX    | LAMPASAS 2.7 ENE               | 69-2052 | DLY                 | 31.0815  | -98.1409  | 1020      | NCEI    | 2009-2017        |
| TX    | LAMPASAS RIVER NEAR KEMPER     | 85-0588 | HLY                 | 31.0817  | -98.0164  | 902       | HADS    | 1995-2017        |
| TX    | LANGTRY                        | 66-5048 | 15M                 | 29.8097  | -101.5604 | 1290      | NCEI    | 2013-2017        |
| TX    | LANGTRY                        | 41-5048 | 15M                 | 29.8097  | -101.5603 | 1290      | NCEI    | 1971-2013        |
| TX    | LANGTRY                        | 41-5048 | HLY                 | 29.8097  | -101.5603 | 1290      | NCEI    | 1942-2013        |
| TX    | LANGTRY                        | 41-5048 | DLY                 | 29.8097  | -101.5603 | 1289      | NCEI    | 1897-2017        |
| TX    | LANGTRY 2                      | 41-5049 | HLY                 | 29.8084  | -101.5617 | 1342      | NCEI    | 1965-1969        |

| State | Station name                 | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
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| TX    | LANGTRY 2                    | 41-5049 | DLY                 | 29.8084  | -101.5617 | 1342      | NCEI    | 1964-1968        |
| TX    | LAREDO                       | 41-5056 | DLY                 | 27.5333  | -99.4667  | 499       | NCEI    | 1891-1978        |
| TX    | LAREDO 2                     | 41-5060 | HLY                 | 27.5683  | -99.4983  | 430       | NCEI    | 1965-1972        |
| TX    | LAREDO 2                     | 41-5060 | DLY                 | 27.5683  | -99.4983  | 430       | NCEI    | 1946-2017        |
| TX    | LAREDO AFB                   | 79-0036 | DLY                 | 27.5333  | -99.4667  | 505       | NCEI    | 1965-2017        |
| TX    | LAREDO CITY                  | 41-5058 | HLY                 | 27.5500  | -99.5000  | 425       | NCEI    | 1943-1944        |
| TX    | LAREDO INTERNATIONAL AIRPORT | 56-0102 | HLY                 | 27.5440  | -99.4610  | 508       | NCEI    | 2007-2017        |
| TX    | LAREDO INTERNATIONAL AIRPORT | 64-0286 | HLY                 | 27.5330  | -99.4670  | 494       | NCEI    | 2008-2016        |
| TX    | LAREDO MUNI AP               | 41-5057 | HLY                 | 27.5333  | -99.4667  | 496       | NCEI    | 1944-1965        |
| TX    | LAREDO WB AP                 | 79-0044 | DLY                 | 27.5333  | -99.4667  | 499       | NCEI    | 1915-1965        |
| TX    | LATEX                        | 41-5081 | HLY                 | 32.3500  | -94.1000  | 302       | NCEI    | 1942-1963        |
| TX    | LATEX                        | 41-5081 | DLY                 | 32.3500  | -94.1000  | 302       | NCEI    | 1942-1963        |
| TX    | LATIMER RCH                  | 41-5086 | DLY                 | 33.8833  | -100.3833 | 1949      | NCEI    | 1971-1994        |
| TX    | LAUGHLIN AFB AIRPORT         | 64-0375 | DLY                 | 29.3670  | -100.7830 | 1082      | NCEI    | 1973-2016        |
| TX    | LAVON DAM                    | 41-5094 | 15M                 | 33.0353  | -96.4861  | 510       | NCEI    | 1971-2013        |
| TX    | LAVON DAM                    | 41-5094 | HLY                 | 33.0353  | -96.4861  | 510       | NCEI    | 1949-2013        |
| TX    | LAVON DAM                    | 41-5094 | DLY                 | 33.0353  | -96.4861  | 509       | NCEI    | 1949-2017        |
| TX    | LAWN                         | 41-5097 | DLY                 | 32.1414  | -99.7528  | 1949      | NCEI    | 1948-2010        |
| TX    | LEAKEY                       | 66-5113 | 15M                 | 29.7393  | -99.7612  | 1622      | NCEI    | 2013-2017        |
| TX    | LEAKEY                       | 41-5113 | 15M                 | 29.7392  | -99.7611  | 1622      | NCEI    | 1975-2013        |
| TX    | LEAKEY                       | 41-5113 | HLY                 | 29.7392  | -99.7611  | 1622      | NCEI    | 1940-2013        |
| TX    | LEAKEY                       | 41-5113 | DLY                 | 29.7392  | -99.7611  | 1621      | NCEI    | 1894-2017        |
| TX    | LEAKEY 2                     | 41-5114 | DLY                 | 29.7242  | -99.7627  | 1601      | NCEI    | 1963-1971        |
| TX    | LEANDER 5 SW                 | 63-0180 | HLY                 | 30.5384  | -97.9289  | 1105      | LCRA    | 1991-2017        |
| TX    | LEFORS                       | 85-0608 | HLY                 | 35.4417  | -100.8114 | 2831      | HADS    | 1995-2017        |
| TX    | LEFORS                       | 87-0043 | HLY                 | 35.4333  | -100.8000 | 2831      | USBR    | 1989-2016        |
| TX    | LENORAH                      | 41-5158 | DLY                 | 32.3081  | -101.8775 | 2844      | NCEI    | 1941-2017        |
| TX    | LEVELLAND                    | 41-5183 | DLY                 | 33.5500  | -102.3758 | 3514      | NCEI    | 1926-2017        |
| TX    | LEWISVILLE                   | 41-5191 | DLY                 | 33.0500  | -97.0000  | 489       | NCEI    | 1941-1959        |
| TX    | LEWISVILLE DAM               | 66-5192 | 15M                 | 33.0694  | -97.0094  | 556       | NCEI    | 2013-2017        |
| TX    | LEWISVILLE DAM               | 41-5192 | 15M                 | 33.0694  | -97.0094  | 556       | NCEI    | 1984-2013        |
| TX    | LEWISVILLE DAM               | 41-3476 | HLY                 | 33.0667  | -97.0167  | 561       | NCEI    | 1949-1964        |
| TX    | LEWISVILLE DAM               | 41-5192 | HLY                 | 33.0694  | -97.0094  | 556       | NCEI    | 1964-2013        |

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|-------|------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | LEWISVILLE DAM               | 41-3476 | DLY                 | 33.0667  | -97.0167  | 561       | NCEI    | 1949-1963        |
| TX    | LEWISVILLE DAM               | 41-5192 | DLY                 | 33.0694  | -97.0094  | 558       | NCEI    | 1964-2017        |
| TX    | LEXINGTON                    | 66-5193 | 15M                 | 30.4065  | -97.0134  | 423       | NCEI    | 2013-2017        |
| TX    | LEXINGTON                    | 41-5193 | 15M                 | 30.4064  | -97.0136  | 465       | NCEI    | 1978-2013        |
| TX    | LEXINGTON                    | 41-5193 | HLY                 | 30.4064  | -97.0136  | 465       | NCEI    | 1940-2013        |
| TX    | LEXINGTON                    | 41-5193 | DLY                 | 30.4064  | -97.0136  | 466       | NCEI    | 1948-2017        |
| TX    | LIBERTY                      | 41-5196 | DLY                 | 30.0592  | -94.7950  | 36        | NCEI    | 1903-2017        |
| TX    | LILLIAN                      | 41-5216 | DLY                 | 32.5000  | -97.1833  | 751       | NCEI    | 1940-1959        |
| TX    | LILLIAN 3 W                  | 41-5218 | DLY                 | 32.5000  | -97.2333  | 745       | NCEI    | 1981-1997        |
| TX    | LINDALE 5 SE                 | 41-5228 | DLY                 | 32.4500  | -95.3667  | 449       | NCEI    | 1931-1965        |
| TX    | LINDEN                       | 41-5229 | DLY                 | 33.0161  | -94.3675  | 417       | NCEI    | 1940-2017        |
| TX    | LIPAN 4NW                    | 41-5243 | DLY                 | 32.5683  | -98.0819  | 988       | NCEI    | 1949-2017        |
| TX    | LIPSCOMB                     | 41-5247 | 15M                 | 36.2358  | -100.2675 | 2450      | NCEI    | 1971-2005        |
| TX    | LIPSCOMB                     | 41-5247 | HLY                 | 36.2358  | -100.2675 | 2450      | NCEI    | 1940-2005        |
| TX    | LIPSCOMB                     | 41-5247 | DLY                 | 36.2358  | -100.2675 | 2451      | NCEI    | 1948-2017        |
| TX    | LITTLE MOUND CK AT MATHIS RD | 60-0091 | 15M                 | 30.0053  | -95.9080  | 204       | HCFC    | 1986-2017        |
| TX    | LITTLEFIELD                  | 41-5263 | DLY                 | 33.9167  | -102.3333 | 3563      | NCEI    | 1916-1966        |
| TX    | LITTLEFIELD                  | 41-5265 | DLY                 | 33.9378  | -102.3447 | 3576      | NCEI    | 1966-2017        |
| TX    | LIVINGSTON 2 NNE             | 41-5271 | DLY                 | 30.7394  | -94.9256  | 177       | NCEI    | 1937-2017        |
| TX    | LK HOUSTON DAM SPILLWAY      | 60-0065 | 15M                 | 29.9163  | -95.1413  | 42        | HCFC    | 1986-2017        |
| TX    | LLANO                        | 41-5272 | DLY                 | 30.7425  | -98.6542  | 1020      | NCEI    | 1893-2017        |
| TX    | LLANO 19 SW                  | 63-0106 | 15M                 | 30.5591  | -98.8848  | 1542      | LCRA    | 2005-2018        |
| TX    | LLANO 19 SW                  | 63-0106 | HLY                 | 30.5591  | -98.8848  | 1542      | LCRA    | 2000-2018        |
| TX    | LLANO GRANDE                 | 41-5274 | DLY                 | 26.2000  | -97.9500  | 85        | NCEI    | 1908-1916        |
| TX    | LLANO RIVER AT LLANO         | 63-0114 | HLY                 | 30.7512  | -98.6697  | 992       | LCRA    | 1988-2018        |
| TX    | LLANO RIVER NR MASON         | 63-0094 | HLY                 | 30.6601  | -99.1085  | 1269      | LCRA    | 1988-2018        |
| TX    | LOCKHART                     | 41-5284 | DLY                 | 29.8858  | -97.6917  | 548       | NCEI    | 1940-2002        |
| TX    | LOCKHART 2SW                 | 41-5285 | DLY                 | 29.8569  | -97.6958  | 489       | NCEI    | 1997-2017        |
| TX    | LOMA ALTA                    | 41-5303 | HLY                 | 29.9173  | -100.7794 | 1903      | NCEI    | 1942-1963        |
| TX    | LOMA ALTO                    | 98-0001 | DLY                 | 28.1569  | -98.5142  | 436       | NCEI    | 2005-2016        |
| TX    | LONDON 3N                    | 41-5312 | 15M                 | 30.7131  | -99.5681  | 1800      | NCEI    | 1971-2009        |
| TX    | LONDON 3N                    | 41-5312 | HLY                 | 30.7131  | -99.5681  | 1800      | NCEI    | 1956-2009        |
| TX    | LONDON 3N                    | 41-5312 | DLY                 | 30.7131  | -99.5681  | 1801      | NCEI    | 1948-2017        |

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| TX    | LONG LAKE 5 SW                | 41-5327 | DLY                 | 31.6167  | -95.8500  | 312       | NCEI    | 1904-1980        |
| TX    | LONGVIEW                      | 41-5341 | DLY                 | 32.4725  | -94.7172  | 331       | NCEI    | 1902-2017        |
| TX    | LONGVIEW #2                   | 41-5344 | DLY                 | 32.5183  | -94.7189  | 372       | NCEI    | 2002-2017        |
| TX    | LONGVIEW 11 SE                | 66-5348 | 15M                 | 32.3466  | -94.6533  | 407       | NCEI    | 2013-2017        |
| TX    | LONGVIEW 11 SE                | 41-5348 | 15M                 | 32.3467  | -94.6533  | 407       | NCEI    | 1978-2013        |
| TX    | LONGVIEW 11 SE                | 41-5348 | HLY                 | 32.3467  | -94.6533  | 407       | NCEI    | 1975-2013        |
| TX    | LONGVIEW WSMO                 | 79-0027 | DLY                 | 32.3500  | -94.6500  | 407       | NCEI    | 1975-2017        |
| TX    | LOOP                          | 41-5351 | DLY                 | 32.9000  | -102.4167 | 3245      | NCEI    | 1941-1995        |
| TX    | LORAIN                        | 41-5358 | HLY                 | 32.4167  | -100.7167 | 2270      | NCEI    | 1940-1984        |
| TX    | LORENZO                       | 41-5363 | DLY                 | 33.6667  | -101.5333 | 3169      | NCEI    | 1947-1995        |
| TX    | LOVELADY                      | 41-5398 | HLY                 | 31.1333  | -95.4500  | 302       | NCEI    | 1940-1986        |
| TX    | LOVELADY                      | 41-5398 | DLY                 | 31.1333  | -95.4500  | 302       | NCEI    | 1948-1986        |
| TX    | LTL CYP CK AT CYP ROSEHILL RD | 60-0094 | 15M                 | 30.0159  | -95.6974  | 157       | HCFC    | 1986-2017        |
| TX    | LTL WHT OAK BYU AT TIDWELL RD | 60-0056 | 15M                 | 29.8454  | -95.3998  | 61        | HCFC    | 1986-2017        |
| TX    | LUBBOCK                       | 79-0114 | DLY                 | 33.6542  | -101.8136 | 3258      | NCEI    | 1947-2017        |
| TX    | LUBBOCK 9 N                   | 66-5410 | 15M                 | 33.6897  | -101.8219 | 3245      | NCEI    | 2013-2018        |
| TX    | LUBBOCK 9 N                   | 41-5410 | 15M                 | 33.6897  | -101.8219 | 3245      | NCEI    | 1971-2013        |
| TX    | LUBBOCK 9 N                   | 41-5410 | HLY                 | 33.6897  | -101.8219 | 3245      | NCEI    | 1942-2013        |
| TX    | LUBBOCK 9 N                   | 41-5410 | DLY                 | 33.6897  | -101.8219 | 3245      | NCEI    | 1911-2017        |
| TX    | LUBBOCK INTERNATIONAL AIRPORT | 56-0181 | HLY                 | 33.6658  | -101.8233 | 3268      | NCEI    | 2007-2017        |
| TX    | LUBBOCK INTL AP               | 41-5411 | HLY                 | 33.6658  | -101.8233 | 3268      | NCEI    | 1940-2013        |
| TX    | LUFKIN 11 NW                  | 41-5415 | DLY                 | 31.4269  | -94.8942  | 217       | NCEI    | 1983-2016        |
| TX    | LUFKIN ANGELINA CO AP         | 79-0159 | DLY                 | 31.2361  | -94.7544  | 289       | NCEI    | 1906-2017        |
| TX    | LULING                        | 41-5429 | HLY                 | 29.6756  | -97.6578  | 400       | NCEI    | 1943-1965        |
| TX    | LULING                        | 41-5429 | DLY                 | 29.6756  | -97.6578  | 400       | NCEI    | 1901-2017        |
| TX    | LYNXHAVEN RCH                 | 41-5449 | DLY                 | 29.9667  | -99.4500  | 2001      | NCEI    | 1941-1976        |
| TX    | LYTLE 3W                      | 41-5454 | DLY                 | 29.2358  | -98.8433  | 722       | NCEI    | 1976-2007        |
| TX    | MABANK 4 SW                   | 66-5463 | 15M                 | 32.3316  | -96.1505  | 360       | NCEI    | 2013-2017        |
| TX    | MABANK 4 SW                   | 41-5463 | 15M                 | 32.3317  | -96.1506  | 360       | NCEI    | 1977-2013        |
| TX    | MABANK 4 SW                   | 41-5461 | HLY                 | 32.3333  | -96.1500  | 341       | NCEI    | 1940-1977        |
| TX    | MABANK 4 SW                   | 41-5463 | HLY                 | 32.3317  | -96.1506  | 360       | NCEI    | 1977-2013        |
| TX    | MADISONVILLE                  | 41-5477 | DLY                 | 30.9392  | -95.9203  | 253       | NCEI    | 1918-2017        |
| TX    | MALONE                        | 85-0674 | HLY                 | 31.9178  | -96.8961  | 492       | HADS    | 2006-2017        |

| State | Station name               | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|----------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | MALONE 3ENE                | 41-5528 | HLY                 | 31.9442  | -96.8464  | 485       | NCEI    | 1973-2004        |
| TX    | MANCHACA                   | 41-5538 | DLY                 | 30.1333  | -97.8333  | 702       | NCEI    | 1948-1965        |
| TX    | MARATHON                   | 41-5579 | DLY                 | 30.1925  | -103.2717 | 3990      | NCEI    | 1896-2017        |
| TX    | MARBLE FALLS               | 41-5580 | DLY                 | 30.5667  | -98.2833  | 771       | NCEI    | 1908-1952        |
| TX    | MARBLE FALLS 10 SSW        | 63-0141 | HLY                 | 30.4476  | -98.3379  | 1364      | LCRA    | 1991-2018        |
| TX    | MARBLE FALLS 4 WSW         | 63-0137 | HLY                 | 30.5545  | -98.3368  | 790       | LCRA    | 1991-2018        |
| TX    | MARBLE FALLS 6 ENE         | 63-0145 | HLY                 | 30.5993  | -98.1709  | 982       | LCRA    | 1991-2018        |
| TX    | MARFA 3W                   | 41-5596 | 15M                 | 30.3125  | -104.0722 | 4790      | NCEI    | 1971-2009        |
| TX    | MARFA 3W                   | 41-5596 | HLY                 | 30.3125  | -104.0722 | 4790      | NCEI    | 1968-2009        |
| TX    | MARFA 3W                   | 41-5596 | DLY                 | 30.3125  | -104.0722 | 4790      | NCEI    | 1958-2009        |
| TX    | MARFA CHARCO M R           | 41-5591 | HLY                 | 30.4833  | -104.1167 | 5300      | NCEI    | 1949-1968        |
| TX    | MARLIN 3 NE                | 41-5611 | DLY                 | 31.3336  | -96.8581  | 384       | NCEI    | 1902-2017        |
| TX    | MARSHALL                   | 41-5618 | DLY                 | 32.5403  | -94.3508  | 351       | NCEI    | 1893-2017        |
| TX    | MARYS CK AT WINDING RD     | 60-0098 | 15M                 | 29.5435  | -95.2172  | 29        | HCFC    | 1999-2017        |
| TX    | MASON                      | 41-5650 | DLY                 | 30.7478  | -99.2306  | 1549      | NCEI    | 1941-2017        |
| TX    | MATADOR                    | 41-5658 | HLY                 | 34.0044  | -100.8250 | 2415      | NCEI    | 1941-1965        |
| TX    | MATADOR                    | 41-5658 | DLY                 | 34.0044  | -100.8250 | 2415      | NCEI    | 1947-2017        |
| TX    | MATADOR NO 2               | 41-5656 | 15M                 | 34.0044  | -100.8250 | 2415      | NCEI    | 1971-2013        |
| TX    | MATADOR NO 2               | 41-5656 | HLY                 | 34.0044  | -100.8250 | 2415      | NCEI    | 1965-2013        |
| TX    | MATAGORDA NO 2             | 41-5659 | DLY                 | 28.6836  | -95.9733  | 10        | NCEI    | 1910-2017        |
| TX    | MATHIS 4 SSW               | 41-5661 | DLY                 | 28.0372  | -97.8725  | 138       | NCEI    | 1964-2017        |
| TX    | MAUD                       | 41-5667 | DLY                 | 33.3322  | -94.3436  | 305       | NCEI    | 1940-2017        |
| TX    | MAYHAW BAYOU - WILBER ROAD | 82-7000 | 15M                 | 29.8075  | -94.2619  | 9         | DD6     | 1992-2017        |
| TX    | MAYPEARL                   | 41-5695 | HLY                 | 32.3117  | -97.0161  | 549       | NCEI    | 1943-1995        |
| TX    | MAYPEARL                   | 41-5695 | DLY                 | 32.3114  | -97.0158  | 548       | NCEI    | 1948-2017        |
| TX    | MC ALLEN MILLER INTL ARPT  | 55-0051 | HLY                 | 26.1750  | -98.2380  | 112       | NCEI    | 1996-2007        |
| TX    | MC CARTNEY BRG             | 41-5710 | DLY                 | 33.3167  | -94.1667  | 230       | NCEI    | 1947-1954        |
| TX    | MC KINNEY MUNICIPAL ARPT   | 56-0207 | HLY                 | 33.1800  | -96.5900  | 585       | NCEI    | 2007-2017        |
| TX    | MC LEAN                    | 66-5770 | 15M                 | 35.2360  | -100.5923 | 2632      | NCEI    | 2013-2017        |
| TX    | MC LEAN                    | 41-5770 | 15M                 | 35.2361  | -100.5922 | 2872      | NCEI    | 1971-2013        |
| TX    | MC LEAN                    | 41-5770 | HLY                 | 35.2361  | -100.5922 | 2872      | NCEI    | 1940-2013        |
| TX    | MC LEAN                    | 41-5770 | DLY                 | 35.2361  | -100.5922 | 2872      | NCEI    | 1907-2008        |
| TX    | MCALLEN                    | 41-5701 | DLY                 | 26.1917  | -98.2511  | 102       | NCEI    | 1941-2017        |

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|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | MCALLEN INTL AP                | 41-5702 | HLY                 | 26.1839  | -98.2539  | 100       | NCEI    | 2004-2013        |
| TX    | MCALLEN MILLER INTL AP         | 78-0059 | 15M                 | 26.1839  | -98.2539  | 100       | NCEI    | 2005-2017        |
| TX    | MCALLEN MILLER INTL AP         | 79-0060 | DLY                 | 26.1839  | -98.2539  | 102       | NCEI    | 1961-2017        |
| TX    | MCCAMEY                        | 41-5707 | DLY                 | 31.1331  | -102.2217 | 2461      | NCEI    | 1932-2017        |
| TX    | MCCOOK                         | 41-5721 | DLY                 | 26.4842  | -98.3907  | 220       | NCEI    | 1941-2017        |
| TX    | MCCREE BRANCH - WHITE ROCK TRA | 81-0004 | 15M                 | 32.8717  | -96.7286  | 475       | COD     | 1993-2016        |
| TX    | MCDONALD OBSERVATORY           | 41-5737 | HLY                 | 30.6797  | -104.0249 | 6255      | NCEI    | 1942-1946        |
| TX    | MCGREGOR                       | 41-5757 | DLY                 | 31.4350  | -97.4011  | 722       | NCEI    | 1893-2013        |
| TX    | MCKINNEY MUNICIPAL AIRPORT     | 41-5766 | DLY                 | 33.1835  | -96.5895  | 587       | NCEI    | 1903-2008        |
| TX    | ME20                           | 62-0098 | HLY                 | 29.5594  | -99.4058  | 1281      | EAA     | 2002-2008        |
| TX    | MEDINA 1NE                     | 41-5742 | DLY                 | 29.8100  | -99.2497  | 1487      | NCEI    | 1966-2017        |
| TX    | MEDINA RIVER                   | 85-0323 | HLY                 | 29.7236  | -99.0697  | 1230      | HADS    | 1997-2017        |
| TX    | MEMPHIS                        | 41-5821 | DLY                 | 34.7261  | -100.5372 | 2090      | NCEI    | 1905-2017        |
| TX    | MENARD                         | 41-5822 | DLY                 | 30.9044  | -99.7864  | 1982      | NCEI    | 1893-2017        |
| TX    | MERCEDES 6 SSE                 | 41-5836 | DLY                 | 26.0619  | -97.8997  | 75        | NCEI    | 1914-2013        |
| TX    | MERCURY                        | 41-5840 | HLY                 | 31.4167  | -99.1667  | 1440      | NCEI    | 1965-1975        |
| TX    | MERIDIAN                       | 41-5845 | DLY                 | 31.9300  | -97.6608  | 771       | NCEI    | 1982-2008        |
| TX    | MERIDIAN SP                    | 41-5847 | DLY                 | 31.8833  | -97.7000  | 1027      | NCEI    | 1963-1982        |
| TX    | MERRILL RCH                    | 41-5854 | DLY                 | 30.5333  | -104.0500 | 5472      | NCEI    | 1939-1967        |
| TX    | MERTZON                        | 41-5859 | DLY                 | 31.2667  | -100.8167 | 2228      | NCEI    | 1941-2017        |
| TX    | MEXIA                          | 41-5869 | DLY                 | 31.6181  | -96.4497  | 502       | NCEI    | 1904-2016        |
| TX    | MHMR SOUTH 8TH & WASHINGTON BL | 82-2400 | 15M                 | 30.0578  | -94.1236  | 16        | DD6     | 1992-2017        |
| TX    | MIAMI                          | 41-5875 | DLY                 | 35.6936  | -100.6392 | 2746      | NCEI    | 1889-2015        |
| TX    | MIDLAND 4 ENE                  | 99-5891 | DLY                 | 32.0186  | -102.0258 | 2776      | NCEI    | 1885-1891        |
| TX    | MIDLAND 4 ENE                  | 41-5891 | DLY                 | 32.0186  | -102.0258 | 2776      | NCEI    | 1894-2017        |
| TX    | MIDLAND INTERNATIONAL AIRPORT  | 56-0177 | HLY                 | 31.9475  | -102.2086 | 2862      | NCEI    | 2007-2017        |
| TX    | MIDLAND INTL AP                | 41-5890 | HLY                 | 31.9475  | -102.2086 | 2862      | NCEI    | 1941-2013        |
| TX    | MIDLAND ODESSA                 | 79-0109 | DLY                 | 31.9433  | -102.1889 | 2867      | NCEI    | 1930-2017        |
| TX    | MIDLOTHIAN                     | 66-5897 | 15M                 | 32.4841  | -96.9941  | 750       | NCEI    | 2013-2017        |
| TX    | MIDLOTHIAN                     | 41-5897 | 15M                 | 32.4842  | -96.9942  | 750       | NCEI    | 1976-2013        |
| TX    | MIDLOTHIAN                     | 41-5897 | HLY                 | 32.4842  | -96.9942  | 750       | NCEI    | 1974-2013        |
| TX    | MIDLOTHIAN                     | 41-5896 | DLY                 | 32.4833  | -97.0000  | 751       | NCEI    | 1940-1964        |
| TX    | MIDLOTHIAN                     | 41-5897 | DLY                 | 32.4842  | -96.9942  | 751       | NCEI    | 1997-2017        |



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| TX    | MIDWAY 4 NE               | 41-5904 | DLY                 | 31.0706  | -95.7150  | 236       | NCEI    | 1978-2015        |
| TX    | MILLER RCH                | 41-5930 | DLY                 | 30.9667  | -98.9333  | 1991      | NCEI    | 1948-1965        |
| TX    | MILLERS RANCH - SECO CRK  | 85-0816 | HLY                 | 29.5731  | -99.4028  | 1312      | HADS    | 1997-2017        |
| TX    | MINEOLA                   | 41-5954 | DLY                 | 32.6350  | -95.4822  | 367       | NCEI    | 1946-2017        |
| TX    | MINEOLA 8 ENE             | 41-5956 | DLY                 | 32.7167  | -95.3667  | 384       | NCEI    | 1966-2000        |
| TX    | MINERAL WELLS 1 SSW       | 66-5957 | 15M                 | 32.7863  | -98.1183  | 845       | NCEI    | 2013-2017        |
| TX    | MINERAL WELLS 1 SSW       | 41-5957 | 15M                 | 32.7864  | -98.1183  | 845       | NCEI    | 1971-2013        |
| TX    | MINERAL WELLS 1 SSW       | 41-5957 | HLY                 | 32.7864  | -98.1183  | 845       | NCEI    | 1952-2013        |
| TX    | MINERAL WELLS AIRPORT     | 55-0174 | HLY                 | 32.7817  | -98.0603  | 970       | NCEI    | 2000-2007        |
| TX    | MINERAL WELLS AIRPORT     | 56-0275 | HLY                 | 32.7816  | -98.0602  | 972       | NCEI    | 2007-2017        |
| TX    | MINERAL WELLS AP          | 41-5958 | HLY                 | 32.7817  | -98.0603  | 972       | NCEI    | 1948-2013        |
| TX    | MINERAL WELLS AP          | 79-0157 | DLY                 | 32.7817  | -98.0603  | 972       | NCEI    | 1948-2017        |
| TX    | MISSION 4 W               | 41-5972 | DLY                 | 26.2167  | -98.4000  | 135       | NCEI    | 1910-1994        |
| TX    | MISSOURI CITY             | 99-4325 | DLY                 | 29.6600  | -95.6275  | 49        | NCEI    | 1939-1948        |
| TX    | MOBEETIE                  | 41-5987 | DLY                 | 35.5333  | -100.4333 | 2680      | NCEI    | 1910-1974        |
| TX    | MOLINE                    | 41-5996 | 15M                 | 31.3933  | -98.3081  | 1385      | NCEI    | 1978-2007        |
| TX    | MOLINE                    | 41-5996 | HLY                 | 31.3933  | -98.3081  | 1385      | NCEI    | 1940-2007        |
| TX    | MONAHANS                  | 41-5999 | DLY                 | 31.5414  | -102.9122 | 2546      | NCEI    | 1959-2009        |
| TX    | MONTELL                   | 41-6019 | DLY                 | 29.5333  | -100.0167 | 1302      | NCEI    | 1912-1944        |
| TX    | MONTGOMERY                | 41-6024 | HLY                 | 30.3908  | -95.6969  | 320       | NCEI    | 1940-1948        |
| TX    | MONTGOMERY                | 41-6024 | DLY                 | 30.3908  | -95.6969  | 322       | NCEI    | 1954-2017        |
| TX    | MONTGOMERY COUNTY AIRPORT | 55-0114 | HLY                 | 30.3567  | -95.4139  | 247       | NCEI    | 1997-2007        |
| TX    | MONTGOMERY COUNTY AIRPORT | 56-0199 | HLY                 | 30.3567  | -95.4139  | 247       | NCEI    | 2007-2017        |
| TX    | MOPAC AT LOOP 360         | 65-0031 | 15M                 | 30.2443  | -97.8020  | 546       | COA     | 1987-2015        |
| TX    | MORGAN                    | 41-6058 | DLY                 | 32.0139  | -97.6131  | 728       | NCEI    | 1965-2016        |
| TX    | MORGAN MILL               | 41-6060 | DLY                 | 32.3842  | -98.1703  | 1056      | NCEI    | 1949-2017        |
| TX    | MORSE                     | 41-6070 | DLY                 | 36.0608  | -101.4747 | 3179      | NCEI    | 1941-1998        |
| TX    | MORTON                    | 41-6074 | DLY                 | 33.7183  | -102.7586 | 3773      | NCEI    | 1935-2017        |
| TX    | MT LOCKE                  | 66-6104 | 15M                 | 30.7053  | -104.0232 | 6790      | NCEI    | 2013-2017        |
| TX    | MT LOCKE                  | 41-6104 | 15M                 | 30.6716  | -104.0225 | 6790      | NCEI    | 1984-2013        |
| TX    | MT LOCKE                  | 41-6104 | HLY                 | 30.6716  | -104.0225 | 6790      | NCEI    | 1948-2013        |
| TX    | MT LOCKE                  | 41-6104 | DLY                 | 30.6716  | -104.0225 | 6791      | NCEI    | 1935-2017        |
| TX    | MT PLEASANT               | 41-6108 | 15M                 | 33.1689  | -95.0056  | 425       | NCEI    | 1971-2013        |

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| TX    | MT PLEASANT                  | 41-6108 | HLY                 | 33.1689  | -95.0056  | 425       | NCEI    | 1940-2013        |
| TX    | MT PLEASANT                  | 41-6108 | DLY                 | 33.1689  | -95.0056  | 427       | NCEI    | 1905-2017        |
| TX    | MT VERNON                    | 41-6119 | DLY                 | 33.1964  | -95.2236  | 446       | NCEI    | 1966-2017        |
| TX    | MUENSTER                     | 41-6130 | DLY                 | 33.6564  | -97.3769  | 1037      | NCEI    | 1941-2017        |
| TX    | MULESHOE # 2                 | 66-6136 | 15M                 | 34.2192  | -102.7327 | 3830      | NCEI    | 2013-2018        |
| TX    | MULESHOE # 2                 | 41-6136 | 15M                 | 34.2192  | -102.7328 | 3830      | NCEI    | 1971-2013        |
| TX    | MULESHOE # 2                 | 41-6136 | HLY                 | 34.2192  | -102.7328 | 3830      | NCEI    | 1941-2013        |
| TX    | MULESHOE #1                  | 41-6135 | DLY                 | 34.2192  | -102.7328 | 3829      | NCEI    | 1921-2017        |
| TX    | MULESHOE 19 S                | 79-0007 | DLY                 | 33.9558  | -102.7739 | 3743      | NCEI    | 2004-2017        |
| TX    | MULESHOE NTL WR              | 41-6137 | DLY                 | 33.9544  | -102.7783 | 3740      | NCEI    | 1980-2017        |
| TX    | MULLIN                       | 41-6140 | DLY                 | 31.5833  | -98.6667  | 1493      | NCEI    | 1948-2001        |
| TX    | MUNDAY                       | 41-6146 | DLY                 | 33.4539  | -99.6158  | 1480      | NCEI    | 1912-2003        |
| TX    | MUNDAY 1W                    | 41-6147 | DLY                 | 33.4500  | -99.6364  | 1486      | NCEI    | 2011-2017        |
| TX    | N FORK RED RIVER NR SHAMROCK | 87-0032 | HLY                 | 35.2642  | -100.2414 | 2217      | USBR    | 1991-2016        |
| TX    | NACOGDOCHES                  | 41-6177 | 15M                 | 31.6164  | -94.6431  | 435       | NCEI    | 1974-2013        |
| TX    | NACOGDOCHES                  | 41-6176 | HLY                 | 31.6000  | -94.6500  | 312       | NCEI    | 1947-1961        |
| TX    | NACOGDOCHES                  | 41-6177 | HLY                 | 31.6164  | -94.6431  | 435       | NCEI    | 1947-2013        |
| TX    | NACOGDOCHES                  | 41-6176 | DLY                 | 31.6000  | -94.6500  | 312       | NCEI    | 1900-1973        |
| TX    | NACOGDOCHES                  | 41-6177 | DLY                 | 31.6164  | -94.6431  | 436       | NCEI    | 1948-2017        |
| TX    | NAPLES 1 SW                  | 41-6190 | DLY                 | 33.1833  | -94.6833  | 361       | NCEI    | 1909-1981        |
| TX    | NAPLES 5 NE                  | 41-6195 | DLY                 | 33.2425  | -94.6736  | 289       | NCEI    | 1982-1997        |
| TX    | NATALIA                      | 41-6205 | DLY                 | 29.2000  | -98.8500  | 712       | NCEI    | 1909-1976        |
| TX    | NAVARRO MILLS DAM            | 66-6210 | 15M                 | 31.9611  | -96.6880  | 454       | NCEI    | 2013-2017        |
| TX    | NAVARRO MILLS DAM            | 41-6210 | 15M                 | 31.9611  | -96.6881  | 454       | NCEI    | 1975-2013        |
| TX    | NAVARRO MILLS DAM            | 41-6210 | HLY                 | 31.9611  | -96.6881  | 454       | NCEI    | 1962-2013        |
| TX    | NAVARRO MILLS DAM            | 41-6210 | DLY                 | 31.9611  | -96.6881  | 453       | NCEI    | 1963-2017        |
| TX    | NEGLEY 4 SSW                 | 41-6247 | DLY                 | 33.7042  | -95.0700  | 404       | NCEI    | 1946-2003        |
| TX    | NEUVILLE                     | 41-6265 | DLY                 | 31.6503  | -94.1519  | 479       | NCEI    | 1940-2008        |
| TX    | NEW BOSTON                   | 66-6270 | 15M                 | 33.4547  | -94.4088  | 345       | NCEI    | 2013-2017        |
| TX    | NEW BOSTON                   | 41-6270 | 15M                 | 33.4547  | -94.4089  | 345       | NCEI    | 1973-2013        |
| TX    | NEW BOSTON                   | 41-6270 | HLY                 | 33.4547  | -94.4089  | 345       | NCEI    | 1973-2013        |
| TX    | NEW BOSTON                   | 41-6270 | DLY                 | 33.4547  | -94.4089  | 344       | NCEI    | 1980-2017        |
| TX    | NEW BRAUNFELS                | 41-6276 | DLY                 | 29.7192  | -98.1189  | 620       | NCEI    | 1893-2017        |

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| TX    | NEW BRAUNFELS 1.5 NNW        | 69-1087 | DLY                 | 29.7236  | -98.1278  | 715       | NCEI    | 2014-2017        |
| TX    | NEW BRAUNFELS MUNICIPAL AP   | 55-0056 | HLY                 | 29.7089  | -98.0458  | 640       | NCEI    | 1996-2007        |
| TX    | NEW BRAUNFELS MUNICIPAL AP   | 56-0128 | HLY                 | 29.7089  | -98.0458  | 645       | NCEI    | 2007-2017        |
| TX    | NEW CANEY 2 E                | 41-6280 | DLY                 | 30.1375  | -95.1783  | 73        | NCEI    | 1952-2017        |
| TX    | NEW GULF                     | 41-6286 | DLY                 | 29.2667  | -95.8950  | 72        | NCEI    | 1946-1999        |
| TX    | NEW SUMMERFIELD 2W           | 66-6335 | 15M                 | 31.9747  | -95.1380  | 372       | NCEI    | 2013-2017        |
| TX    | NEW SUMMERFIELD 2W           | 41-6335 | 15M                 | 31.9747  | -95.1381  | 372       | NCEI    | 1984-2013        |
| TX    | NEW SUMMERFIELD 2W           | 41-6335 | HLY                 | 31.9747  | -95.1381  | 372       | NCEI    | 1962-2013        |
| TX    | NEW SUMMERFIELD 2W           | 41-6335 | DLY                 | 31.9747  | -95.1381  | 371       | NCEI    | 1992-2017        |
| TX    | NEWPORT 1SW                  | 41-6331 | DLY                 | 33.4561  | -98.0253  | 1060      | NCEI    | 1947-2006        |
| TX    | NEWTON                       | 41-6339 | DLY                 | 30.8500  | -93.7667  | 190       | NCEI    | 1966-1977        |
| TX    | NEWTON                       | 41-6341 | DLY                 | 30.8331  | -93.7369  | 151       | NCEI    | 1980-2013        |
| TX    | NIX STORE 1 W                | 41-6367 | DLY                 | 31.1081  | -98.3794  | 1362      | NCEI    | 1948-2017        |
| TX    | NIXON                        | 41-6368 | DLY                 | 29.2828  | -97.7675  | 341       | NCEI    | 1921-2017        |
| TX    | NORTH HOUSTON                | 99-4327 | DLY                 | 29.8733  | -95.5275  | 112       | NCEI    | 1939-1947        |
| TX    | NORTHFIELD                   | 41-6433 | DLY                 | 34.2606  | -100.6014 | 2070      | NCEI    | 1944-2017        |
| TX    | NORTHINGTON RCH              | 41-6448 | DLY                 | 29.8642  | -98.6581  | 1526      | NCEI    | 1986-2017        |
| TX    | NOTLA 3 SE                   | 41-6477 | DLY                 | 36.1014  | -100.5894 | 2900      | NCEI    | 1940-2017        |
| TX    | NOVICE 1 E                   | 41-6484 | DLY                 | 31.9833  | -99.6167  | 1982      | NCEI    | 1948-1973        |
| TX    | NUGENT 1 ESE                 | 41-6494 | DLY                 | 32.6833  | -99.6667  | 1591      | NCEI    | 1940-1972        |
| TX    | O C FISHER DAM               | 41-6499 | DLY                 | 31.4539  | -100.4933 | 1965      | NCEI    | 1975-2008        |
| TX    | O DONNELL                    | 66-6504 | 15M                 | 32.9711  | -101.8247 | 3046      | NCEI    | 2013-2018        |
| TX    | O DONNELL                    | 41-6504 | 15M                 | 32.9711  | -101.8247 | 3046      | NCEI    | 1971-2013        |
| TX    | O DONNELL                    | 41-6504 | HLY                 | 32.9711  | -101.8247 | 3046      | NCEI    | 1940-2013        |
| TX    | OAK CREEK LAKE               | 41-6495 | DLY                 | 32.0567  | -100.2958 | 2008      | NCEI    | 1962-2017        |
| TX    | OAKWOOD                      | 41-6496 | DLY                 | 31.5914  | -95.8442  | 285       | NCEI    | 1980-2010        |
| TX    | OAKWOOD 4.2 NE               | 69-1355 | DLY                 | 31.6334  | -95.8063  | 266       | NCEI    | 2008-2017        |
| TX    | ODESSA                       | 41-6502 | DLY                 | 31.8797  | -102.3592 | 2910      | NCEI    | 1950-2017        |
| TX    | OLNEY                        | 41-6636 | DLY                 | 33.3733  | -98.7664  | 1194      | NCEI    | 1956-2011        |
| TX    | OLNEY 5 NNW                  | 41-6641 | DLY                 | 33.4372  | -98.7806  | 1184      | NCEI    | 1941-2004        |
| TX    | OLTON                        | 41-6644 | DLY                 | 34.1797  | -102.1356 | 3642      | NCEI    | 1928-2017        |
| TX    | ONION CRK AT BUDA            | 63-0199 | 15M                 | 30.0864  | -97.8485  | 673       | LCRA    | 2006-2018        |
| TX    | ONION CRK AT HWY 183, AUSTIN | 63-0201 | 15M                 | 30.1773  | -97.6890  | 481       | LCRA    | 2005-2018        |

| State | Station name                 | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | ONION CRK AT HWY 183, AUSTIN | 63-0201 | HLY                 | 30.1773  | -97.6890  | N/A       | LCRA    | 1989-2018        |
| TX    | ORANGE                       | 99-6664 | DLY                 | 30.0858  | -93.7417  | 10        | NCEI    | 1883-1937        |
| TX    | ORANGE                       | 41-6664 | DLY                 | 30.0858  | -93.7417  | 10        | NCEI    | 1903-2017        |
| TX    | ORANGE 9 N                   | 41-6680 | DLY                 | 30.2264  | -93.7394  | 20        | NCEI    | 1986-2017        |
| TX    | OVERTON                      | 89-0038 | DLY                 | 32.2956  | -94.9753  | 480       | TEN     | 2004-2016        |
| TX    | OVERTON                      | 41-6722 | DLY                 | 32.2667  | -94.9833  | 499       | NCEI    | 1943-1987        |
| TX    | OYSTER CREEK - SH 6          | 60-0169 | 15M                 | 29.6345  | -95.6513  | 75        | HCFCDD  | 2001-2017        |
| TX    | OZONA                        | 41-6734 | HLY                 | 30.7169  | -101.2061 | 2345      | NCEI    | 1940-2013        |
| TX    | OZONA                        | 41-6734 | DLY                 | 30.7169  | -101.2061 | 2346      | NCEI    | 1948-2013        |
| TX    | OZONA 8 WSW                  | 41-6736 | 15M                 | 30.6819  | -101.3375 | 2550      | NCEI    | 1973-2002        |
| TX    | OZONA 8 WSW                  | 41-6736 | HLY                 | 30.6819  | -101.3375 | 2550      | NCEI    | 1951-2002        |
| TX    | PADUCAH                      | 41-6740 | HLY                 | 34.0067  | -100.2989 | 1900      | NCEI    | 1957-1957        |
| TX    | PADUCAH                      | 41-6740 | DLY                 | 34.0067  | -100.2989 | 1900      | NCEI    | 1944-2017        |
| TX    | PADUCAH 10S                  | 41-6745 | DLY                 | 33.8758  | -100.3831 | 1949      | NCEI    | 1994-2017        |
| TX    | PADUCAH 15 S                 | 41-6742 | DLY                 | 33.8083  | -100.2981 | 1831      | NCEI    | 1971-2017        |
| TX    | PADUCAH 2 WNW                | 41-6743 | DLY                 | 34.0333  | -100.3167 | 1890      | NCEI    | 1913-1950        |
| TX    | PAINT ROCK                   | 41-6747 | DLY                 | 31.5536  | -99.8500  | 1588      | NCEI    | 1918-2017        |
| TX    | PALACIOS MUNI AP             | 79-0054 | DLY                 | 28.7247  | -96.2536  | 13        | NCEI    | 1943-2017        |
| TX    | PALESTINE 2 NE               | 66-6757 | 15M                 | 31.7831  | -95.6039  | 465       | NCEI    | 2013-2017        |
| TX    | PALESTINE 2 NE               | 41-6757 | HLY                 | 31.7831  | -95.6039  | 465       | NCEI    | 1940-2013        |
| TX    | PALESTINE 2 NE               | 99-6757 | DLY                 | 31.7831  | -95.6039  | 465       | NCEI    | 1882-1929        |
| TX    | PALESTINE 2 NE               | 79-0153 | DLY                 | 31.7831  | -95.6039  | 466       | NCEI    | 1930-2017        |
| TX    | PALO PINTO                   | 41-6766 | DLY                 | 32.7664  | -98.3083  | 1040      | NCEI    | 1949-2012        |
| TX    | PAMPA #2                     | 66-6776 | 15M                 | 35.5544  | -100.9736 | 3150      | NCEI    | 2013-2017        |
| TX    | PAMPA 2                      | 41-6776 | 15M                 | 35.5544  | -100.9736 | 3150      | NCEI    | 1974-2013        |
| TX    | PAMPA 2                      | 41-6776 | HLY                 | 35.5544  | -100.9736 | 3150      | NCEI    | 1953-2013        |
| TX    | PAMPA 2                      | 41-6776 | DLY                 | 35.5544  | -100.9736 | 3150      | NCEI    | 1964-2017        |
| TX    | PAMPA WB AP                  | 41-6775 | HLY                 | 35.5333  | -100.9667 | 3232      | NCEI    | 1941-1953        |
| TX    | PAMPA WB AP                  | 79-0119 | DLY                 | 35.5333  | -100.9667 | 3232      | NCEI    | 1908-1964        |
| TX    | PANDALE                      | 99-6780 | DLY                 | 30.2061  | -101.5575 | 1690      | NCEI    | 1943-1947        |
| TX    | PANDALE 1 N                  | 41-6780 | DLY                 | 30.2061  | -101.5575 | 1690      | NCEI    | 1909-2011        |
| TX    | PANHANDLE                    | 41-6785 | DLY                 | 35.3514  | -101.3897 | 3465      | NCEI    | 1911-2017        |
| TX    | PANOLA 1 WSW                 | 41-6788 | HLY                 | 32.3500  | -94.1167  | 322       | NCEI    | 1970-1973        |

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| TX    | PANTHER JUNCTION              | 41-6792 | 15M                 | 29.3272  | -103.2061 | 3740      | NCEI    | 1972-2013        |
| TX    | PANTHER JUNCTION              | 76-0089 | HLY                 | 29.3167  | -103.2000 | 3750      | RAWS    | 2003-2015        |
| TX    | PANTHER JUNCTION              | 41-6792 | HLY                 | 29.3272  | -103.2061 | 3740      | NCEI    | 1955-2013        |
| TX    | PANTHER JUNCTION              | 41-6792 | DLY                 | 29.3272  | -103.2061 | 3740      | NCEI    | 1955-2017        |
| TX    | PANTHER JUNCTION RAWS         | 85-0722 | HLY                 | 29.3250  | -103.2083 | 3776      | HADS    | 2003-2017        |
| TX    | PARIS                         | 41-6794 | DLY                 | 33.6744  | -95.5586  | 541       | NCEI    | 1896-2017        |
| TX    | PAT MAYSE DAM                 | 41-6834 | 15M                 | 33.8536  | -95.5167  | 495       | NCEI    | 1971-2004        |
| TX    | PAT MAYSE DAM                 | 41-6834 | HLY                 | 33.8536  | -95.5167  | 495       | NCEI    | 1966-2004        |
| TX    | PEARSALL                      | 41-6879 | DLY                 | 28.8889  | -99.0897  | 636       | NCEI    | 1902-2017        |
| TX    | PECAN BAYOU                   | 85-0675 | HLY                 | 31.5172  | -98.7403  | 1280      | HADS    | 1998-2014        |
| TX    | PECAN BAYOU NR MULLIN         | 63-0022 | HLY                 | 31.5172  | -98.7414  | 1244      | LCRA    | 1988-2018        |
| TX    | PECOS                         | 41-6892 | DLY                 | 31.4167  | -103.5000 | 2612      | NCEI    | 1904-2000        |
| TX    | PECOS 8W                      | 66-6893 | 15M                 | 31.3782  | -103.6330 | 2724      | NCEI    | 2013-2017        |
| TX    | PECOS 8W                      | 41-6893 | 15M                 | 31.3783  | -103.6331 | 2724      | NCEI    | 1977-2013        |
| TX    | PECOS 8W                      | 41-6893 | HLY                 | 31.3783  | -103.6331 | 2724      | NCEI    | 1960-2013        |
| TX    | PECOS 8W                      | 41-6893 | DLY                 | 31.3783  | -103.6331 | 2723      | NCEI    | 2000-2017        |
| TX    | PEDERNALES RIVER NR JOHNSON C | 63-0165 | HLY                 | 30.2922  | -98.3994  | 1138      | LCRA    | 1988-2018        |
| TX    | PEDERNALES RVR NR FRDRCKSBRG  | 63-0152 | HLY                 | 30.2206  | -98.8700  | 1604      | LCRA    | 1988-2018        |
| TX    | PENWELL                       | 41-6932 | DLY                 | 31.7356  | -102.5897 | 2933      | NCEI    | 1955-2013        |
| TX    | PEP                           | 66-6935 | 15M                 | 33.8153  | -102.5578 | 3660      | NCEI    | 2013-2018        |
| TX    | PEP                           | 41-6935 | 15M                 | 33.8153  | -102.5578 | 3660      | NCEI    | 1971-2013        |
| TX    | PEP                           | 41-6935 | HLY                 | 33.8153  | -102.5578 | 3660      | NCEI    | 1956-2013        |
| TX    | PERRYTON                      | 41-6950 | DLY                 | 36.3897  | -100.8239 | 2943      | NCEI    | 1893-2017        |
| TX    | PERRYTON 11 WNW               | 41-6953 | DLY                 | 36.4408  | -100.9961 | 3009      | NCEI    | 1945-2017        |
| TX    | PERRYTON 21 S                 | 41-6952 | DLY                 | 36.1017  | -100.7394 | 2986      | NCEI    | 1978-2017        |
| TX    | PERSIMMON GAP                 | 41-6959 | DLY                 | 29.6603  | -103.1736 | 2864      | NCEI    | 1952-2017        |
| TX    | PFLUGERVILLE                  | 41-6992 | DLY                 | 30.4333  | -97.6167  | 679       | NCEI    | 1948-1965        |
| TX    | PFLUGERVILLE 3 SSE            | 63-0202 | 15M                 | 30.4062  | -97.6030  | 645       | LCRA    | 2007-2018        |
| TX    | PFLUGERVILLE HIGH SCHOOL      | 65-0041 | 15M                 | 30.4461  | -97.6372  | 783       | COA     | 1986-2015        |
| TX    | PIERCE 1 E                    | 41-7020 | DLY                 | 29.2353  | -96.1817  | 105       | NCEI    | 1904-2014        |
| TX    | PILOT POINT ISL DU BOI        | 41-7028 | DLY                 | 33.3658  | -97.0122  | 689       | NCEI    | 1916-2003        |
| TX    | PINE SPRINGS                  | 41-7044 | DLY                 | 31.8903  | -104.8078 | 5591      | NCEI    | 1939-2008        |
| TX    | PINE SPRINGS, GMNP            | 80-0034 | 15M                 | 31.8913  | -104.8100 | 5571      | WTM     | 2010-2017        |

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| TX    | PINELAND             | 41-7040 | DLY                 | 31.2447  | -93.9658  | 220       | NCEI    | 1965-2017        |
| TX    | PINERY               | 76-0091 | HLY                 | 31.8944  | -104.7978 | 5381      | RAWS    | 2001-2015        |
| TX    | PITCHFORK RCH        | 66-7060 | 15M                 | 33.5992  | -100.5319 | 1945      | NCEI    | 2013-2018        |
| TX    | PITCHFORK RCH        | 41-7060 | HLY                 | 33.5992  | -100.5319 | 1945      | NCEI    | 1971-2013        |
| TX    | PITCHFORK RCH        | 41-7060 | DLY                 | 33.5992  | -100.5319 | 1946      | NCEI    | 1971-2017        |
| TX    | PITTSBURG 5 SSE      | 41-7066 | HLY                 | 32.9264  | -94.9392  | 365       | NCEI    | 1949-2013        |
| TX    | PITTSBURG 5 SSE      | 41-7066 | DLY                 | 32.9264  | -94.9392  | 364       | NCEI    | 1949-2017        |
| TX    | PLAINS               | 66-7074 | 15M                 | 33.1869  | -102.8281 | 3675      | NCEI    | 2013-2018        |
| TX    | PLAINS               | 41-7074 | 15M                 | 33.1869  | -102.8281 | 3675      | NCEI    | 1971-2013        |
| TX    | PLAINS               | 41-7074 | HLY                 | 33.1869  | -102.8281 | 3675      | NCEI    | 1942-2013        |
| TX    | PLAINS               | 41-7074 | DLY                 | 33.1869  | -102.8281 | 3675      | NCEI    | 1925-2017        |
| TX    | PLAINVIEW            | 41-7079 | DLY                 | 34.1892  | -101.7022 | 3369      | NCEI    | 1908-2017        |
| TX    | PLEMONS              | 41-7116 | HLY                 | 35.7667  | -101.3333 | 2802      | NCEI    | 1940-1959        |
| TX    | PLEMONS              | 41-7116 | DLY                 | 35.7667  | -101.3333 | 2802      | NCEI    | 1906-1951        |
| TX    | POINT 3.7 ESE        | 69-2332 | DLY                 | 32.9133  | -95.8100  | 469       | NCEI    | 2007-2017        |
| TX    | POINT COMFORT        | 66-7140 | 15M                 | 28.6575  | -96.5553  | 20        | NCEI    | 2013-2017        |
| TX    | POINT COMFORT        | 41-7140 | 15M                 | 28.6575  | -96.5553  | 20        | NCEI    | 1984-2013        |
| TX    | POINT COMFORT        | 41-7140 | HLY                 | 28.6575  | -96.5553  | 20        | NCEI    | 1957-2013        |
| TX    | POINT COMFORT        | 41-7140 | DLY                 | 28.6575  | -96.5553  | 20        | NCEI    | 1957-2017        |
| TX    | POLAR                | 41-7146 | DLY                 | 33.0167  | -101.0667 | 2352      | NCEI    | 1940-1975        |
| TX    | PORT ARANSAS         | 41-7170 | DLY                 | 27.8381  | -97.0592  | 13        | NCEI    | 1986-2017        |
| TX    | PORT ARANSAS 32 NNE  | 64-0662 | HLY                 | 28.3050  | -96.8230  | 15        | NCEI    | 2007-2016        |
| TX    | PORT ARTHUR AP       | 41-7174 | HLY                 | 29.9506  | -94.0206  | 16        | NCEI    | 1947-2013        |
| TX    | PORT ARTHUR CITY     | 99-7173 | HLY                 | 29.8691  | -93.9343  | 7         | NCEI    | 1917-1940        |
| TX    | PORT ARTHUR CITY     | 41-7173 | HLY                 | 29.8691  | -93.9343  | 7         | NCEI    | 1940-1953        |
| TX    | PORT ARTHUR CITY     | 41-7172 | DLY                 | 29.9044  | -93.9708  | 7         | NCEI    | 1975-2017        |
| TX    | PORT ARTHUR SE TX AP | 79-0041 | DLY                 | 29.9506  | -94.0206  | 16        | NCEI    | 1947-2017        |
| TX    | PORT ARTHUR WB CITY  | 41-7173 | DLY                 | 29.8691  | -93.9343  | 10        | NCEI    | 1911-1967        |
| TX    | PORT ISABEL          | 41-7179 | DLY                 | 26.0942  | -97.3094  | 16        | NCEI    | 1896-2014        |
| TX    | PORT LAVACA          | 41-7183 | DLY                 | 28.6078  | -96.6417  | 20        | NCEI    | 2004-2015        |
| TX    | PORT LAVACA 2        | 41-7182 | DLY                 | 28.6167  | -96.6333  | 20        | NCEI    | 1901-1988        |
| TX    | PORT MANSFIELD       | 41-7184 | DLY                 | 26.5578  | -97.4264  | 10        | NCEI    | 1958-2017        |
| TX    | PORT O'CONNOR        | 41-7186 | DLY                 | 28.4342  | -96.4278  | 7         | NCEI    | 1948-2013        |

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| TX    | POSSUM KINGDOM DAM        | 41-7205 | DLY                 | 32.8667  | -98.4333  | 902       | NCEI    | 1939-1975        |
| TX    | POST                      | 41-7206 | DLY                 | 33.1986  | -101.3744 | 2612      | NCEI    | 1910-2017        |
| TX    | POTEET                    | 41-7215 | DLY                 | 29.0283  | -98.5686  | 427       | NCEI    | 1941-2017        |
| TX    | POWELL 1.0 SW             | 69-2256 | DLY                 | 32.1060  | -96.3405  | 374       | NCEI    | 2009-2017        |
| TX    | POYNOR 1 NE               | 41-7230 | DLY                 | 32.0833  | -95.5833  | 531       | NCEI    | 1944-1975        |
| TX    | PRADE RCH                 | 41-7232 | DLY                 | 29.9167  | -99.7908  | 2051      | NCEI    | 1955-2017        |
| TX    | PRAIRIE MTN               | 41-7243 | 15M                 | 30.5767  | -98.8767  | 1448      | NCEI    | 1971-2009        |
| TX    | PRAIRIE MTN               | 41-7243 | HLY                 | 30.5767  | -98.8767  | 1448      | NCEI    | 1940-2009        |
| TX    | PRAIRIE MTN               | 41-7243 | DLY                 | 30.5767  | -98.8767  | 1447      | NCEI    | 1948-2017        |
| TX    | PRESIDIO                  | 41-7262 | DLY                 | 29.5711  | -104.3714 | 2612      | NCEI    | 1927-2013        |
| TX    | PRESIDIO 2                | 41-7264 | DLY                 | 29.5600  | -104.3728 | 2569      | NCEI    | 2009-2015        |
| TX    | PRESTON ROAD - OLIVE TREE | 81-0008 | 15M                 | 33.0128  | -96.7958  | 679       | COD     | 1991-2016        |
| TX    | PRICE 2 SW                | 41-7271 | DLY                 | 32.1167  | -94.9667  | 371       | NCEI    | 1941-1975        |
| TX    | PRIDDY 1 NE               | 41-7274 | HLY                 | 31.6667  | -98.4833  | 1470      | NCEI    | 1984-2003        |
| TX    | PRIDDY 1 NE               | 41-7274 | DLY                 | 31.6667  | -98.4833  | 1470      | NCEI    | 1984-1997        |
| TX    | PROCTOR RSVR              | 41-7300 | 15M                 | 31.9633  | -98.4942  | 1221      | NCEI    | 1984-2013        |
| TX    | PROCTOR RSVR              | 41-7300 | HLY                 | 31.9633  | -98.4942  | 1221      | NCEI    | 1973-2013        |
| TX    | PROCTOR RSVR              | 41-7300 | DLY                 | 31.9633  | -98.4942  | 1220      | NCEI    | 1963-2017        |
| TX    | PROVIDENT CITY            | 41-7299 | DLY                 | 29.2833  | -96.6333  | 151       | NCEI    | 1944-1966        |
| TX    | PUTNAM                    | 41-7327 | DLY                 | 32.3664  | -99.1925  | 1631      | NCEI    | 1911-2017        |
| TX    | QUANAHA 2 SW              | 41-7336 | DLY                 | 34.2761  | -99.7578  | 1601      | NCEI    | 1893-2013        |
| TX    | QUITAQUE                  | 41-7361 | DLY                 | 34.3667  | -101.0500 | 2572      | NCEI    | 1934-1976        |
| TX    | QUITMAN                   | 41-7363 | DLY                 | 32.7833  | -95.4333  | 374       | NCEI    | 1948-1987        |
| TX    | QUITMAN 2                 | 41-7365 | DLY                 | 32.7931  | -95.4350  | 413       | NCEI    | 1999-2015        |
| TX    | RAINBOW                   | 41-7388 | DLY                 | 32.2619  | -97.7064  | 650       | NCEI    | 1934-2017        |
| TX    | RANDOLPH AFB              | 66-7422 | 15M                 | 29.5325  | -98.2623  | 728       | NCEI    | 2013-2017        |
| TX    | RANDOLPH AFB              | 41-7422 | 15M                 | 29.5325  | -98.2622  | 728       | NCEI    | 1975-2013        |
| TX    | RANDOLPH AFB              | 41-7422 | HLY                 | 29.5325  | -98.2622  | 728       | NCEI    | 1940-2013        |
| TX    | RANDOLPH AFB              | 79-0039 | DLY                 | 29.5439  | -98.2736  | 761       | NCEI    | 1948-1970        |
| TX    | RANGER                    | 41-7425 | DLY                 | 32.4667  | -98.6833  | 1430      | NCEI    | 1946-1952        |
| TX    | RANGER 1 W                | 41-7426 | DLY                 | 32.4667  | -98.7000  | 1542      | NCEI    | 1940-1975        |
| TX    | RANKIN                    | 41-7431 | 15M                 | 31.2286  | -101.9472 | 2615      | NCEI    | 1984-2013        |
| TX    | RANKIN                    | 41-7431 | HLY                 | 31.2286  | -101.9472 | 2615      | NCEI    | 1948-2013        |

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| TX    | RANKIN                 | 41-7431 | DLY                 | 31.2286  | -101.9461 | 2615      | NCEI    | 1948-1984        |
| TX    | RAYMONDVILLE           | 41-7458 | DLY                 | 26.7069  | -97.7833  | 30        | NCEI    | 1910-2017        |
| TX    | RED BLUFF CROSSING     | 41-7480 | DLY                 | 31.2175  | -98.5833  | 1234      | NCEI    | 1948-2017        |
| TX    | RED BLUFF DAM          | 41-7481 | HLY                 | 31.8950  | -103.9183 | 2847      | NCEI    | 1942-2004        |
| TX    | RED BLUFF DAM          | 41-7481 | DLY                 | 31.8950  | -103.9183 | 2848      | NCEI    | 1939-2003        |
| TX    | RED ROCK               | 41-7497 | 15M                 | 29.9667  | -97.4500  | 520       | NCEI    | 1975-2000        |
| TX    | RED ROCK               | 41-7497 | HLY                 | 29.9667  | -97.4500  | 520       | NCEI    | 1967-2000        |
| TX    | RED ROCK               | 41-7497 | DLY                 | 29.9667  | -97.4500  | 522       | NCEI    | 1965-2000        |
| TX    | RED SPRINGS 3 N        | 41-7499 | 15M                 | 33.6494  | -99.4042  | 1351      | NCEI    | 1971-2013        |
| TX    | RED SPRINGS 3 N        | 41-7499 | HLY                 | 33.6494  | -99.4042  | 1351      | NCEI    | 1943-2013        |
| TX    | REESE AFB              | 79-0108 | DLY                 | 33.6000  | -102.0500 | 3327      | NCEI    | 1950-1970        |
| TX    | REESE AFB/LUBBOCK      | 64-0405 | DLY                 | 33.6000  | -102.0500 | 3337      | NCEI    | 1973-1997        |
| TX    | REFUGIO                | 41-7529 | DLY                 | 28.3000  | -97.2833  | 49        | NCEI    | 1948-1984        |
| TX    | REFUGIO 3 SW           | 99-7530 | DLY                 | 28.2939  | -97.3297  | 56        | NCEI    | 1988-1991        |
| TX    | REFUGIO 3 SW           | 41-7530 | DLY                 | 28.2939  | -97.3297  | 56        | NCEI    | 1991-2017        |
| TX    | RENO                   | 41-7556 | 15M                 | 32.9536  | -97.5739  | 770       | NCEI    | 1971-2004        |
| TX    | RENO                   | 41-7556 | HLY                 | 32.9536  | -97.5739  | 770       | NCEI    | 1946-2004        |
| TX    | RG75A                  | 94-0008 | 15M                 | 31.4706  | -96.8833  | 556       | USDA    | 1938-2015        |
| TX    | RG89                   | 94-0010 | 15M                 | 31.4672  | -96.8825  | 561       | USDA    | 1938-2015        |
| TX    | RICARDO                | 41-7580 | DLY                 | 27.4167  | -97.8167  | 59        | NCEI    | 1909-1975        |
| TX    | RICHARDS               | 41-7586 | DLY                 | 30.5381  | -95.8458  | 315       | NCEI    | 1954-2013        |
| TX    | RICHARDSON             | 41-7588 | DLY                 | 32.9964  | -96.7428  | 679       | NCEI    | 1946-2017        |
| TX    | RICHLAND SPRINGS       | 41-7593 | DLY                 | 31.2700  | -98.9486  | 1381      | NCEI    | 1948-2009        |
| TX    | RICHMOND               | 41-7594 | HLY                 | 29.5839  | -95.7553  | 101       | NCEI    | 1967-2013        |
| TX    | RICHMOND               | 99-7594 | DLY                 | 29.5839  | -95.7553  | 102       | NCEI    | 1935-1946        |
| TX    | RICHMOND               | 41-7594 | DLY                 | 29.5839  | -95.7553  | 102       | NCEI    | 1919-2017        |
| TX    | RICHMOND 2             | 41-7596 | HLY                 | 29.5833  | -95.7500  | 102       | NCEI    | 1964-1967        |
| TX    | RILEY BEN RANCH        | 99-7612 | DLY                 | 30.4333  | -98.8167  | 1631      | NCEI    | 1942-1948        |
| TX    | RILEY BEN RCH          | 41-7612 | DLY                 | 30.4333  | -98.8167  | 1631      | NCEI    | 1948-1965        |
| TX    | RINGGOLD               | 41-7614 | DLY                 | 33.8167  | -97.9333  | 896       | NCEI    | 1940-1994        |
| TX    | RIO GRANDE CITY        | 52-7622 | DLY                 | 26.3778  | -98.8136  | 166       | FORTS   | 1879-1891        |
| TX    | RIO GRANDE CITY        | 41-7622 | DLY                 | 26.3769  | -98.8117  | 171       | NCEI    | 1892-2017        |
| TX    | RIO GRANDE NEAR LAREDO | 85-0606 | HLY                 | 27.5000  | -99.5000  | 397       | HADS    | 2003-2017        |



| State | Station name               | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
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| TX    | RIO GRANDE VALLEY INT'L AP | 55-0034 | HLY                 | 26.2261  | -97.6617  | 35        | NCEI    | 1996-2007        |
| TX    | RIO GRANDE VILLAGE         | 41-7624 | DLY                 | 29.1853  | -102.9622 | 1857      | NCEI    | 2006-2017        |
| TX    | RIOMEDINA                  | 41-7628 | DLY                 | 29.4417  | -98.8800  | 850       | NCEI    | 1922-2017        |
| TX    | RISING STAR 1S             | 41-7633 | DLY                 | 32.0817  | -98.9658  | 1634      | NCEI    | 1942-2011        |
| TX    | RIVERSIDE                  | 41-7651 | DLY                 | 30.8500  | -95.4000  | 240       | NCEI    | 1903-1970        |
| TX    | ROANOKE                    | 41-7659 | DLY                 | 33.0050  | -97.2331  | 640       | NCEI    | 1941-2017        |
| TX    | ROBERT LEE                 | 41-7669 | DLY                 | 31.8836  | -100.5358 | 1916      | NCEI    | 1908-2017        |
| TX    | ROBERT LEE 0.5 NNE         | 69-0931 | DLY                 | 31.9024  | -100.4809 | 1870      | NCEI    | 2009-2014        |
| TX    | ROBSTOWN                   | 41-7677 | DLY                 | 27.7894  | -97.6619  | 85        | NCEI    | 1922-2017        |
| TX    | ROBY                       | 41-7678 | DLY                 | 32.7333  | -100.3833 | 1982      | NCEI    | 1893-1975        |
| TX    | ROCKDALE                   | 41-7685 | DLY                 | 30.6431  | -97.0372  | 528       | NCEI    | 1963-2016        |
| TX    | ROCKDALE 0.5 NE            | 69-2164 | DLY                 | 30.6608  | -97.0032  | 476       | NCEI    | 2008-2017        |
| TX    | ROCKLAND                   | 99-7700 | DLY                 | 31.0167  | -94.4000  | 89        | NCEI    | 1903-1940        |
| TX    | ROCKLAND 2 NW              | 41-7700 | HLY                 | 31.0167  | -94.4000  | 88        | NCEI    | 1940-1975        |
| TX    | ROCKLAND 2 NW              | 41-7700 | DLY                 | 31.0167  | -94.4000  | 89        | NCEI    | 1904-1979        |
| TX    | ROCKPORT                   | 41-7704 | DLY                 | 28.0286  | -97.0567  | 10        | NCEI    | 1959-2013        |
| TX    | ROCKPORT ARANSAS CO AP     | 79-0065 | DLY                 | 28.0836  | -97.0464  | 23        | NCEI    | 1998-2017        |
| TX    | ROCKPORT MARINE LAB        | 41-7705 | DLY                 | 28.0167  | -97.0500  | 10        | NCEI    | 1901-1958        |
| TX    | ROCKSPRINGS                | 41-7706 | 15M                 | 30.0239  | -100.2119 | 2382      | NCEI    | 1975-2013        |
| TX    | ROCKSPRINGS                | 41-7706 | HLY                 | 30.0239  | -100.2119 | 2382      | NCEI    | 1940-2013        |
| TX    | ROCKSPRINGS                | 41-7706 | DLY                 | 30.0239  | -100.2119 | 2382      | NCEI    | 1894-2014        |
| TX    | ROCKSPRINGS 17.2 SW        | 69-1221 | DLY                 | 29.8355  | -100.4084 | 1886      | NCEI    | 1998-2015        |
| TX    | ROCKSPRINGS 18 SW          | 41-7712 | DLY                 | 29.7902  | -100.4151 | 1726      | NCEI    | 1963-1993        |
| TX    | ROCKSPRINGS 2              | 41-7718 | HLY                 | 30.0167  | -100.2000 | 2421      | NCEI    | 1971-1975        |
| TX    | ROCKWALL                   | 89-0089 | DLY                 | 32.9364  | -96.4592  | 547       | TEN     | 2012-2016        |
| TX    | ROCKWALL                   | 41-7707 | DLY                 | 32.9331  | -96.4647  | 545       | NCEI    | 1941-2009        |
| TX    | ROCKWALL                   | 41-7708 | DLY                 | 32.9327  | -96.4584  | 600       | NCEI    | 1950-1956        |
| TX    | ROCKWALL 0.8 WNW           | 69-2315 | DLY                 | 32.9270  | -96.4701  | 479       | NCEI    | 2007-2015        |
| TX    | ROSCOE                     | 41-7743 | DLY                 | 32.4481  | -100.5264 | 2379      | NCEI    | 1935-2017        |
| TX    | ROSEBUD                    | 41-7744 | DLY                 | 31.0736  | -96.9789  | 410       | NCEI    | 1965-2015        |
| TX    | ROSSER                     | 41-7773 | DLY                 | 32.4611  | -96.4494  | 364       | NCEI    | 1941-2017        |
| TX    | ROTAN                      | 41-7782 | DLY                 | 32.8556  | -100.4611 | 1936      | NCEI    | 1924-2017        |
| TX    | ROUND MTN                  | 41-7787 | DLY                 | 30.4247  | -98.3492  | 1289      | NCEI    | 1958-2011        |

| State | Station name                   | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
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| TX    | ROUND ROCK 3 NE                | 41-7791 | DLY                 | 30.5414  | -97.6350  | 722       | NCEI    | 1968-2015        |
| TX    | RUNGE                          | 41-7836 | DLY                 | 28.8297  | -97.7133  | 295       | NCEI    | 1895-2017        |
| TX    | RUSK                           | 41-7841 | DLY                 | 31.8092  | -95.1428  | 696       | NCEI    | 1942-2017        |
| TX    | S MAYDE CK AT MORTON RD        | 60-0129 | 15M                 | 29.8171  | -95.7411  | 113       | HCFC    | 2014-2017        |
| TX    | SABINAL                        | 41-7873 | DLY                 | 29.3283  | -99.4653  | 955       | NCEI    | 1903-2017        |
| TX    | SALT FLAT                      | 41-7920 | DLY                 | 31.7456  | -105.0806 | 3724      | NCEI    | 1978-1998        |
| TX    | SALT FLAT CAA AP               | 41-7922 | HLY                 | 31.7500  | -105.0833 | 3717      | NCEI    | 1942-1955        |
| TX    | SALT FLAT CAA AP               | 79-0122 | DLY                 | 31.7500  | -105.0833 | 3717      | NCEI    | 1946-1957        |
| TX    | SAM RAYBURN DAM                | 66-7936 | 15M                 | 31.0619  | -94.1011  | 189       | NCEI    | 2013-2017        |
| TX    | SAM RAYBURN DAM                | 41-7936 | 15M                 | 31.0619  | -94.1011  | 189       | NCEI    | 1979-2013        |
| TX    | SAM RAYBURN DAM                | 41-7936 | HLY                 | 31.0619  | -94.1011  | 189       | NCEI    | 1968-2013        |
| TX    | SAM RAYBURN DAM                | 41-7936 | DLY                 | 31.0619  | -94.1011  | 190       | NCEI    | 1968-2017        |
| TX    | SAN ANGELO                     | 79-0110 | DLY                 | 31.3711  | -100.4922 | 1890      | NCEI    | 1907-2017        |
| TX    | SAN ANGELO 2.2 WSW             | 69-2400 | DLY                 | 31.4318  | -100.4853 | 1880      | NCEI    | 2011-2017        |
| TX    | SAN ANGELO DAM                 | 41-7940 | DLY                 | 31.4667  | -100.4833 | 1962      | NCEI    | 1953-1975        |
| TX    | SAN ANGELO MATHIS FLD          | 41-7943 | HLY                 | 31.3517  | -100.4950 | 1916      | NCEI    | 1948-2013        |
| TX    | SAN ANGELO REGIONAL/MATHS FIEL | 55-0100 | HLY                 | 31.3517  | -100.4950 | 1916      | NCEI    | 1996-2007        |
| TX    | SAN ANGELO REGIONAL/MATHS FIEL | 56-0179 | HLY                 | 31.3510  | -100.4940 | 1892      | NCEI    | 2007-2017        |
| TX    | SAN ANGELO WFO                 | 66-7944 | 15M                 | 31.3705  | -100.4941 | 1900      | NCEI    | 2013-2018        |
| TX    | SAN ANGELO WFO                 | 41-7944 | DLY                 | 31.3706  | -100.4942 | 1900      | NCEI    | 1947-2017        |
| TX    | SAN ANTONIO                    | 52-7950 | DLY                 | 29.4258  | -98.4900  | 641       | FORTS   | 1849-1892        |
| TX    | SAN ANTONIO                    | 52-7954 | DLY                 | 29.4239  | -98.4936  | 645       | FORTS   | 1870-1873        |
| TX    | SAN ANTONIO INT'L AP           | 41-7945 | HLY                 | 29.5442  | -98.4839  | 789       | NCEI    | 1941-2013        |
| TX    | SAN ANTONIO INTL AP            | 78-0068 | 15M                 | 29.5443  | -98.4839  | 789       | NCEI    | 2000-2017        |
| TX    | SAN ANTONIO INTL AP            | 79-0045 | DLY                 | 29.5442  | -98.4839  | 791       | NCEI    | 1946-2017        |
| TX    | SAN ANTONIO KELLY AFB          | 79-0037 | DLY                 | 29.3833  | -98.5833  | 682       | NCEI    | 1949-1970        |
| TX    | SAN ANTONIO NURSERY            | 41-7948 | HLY                 | 29.3000  | -98.4667  | 591       | NCEI    | 1944-1968        |
| TX    | SAN ANTONIO NURSERY            | 41-7948 | DLY                 | 29.3000  | -98.4667  | 591       | NCEI    | 1893-1951        |
| TX    | SAN ANTONIO STINSON AP         | 41-8653 | HLY                 | 29.3389  | -98.4719  | 571       | NCEI    | 2002-2013        |
| TX    | SAN ANTONIO STINSON AP         | 79-0063 | DLY                 | 29.3389  | -98.4719  | 571       | NCEI    | 1998-2017        |
| TX    | SAN ANTONIO WB CITY            | 99-0002 | HLY                 | 29.4245  | -98.4919  | 653       | NCEI    | 1902-1941        |
| TX    | SAN AUGUSTINE                  | 41-7951 | HLY                 | 31.5069  | -94.1072  | 310       | NCEI    | 1962-1978        |
| TX    | SAN AUGUSTINE                  | 41-7951 | DLY                 | 31.5069  | -94.1072  | 312       | NCEI    | 1909-2017        |

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| TX    | SAN BENITO                 | 41-7952 | DLY                 | 26.1333  | -97.6333  | 39        | NCEI    | 1920-1975        |
| TX    | SAN BENITO 0.6 SSE         | 69-1126 | DLY                 | 26.1301  | -97.6306  | 33        | NCEI    | 2012-2015        |
| TX    | SAN JACINTO RVR AT US 59   | 60-0067 | 15M                 | 30.0265  | -95.2582  | 43        | HCFC    | 1986-2017        |
| TX    | SAN JACINTO RVR AT US 90   | 60-0064 | 15M                 | 29.8764  | -95.0936  | 2         | HCFC    | 1986-2017        |
| TX    | SAN MARCOS                 | 99-7983 | DLY                 | 29.8833  | -97.9494  | 666       | NCEI    | 1897-1901        |
| TX    | SAN MARCOS                 | 41-7983 | DLY                 | 29.8833  | -97.9494  | 666       | NCEI    | 1893-2017        |
| TX    | SAN SABA                   | 41-7992 | DLY                 | 31.1966  | -98.7164  | 1194      | NCEI    | 1901-2000        |
| TX    | SAN SABA 0.4 E             | 69-2376 | DLY                 | 31.1960  | -98.7187  | 1204      | NCEI    | 2008-2015        |
| TX    | SAN SABA 1.5 E             | 69-2377 | DLY                 | 31.1972  | -98.6997  | 1201      | NCEI    | 2008-2015        |
| TX    | SAN SABA 15 ESE            | 63-0053 | HLY                 | 31.1577  | -98.4725  | 1326      | LCRA    | 1991-2018        |
| TX    | SAN SABA RIVER AT SAN SABA | 63-0041 | HLY                 | 31.2139  | -98.7197  | 1200      | LCRA    | 1988-2018        |
| TX    | SAN SABA RIVER AT SAN SABA | 85-0814 | HLY                 | 31.2131  | -98.7192  | 1220      | HADS    | 1999-2017        |
| TX    | SANDERSON                  | 41-8022 | HLY                 | 30.1414  | -102.3917 | 2788      | NCEI    | 1942-2013        |
| TX    | SANDERSON                  | 41-8022 | DLY                 | 30.1414  | -102.3917 | 2789      | NCEI    | 1897-2013        |
| TX    | SANDERSON 5 NNW            | 41-8023 | 15M                 | 30.2156  | -102.4164 | 3080      | NCEI    | 1982-2008        |
| TX    | SANDERSON 5 NNW            | 41-8023 | HLY                 | 30.2156  | -102.4164 | 3080      | NCEI    | 1947-2008        |
| TX    | SANDERSON 5 NNW            | 41-8023 | DLY                 | 30.2156  | -102.4164 | 3081      | NCEI    | 1947-1951        |
| TX    | SANDY CRK NR KINGSLAND     | 63-0133 | HLY                 | 30.5577  | -98.4722  | 875       | LCRA    | 1988-2018        |
| TX    | SANGER                     | 41-8043 | DLY                 | 33.3633  | -97.1744  | 676       | NCEI    | 1941-1999        |
| TX    | SANGER 1.8 WSW             | 69-1191 | DLY                 | 33.3504  | -97.2063  | 692       | NCEI    | 2008-2017        |
| TX    | SANTA ANNA                 | 66-8047 | 15M                 | 31.7427  | -99.3105  | 1745      | NCEI    | 2013-2018        |
| TX    | SANTA ANNA                 | 41-8047 | 15M                 | 31.7428  | -99.3106  | 1745      | NCEI    | 1980-2013        |
| TX    | SANTA ANNA                 | 41-8047 | HLY                 | 31.7428  | -99.3106  | 1745      | NCEI    | 1940-2013        |
| TX    | SARITA 7 E                 | 66-8081 | 15M                 | 27.2169  | -97.6955  | 38        | NCEI    | 2014-2018        |
| TX    | SARITA 7 E                 | 41-8081 | 15M                 | 27.2169  | -97.6956  | 38        | NCEI    | 1978-2013        |
| TX    | SARITA 7 E                 | 41-8081 | HLY                 | 27.2169  | -97.6956  | 38        | NCEI    | 1941-2013        |
| TX    | SARITA 7 E                 | 41-8081 | DLY                 | 27.2169  | -97.6956  | 39        | NCEI    | 1899-2017        |
| TX    | SCHERTZ 2.2 N              | 69-1425 | DLY                 | 29.5856  | -98.2554  | 764       | NCEI    | 2008-2017        |
| TX    | SCHOLES FIELD              | 55-0043 | HLY                 | 29.2650  | -94.8600  | 54        | NCEI    | 1996-2007        |
| TX    | SCHOLES INTL AT GLSTON APT | 56-0111 | HLY                 | 29.2650  | -94.8600  | 9         | NCEI    | 2007-2017        |
| TX    | SCHULENBURG                | 41-8126 | DLY                 | 29.6825  | -96.8564  | 289       | NCEI    | 1926-2017        |
| TX    | SEALY                      | 41-8160 | DLY                 | 29.7714  | -96.1456  | 197       | NCEI    | 1910-2003        |
| TX    | SEALY 0.3 WNW              | 69-0550 | DLY                 | 29.7757  | -96.1581  | 194       | NCEI    | 2007-2017        |

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| TX    | SECO CREEK AT MILLER RANCH     | 87-0031 | DLY                 | 29.5731  | -99.4028  | 1283      | USBR    | 2006-2016        |
| TX    | SEGUIN                         | 41-8186 | DLY                 | 29.5833  | -97.9500  | 512       | NCEI    | 1922-1972        |
| TX    | SEGUIN 1 SSW                   | 41-8187 | DLY                 | 29.5519  | -97.9697  | 502       | NCEI    | 1992-2017        |
| TX    | SEMINOLE                       | 41-8201 | DLY                 | 32.7131  | -102.6597 | 3337      | NCEI    | 1922-2017        |
| TX    | SEYMOUR 3NW                    | 41-8221 | DLY                 | 33.6325  | -99.2897  | 1302      | NCEI    | 1905-2017        |
| TX    | SH 6 -SH 290                   | 60-0235 | 15M                 | 30.1144  | -96.0756  | 231       | HCFCDD  | 2002-2017        |
| TX    | SHAMROCK                       | 41-8235 | DLY                 | 35.2000  | -100.2500 | 2323      | NCEI    | 1929-1987        |
| TX    | SHAMROCK 2                     | 41-8236 | DLY                 | 35.2150  | -100.2503 | 2359      | NCEI    | 1962-2017        |
| TX    | SHEFFIELD                      | 41-8252 | 15M                 | 30.6886  | -101.8272 | 2175      | NCEI    | 1978-2013        |
| TX    | SHEFFIELD                      | 41-8252 | HLY                 | 30.6886  | -101.8272 | 2175      | NCEI    | 1942-2013        |
| TX    | SHEFFIELD                      | 41-8252 | DLY                 | 30.6886  | -101.8272 | 2175      | NCEI    | 1938-2011        |
| TX    | SHEPHERD 2 SE                  | 41-8265 | HLY                 | 30.4833  | -95.0000  | 180       | NCEI    | 1940-1965        |
| TX    | SHEPPARD AFB/WICHITA FALLS MUN | 56-0164 | HLY                 | 33.9786  | -98.4928  | 1030      | NCEI    | 2007-2017        |
| TX    | SHERMAN                        | 41-8274 | DLY                 | 33.7033  | -96.6419  | 860       | NCEI    | 1897-2017        |
| TX    | SHOAL CREEK AT W 45TH STREET   | 65-0064 | 15M                 | 30.3187  | -97.7489  | 602       | COA     | 1987-2017        |
| TX    | SIERRA BLANCA 0.7 NNE          | 69-1574 | DLY                 | 31.1836  | -105.3517 | 4551      | NCEI    | 2013-2013        |
| TX    | SIERRA BLANCA 2 E              | 41-8305 | HLY                 | 31.1831  | -105.3542 | 4590      | NCEI    | 1942-2007        |
| TX    | SIERRA BLANCA 2 E              | 41-8305 | DLY                 | 31.1831  | -105.3542 | 4590      | NCEI    | 1893-2002        |
| TX    | SILVER VALLEY                  | 41-8326 | DLY                 | 31.9550  | -99.5439  | 2011      | NCEI    | 1973-2017        |
| TX    | SILVERTON                      | 41-8323 | DLY                 | 34.4722  | -101.3006 | 3281      | NCEI    | 1925-2017        |
| TX    | SIMMS 3 W                      | 41-8333 | DLY                 | 33.3500  | -94.5500  | 322       | NCEI    | 1981-1981        |
| TX    | SIMMS 4 WNW                    | 41-8335 | HLY                 | 33.3667  | -94.5667  | 322       | NCEI    | 1944-1973        |
| TX    | SIMMS 4 WNW                    | 41-8335 | DLY                 | 33.3667  | -94.5667  | 322       | NCEI    | 1948-1973        |
| TX    | SINTON                         | 41-8354 | DLY                 | 28.0353  | -97.4972  | 52        | NCEI    | 1921-2017        |
| TX    | SISTERDALE                     | 41-8358 | DLY                 | 29.9756  | -98.7217  | 1325      | NCEI    | 1988-2017        |
| TX    | SITE 1-RESERVOIR               | 85-0310 | HLY                 | 29.7697  | -95.6469  | 89        | HADS    | 1995-2017        |
| TX    | SLATON                         | 41-8373 | DLY                 | 33.4367  | -101.6472 | 3081      | NCEI    | 1949-2017        |
| TX    | SLIDELL                        | 41-8378 | DLY                 | 33.3583  | -97.3933  | 984       | NCEI    | 1947-2000        |
| TX    | SLOAN                          | 41-8382 | DLY                 | 31.1561  | -98.9173  | 1302      | NCEI    | 1935-1975        |
| TX    | SMITH BROTHERS RCH             | 41-8400 | HLY                 | 30.4833  | -104.1000 | 5300      | NCEI    | 1942-1949        |
| TX    | SMITHSONS VALLEY               | 41-8414 | DLY                 | 29.8167  | -98.3333  | 1302      | NCEI    | 1946-1955        |
| TX    | SMITHVILLE                     | 41-8415 | DLY                 | 30.0067  | -97.1689  | 341       | NCEI    | 1917-2017        |
| TX    | SNYDER                         | 41-8433 | DLY                 | 32.7100  | -100.9111 | 2320      | NCEI    | 1911-2017        |

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| TX    | SOCORRO                        | 41-8435 | DLY                 | 31.6500  | -106.2833 | 3661      | NCEI    | 1918-1950        |
| TX    | SOCORRO 3.5 NW                 | 69-1274 | DLY                 | 31.6716  | -106.3142 | 3675      | NCEI    | 2012-2017        |
| TX    | SOMERVILLE                     | 41-8445 | HLY                 | 30.3500  | -96.5167  | 249       | NCEI    | 1940-1963        |
| TX    | SOMERVILLE                     | 41-8445 | DLY                 | 30.3500  | -96.5167  | 249       | NCEI    | 1908-1951        |
| TX    | SOMERVILLE DAM                 | 41-8446 | HLY                 | 30.3367  | -96.5403  | 263       | NCEI    | 1963-1994        |
| TX    | SOMERVILLE DAM                 | 41-8446 | DLY                 | 30.3367  | -96.5403  | 262       | NCEI    | 1963-2017        |
| TX    | SOMERVILLE LAKE                | 85-0802 | HLY                 | 30.3167  | -96.5333  | 226       | HADS    | 1995-2017        |
| TX    | SONORA                         | 54-0210 | DLY                 | 30.2613  | -100.5551 | 2283      | NADP    | 1984-2015        |
| TX    | SONORA                         | 41-8449 | DLY                 | 30.5831  | -100.6503 | 2139      | NCEI    | 1902-2017        |
| TX    | SONORA EXP ST                  | 41-8450 | DLY                 | 30.2667  | -100.5667 | 2285      | NCEI    | 1959-1964        |
| TX    | SOUTH LLANO RIVER AT TELEGRAPH | 63-0078 | HLY                 | 30.3234  | -99.9058  | 1839      | LCRA    | 2007-2018        |
| TX    | SOUTH WICHITA RIVER NR BENJAMI | 85-0328 | HLY                 | 33.6500  | -99.8000  | 1358      | HADS    | 1995-2017        |
| TX    | SOUTHEAST TEXAS REGIONAL AIRPO | 56-0106 | HLY                 | 29.9506  | -94.0206  | 16        | NCEI    | 2007-2017        |
| TX    | SPEAKS 2                       | 41-8519 | DLY                 | 29.2728  | -96.6858  | 144       | NCEI    | 1967-2017        |
| TX    | SPEARMAN                       | 41-8523 | DLY                 | 36.1981  | -101.1847 | 3094      | NCEI    | 1920-2003        |
| TX    | SPICEWOOD                      | 66-8531 | 15M                 | 30.4827  | -98.1597  | 850       | NCEI    | 2013-2017        |
| TX    | SPICEWOOD                      | 41-8531 | 15M                 | 30.4828  | -98.1597  | 850       | NCEI    | 1984-2013        |
| TX    | SPICEWOOD                      | 41-8531 | HLY                 | 30.4828  | -98.1597  | 850       | NCEI    | 1968-2013        |
| TX    | SPICEWOOD                      | 41-8531 | DLY                 | 30.4828  | -98.1597  | 850       | NCEI    | 1968-2017        |
| TX    | SPICEWOOD 2 NNE                | 63-0147 | 15M                 | 30.4977  | -98.1483  | 821       | LCRA    | 2005-2018        |
| TX    | SPICEWOOD 2 NNE                | 63-0147 | HLY                 | 30.4977  | -98.1483  | 821       | LCRA    | 2004-2018        |
| TX    | SPRING BRANCH 2SE              | 66-8544 | 15M                 | 29.8652  | -98.3796  | 1005      | NCEI    | 2013-2017        |
| TX    | SPRING BRANCH 2SE              | 41-8544 | 15M                 | 29.8653  | -98.3797  | 1005      | NCEI    | 1988-2013        |
| TX    | SPRING BRANCH 2SE              | 41-8544 | HLY                 | 29.8653  | -98.3797  | 1005      | NCEI    | 1988-2013        |
| TX    | SPRING BRANCH 2SE              | 41-8544 | DLY                 | 29.8653  | -98.3797  | 1004      | NCEI    | 1956-2017        |
| TX    | SPRING BRANCH AT BINGLE RD     | 60-0141 | 15M                 | 29.7963  | -95.5004  | 72        | HCFC    | 1996-2017        |
| TX    | SPRINGTOWN 4 S                 | 66-8563 | 15M                 | 32.9086  | -97.6786  | 1053      | NCEI    | 2013-2017        |
| TX    | SPRINGTOWN 4 S                 | 41-8563 | 15M                 | 32.9086  | -97.6786  | 1053      | NCEI    | 1977-2013        |
| TX    | SPRINGTOWN 4 S                 | 41-8563 | HLY                 | 32.9086  | -97.6786  | 1053      | NCEI    | 1977-2013        |
| TX    | SPUR                           | 41-8566 | HLY                 | 33.4792  | -100.8761 | 2297      | NCEI    | 1947-1964        |
| TX    | SPUR                           | 41-8566 | DLY                 | 33.4792  | -100.8761 | 2297      | NCEI    | 1911-2017        |
| TX    | SPUR (NEAR)                    | 41-8567 | HLY                 | 33.4833  | -100.9000 | 2311      | NCEI    | 1940-1946        |
| TX    | STAMFORD 1                     | 66-8583 | 15M                 | 32.9402  | -99.8036  | 1640      | NCEI    | 2013-2018        |

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| TX    | STAMFORD 1                     | 41-8583 | 15M                 | 32.9403  | -99.8036  | 1640      | NCEI    | 1980-2013        |
| TX    | STAMFORD 1                     | 41-8583 | HLY                 | 32.9403  | -99.8036  | 1640      | NCEI    | 1947-2013        |
| TX    | STAMFORD 1                     | 41-8583 | DLY                 | 32.9403  | -99.8036  | 1640      | NCEI    | 1911-2017        |
| TX    | STAMFORD 2                     | 41-8584 | 15M                 | 32.9500  | -99.8000  | 1601      | NCEI    | 1971-1980        |
| TX    | STAMFORD 2                     | 41-8584 | HLY                 | 32.9500  | -99.8000  | 1601      | NCEI    | 1940-1980        |
| TX    | STATE HIGHWAY 365 - GREEN POND | 82-5400 | 15M                 | 29.9453  | -94.3261  | 20        | DD6     | 1991-2017        |
| TX    | STATE HWY 124 - HILLEBRANDT BA | 82-2300 | 15M                 | 30.0358  | -94.1489  | 16        | DD6     | 1993-2017        |
| TX    | STEPHENVILLE                   | 66-8623 | 15M                 | 32.2313  | -98.2319  | 1290      | NCEI    | 2013-2017        |
| TX    | STEPHENVILLE                   | 41-8623 | 15M                 | 32.2314  | -98.2319  | 1290      | NCEI    | 1978-2013        |
| TX    | STEPHENVILLE                   | 41-8623 | HLY                 | 32.2314  | -98.2319  | 1290      | NCEI    | 1940-2013        |
| TX    | STEPHENVILLE                   | 79-0028 | DLY                 | 32.2314  | -98.2319  | 1289      | NCEI    | 1918-2016        |
| TX    | STEPHENVILLE 7 WSW             | 41-8625 | HLY                 | 32.1667  | -98.3167  | 1450      | NCEI    | 1947-1975        |
| TX    | STERLING CITY                  | 66-8630 | 15M                 | 31.8347  | -100.9827 | 2280      | NCEI    | 2013-2018        |
| TX    | STERLING CITY                  | 41-8630 | 15M                 | 31.8347  | -100.9828 | 2280      | NCEI    | 1984-2013        |
| TX    | STERLING CITY                  | 41-8630 | HLY                 | 31.8347  | -100.9828 | 2280      | NCEI    | 1977-2013        |
| TX    | STERLING CITY                  | 41-8630 | DLY                 | 31.8347  | -100.9828 | 2280      | NCEI    | 1926-2017        |
| TX    | STERLING CITY 8 NE             | 41-8631 | HLY                 | 31.9186  | -100.8786 | 2710      | NCEI    | 1949-1977        |
| TX    | STERLING CITY 8 NE             | 41-8631 | DLY                 | 31.9186  | -100.8786 | 2710      | NCEI    | 1949-2007        |
| TX    | STILLHOUSE HOLLOW DAM          | 66-8646 | 15M                 | 31.0372  | -97.5283  | 706       | NCEI    | 2013-2017        |
| TX    | STILLHOUSE HOLLOW DAM          | 41-8646 | 15M                 | 31.0372  | -97.5283  | 706       | NCEI    | 1984-2013        |
| TX    | STILLHOUSE HOLLOW DAM          | 41-8646 | HLY                 | 31.0372  | -97.5283  | 706       | NCEI    | 1964-2013        |
| TX    | STILLHOUSE HOLLOW DAM          | 41-8646 | DLY                 | 31.0372  | -97.5283  | 705       | NCEI    | 1963-2017        |
| TX    | STINNETT                       | 41-8647 | HLY                 | 35.8185  | -101.4425 | 3130      | NCEI    | 1959-1992        |
| TX    | STINNETT                       | 41-8647 | DLY                 | 35.8185  | -101.4425 | 3130      | NCEI    | 1929-1944        |
| TX    | STINSON MINICIPAL AIRPORT      | 55-0055 | HLY                 | 29.3389  | -98.4720  | 577       | NCEI    | 1998-2007        |
| TX    | STINSON MINICIPAL AIRPORT      | 56-0127 | HLY                 | 29.3370  | -98.4710  | 577       | NCEI    | 2007-2017        |
| TX    | STOCKDALE 6N                   | 41-8658 | DLY                 | 29.3258  | -97.9753  | 531       | NCEI    | 1940-2017        |
| TX    | STRATFORD                      | 41-8692 | DLY                 | 36.4414  | -102.0775 | 3602      | NCEI    | 1911-2017        |
| TX    | STRAWN 8 NNE                   | 41-8696 | DLY                 | 32.6592  | -98.4678  | 1181      | NCEI    | 1949-2017        |
| TX    | STUDY BUTTE                    | 41-8714 | DLY                 | 29.3286  | -103.5531 | 2562      | NCEI    | 1993-2007        |
| TX    | SUBSTN 14                      | 41-8721 | DLY                 | 30.2667  | -100.5833 | 2268      | NCEI    | 1922-1952        |
| TX    | SUGAR LAND                     | 41-8728 | DLY                 | 29.6219  | -95.6567  | 85        | NCEI    | 1893-2013        |
| TX    | SUGAR LAND .5 SE               | 69-1325 | DLY                 | 29.6107  | -95.6335  | 95        | NCEI    | 2007-2017        |

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| TX    | SUGAR LAND MUNI/HULL FIELD   | 55-0061 | HLY                 | 29.6219  | -95.6567  | 82        | NCEI    | 2000-2007        |
| TX    | SUGAR LAND REGIONAL ARPT     | 56-0134 | HLY                 | 29.6219  | -95.6567  | 82        | NCEI    | 2007-2017        |
| TX    | SUGAR LAND REGIONAL ARPT     | 64-0315 | HLY                 | 29.6220  | -95.6570  | 84        | NCEI    | 2005-2016        |
| TX    | SULPHUR SPRINGS              | 41-8743 | 15M                 | 33.1481  | -95.6269  | 495       | NCEI    | 1978-2013        |
| TX    | SULPHUR SPRINGS              | 41-8743 | HLY                 | 33.1481  | -95.6269  | 495       | NCEI    | 1941-2013        |
| TX    | SULPHUR SPRINGS              | 41-8743 | DLY                 | 33.1481  | -95.6269  | 495       | NCEI    | 1893-2017        |
| TX    | SUNRAY 4 SW                  | 41-8761 | HLY                 | 35.9667  | -101.8667 | 3543      | NCEI    | 1955-1984        |
| TX    | SUNRAY 4 SW                  | 41-8761 | DLY                 | 35.9667  | -101.8667 | 3543      | NCEI    | 1932-1984        |
| TX    | SWAN 4 NW                    | 66-8778 | 15M                 | 32.4561  | -95.4230  | 450       | NCEI    | 2013-2017        |
| TX    | SWAN 4 NW                    | 41-8778 | 15M                 | 32.4561  | -95.4231  | 450       | NCEI    | 1974-2013        |
| TX    | SWAN 4 NW                    | 41-8778 | HLY                 | 32.4561  | -95.4231  | 450       | NCEI    | 1957-2013        |
| TX    | SWEETWATER CREEK             | 85-0597 | HLY                 | 35.4667  | -100.1206 | 2290      | HADS    | 1995-2017        |
| TX    | SWEETWATER CREEK NEAR KELTON | 87-0038 | HLY                 | 35.4667  | -100.1206 | 2276      | USBR    | 1989-2016        |
| TX    | TAHOKA                       | 41-8818 | DLY                 | 33.1714  | -101.7981 | 3120      | NCEI    | 1913-2017        |
| TX    | TAMPICO                      | 41-8833 | DLY                 | 34.4667  | -100.8167 | 2251      | NCEI    | 1940-1984        |
| TX    | TARPLEY                      | 41-8845 | 15M                 | 29.6675  | -99.2883  | 1390      | NCEI    | 1976-2013        |
| TX    | TARPLEY                      | 41-8845 | HLY                 | 29.6675  | -99.2883  | 1390      | NCEI    | 1940-2013        |
| TX    | TARPLEY                      | 99-8845 | DLY                 | 29.6675  | -99.2883  | 1391      | NCEI    | 1978-1996        |
| TX    | TARPLEY                      | 41-8845 | DLY                 | 29.6675  | -99.2883  | 1391      | NCEI    | 1937-2017        |
| TX    | TASCOSA                      | 41-8852 | DLY                 | 35.5667  | -102.3000 | 3412      | NCEI    | 1941-1984        |
| TX    | TATUM                        | 41-8859 | HLY                 | 32.3000  | -94.5167  | 269       | NCEI    | 1940-1975        |
| TX    | TAYLOR                       | 99-8861 | HLY                 | 30.5689  | -97.4093  | 555       | NCEI    | 1901-1934        |
| TX    | TAYLOR                       | 41-8861 | DLY                 | 30.5700  | -97.4092  | 564       | NCEI    | 1929-2001        |
| TX    | TAYLOR 1NW                   | 41-8862 | DLY                 | 30.5844  | -97.4156  | 571       | NCEI    | 2000-2017        |
| TX    | TAYLOR RCH                   | 41-8863 | DLY                 | 30.9731  | -98.9433  | 1831      | NCEI    | 1965-2017        |
| TX    | TEAGUE RCH                   | 41-8877 | DLY                 | 30.4333  | -98.8097  | 1719      | NCEI    | 1966-2017        |
| TX    | TELEGRAPH                    | 41-8897 | DLY                 | 30.3289  | -99.9067  | 1868      | NCEI    | 1948-2009        |
| TX    | TEMPLE                       | 76-0102 | HLY                 | 31.0564  | -97.3469  | 573       | RAWS    | 2003-2015        |
| TX    | TEMPLE                       | 85-0842 | HLY                 | 31.0564  | -97.3469  | 650       | HADS    | 2004-2017        |
| TX    | TEMPLE                       | 41-8910 | DLY                 | 31.0781  | -97.3183  | 636       | NCEI    | 1893-2003        |
| TX    | TEMPLE 3 SE                  | 41-8911 | HLY                 | 31.0500  | -97.3500  | 650       | NCEI    | 1947-1968        |
| TX    | TERLINGUA                    | 41-8924 | HLY                 | 29.3486  | -103.5950 | 2633      | NCEI    | 1942-1963        |
| TX    | TERLINGUA                    | 41-8924 | DLY                 | 29.3486  | -103.5950 | 2635      | NCEI    | 1948-2017        |

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| TX    | TERRELL                       | 41-8929 | DLY                 | 32.7336  | -96.3225  | 495       | NCEI    | 1941-2017        |
| TX    | TERRELL MUNI AP               | 79-0141 | DLY                 | 32.7100  | -96.2672  | 476       | NCEI    | 1998-2017        |
| TX    | TESCO                         | 41-8939 | DLY                 | 32.5000  | -100.2500 | 2001      | NCEI    | 1944-1971        |
| TX    | TEXARKANA                     | 41-8942 | 15M                 | 33.4367  | -94.0772  | 390       | NCEI    | 1973-2013        |
| TX    | TEXARKANA                     | 41-8942 | HLY                 | 33.4367  | -94.0772  | 390       | NCEI    | 1968-2013        |
| TX    | TEXARKANA                     | 41-8942 | DLY                 | 33.4367  | -94.0772  | 390       | NCEI    | 1968-2017        |
| TX    | TEXARKANA DAM                 | 41-8944 | HLY                 | 33.3000  | -94.1667  | 282       | NCEI    | 1955-1972        |
| TX    | TEXARKANA DAM                 | 41-8944 | DLY                 | 33.3000  | -94.1667  | 282       | NCEI    | 1955-1974        |
| TX    | THOMPSONS 3 WSW               | 41-8996 | HLY                 | 29.4822  | -95.6314  | 70        | NCEI    | 1957-2010        |
| TX    | THOMPSONS 3 WSW               | 41-8996 | DLY                 | 29.4822  | -95.6314  | 69        | NCEI    | 1942-2017        |
| TX    | THORNDALE                     | 41-9001 | DLY                 | 30.6147  | -97.2086  | 476       | NCEI    | 1968-2017        |
| TX    | THORNTON 1SSE                 | 41-9004 | DLY                 | 31.3917  | -96.5656  | 476       | NCEI    | 1944-2017        |
| TX    | THREE RIVERS                  | 41-9009 | DLY                 | 28.4667  | -98.1833  | 151       | NCEI    | 1922-1987        |
| TX    | THROCKMORTON                  | 41-9014 | DLY                 | 33.1806  | -99.1897  | 1371      | NCEI    | 1924-1999        |
| TX    | THURBER 5 NE                  | 41-9015 | DLY                 | 32.5333  | -98.3333  | 965       | NCEI    | 1910-1991        |
| TX    | TIERRA BLANCA CK NR FM 1259   | 59-0001 | 15M                 | 34.8129  | -102.3899 | 3767      | NWIS    | 2013-2016        |
| TX    | TILDEN 4 SSE                  | 41-9031 | DLY                 | 28.4114  | -98.5294  | 344       | NCEI    | 1903-2010        |
| TX    | TINNIN RCH                    | 41-9037 | HLY                 | 31.3167  | -103.9833 | 3232      | NCEI    | 1942-1969        |
| TX    | TOLEDO BEND DAM               | 41-9068 | DLY                 | 31.1750  | -93.5653  | 190       | NCEI    | 1975-2005        |
| TX    | TOMBALL                       | 41-9076 | DLY                 | 30.1003  | -95.6114  | 210       | NCEI    | 1941-2014        |
| TX    | TOMBALL 2.7 ENE               | 69-1652 | DLY                 | 30.1135  | -95.5748  | 164       | NCEI    | 2012-2017        |
| TX    | TORNILLO 2 SSE                | 41-9088 | DLY                 | 31.4028  | -106.0581 | 3524      | NCEI    | 1946-2017        |
| TX    | TOW                           | 41-9099 | DLY                 | 30.8836  | -98.4708  | 1027      | NCEI    | 1978-2017        |
| TX    | TOWN BLUFF DAM                | 41-8568 | DLY                 | 30.7931  | -94.1819  | 210       | NCEI    | 1953-1970        |
| TX    | TOWN BLUFF DAM                | 41-9101 | DLY                 | 30.7931  | -94.1819  | 213       | NCEI    | 1970-2017        |
| TX    | TOYAH                         | 41-9106 | DLY                 | 31.3000  | -103.8000 | 2945      | NCEI    | 1943-1977        |
| TX    | TRA RIVERSIDE                 | 60-0194 | 15M                 | 30.8447  | -95.3992  | 198       | HCFC    | 2008-2017        |
| TX    | TRENT                         | 41-9122 | DLY                 | 32.4906  | -100.1197 | 1909      | NCEI    | 1940-2006        |
| TX    | TRENTON                       | 41-9125 | DLY                 | 33.4311  | -96.3397  | 755       | NCEI    | 1946-2017        |
| TX    | TRINIDAD 1 SW                 | 41-9136 | DLY                 | 32.1344  | -96.1053  | 240       | NCEI    | 1915-1966        |
| TX    | TRINIDAD PWR PLT              | 41-9137 | DLY                 | 32.1333  | -96.1000  | 292       | NCEI    | 1966-1990        |
| TX    | TRINITY RIVER - US 90 LIBERTY | 60-0243 | 15M                 | 30.0576  | -94.8170  | 30        | HCFC    | 1995-2017        |
| TX    | TRINITY RIVER AT RIVERSIDE    | 85-0763 | HLY                 | 30.8592  | -95.3986  | 131       | HADS    | 2006-2017        |



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| TX    | TRINITY RIVER AT TRINIDAD      | 85-0833 | HLY                 | 32.1347  | -96.1056  | 312       | HADS    | 2001-2017        |
| TX    | TROY                           | 41-9153 | DLY                 | 31.2061  | -97.2956  | 699       | NCEI    | 1940-2008        |
| TX    | TROY 3.1 SE                    | 69-0598 | DLY                 | 31.1636  | -97.2694  | 620       | NCEI    | 2011-2017        |
| TX    | TRUSCOTT 3 W                   | 66-9163 | 15M                 | 33.7570  | -99.8618  | 1571      | NCEI    | 2013-2017        |
| TX    | TRUSCOTT 3 W                   | 41-9163 | 15M                 | 33.7569  | -99.8617  | 1571      | NCEI    | 1984-2013        |
| TX    | TRUSCOTT 3 W                   | 41-9163 | HLY                 | 33.7569  | -99.8617  | 1571      | NCEI    | 1940-2013        |
| TX    | TRUSCOTT 3 W                   | 41-9163 | DLY                 | 33.7569  | -99.8617  | 1572      | NCEI    | 1948-2017        |
| TX    | TULIA                          | 41-9175 | DLY                 | 34.5475  | -101.7614 | 3481      | NCEI    | 1948-2017        |
| TX    | TULIA 6 NE                     | 41-9176 | DLY                 | 34.6000  | -101.7000 | 3504      | NCEI    | 1896-1952        |
| TX    | TURKEY                         | 41-9191 | DLY                 | 34.3956  | -100.8972 | 2329      | NCEI    | 1941-2017        |
| TX    | TURKEY CK AT FM 1959           | 60-0019 | 15M                 | 29.5845  | -95.1869  | 28        | HCFCFCD | 1986-2017        |
| TX    | TURNER RD. - DITCH 600         | 82-5100 | 15M                 | 30.0642  | -94.3153  | 34        | DD6     | 1991-2017        |
| TX    | TYLER                          | 41-9207 | DLY                 | 32.3067  | -95.2969  | 551       | NCEI    | 1984-2017        |
| TX    | TYLER POUNDS FIELD             | 55-0088 | HLY                 | 32.3542  | -95.4025  | 544       | NCEI    | 1998-2007        |
| TX    | TYLER POUNDS FLD               | 79-0093 | DLY                 | 32.3542  | -95.4025  | 545       | NCEI    | 1898-2017        |
| TX    | UMBARGER                       | 41-9224 | DLY                 | 34.9578  | -102.1044 | 3747      | NCEI    | 1941-2012        |
| TX    | UPPER A SUMP - 1200 INDUSTRIAL | 81-0040 | 15M                 | 32.7614  | -96.7961  | 403       | COD     | 1993-2016        |
| TX    | UVALDE                         | 41-9265 | DLY                 | 29.2167  | -99.7667  | 912       | NCEI    | 1905-1985        |
| TX    | UVALDE 3 SW                    | 41-9268 | DLY                 | 29.1850  | -99.8325  | 919       | NCEI    | 1985-2005        |
| TX    | VALENTINE                      | 41-9270 | 15M                 | 30.5908  | -104.4914 | 4440      | NCEI    | 1980-2013        |
| TX    | VALENTINE                      | 41-9270 | HLY                 | 30.5908  | -104.4914 | 4440      | NCEI    | 1959-2013        |
| TX    | VALENTINE                      | 41-9270 | DLY                 | 30.5908  | -104.4914 | 4439      | NCEI    | 1978-2017        |
| TX    | VALENTINE 10 WSW               | 41-9275 | DLY                 | 30.5525  | -104.6467 | 4393      | NCEI    | 1897-2017        |
| TX    | VALLEY INTERNATIONAL ARPT      | 56-0100 | HLY                 | 26.2280  | -97.6540  | 35        | NCEI    | 2007-2017        |
| TX    | VALLEY JUNCTION                | 41-9280 | DLY                 | 30.8333  | -96.6333  | 269       | NCEI    | 1902-1977        |
| TX    | VALLEY JUNCTION HEARNE         | 99-9280 | DLY                 | 30.8333  | -96.6333  | 269       | NCEI    | 1888-1946        |
| TX    | VALLEY VIEW                    | 41-9286 | DLY                 | 33.4869  | -97.1572  | 725       | NCEI    | 1947-2002        |
| TX    | VAN HORN                       | 41-9295 | DLY                 | 31.0417  | -104.8372 | 4065      | NCEI    | 1939-2017        |
| TX    | VANDERPOOL 10 N                | 41-9312 | DLY                 | 29.8451  | -99.5516  | 2264      | NCEI    | 1996-2017        |
| TX    | VANDERPOOL 10N                 | 99-9312 | DLY                 | 29.8451  | -99.5516  | 2264      | NCEI    | 1986-1996        |
| TX    | VEGA 2NW                       | 41-9330 | DLY                 | 35.2775  | -102.4633 | 3999      | NCEI    | 1923-2017        |
| TX    | VERNON                         | 41-9346 | DLY                 | 34.1517  | -99.3256  | 1211      | NCEI    | 1904-2017        |
| TX    | VICTORIA 6.4 SSW               | 69-2646 | DLY                 | 28.7423  | -97.0268  | 62        | NCEI    | 2013-2017        |

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| TX    | VICTORIA ASOS             | 41-9364 | HLY                 | 28.8614  | -96.9303  | 115       | NCEI    | 1940-2013        |
| TX    | VICTORIA CP&L             | 41-9365 | DLY                 | 28.7875  | -97.0106  | 62        | NCEI    | 1893-2003        |
| TX    | VICTORIA REGIONAL AIRPORT | 56-0105 | HLY                 | 28.8614  | -96.9303  | 117       | NCEI    | 2007-2017        |
| TX    | VICTORIA RGNL AP          | 79-0040 | DLY                 | 28.8614  | -96.9303  | 115       | NCEI    | 1953-2017        |
| TX    | VICTORIA WB AP            | 41-9363 | HLY                 | 28.7833  | -97.0833  | 115       | NCEI    | 1946-1961        |
| TX    | VICTORIA WB AP            | 79-0046 | DLY                 | 28.7833  | -97.0833  | 115       | NCEI    | 1946-1961        |
| TX    | VOSS 1 WSW                | 41-9410 | DLY                 | 31.6167  | -99.5833  | 1650      | NCEI    | 1949-1981        |
| TX    | WACO                      | 41-9421 | DLY                 | 31.5333  | -97.0667  | 381       | NCEI    | 1883-1957        |
| TX    | WACO DAM                  | 66-9417 | 15M                 | 31.6003  | -97.2169  | 495       | NCEI    | 2013-2017        |
| TX    | WACO DAM                  | 41-9417 | 15M                 | 31.6003  | -97.2169  | 495       | NCEI    | 1984-2013        |
| TX    | WACO DAM                  | 41-9417 | HLY                 | 31.6003  | -97.2169  | 495       | NCEI    | 1965-2013        |
| TX    | WACO DAM                  | 41-9417 | DLY                 | 31.6003  | -97.2169  | 495       | NCEI    | 1965-2017        |
| TX    | WACO REGIONAL AIRPORT     | 56-0160 | HLY                 | 31.6110  | -97.2290  | 508       | NCEI    | 2007-2017        |
| TX    | WACO RGNL AP              | 41-9419 | HLY                 | 31.6189  | -97.2283  | 500       | NCEI    | 1941-2013        |
| TX    | WACO RGNL AP              | 79-0087 | DLY                 | 31.6189  | -97.2283  | 499       | NCEI    | 1941-2017        |
| TX    | WAELDER 7 S               | 41-9424 | DLY                 | 29.6000  | -97.3167  | 341       | NCEI    | 1944-1993        |
| TX    | WALLER                    | 41-9448 | DLY                 | 30.0486  | -95.9250  | 144       | NCEI    | 1943-1999        |
| TX    | WARREN 2 S                | 41-9480 | DLY                 | 30.5833  | -94.4000  | 112       | NCEI    | 1935-1992        |
| TX    | WASHINGTON SP             | 66-9491 | 15M                 | 30.3237  | -96.1594  | 215       | NCEI    | 2013-2018        |
| TX    | WASHINGTON SP             | 41-9491 | 15M                 | 30.3236  | -96.1594  | 215       | NCEI    | 1978-2013        |
| TX    | WASHINGTON SP             | 41-9491 | HLY                 | 30.3236  | -96.1594  | 215       | NCEI    | 1952-2013        |
| TX    | WASHINGTON SP             | 41-9491 | DLY                 | 30.3236  | -96.1594  | 217       | NCEI    | 1915-2017        |
| TX    | WATER VALLEY              | 66-9499 | 15M                 | 31.6725  | -100.7283 | 2120      | NCEI    | 2013-2018        |
| TX    | WATER VALLEY              | 41-9499 | 15M                 | 31.6725  | -100.7283 | 2120      | NCEI    | 1971-2013        |
| TX    | WATER VALLEY              | 41-9499 | HLY                 | 31.6725  | -100.7283 | 2120      | NCEI    | 1953-2013        |
| TX    | WATER VALLEY              | 41-9499 | DLY                 | 31.6725  | -100.7283 | 2119      | NCEI    | 1898-2017        |
| TX    | WATER VALLEY 11 NNE       | 41-9501 | DLY                 | 31.8136  | -100.6286 | 2454      | NCEI    | 1959-2017        |
| TX    | WATSON                    | 41-9504 | DLY                 | 30.9328  | -98.0197  | 1004      | NCEI    | 1968-2017        |
| TX    | WAXAHACHIE                | 41-9522 | DLY                 | 32.4281  | -96.8422  | 627       | NCEI    | 1897-2012        |
| TX    | WAYSIDE                   | 66-9527 | 15M                 | 34.7933  | -101.5483 | 3400      | NCEI    | 2013-2017        |
| TX    | WAYSIDE                   | 41-9527 | 15M                 | 34.7933  | -101.5483 | 3400      | NCEI    | 1971-2013        |
| TX    | WAYSIDE                   | 41-9527 | HLY                 | 34.7933  | -101.5483 | 3400      | NCEI    | 1941-2013        |
| TX    | WEATHERFORD               | 66-9532 | 15M                 | 32.7483  | -97.7700  | 955       | NCEI    | 2013-2017        |

| State | Station name              | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|---------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | WEATHERFORD               | 41-9532 | 15M                 | 32.7483  | -97.7700  | 955       | NCEI    | 1971-2013        |
| TX    | WEATHERFORD               | 41-9532 | HLY                 | 32.7483  | -97.7700  | 955       | NCEI    | 1947-2013        |
| TX    | WEATHERFORD               | 99-9532 | DLY                 | 32.7483  | -97.7700  | 955       | NCEI    | 1883-1901        |
| TX    | WEATHERFORD               | 41-9532 | DLY                 | 32.7483  | -97.7700  | 955       | NCEI    | 1902-2017        |
| TX    | WEBBERVILLE ROAD          | 65-0089 | 15M                 | 30.2636  | -97.7126  | 473       | COA     | 1986-2017        |
| TX    | WELDER WILDLIFE FNDN      | 41-9559 | DLY                 | 28.1136  | -97.4178  | 49        | NCEI    | 1964-2017        |
| TX    | WELLINGTON                | 41-9565 | 15M                 | 34.8422  | -100.2103 | 2040      | NCEI    | 1985-2013        |
| TX    | WELLINGTON                | 41-9565 | HLY                 | 34.8422  | -100.2103 | 2040      | NCEI    | 1949-2013        |
| TX    | WELLINGTON                | 41-9565 | DLY                 | 34.8422  | -100.2103 | 2041      | NCEI    | 1912-2017        |
| TX    | WELLINGTON 2              | 41-9570 | 15M                 | 34.8500  | -100.2167 | 2031      | NCEI    | 1971-1983        |
| TX    | WELLINGTON 2              | 41-9570 | HLY                 | 34.8500  | -100.2167 | 2031      | NCEI    | 1971-1983        |
| TX    | WESLACO                   | 66-9588 | 15M                 | 26.1780  | -97.9708  | 75        | NCEI    | 2013-2018        |
| TX    | WESLACO                   | 41-9588 | 15M                 | 26.1781  | -97.9708  | 75        | NCEI    | 1975-2013        |
| TX    | WESLACO                   | 88-2205 | HLY                 | 26.1555  | -97.9593  | 57        | SCAN    | 2013-2016        |
| TX    | WESLACO                   | 41-9588 | HLY                 | 26.1781  | -97.9708  | 75        | NCEI    | 1947-2013        |
| TX    | WESLACO                   | 41-9588 | DLY                 | 26.1781  | -97.9708  | 75        | NCEI    | 1914-2017        |
| TX    | WF TRINITY R NR JACKSBORO | 85-0568 | HLY                 | 33.2933  | -98.0786  | 915       | HADS    | 1995-2017        |
| TX    | WHARTON                   | 41-9655 | DLY                 | 29.3178  | -96.0847  | 112       | NCEI    | 1902-2017        |
| TX    | WHEELOCK                  | 41-9665 | 15M                 | 30.9003  | -96.3953  | 420       | NCEI    | 1979-2006        |
| TX    | WHEELOCK                  | 41-9665 | HLY                 | 30.9003  | -96.3953  | 420       | NCEI    | 1940-2006        |
| TX    | WHITE OAK 1 WSW           | 41-9709 | DLY                 | 32.5164  | -94.8914  | 315       | NCEI    | 2000-2005        |
| TX    | WHITNEY DAM               | 66-9715 | 15M                 | 31.8611  | -97.3750  | 574       | NCEI    | 2013-2017        |
| TX    | WHITNEY DAM               | 41-9715 | 15M                 | 31.8611  | -97.3750  | 574       | NCEI    | 1975-2013        |
| TX    | WHITNEY DAM               | 41-9715 | HLY                 | 31.8611  | -97.3750  | 574       | NCEI    | 1952-2013        |
| TX    | WHITNEY DAM               | 41-9715 | DLY                 | 31.8611  | -97.3750  | 574       | NCEI    | 1949-2017        |
| TX    | WHITSETT                  | 41-9717 | DLY                 | 28.6611  | -98.2553  | 259       | NCEI    | 1964-2015        |
| TX    | WHITSETT 3 SW             | 41-9716 | DLY                 | 28.6333  | -98.2667  | 210       | NCEI    | 1914-1964        |
| TX    | WICHITA FALLS MUNI AP     | 41-9729 | HLY                 | 33.9786  | -98.4928  | 1017      | NCEI    | 1940-2013        |
| TX    | WICHITA FALLS MUNI AP     | 79-0092 | DLY                 | 33.9786  | -98.4928  | 1017      | NCEI    | 1897-2017        |
| TX    | WICHITA VALLEY FARM 29    | 41-9730 | DLY                 | 33.9333  | -98.5833  | 961       | NCEI    | 1939-1972        |
| TX    | WILBARGER CRK NR ELGIN    | 63-0209 | HLY                 | 30.2318  | -97.4327  | 373       | LCRA    | 1994-2018        |
| TX    | WILDWOOD                  | 41-9754 | DLY                 | 30.5347  | -94.4456  | 200       | NCEI    | 1992-2016        |
| TX    | WILLS POINT               | 41-9800 | DLY                 | 32.7019  | -96.0150  | 522       | NCEI    | 1905-2017        |

| State | Station name                   | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| TX    | WILSON RCH                     | 41-9813 | DLY                 | 29.9000  | -99.6000  | 2280      | NCEI    | 1941-1962        |
| TX    | WIMBERLEY 1 NW                 | 66-9815 | 15M                 | 30.0016  | -98.1048  | 905       | NCEI    | 2013-2017        |
| TX    | WIMBERLEY 1 NW                 | 41-9815 | 15M                 | 30.0017  | -98.1047  | 905       | NCEI    | 1989-2013        |
| TX    | WIMBERLEY 1 NW                 | 41-9815 | HLY                 | 30.0017  | -98.1047  | 905       | NCEI    | 1989-2013        |
| TX    | WIMBERLEY 1 NW                 | 41-9815 | DLY                 | 30.0017  | -98.1047  | 906       | NCEI    | 1984-2017        |
| TX    | WINCHELL                       | 41-9817 | 15M                 | 31.4658  | -99.1708  | 1460      | NCEI    | 1976-2013        |
| TX    | WINCHELL                       | 41-9817 | HLY                 | 31.4658  | -99.1708  | 1460      | NCEI    | 1953-2013        |
| TX    | WINCHELL 1 WNW                 | 41-9816 | HLY                 | 31.4833  | -99.1833  | 1381      | NCEI    | 1949-1953        |
| TX    | WINCHELL 1 WNW                 | 41-9816 | DLY                 | 31.4833  | -99.1833  | 1381      | NCEI    | 1948-1965        |
| TX    | WINGATE                        | 41-9847 | DLY                 | 32.0444  | -100.1069 | 2008      | NCEI    | 1968-2017        |
| TX    | WINK                           | 41-9829 | 15M                 | 31.7667  | -103.1500 | 2790      | NCEI    | 1976-1997        |
| TX    | WINK                           | 41-9829 | HLY                 | 31.7667  | -103.1500 | 2790      | NCEI    | 1942-1997        |
| TX    | WINK FAA AP                    | 41-9830 | HLY                 | 31.7800  | -103.2017 | 2807      | NCEI    | 1947-2013        |
| TX    | WINKLER CO AP                  | 79-0112 | DLY                 | 31.7800  | -103.2017 | 2808      | NCEI    | 1938-2017        |
| TX    | WINKLER COUNTY AIRPORT         | 55-0101 | HLY                 | 31.7800  | -103.2010 | 2820      | NCEI    | 2000-2007        |
| TX    | WINKLER COUNTY AIRPORT         | 56-0180 | HLY                 | 31.7800  | -103.2010 | 2820      | NCEI    | 2007-2017        |
| TX    | WINNSBORO                      | 99-9836 | DLY                 | 32.8892  | -95.3331  | 430       | NCEI    | 1944-1947        |
| TX    | WINNSBORO 0.7 SSW              | 69-2728 | DLY                 | 32.9470  | -95.2960  | 495       | NCEI    | 2009-2017        |
| TX    | WINNSBORO 6 SW                 | 41-9836 | DLY                 | 32.8892  | -95.3331  | 430       | NCEI    | 1947-2013        |
| TX    | WINTERS 9 NNE                  | 41-9845 | DLY                 | 32.1000  | -99.9000  | 1972      | NCEI    | 1911-1968        |
| TX    | WITT RCH                       | 41-9853 | DLY                 | 32.4833  | -100.3000 | 2090      | NCEI    | 1972-1975        |
| TX    | WOLF CREEK DAM                 | 41-9858 | HLY                 | 36.2333  | -100.6667 | 2703      | NCEI    | 1941-1974        |
| TX    | WOLF CREEK DAM                 | 41-9858 | DLY                 | 36.2333  | -100.6667 | 2703      | NCEI    | 1948-1951        |
| TX    | WOLFE CITY                     | 41-9859 | DLY                 | 33.3675  | -96.0675  | 659       | NCEI    | 1944-2008        |
| TX    | WOODSBORO                      | 41-9892 | DLY                 | 28.2333  | -97.3333  | 49        | NCEI    | 1916-1964        |
| TX    | WOODSON                        | 66-9893 | 15M                 | 33.0177  | -99.0538  | 1263      | NCEI    | 2013-2018        |
| TX    | WOODSON                        | 41-9893 | 15M                 | 33.0178  | -99.0539  | 1263      | NCEI    | 1980-2013        |
| TX    | WOODSON                        | 41-9893 | HLY                 | 33.0178  | -99.0539  | 1263      | NCEI    | 1941-2013        |
| TX    | WOODSON                        | 41-9893 | DLY                 | 33.0178  | -99.0539  | 1263      | NCEI    | 1948-2017        |
| TX    | WOODY BRANCH - WESTMORELAND RD | 81-0027 | 15M                 | 32.6739  | -96.8828  | N/A       | COD     | 1991-2016        |
| TX    | WORLDS END RCH                 | 41-9904 | DLY                 | 29.9828  | -99.4290  | 1923      | NCEI    | 1976-1983        |
| TX    | WRIGHT PATMAN DM & LK          | 41-9916 | 15M                 | 33.3039  | -94.1583  | 282       | NCEI    | 1984-2013        |
| TX    | WRIGHT PATMAN DM & LK          | 41-9916 | HLY                 | 33.3039  | -94.1583  | 282       | NCEI    | 1981-2013        |

| <b>State</b> | <b>Station name</b>   | <b>SID</b> | <b>Formatting interval</b> | <b>Latitude</b> | <b>Longitude</b> | <b>Elev (ft)</b> | <b>Dataset</b> | <b>Period of record</b> |
|--------------|-----------------------|------------|----------------------------|-----------------|------------------|------------------|----------------|-------------------------|
| TX           | WRIGHT PATMAN DM & LK | 41-9916    | DLY                        | 33.3039         | -94.1583         | 282              | NCEI           | 1974-2017               |
| TX           | YOAKUM                | 41-9952    | DLY                        | 29.2739         | -97.1556         | 295              | NCEI           | 1917-2017               |
| TX           | YOAKUM 6.2 WNW        | 69-1214    | DLY                        | 29.3354         | -97.2363         | 413              | NCEI           | 2007-2017               |
| TX           | YORKTOWN              | 41-9953    | DLY                        | 28.9803         | -97.5186         | 259              | NCEI           | 1940-2012               |
| TX           | YSLETA                | 41-9966    | DLY                        | 31.6953         | -106.3217        | 3671             | NCEI           | 1939-2009               |
| TX           | ZAPATA 1 S            | 41-9976    | 15M                        | 26.8706         | -99.2536         | 320              | NCEI           | 1976-2008               |
| TX           | ZAPATA 1 S            | 41-9976    | HLY                        | 26.8706         | -99.2536         | 320              | NCEI           | 1940-2008               |
| TX           | ZAPATA 1 S            | 41-9976    | DLY                        | 26.8706         | -99.2536         | 322              | NCEI           | 1909-2014               |

Table A.1.4. Same as Table A.1.3, but for stations in Arkansas (AR), Colorado (CO), Kansas (KS), Louisiana (LA), New Mexico (NM) and in the United Mexican States (MX).

| State | Station name          | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|-----------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| AR    | AMITY 1N              | 03-0150 | DLY                 | 34.2808  | -93.4614  | 459       | NCEI    | 1896-2017        |
| AR    | ANTOINE               | 03-0178 | DLY                 | 34.0292  | -93.4211  | 285       | NCEI    | 1940-2017        |
| AR    | ANTOINE 1 SW          | 66-0178 | 15M                 | 34.0275  | -93.4332  | 300       | NCEI    | 2013-2018        |
| AR    | ANTOINE 1 SW          | 03-0178 | 15M                 | 34.0275  | -93.4333  | 300       | NCEI    | 1984-2013        |
| AR    | ANTOINE 1 SW          | 03-0178 | HLY                 | 34.0275  | -93.4333  | 300       | NCEI    | 1950-2013        |
| AR    | ASHDOWN 4 SSE         | 03-0286 | DLY                 | 33.6194  | -94.0994  | 322       | NCEI    | 1893-2017        |
| AR    | ATHENS                | 03-0300 | DLY                 | 34.3253  | -93.9811  | 961       | NCEI    | 1948-2013        |
| AR    | BIG FORK 1 SSE        | 03-0664 | DLY                 | 34.4653  | -93.9932  | 1200      | NCEI    | 1944-2017        |
| AR    | BLUFF CITY            | 76-0001 | HLY                 | 33.6922  | -93.1625  | 360       | RAWS    | 2004-2015        |
| AR    | BLUFF CITY 3 SW       | 03-0800 | DLY                 | 33.6919  | -93.1622  | 361       | NCEI    | 1941-2012        |
| AR    | BONNERDALE 1 ESE      | 03-0820 | DLY                 | 34.3811  | -93.3497  | 682       | NCEI    | 1965-2017        |
| AR    | BOUGHTON              | 03-0848 | DLY                 | 33.8667  | -93.3333  | 249       | NCEI    | 1935-1982        |
| AR    | COSSATOT RIVER        | 85-0005 | HLY                 | 34.0500  | -94.2167  | 394       | HADS    | 1995-2017        |
| AR    | COVE                  | 03-1666 | DLY                 | 34.4314  | -94.4175  | 1060      | NCEI    | 1946-2017        |
| AR    | DAISY                 | 03-1814 | HLY                 | 34.2500  | -93.7333  | 630       | NCEI    | 1948-1975        |
| AR    | DAISY                 | 03-1814 | DLY                 | 34.2500  | -93.7333  | 630       | NCEI    | 1948-1974        |
| AR    | DE QUEEN DAM          | 03-1952 | 15M                 | 34.1003  | -94.3725  | 557       | NCEI    | 1984-2008        |
| AR    | DE QUEEN DAM          | 03-1952 | HLY                 | 34.1003  | -94.3725  | 557       | NCEI    | 1973-2008        |
| AR    | DE QUEEN DAM          | 03-1952 | DLY                 | 34.1003  | -94.3725  | 558       | NCEI    | 2002-2007        |
| AR    | DE QUEEN SEVIER CO AP | 78-0027 | 15M                 | 34.0500  | -94.4008  | 355       | NCEI    | 2005-2017        |
| AR    | DE QUEEN SEVIER CO AP | 79-0144 | DLY                 | 34.0500  | -94.4008  | 354       | NCEI    | 2003-2017        |
| AR    | DEQUEEN               | 03-1948 | DLY                 | 34.0464  | -94.3481  | 407       | NCEI    | 1902-2017        |
| AR    | DIERKS                | 03-2015 | DLY                 | 34.1267  | -94.0172  | 469       | NCEI    | 1959-2017        |
| AR    | DIERKS DAM            | 03-2020 | HLY                 | 34.1475  | -94.0889  | 686       | NCEI    | 1973-2005        |
| AR    | DIERKS DAM            | 03-2020 | DLY                 | 34.1475  | -94.0889  | 686       | NCEI    | 1994-2005        |
| AR    | FOREMAN               | 03-2544 | HLY                 | 33.7222  | -94.3975  | 423       | NCEI    | 1948-2013        |
| AR    | FOREMAN               | 03-2544 | DLY                 | 33.7222  | -94.3975  | 423       | NCEI    | 1917-2017        |
| AR    | FULTON                | 03-2670 | DLY                 | 33.6128  | -93.8136  | 259       | NCEI    | 1892-2004        |
| AR    | GILLHAM DAM           | 03-2810 | 15M                 | 34.2056  | -94.2464  | 520       | NCEI    | 1971-2001        |

| State | Station name              | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|---------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| AR    | GILLHAM DAM               | 03-2810 | HLY                 | 34.2056  | -94.2464  | 520       | NCEI    | 1966-2002        |
| AR    | GLENWOOD                  | 03-2842 | DLY                 | 34.3347  | -93.5503  | 581       | NCEI    | 1935-2016        |
| AR    | GRANNIS                   | 03-2908 | DLY                 | 34.2500  | -94.3333  | 922       | NCEI    | 1919-1957        |
| AR    | GURDON                    | 03-3074 | DLY                 | 33.9167  | -93.1333  | 220       | NCEI    | 1948-1986        |
| AR    | HOPE 3 NE                 | 03-3428 | DLY                 | 33.7092  | -93.5564  | 374       | NCEI    | 1892-2017        |
| AR    | HORATIO                   | 03-3442 | DLY                 | 33.9353  | -94.3597  | 338       | NCEI    | 1946-2013        |
| AR    | J.L. HELMS SEVIER CO ARPT | 55-0124 | HLY                 | 34.0500  | -94.4008  | 355       | NCEI    | 2003-2007        |
| AR    | J.L. HELMS SEVIER CO ARPT | 56-0208 | HLY                 | 34.0470  | -94.3990  | 355       | NCEI    | 2007-2017        |
| AR    | LANGLEY                   | 03-4060 | DLY                 | 34.3244  | -93.8464  | 771       | NCEI    | 1948-2017        |
| AR    | LEWISVILLE                | 66-4185 | 15M                 | 33.3613  | -93.5674  | 340       | NCEI    | 2013-2017        |
| AR    | LEWISVILLE                | 03-4185 | 15M                 | 33.3614  | -93.5675  | 340       | NCEI    | 1991-2013        |
| AR    | LEWISVILLE                | 03-4185 | HLY                 | 33.3614  | -93.5675  | 340       | NCEI    | 1991-2013        |
| AR    | LEWISVILLE                | 03-4185 | DLY                 | 33.3614  | -93.5675  | 341       | NCEI    | 1991-2017        |
| AR    | LOCKESBURG 9.6 NNE        | 69-0041 | DLY                 | 34.1008  | -94.1136  | 479       | NCEI    | 2001-2017        |
| AR    | MAGNOLIA                  | 03-4548 | 15M                 | 33.2950  | -93.2325  | 325       | NCEI    | 1977-2013        |
| AR    | MAGNOLIA                  | 03-4548 | HLY                 | 33.2950  | -93.2325  | 325       | NCEI    | 1948-2013        |
| AR    | MAGNOLIA                  | 03-4548 | DLY                 | 33.2950  | -93.2325  | 325       | NCEI    | 1948-2017        |
| AR    | MAGNOLIA 2                | 03-4550 | 15M                 | 33.2667  | -93.2333  | 289       | NCEI    | 1971-1984        |
| AR    | MAGNOLIA 2                | 03-4550 | HLY                 | 33.2667  | -93.2333  | 289       | NCEI    | 1951-1984        |
| AR    | MENA                      | 66-4756 | 15M                 | 34.5979  | -94.2900  | 1152      | NCEI    | 2013-2018        |
| AR    | MENA                      | 03-4756 | 15M                 | 34.5731  | -94.2494  | 1130      | NCEI    | 1984-2013        |
| AR    | MENA                      | 03-4756 | HLY                 | 34.5731  | -94.2494  | 1130      | NCEI    | 1948-2013        |
| AR    | MENA                      | 03-4756 | DLY                 | 34.5731  | -94.2494  | 1129      | NCEI    | 1890-2017        |
| AR    | MILLWOOD DAM              | 03-4839 | 15M                 | 33.6772  | -93.9903  | 316       | NCEI    | 1984-2013        |
| AR    | MILLWOOD DAM              | 03-4839 | HLY                 | 33.6772  | -93.9903  | 316       | NCEI    | 1963-2013        |
| AR    | MURFREESBORO              | 03-5078 | DLY                 | 34.0667  | -93.6833  | 371       | NCEI    | 1916-1925        |
| AR    | MURFREESBORO 1W           | 03-5079 | DLY                 | 34.0783  | -93.7019  | 459       | NCEI    | 1970-2017        |
| AR    | NARROWS DAM               | 66-5110 | 15M                 | 34.1452  | -93.7138  | 435       | NCEI    | 2013-2018        |
| AR    | NARROWS DAM               | 03-5110 | 15M                 | 34.1453  | -93.7139  | 435       | NCEI    | 1971-2013        |
| AR    | NARROWS DAM               | 03-5110 | HLY                 | 34.1453  | -93.7139  | 435       | NCEI    | 1950-2013        |
| AR    | NARROWS DAM               | 03-5110 | DLY                 | 34.1453  | -93.7139  | 436       | NCEI    | 1950-2017        |
| AR    | NASHVILLE                 | 66-5112 | 15M                 | 33.9294  | -93.8583  | 400       | NCEI    | 2013-2017        |

| State | Station name                   | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| AR    | NASHVILLE                      | 03-5112 | 15M                 | 33.9294  | -93.8583  | 400       | NCEI    | 1975-2013        |
| AR    | NASHVILLE                      | 03-5112 | HLY                 | 33.9294  | -93.8583  | 400       | NCEI    | 1966-2013        |
| AR    | NASHVILLE                      | 03-5114 | HLY                 | 33.9500  | -93.8667  | 371       | NCEI    | 1948-1966        |
| AR    | NASHVILLE                      | 03-5112 | DLY                 | 33.9294  | -93.8583  | 400       | NCEI    | 1899-2017        |
| AR    | NATHAN 4 WNW                   | 03-5158 | DLY                 | 34.1167  | -93.8667  | 541       | NCEI    | 1948-1985        |
| AR    | NEWHOPE 3 E                    | 03-5174 | DLY                 | 34.2284  | -93.8300  | 850       | NCEI    | 1940-1983        |
| AR    | NEWHOPE 6 S                    | 03-5177 | DLY                 | 34.1469  | -93.8936  | 630       | NCEI    | 1985-2017        |
| AR    | OKAY                           | 03-5376 | DLY                 | 33.7667  | -93.9167  | 299       | NCEI    | 1915-1992        |
| AR    | PINEY GROVE                    | 03-5770 | DLY                 | 34.1728  | -93.2050  | 381       | NCEI    | 1966-2002        |
| AR    | PRESCOTT 2 NNW                 | 66-5908 | 15M                 | 33.8204  | -93.3879  | 308       | NCEI    | 2013-2017        |
| AR    | PRESCOTT 2 NNW                 | 03-5908 | 15M                 | 33.8203  | -93.3878  | 308       | NCEI    | 1984-2013        |
| AR    | PRESCOTT 2 NNW                 | 03-5908 | HLY                 | 33.8203  | -93.3878  | 308       | NCEI    | 1982-2013        |
| AR    | PRESCOTT 2 NNW                 | 03-5908 | DLY                 | 33.8203  | -93.3878  | 308       | NCEI    | 1890-2017        |
| AR    | PRESCOTT SCS                   | 03-5910 | HLY                 | 33.8000  | -93.3833  | 322       | NCEI    | 1948-1982        |
| AR    | RAVANA                         | 03-6016 | HLY                 | 33.0667  | -94.0333  | 249       | NCEI    | 1948-1970        |
| AR    | SALINE RIVER                   | 85-0017 | HLY                 | 33.9667  | -94.0667  | 348       | HADS    | 1995-2017        |
| AR    | SITE 2-LITTLE RIVER            | 85-0014 | HLY                 | 33.9181  | -94.3897  | 335       | HADS    | 1995-2017        |
| AR    | STAMPS                         | 03-6804 | 15M                 | 33.3667  | -93.4833  | 270       | NCEI    | 1971-1990        |
| AR    | STAMPS                         | 03-6804 | HLY                 | 33.3667  | -93.4833  | 270       | NCEI    | 1969-1990        |
| AR    | STAMPS                         | 03-6804 | DLY                 | 33.3667  | -93.4833  | 269       | NCEI    | 1897-1987        |
| AR    | TAYLOR                         | 03-7038 | DLY                 | 33.0986  | -93.4647  | 249       | NCEI    | 1943-2001        |
| AR    | TEXARKANA REGIONAL AIRPORT-WEB | 56-0168 | HLY                 | 33.4536  | -94.0074  | 399       | NCEI    | 2007-2017        |
| AR    | TEXARKANA WEBB FLD             | 78-0078 | 15M                 | 33.4536  | -94.0074  | 361       | NCEI    | 2005-2017        |
| AR    | TEXARKANA WEBB FLD             | 03-7048 | HLY                 | 33.4536  | -94.0075  | 361       | NCEI    | 1948-2013        |
| AR    | TEXARKANA WEBB FLD             | 79-0096 | DLY                 | 33.4536  | -94.0075  | 361       | NCEI    | 1892-2017        |
| AR    | TXRKNA RGNL-WEBB FLD ARPT      | 55-0091 | HLY                 | 33.4533  | -93.9897  | 399       | NCEI    | 1996-2007        |
| AR    | WALDO 4.2 S                    | 69-0003 | DLY                 | 33.2919  | -93.2938  | 308       | NCEI    | 2011-2017        |
| AR    | WHITE CLIFFS                   | 03-7812 | DLY                 | 33.8000  | -94.0667  | 392       | NCEI    | 1904-1961        |
| CO    | CAMPO 7 S                      | 05-1268 | DLY                 | 37.0158  | -102.5550 | 4117      | NCEI    | 1954-2017        |
| CO    | COMANCHE NATIONAL GRASSLAND    | 56-0054 | HLY                 | 37.2830  | -102.6140 | 4380      | NCEI    | 2007-2017        |
| CO    | COMANCHE NATL GRASSLAND        | 55-0002 | HLY                 | 37.2833  | -102.6139 | 4387      | NCEI    | 1998-2007        |
| CO    | KIM 10SSE                      | 05-4546 | DLY                 | 37.1150  | -103.2986 | 5299      | NCEI    | 1988-2017        |



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|-------|----------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| CO    | KIM 15 NNE           | 66-4538 | 15M                 | 37.4536  | -103.3220 | 5190      | NCEI    | 2013-2018        |
| CO    | KIM 15 NNE           | 05-4538 | 15M                 | 37.4536  | -103.3219 | 5190      | NCEI    | 1972-2013        |
| CO    | KIM 15 NNE           | 05-4538 | HLY                 | 37.4536  | -103.3219 | 5190      | NCEI    | 1948-2013        |
| CO    | KIM 15 NNE           | 05-4538 | DLY                 | 37.4536  | -103.3219 | 5190      | NCEI    | 1948-2017        |
| CO    | PRITCHETT 5 ESE      | 05-6705 | DLY                 | 37.3167  | -102.7167 | 4590      | NCEI    | 1943-1951        |
| CO    | SPRINGFIELD          | 05-7862 | DLY                 | 37.4000  | -102.6167 | 4413      | NCEI    | 1893-1985        |
| CO    | SPRINGFIELD 0.5 NW   | 69-0052 | DLY                 | 37.4114  | -102.6226 | 4377      | NCEI    | 2010-2017        |
| CO    | SPRINGFIELD 0.7 NNW  | 69-0043 | DLY                 | 37.4169  | -102.6194 | 4360      | NCEI    | 2006-2010        |
| CO    | SPRINGFIELD 7 WSW    | 05-7866 | 15M                 | 37.3694  | -102.7428 | 4622      | NCEI    | 1976-2002        |
| CO    | SPRINGFIELD 7 WSW    | 05-7866 | HLY                 | 37.3694  | -102.7428 | 4622      | NCEI    | 1972-2002        |
| CO    | SPRINGFIELD 7 WSW    | 05-7866 | DLY                 | 37.3694  | -102.7428 | 4623      | NCEI    | 1956-2002        |
| CO    | SPRINGFIELD 8 S      | 05-7867 | HLY                 | 37.2823  | -102.6417 | 4505      | NCEI    | 1948-1972        |
| CO    | SPRINGFIELD 8 S      | 05-7867 | DLY                 | 37.2823  | -102.6417 | 4505      | NCEI    | 1948-1964        |
| CO    | SPRINGFIELD 8 SW     | 05-7871 | DLY                 | 37.3167  | -102.7167 | 4590      | NCEI    | 1951-1956        |
| CO    | SPRINGFIELD COMANCHE | 79-0002 | DLY                 | 37.2833  | -102.6139 | 4383      | NCEI    | 1998-2017        |
| CO    | STONINGTON           | 05-7992 | DLY                 | 37.2931  | -102.1864 | 3802      | NCEI    | 1941-1999        |
| CO    | TROY 1 SE            | 05-8468 | DLY                 | 37.1333  | -103.3000 | 5351      | NCEI    | 1941-1987        |
| CO    | WALSH 1 W            | 05-8793 | DLY                 | 37.3822  | -102.2986 | 3980      | NCEI    | 1940-2017        |
| KS    | ASHLAND              | 14-0365 | DLY                 | 37.1942  | -99.7633  | 1972      | NCEI    | 1900-2017        |
| KS    | CIMARRON RIVER       | 85-0028 | HLY                 | 37.0314  | -100.2100 | 2195      | HADS    | 1995-2017        |
| KS    | COLDWATER            | 14-1704 | DLY                 | 37.2733  | -99.3289  | 2116      | NCEI    | 1893-2017        |
| KS    | ELKHART              | 14-2432 | 15M                 | 37.0058  | -101.8867 | 3599      | NCEI    | 1984-2013        |
| KS    | ELKHART              | 14-2432 | HLY                 | 37.0058  | -101.8867 | 3599      | NCEI    | 1949-2013        |
| KS    | ELKHART              | 14-2432 | DLY                 | 37.0058  | -101.8867 | 3599      | NCEI    | 1900-2017        |
| KS    | ELKHART 3 N          | 14-2437 | HLY                 | 37.0500  | -101.9000 | 3543      | NCEI    | 1948-1967        |
| KS    | ENGLEWOOD 1 NW       | 14-2560 | 15M                 | 37.0458  | -99.9964  | 1970      | NCEI    | 1984-2008        |
| KS    | ENGLEWOOD 1 NW       | 14-2560 | HLY                 | 37.0458  | -99.9964  | 1970      | NCEI    | 1948-2008        |
| KS    | ENGLEWOOD 1 NW       | 14-2560 | DLY                 | 37.0458  | -99.9964  | 1972      | NCEI    | 1890-1951        |
| KS    | FOWLER 3 NNE         | 14-2855 | DLY                 | 37.4167  | -100.1833 | 2480      | NCEI    | 1946-1987        |
| KS    | HUGOTON              | 14-3855 | DLY                 | 37.1639  | -101.3400 | 3110      | NCEI    | 1904-2017        |
| KS    | KISMET 11.4 NW       | 69-0087 | DLY                 | 37.3303  | -100.8350 | 2864      | NCEI    | 2010-2017        |
| KS    | KISMET NEAR          | 14-4363 | DLY                 | 37.3333  | -100.8833 | 2908      | NCEI    | 1909-1947        |

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|-------|--------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| KS    | LIBERAL                  | 14-4695 | DLY                 | 37.0222  | -100.9294 | 2835      | NCEI    | 1893-2017        |
| KS    | MEADE                    | 14-5171 | DLY                 | 37.2850  | -100.3450 | 2477      | NCEI    | 1895-2017        |
| KS    | MINNEOLA                 | 14-5371 | DLY                 | 37.4500  | -100.0167 | 2552      | NCEI    | 1912-1974        |
| KS    | MINNEOLA 4.1 SSE         | 69-0063 | DLY                 | 37.3850  | -99.9980  | 2579      | NCEI    | 2006-2017        |
| KS    | PLAINS                   | 14-6427 | DLY                 | 37.2667  | -100.6000 | 2762      | NCEI    | 1910-1974        |
| KS    | PLAINS CITY 0.3 NW       | 69-0075 | DLY                 | 37.2666  | -100.5950 | 2782      | NCEI    | 2006-2007        |
| KS    | PLAINS CITY 0.3 W        | 69-0078 | DLY                 | 37.2631  | -100.5950 | 2762      | NCEI    | 2011-2016        |
| KS    | RICHFIELD                | 14-6808 | DLY                 | 37.2633  | -101.7886 | 3386      | NCEI    | 1893-2017        |
| KS    | RICHFIELD 10 WSW         | 14-6813 | DLY                 | 37.2294  | -101.9511 | 3530      | NCEI    | 1941-2017        |
| KS    | SUBLETTE 7WSW            | 66-7922 | 15M                 | 37.4415  | -100.9793 | 2949      | NCEI    | 2013-2018        |
| KS    | SUBLETTE 7WSW            | 14-7922 | 15M                 | 37.4414  | -100.9792 | 2949      | NCEI    | 1971-2013        |
| KS    | SUBLETTE 7WSW            | 14-7922 | HLY                 | 37.4414  | -100.9792 | 2949      | NCEI    | 1958-2013        |
| KS    | SUBLETTE 7WSW            | 14-7922 | DLY                 | 37.4414  | -100.9792 | 2949      | NCEI    | 1918-2017        |
| KS    | WILMORE 16SE             | 14-8914 | DLY                 | 37.1317  | -99.0556  | 1699      | NCEI    | 1986-2017        |
| LA    | ALEXANDRIA               | 16-0098 | 15M                 | 31.3206  | -92.4611  | 87        | NCEI    | 1971-1996        |
| LA    | ALEXANDRIA               | 16-0098 | HLY                 | 31.3206  | -92.4611  | 87        | NCEI    | 1948-1996        |
| LA    | ALEXANDRIA               | 16-0098 | DLY                 | 31.3206  | -92.4611  | 89        | NCEI    | 1892-2017        |
| LA    | ALEXANDRIA #2            | 16-0101 | DLY                 | 31.3167  | -92.4500  | 43        | NCEI    | 1948-1967        |
| LA    | ALEXANDRIA 5 SSE         | 16-0103 | DLY                 | 31.2489  | -92.4489  | 85        | NCEI    | 1992-2017        |
| LA    | ALEXANDRIA INT           | 64-0505 | HLY                 | 31.3170  | -92.5500  | 89        | NCEI    | 1959-1999        |
| LA    | ALEXANDRIA INT           | 64-0505 | DLY                 | 31.3170  | -92.5500  | 89        | NCEI    | 1971-2000        |
| LA    | ALEXANDRIA INTL AIRPORT  | 56-0264 | HLY                 | 31.3347  | -92.5586  | 80        | NCEI    | 2007-2017        |
| LA    | ALEXANDRIA INTL AP       | 78-0004 | 15M                 | 31.3347  | -92.5586  | 84        | NCEI    | 2005-2017        |
| LA    | ALEXANDRIA INTL AP       | 79-0154 | DLY                 | 31.3347  | -92.5586  | 85        | NCEI    | 1948-2017        |
| LA    | ARCADIA                  | 16-0277 | DLY                 | 32.5511  | -92.9186  | 400       | NCEI    | 1929-2017        |
| LA    | ASHLAND                  | 16-0349 | DLY                 | 32.1292  | -93.1164  | 240       | NCEI    | 1943-2014        |
| LA    | BARKSDALE AIR FORCE BASE | 64-0265 | DLY                 | 32.5000  | -93.6670  | 166       | NCEI    | 1973-2016        |
| LA    | BEAVER FIRE TWR          | 16-0617 | DLY                 | 30.7925  | -92.4953  | 105       | NCEI    | 1973-2017        |
| LA    | BETHANY                  | 16-0786 | HLY                 | 32.3833  | -94.0500  | 370       | NCEI    | 1963-1970        |
| LA    | BETHANY                  | 16-0786 | DLY                 | 32.3833  | -94.0500  | 371       | NCEI    | 1963-1983        |
| LA    | BIENVILLE 3 NE           | 16-0800 | DLY                 | 32.3744  | -92.9433  | 308       | NCEI    | 1972-2017        |
| LA    | BOYCE 3 WNW              | 16-1232 | DLY                 | 31.3944  | -92.7164  | 112       | NCEI    | 1976-2017        |

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|-------|-----------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| LA    | CAMP POLK             | 16-1446 | DLY                 | 31.0667  | -93.2000  | 351       | NCEI    | 1938-1959        |
| LA    | COLFAX                | 16-1941 | DLY                 | 31.5183  | -92.7142  | 112       | NCEI    | 1926-2011        |
| LA    | CONVERSE              | 16-2023 | DLY                 | 31.7500  | -93.7000  | 220       | NCEI    | 1944-1986        |
| LA    | COTTON VALLEY 5 NNW   | 16-2121 | DLY                 | 32.8869  | -93.4569  | 259       | NCEI    | 1943-2009        |
| LA    | COUSHATTA 1 SE        | 16-2140 | HLY                 | 32.0167  | -93.3333  | 151       | NCEI    | 1954-1966        |
| LA    | COUSHATTA 1 SE        | 16-2140 | DLY                 | 32.0167  | -93.3333  | 151       | NCEI    | 1893-1951        |
| LA    | COUSHATTA 2           | 16-2143 | DLY                 | 32.0167  | -93.3500  | 141       | NCEI    | 1892-1895        |
| LA    | COUSHATTA 2 SW        | 16-2145 | DLY                 | 31.9944  | -93.3764  | 121       | NCEI    | 1981-2000        |
| LA    | CURTIS 1 SSE          | 16-2235 | 15M                 | 32.4167  | -93.6333  | 161       | NCEI    | 1971-1975        |
| LA    | CURTIS 1 SSE          | 16-2235 | HLY                 | 32.4167  | -93.6333  | 161       | NCEI    | 1966-1975        |
| LA    | CURTIS 1 SSE          | 16-2235 | DLY                 | 32.4167  | -93.6333  | 161       | NCEI    | 1966-1975        |
| LA    | DE QUINCY             | 16-2361 | DLY                 | 30.4347  | -93.4692  | 82        | NCEI    | 1940-2003        |
| LA    | DE RIDDER             | 16-2367 | DLY                 | 30.8428  | -93.2869  | 190       | NCEI    | 1903-2016        |
| LA    | ELIZABETH             | 16-2800 | DLY                 | 30.8500  | -92.7833  | 151       | NCEI    | 1924-2002        |
| LA    | ENGLAND AFB           | 79-0080 | DLY                 | 31.3167  | -92.5500  | 89        | NCEI    | 1952-1970        |
| LA    | GLOSTER 1 W           | 16-3657 | DLY                 | 32.2000  | -93.8333  | 259       | NCEI    | 1947-1981        |
| LA    | GORUM FIRE TWR        | 16-3741 | DLY                 | 31.4358  | -92.8828  | 308       | NCEI    | 1953-2012        |
| LA    | GRAND CANE FIRE TWR   | 16-3794 | DLY                 | 32.1333  | -93.8000  | 269       | NCEI    | 1907-1985        |
| LA    | GRAND ECORE           | 16-3804 | DLY                 | 31.8078  | -93.0867  | 151       | NCEI    | 1914-2011        |
| LA    | GREENWOOD FIRE TWR    | 16-3877 | DLY                 | 32.4175  | -94.0003  | 351       | NCEI    | 1952-2008        |
| LA    | HACKBERRY 8 SSW       | 16-3979 | DLY                 | 29.8894  | -93.4019  | 7         | NCEI    | 1939-2017        |
| LA    | HANNA 4 SSE           | 16-4050 | DLY                 | 31.9158  | -93.3183  | 118       | NCEI    | 1972-2017        |
| LA    | HAYNESVILLE           | 16-4131 | DLY                 | 32.9683  | -93.1297  | 302       | NCEI    | 1940-2012        |
| LA    | HODGES GARDENS        | 16-4288 | DLY                 | 31.3747  | -93.3911  | 420       | NCEI    | 1963-2017        |
| LA    | HOMER 1N              | 16-4355 | DLY                 | 32.8100  | -93.0625  | 217       | NCEI    | 1893-2017        |
| LA    | HORNBECK HODGES EXP A | 16-4384 | DLY                 | 31.3833  | -93.4000  | 361       | NCEI    | 1943-1963        |
| LA    | HOSSTON               | 16-4398 | DLY                 | 32.8867  | -93.8733  | 246       | NCEI    | 1940-2014        |
| LA    | JAMESTOWN NEAR SCS 16 | 16-4590 | DLY                 | 32.3500  | -93.1500  | 281       | NCEI    | 1941-1943        |
| LA    | JENNINGS              | 16-4700 | 15M                 | 30.2003  | -92.6642  | 25        | NCEI    | 1971-2013        |
| LA    | JENNINGS              | 16-4700 | HLY                 | 30.2003  | -92.6642  | 25        | NCEI    | 1969-2013        |
| LA    | JENNINGS              | 16-4700 | DLY                 | 30.2003  | -92.6642  | 26        | NCEI    | 1897-2017        |
| LA    | JENNINGS 2            | 16-4702 | 15M                 | 30.2500  | -92.6667  | 30        | NCEI    | 1973-1975        |

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|-------|-------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| LA    | JENNINGS 2                    | 16-4702 | HLY                 | 30.2500  | -92.6667  | 30        | NCEI    | 1973-1975        |
| LA    | KEATCHIE                      | 16-4800 | DLY                 | 32.1833  | -93.9000  | 327       | NCEI    | 1942-1946        |
| LA    | KEITHVILLE                    | 16-4816 | HLY                 | 32.3550  | -93.8619  | 200       | NCEI    | 1948-1973        |
| LA    | KEITHVILLE                    | 16-4816 | DLY                 | 32.3550  | -93.8619  | 200       | NCEI    | 1940-2017        |
| LA    | KINDER 3 W                    | 16-4884 | DLY                 | 30.5000  | -92.9000  | 49        | NCEI    | 1943-1986        |
| LA    | KORAN                         | 16-4931 | DLY                 | 32.4169  | -93.4428  | 174       | NCEI    | 1947-2017        |
| LA    | LAKE ARTHUR 7 SW              | 16-5065 | DLY                 | 30.0206  | -92.7681  | 10        | NCEI    | 1901-2017        |
| LA    | LAKE CHARLES                  | 16-5075 | DLY                 | 30.2274  | -93.2158  | 16        | NCEI    | 1949-1959        |
| LA    | LAKE CHARLES                  | 79-0022 | DLY                 | 30.1250  | -93.2158  | 13        | NCEI    | 1961-2017        |
| LA    | LAKE CHARLES 2 N              | 16-5074 | DLY                 | 30.2544  | -93.2186  | 7         | NCEI    | 1972-2017        |
| LA    | LAKE CHARLES AP               | 16-5078 | HLY                 | 30.1247  | -93.2283  | 9         | NCEI    | 1962-2013        |
| LA    | LAKE CHARLES CHENAULT         | 99-5077 | HLY                 | 30.2167  | -93.1500  | 16        | NCEI    | 1940-1947        |
| LA    | LAKE CHARLES CHENAULT         | 16-5077 | HLY                 | 30.2167  | -93.1500  | 16        | NCEI    | 1947-1961        |
| LA    | LAKE CHARLES CHENAULT         | 79-0081 | DLY                 | 30.2167  | -93.1500  | 16        | NCEI    | 1930-1963        |
| LA    | LAKE CHARLES REGIONAL AIRPORT | 56-0087 | HLY                 | 30.1247  | -93.2283  | 9         | NCEI    | 2007-2017        |
| LA    | LAKE END                      | 16-5081 | DLY                 | 31.9167  | -93.3000  | 131       | NCEI    | 1942-1972        |
| LA    | LEESVILLE                     | 16-5266 | HLY                 | 31.1417  | -93.2397  | 265       | NCEI    | 1947-1992        |
| LA    | LEESVILLE                     | 16-5266 | DLY                 | 31.1417  | -93.2397  | 265       | NCEI    | 1903-2017        |
| LA    | LEESVILLE 6 SSW               | 16-5287 | DLY                 | 31.0517  | -93.2789  | 259       | NCEI    | 1988-2017        |
| LA    | LIBERTY HILL                  | 16-5365 | DLY                 | 32.3167  | -92.9167  | 250       | NCEI    | 1893-1918        |
| LA    | LOGANSFORT                    | 16-5522 | DLY                 | 31.9672  | -94.0003  | 190       | NCEI    | 1903-2017        |
| LA    | LOGANSFORT 4 ENE              | 16-5527 | 15M                 | 31.9833  | -93.9500  | 210       | NCEI    | 1971-1993        |
| LA    | LOGANSFORT 4 ENE              | 16-5527 | HLY                 | 31.9833  | -93.9500  | 210       | NCEI    | 1955-1993        |
| LA    | LOGANSFORT 4 ENE              | 16-5527 | DLY                 | 31.9833  | -93.9500  | 210       | NCEI    | 1968-1993        |
| LA    | LONGVILLE                     | 16-5584 | DLY                 | 30.6000  | -93.2333  | 115       | NCEI    | 1944-1990        |
| LA    | LSU DEAN LEE RSCH STN         | 16-5630 | DLY                 | 31.1783  | -92.4108  | 69        | NCEI    | 1976-2016        |
| LA    | MANSFIELD                     | 16-5874 | DLY                 | 32.0389  | -93.7053  | 394       | NCEI    | 1896-2017        |
| LA    | MANY                          | 16-5890 | HLY                 | 31.5667  | -93.4833  | 230       | NCEI    | 1947-1957        |
| LA    | MANY                          | 16-5892 | DLY                 | 31.5769  | -93.4817  | 256       | NCEI    | 1953-2011        |
| LA    | MERMENTAU                     | 16-6142 | DLY                 | 30.1900  | -92.5906  | 16        | NCEI    | 1943-1988        |
| LA    | MERMENTAU 1 NNE               | 16-6144 | DLY                 | 30.2036  | -92.5747  | 20        | NCEI    | 1989-1993        |
| LA    | MINDEN                        | 66-6244 | 15M                 | 32.6052  | -93.2947  | 185       | NCEI    | 2013-2017        |

| State | Station name              | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|---------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| LA    | MINDEN                    | 16-6244 | 15M                 | 32.6053  | -93.2947  | 185       | NCEI    | 1971-2013        |
| LA    | MINDEN                    | 16-6244 | HLY                 | 32.6053  | -93.2947  | 185       | NCEI    | 1964-2013        |
| LA    | MINDEN                    | 16-6244 | DLY                 | 32.6053  | -93.2947  | 184       | NCEI    | 1893-2017        |
| LA    | MINDEN 2                  | 16-6245 | HLY                 | 32.6167  | -93.2833  | 249       | NCEI    | 1960-1964        |
| LA    | MINDEN 4 NNW              | 16-6246 | HLY                 | 32.6833  | -93.3000  | 240       | NCEI    | 1947-1960        |
| LA    | MITTIE 2 SE               | 16-6271 | DLY                 | 30.7000  | -92.8833  | 121       | NCEI    | 1954-1985        |
| LA    | MONTGOMERY                | 16-6324 | HLY                 | 31.6667  | -92.9000  | 102       | NCEI    | 1947-1968        |
| LA    | MONTGOMERY                | 16-6324 | DLY                 | 31.6667  | -92.9000  | 102       | NCEI    | 1896-1951        |
| LA    | MOORINGSPOINT 1 N         | 16-6364 | DLY                 | 32.7053  | -93.9603  | 200       | NCEI    | 1975-2017        |
| LA    | NATCHITOCHE               | 16-6582 | 15M                 | 31.7722  | -93.0956  | 130       | NCEI    | 1971-2008        |
| LA    | NATCHITOCHE               | 16-6582 | HLY                 | 31.7722  | -93.0956  | 130       | NCEI    | 1968-2009        |
| LA    | NATCHITOCHE               | 16-6582 | DLY                 | 31.7722  | -93.0956  | 131       | NCEI    | 1893-2010        |
| LA    | NATCHITOCHE #2            | 66-6584 | 15M                 | 31.8142  | -93.0856  | 141       | NCEI    | 2013-2017        |
| LA    | NATCHITOCHE #2            | 16-6584 | 15M                 | 31.8142  | -93.0856  | 141       | NCEI    | 2009-2013        |
| LA    | NATCHITOCHE #2            | 16-6584 | HLY                 | 31.8142  | -93.0856  | 141       | NCEI    | 2009-2013        |
| LA    | NATCHITOCHE #2            | 16-6584 | DLY                 | 31.8142  | -93.0856  | 141       | NCEI    | 2008-2017        |
| LA    | OAKDALE                   | 16-6836 | DLY                 | 30.8214  | -92.6697  | 112       | NCEI    | 1953-2017        |
| LA    | OBERLIN FIRE TWR          | 16-6938 | DLY                 | 30.6036  | -92.7739  | 66        | NCEI    | 1952-2017        |
| LA    | PLAIN DEALING             | 16-7344 | DLY                 | 32.8919  | -93.6944  | 253       | NCEI    | 1892-2017        |
| LA    | POLLOCK FOREST NURSERY    | 16-7421 | DLY                 | 31.5000  | -92.4667  | 230       | NCEI    | 1935-1965        |
| LA    | RED RIVER - LOCK & DAM #4 | 85-0085 | HLY                 | 31.9394  | -93.2756  | 112       | HADS    | 1995-2017        |
| LA    | RED RIVER RSCH STN        | 66-7738 | 15M                 | 32.4219  | -93.6380  | 155       | NCEI    | 2013-2017        |
| LA    | RED RIVER RSCH STN        | 16-7738 | 15M                 | 32.4219  | -93.6381  | 155       | NCEI    | 1975-2013        |
| LA    | RED RIVER RSCH STN        | 16-7738 | HLY                 | 32.4219  | -93.6381  | 155       | NCEI    | 1975-2013        |
| LA    | RED RIVER RSCH STN        | 16-7738 | DLY                 | 32.4219  | -93.6381  | 154       | NCEI    | 1975-2017        |
| LA    | RICHLAND PLANTATION       | 16-7825 | DLY                 | 31.2833  | -92.4167  | 89        | NCEI    | 1912-1923        |
| LA    | ROBELINE                  | 16-7905 | DLY                 | 31.6833  | -93.3000  | 151       | NCEI    | 1896-1957        |
| LA    | ROBSON                    | 16-7924 | DLY                 | 32.3556  | -93.6425  | 161       | NCEI    | 1948-2012        |
| LA    | ROCKEFELLER WL REFUGE     | 16-7932 | HLY                 | 29.7286  | -92.8181  | 4         | NCEI    | 1964-1990        |
| LA    | ROCKEFELLER WL REFUGE     | 16-7932 | DLY                 | 29.7286  | -92.8181  | 3         | NCEI    | 1964-2017        |
| LA    | RODESSA                   | 16-7950 | DLY                 | 32.9667  | -94.0000  | 200       | NCEI    | 1940-1985        |
| LA    | ROSEPINE RSCH STN         | 16-8046 | DLY                 | 30.9461  | -93.2789  | 240       | NCEI    | 1901-2010        |

| State | Station name                  | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|-------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| LA    | SAILES FIRE TWR               | 16-8094 | DLY                 | 32.3625  | -93.1400  | 276       | NCEI    | 1952-2017        |
| LA    | SAREPTA 5 N                   | 16-8263 | DLY                 | 32.9500  | -93.4500  | 302       | NCEI    | 1947-1954        |
| LA    | SHREVEPORT                    | 79-0085 | DLY                 | 32.4506  | -93.8411  | 272       | NCEI    | 1939-2017        |
| LA    | SHREVEPORT AP                 | 16-8440 | HLY                 | 32.4472  | -93.8244  | 254       | NCEI    | 1947-2013        |
| LA    | SHREVEPORT BARKSDALE AFB      | 79-0082 | DLY                 | 32.5000  | -93.6667  | 177       | NCEI    | 1949-1970        |
| LA    | SHREVEPORT DWTN               | 16-8436 | DLY                 | 32.5158  | -93.7447  | 180       | NCEI    | 1977-2017        |
| LA    | SHREVEPORT RGNL AP            | 78-0070 | 15M                 | 32.4472  | -93.8244  | 254       | NCEI    | 2000-2017        |
| LA    | SPRINGHILL                    | 16-8683 | DLY                 | 32.9922  | -93.4417  | 240       | NCEI    | 1955-2017        |
| LA    | SUGARTOWN                     | 16-8828 | DLY                 | 30.8500  | -93.0167  | 171       | NCEI    | 1893-1992        |
| LA    | SULPHUR                       | 16-8831 | DLY                 | 30.2383  | -93.3447  | 10        | NCEI    | 1972-2017        |
| LA    | SULPHUR 2.2 E                 | 69-0099 | DLY                 | 30.2339  | -93.3205  | 16        | NCEI    | 2008-2017        |
| LA    | TOLEDO BEND LAKE              | 16-9074 | DLY                 | 31.2022  | -93.5725  | 180       | NCEI    | 2004-2017        |
| LA    | VERNON                        | 76-0011 | HLY                 | 31.0167  | -93.1869  | 350       | RAWS    | 2000-2015        |
| LA    | VERNON - FTS                  | 85-0069 | HLY                 | 31.0167  | -93.1869  | 325       | HADS    | 2001-2017        |
| LA    | VINTON                        | 16-9375 | DLY                 | 30.1922  | -93.5811  | 13        | NCEI    | 1915-2003        |
| LA    | VIVIAN                        | 16-9392 | DLY                 | 32.9033  | -93.9819  | 220       | NCEI    | 1985-2013        |
| LA    | WOODWORTH 2 SE                | 16-9865 | DLY                 | 31.1167  | -92.4667  | 115       | NCEI    | 1956-1985        |
| LA    | WOODWORTH 3 ESE               | 16-9860 | DLY                 | 31.1333  | -92.4500  | 69        | NCEI    | 1928-1956        |
| MX    | ALLENDE                       | 90-0001 | DLY                 | 28.3300  | -100.8300 | 1227      | NCEI    | 1907-1989        |
| MX    | ALLENDE (SMN)                 | 61-0214 | DLY                 | 28.3333  | -100.8333 | 1227      | SMN     | 1907-1986        |
| MX    | ALLENDE II (DGE)              | 61-0268 | DLY                 | 28.3478  | -100.8536 | 1247      | SMN     | 1972-2013        |
| MX    | ANAHUAC                       | 61-0339 | DLY                 | 27.2383  | -100.1314 | 636       | SMN     | 1933-2013        |
| MX    | CERRALVO (DGE)                | 61-0327 | DLY                 | 26.0900  | -99.6175  | 919       | SMN     | 1961-2011        |
| MX    | CORRALES U.G.R.CH.            | 61-0021 | DLY                 | 29.5622  | -104.3986 | 2559      | SMN     | 1970-1990        |
| MX    | EJIDO MARIN                   | 61-0418 | DLY                 | 25.8586  | -100.0222 | 1322      | SMN     | 1979-2013        |
| MX    | EJIDO SAN MIGUEL              | 61-0223 | DLY                 | 28.6367  | -102.9483 | 3478      | SMN     | 1960-2013        |
| MX    | EL CUCHILLO                   | 61-0333 | DLY                 | 25.7181  | -99.2558  | 476       | SMN     | 1938-2013        |
| MX    | EL CUCHILLO                   | 90-0011 | DLY                 | 25.7300  | -99.2500  | 430       | NCEI    | 1938-1986        |
| MX    | FRANCISCO GONZALEZ VILLARREAL | 61-0519 | DLY                 | 25.3661  | -97.9792  | 43        | SMN     | 1952-2003        |
| MX    | GARZA AYALA                   | 61-0337 | DLY                 | 26.4914  | -100.0583 | 843       | SMN     | 1969-2013        |
| MX    | GENERAL BRAVO                 | 90-0012 | DLY                 | 25.8000  | -99.1800  | 407       | NCEI    | 1953-1990        |
| MX    | GENERAL BRAVO (SMN)           | 61-0388 | DLY                 | 25.7928  | -99.1808  | 423       | SMN     | 1944-1987        |

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|-------|---------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| MX    | HIGUERAS (SMN)            | 61-0340 | DLY                 | 25.9500  | -100.0167 | 1706      | SMN     | 1944-1979        |
| MX    | JUAREZ                    | 61-0252 | DLY                 | 27.6139  | -100.7250 | 919       | SMN     | 1943-2013        |
| MX    | LAMPAZOS (SMN)            | 61-0343 | DLY                 | 27.0781  | -100.4908 | 935       | SMN     | 1934-2013        |
| MX    | LAS ENRAMADAS             | 61-0353 | DLY                 | 25.5014  | -99.5214  | 755       | SMN     | 1946-2013        |
| MX    | LOS ALDAMAS               | 61-0354 | DLY                 | 26.0644  | -99.1967  | 338       | SMN     | 1941-1993        |
| MX    | LOS HERRERAS              | 61-0355 | DLY                 | 25.8975  | -99.4008  | 459       | SMN     | 1943-2012        |
| MX    | LOS HERRERAS              | 90-0013 | DLY                 | 25.9000  | -99.4200  | 469       | NCEI    | 1943-1986        |
| MX    | LOS RAMONES               | 61-0356 | DLY                 | 25.6914  | -99.6306  | 689       | SMN     | 1944-2013        |
| MX    | LOS RAMONES               | 90-0014 | DLY                 | 25.7000  | -99.6300  | 682       | NCEI    | 1944-1986        |
| MX    | LUIS L. LEON              | 61-0043 | DLY                 | 28.9786  | -105.3117 | 3543      | SMN     | 1964-2013        |
| MX    | NUEVA ROSITA              | 61-0229 | DLY                 | 27.9167  | -101.2500 | 1211      | SMN     | 1924-1971        |
| MX    | NUEVO LAREDO              | 61-0534 | DLY                 | 27.4864  | -99.5081  | 423       | SMN     | 1961-1991        |
| MX    | OJINAGA                   | 90-0007 | DLY                 | 29.5700  | -104.4200 | 2759      | NCEI    | 1922-1998        |
| MX    | OJINAGA (DGE)             | 61-0182 | DLY                 | 29.5500  | -104.4000 | 2625      | SMN     | 1974-2013        |
| MX    | OJINAGA (SMN)             | 61-0027 | DLY                 | 29.5644  | -104.4164 | 2625      | SMN     | 1922-1984        |
| MX    | PALESTINA                 | 90-0002 | DLY                 | 29.1500  | -100.9800 | 1083      | NCEI    | 1944-1990        |
| MX    | PALESTINA (DGE)           | 61-0231 | DLY                 | 29.1586  | -100.9883 | 1115      | SMN     | 1987-2013        |
| MX    | PALESTINA (SMN)           | 61-0265 | DLY                 | 29.1644  | -100.9867 | 1083      | SMN     | 1932-1982        |
| MX    | PARAS                     | 61-0385 | DLY                 | 26.4933  | -99.5242  | 492       | SMN     | 1961-2013        |
| MX    | PRESA FALCON              | 61-0536 | DLY                 | 26.5833  | -99.1833  | 325       | SMN     | 1961-1990        |
| MX    | PRESA VENUSTIANO CARRANZA | 61-0238 | DLY                 | 27.5189  | -100.6197 | 892       | SMN     | 1942-2013        |
| MX    | SABINAS                   | 90-0004 | DLY                 | 27.8732  | -101.2195 | 1115      | NCEI    | 1941-1998        |
| MX    | SABINAS (DGE)             | 61-0241 | DLY                 | 27.8467  | -101.1228 | 1112      | SMN     | 1944-2013        |
| MX    | SALINILLAS                | 61-0369 | DLY                 | 27.4292  | -100.3739 | 787       | SMN     | 1941-2013        |
| MX    | SALINILLAS                | 90-0015 | DLY                 | 27.4500  | -100.1200 | 741       | NCEI    | 1941-1986        |
| MX    | SAMALAYUCA                | 61-0105 | DLY                 | 31.3425  | -106.4764 | 4088      | SMN     | 1946-1999        |
| MX    | SOMBRERETILLO             | 61-0374 | DLY                 | 26.3414  | -99.9400  | 1017      | SMN     | 1967-2010        |
| MX    | VALLECILLO (DGE)          | 61-0377 | DLY                 | 26.6581  | -99.9864  | 869       | SMN     | 1961-2013        |
| MX    | VALLECILLO (SMN)          | 61-0390 | DLY                 | 26.6597  | -99.9869  | 873       | SMN     | 1941-1988        |
| MX    | VILLA AHUMADA             | 61-0134 | DLY                 | 30.6186  | -106.5122 | 3937      | SMN     | 1903-1993        |
| MX    | VILLA JUAREZ              | 90-0006 | DLY                 | 27.6200  | -100.7200 | 900       | NCEI    | 1943-1990        |
| MX    | ZARAGOZA                  | 90-0005 | DLY                 | 28.5000  | -100.9200 | 1173      | NCEI    | 1932-1977        |

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|-------|----------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| MX    | ZARAGOZA (SMN)       | 61-0249 | DLY                 | 28.4917  | -100.9286 | 1181      | SMN     | 1926-1976        |
| NM    | ABBOTT 1 SE          | 29-0022 | DLY                 | 36.3028  | -104.2497 | 6152      | NCEI    | 1909-2017        |
| NM    | AFTON 6 NE           | 29-0125 | DLY                 | 32.1167  | -106.8667 | 4190      | NCEI    | 1942-1999        |
| NM    | ALAMOGORDO           | 29-0199 | HLY                 | 32.9181  | -105.9550 | 4380      | NCEI    | 1968-2010        |
| NM    | ALAMOGORDO           | 29-0199 | DLY                 | 32.9181  | -105.9550 | 4380      | NCEI    | 1909-2009        |
| NM    | ALAMOGORDO 1         | 29-0200 | DLY                 | 32.8667  | -105.9333 | 4576      | NCEI    | 1892-1943        |
| NM    | ALAMOGORDO 1.6 NNE   | 69-0393 | DLY                 | 32.9058  | -105.9481 | 4373      | NCEI    | 2006-2015        |
| NM    | ALAMOGORDO 2.0 N     | 69-0406 | DLY                 | 32.9125  | -105.9511 | 4390      | NCEI    | 2012-2017        |
| NM    | ALAMOGORDO 2.1 SE    | 69-0376 | DLY                 | 32.8598  | -105.9377 | 4524      | NCEI    | 2005-2017        |
| NM    | ALAMOGORDO FLTR PLAN | 29-0208 | HLY                 | 32.9667  | -105.9333 | 4724      | NCEI    | 1958-1968        |
| NM    | ALEMAN RCH           | 29-0268 | DLY                 | 32.9308  | -106.9328 | 4521      | NCEI    | 1943-2000        |
| NM    | AMISTAD 5 SSW        | 29-0377 | DLY                 | 35.8742  | -103.1819 | 4446      | NCEI    | 1925-2017        |
| NM    | ARTESIA 6S           | 66-0600 | 15M                 | 32.7547  | -104.3835 | 3366      | NCEI    | 2013-2017        |
| NM    | ARTESIA 6S           | 29-0600 | 15M                 | 32.7547  | -104.3836 | 3366      | NCEI    | 1973-2013        |
| NM    | ARTESIA 6S           | 29-0600 | HLY                 | 32.7547  | -104.3836 | 3366      | NCEI    | 1947-2013        |
| NM    | ARTESIA 6S           | 29-0600 | DLY                 | 32.7547  | -104.3836 | 3366      | NCEI    | 1905-2017        |
| NM    | BAT DRAW RAWS        | 85-0151 | HLY                 | 32.1783  | -104.4406 | 4406      | HADS    | 1997-2017        |
| NM    | BATDRAW              | 76-0012 | HLY                 | 32.1786  | -104.4419 | 4300      | RAWS    | 1997-2015        |
| NM    | BELL RANCH           | 29-0858 | DLY                 | 35.5297  | -104.0936 | 4330      | NCEI    | 1899-2010        |
| NM    | BRANTLEY DAM         | 29-1153 | DLY                 | 32.5433  | -104.3807 | 3254      | NCEI    | 1987-2017        |
| NM    | BUEYEROS 4 NW        | 29-1269 | DLY                 | 36.0167  | -103.7333 | 4682      | NCEI    | 1929-1968        |
| NM    | CAMBRAY              | 29-1309 | DLY                 | 32.2333  | -107.3333 | 4232      | NCEI    | 1899-1940        |
| NM    | CAMERON              | 29-1332 | DLY                 | 34.9039  | -103.4428 | 4747      | NCEI    | 1927-1998        |
| NM    | CANNON AFB AIRPORT   | 64-0408 | DLY                 | 34.3830  | -103.3170 | 4295      | NCEI    | 1956-2016        |
| NM    | CANTON               | 29-1423 | DLY                 | 34.2753  | -104.1636 | 4055      | NCEI    | 1942-2012        |
| NM    | CAPROCK              | 76-0014 | HLY                 | 32.9278  | -103.8567 | 4210      | RAWS    | 1990-2015        |
| NM    | CAPROCK              | 29-1445 | HLY                 | 33.3433  | -103.6783 | 4350      | NCEI    | 2007-2013        |
| NM    | CAPROCK              | 29-1445 | DLY                 | 33.3433  | -103.6783 | 4350      | NCEI    | 2007-2017        |
| NM    | CAPROCK 6 SE         | 29-1446 | HLY                 | 33.3500  | -103.6333 | 4272      | NCEI    | 1947-1971        |
| NM    | CAPROCK 6 SE         | 29-1446 | DLY                 | 33.3500  | -103.6333 | 4272      | NCEI    | 1929-1951        |
| NM    | CAPROCK RAWS         | 85-0155 | HLY                 | 32.9278  | -103.8567 | 4183      | HADS    | 1995-2017        |
| NM    | CAPULIN              | 29-1450 | DLY                 | 36.7386  | -103.9936 | 6841      | NCEI    | 1995-2017        |



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| NM    | CAPULIN 6 SSE                  | 29-1452 | DLY                 | 36.6667  | -103.9500 | 6771      | NCEI    | 1930-1969        |
| NM    | CAPULIN NM                     | 29-1454 | DLY                 | 36.7785  | -103.9801 | 7252      | NCEI    | 1966-1979        |
| NM    | CAPULIN VOLCANO NATIONAL MONUM | 54-0199 | DLY                 | 36.7790  | -103.9810 | 7185      | NADP    | 1984-2012        |
| NM    | CARLSBAD                       | 66-1469 | 15M                 | 32.3479  | -104.2224 | 3120      | NCEI    | 2013-2017        |
| NM    | CARLSBAD                       | 29-1469 | 15M                 | 32.3478  | -104.2225 | 3120      | NCEI    | 1974-2013        |
| NM    | CARLSBAD                       | 29-1469 | HLY                 | 32.3478  | -104.2225 | 3120      | NCEI    | 1947-2013        |
| NM    | CARLSBAD                       | 29-1469 | DLY                 | 32.3478  | -104.2225 | 3120      | NCEI    | 1900-2017        |
| NM    | CARLSBAD 3.4 N                 | 69-0306 | DLY                 | 32.4539  | -104.2378 | 3136      | NCEI    | 2005-2017        |
| NM    | CARLSBAD 33.3 WSW              | 69-0315 | DLY                 | 32.1908  | -104.7477 | 5853      | NCEI    | 2007-2017        |
| NM    | CARLSBAD CAVERN CITY AP        | 79-0148 | DLY                 | 32.3336  | -104.2581 | 3232      | NCEI    | 1930-2017        |
| NM    | CARLSBAD CAVERNS               | 29-1480 | DLY                 | 32.1783  | -104.4433 | 4436      | NCEI    | 1935-2017        |
| NM    | CLAYTON 14.6 SSW               | 69-0442 | DLY                 | 36.2700  | -103.3122 | 5066      | NCEI    | 2007-2017        |
| NM    | CLAYTON 9 SSE                  | 29-1881 | DLY                 | 36.3333  | -103.1000 | 4720      | NCEI    | 1907-1959        |
| NM    | CLAYTON MUNI AIR PK            | 78-0017 | 15M                 | 36.4486  | -103.1539 | 4960      | NCEI    | 2000-2017        |
| NM    | CLAYTON MUNI AIR PK            | 79-0118 | DLY                 | 36.4486  | -103.1539 | 4961      | NCEI    | 1896-2017        |
| NM    | CLAYTON MUNI ARPK AP           | 29-1887 | 15M                 | 36.4486  | -103.1539 | 4960      | NCEI    | 1984-1998        |
| NM    | CLAYTON MUNI ARPK AP           | 29-1887 | HLY                 | 36.4486  | -103.1539 | 4960      | NCEI    | 1947-2013        |
| NM    | CLAYTON MUNICIPAL AIRPARK AIRP | 56-0185 | HLY                 | 36.4460  | -103.1540 | 4972      | NCEI    | 2007-2017        |
| NM    | CLOUDCROFT                     | 29-1927 | DLY                 | 32.9667  | -105.7500 | 8621      | NCEI    | 1901-1987        |
| NM    | CLOUDCROFT                     | 29-1931 | DLY                 | 32.9544  | -105.7353 | 8678      | NCEI    | 1987-2017        |
| NM    | CLOUDCROFT 0.5 NNW             | 69-0387 | DLY                 | 32.9601  | -105.7413 | 8839      | NCEI    | 2005-2017        |
| NM    | CLOUDCROFT 16 ESE              | 69-0383 | DLY                 | 32.8937  | -105.4779 | 6578      | NCEI    | 2005-2013        |
| NM    | CLOVIS                         | 29-1939 | 15M                 | 34.4289  | -103.1992 | 4295      | NCEI    | 1978-2011        |
| NM    | CLOVIS                         | 29-1939 | HLY                 | 34.4289  | -103.1992 | 4295      | NCEI    | 1949-2011        |
| NM    | CLOVIS                         | 29-1939 | DLY                 | 34.4289  | -103.1992 | 4295      | NCEI    | 1910-2011        |
| NM    | CLOVIS 1.1 NE                  | 69-0134 | DLY                 | 34.4204  | -103.1884 | 4275      | NCEI    | 2014-2017        |
| NM    | CLOVIS 13 N                    | 29-1963 | 15M                 | 34.5989  | -103.2161 | 4435      | NCEI    | 1973-2013        |
| NM    | CLOVIS 13 N                    | 29-1963 | HLY                 | 34.5989  | -103.2161 | 4435      | NCEI    | 1949-2013        |
| NM    | CLOVIS 13 N                    | 29-1963 | DLY                 | 34.5989  | -103.2161 | 4436      | NCEI    | 1949-2017        |
| NM    | CLOVIS 3 W                     | 29-1956 | HLY                 | 34.4167  | -103.2333 | 4272      | NCEI    | 1947-1949        |
| NM    | CLOVIS CANNON AFB              | 79-0105 | DLY                 | 34.3833  | -103.3167 | 4295      | NCEI    | 1951-1970        |
| NM    | COLUMBUS                       | 29-2024 | 15M                 | 31.8297  | -107.6389 | 4065      | NCEI    | 1978-2011        |

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|-------|--------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| NM    | COLUMBUS                 | 29-2024 | HLY                 | 31.8297  | -107.6389 | 4065      | NCEI    | 1947-2011        |
| NM    | COLUMBUS                 | 79-0121 | DLY                 | 31.8297  | -107.6389 | 4065      | NCEI    | 1909-2010        |
| NM    | CONCHAS DAM              | 29-2030 | 15M                 | 35.4072  | -104.1906 | 4244      | NCEI    | 1971-2013        |
| NM    | CONCHAS DAM              | 29-2030 | HLY                 | 35.4072  | -104.1906 | 4244      | NCEI    | 1947-2013        |
| NM    | CONCHAS DAM              | 29-2030 | DLY                 | 35.4072  | -104.1906 | 4245      | NCEI    | 1936-2017        |
| NM    | CROSSROADS               | 29-2203 | 15M                 | 33.5167  | -103.3333 | 4150      | NCEI    | 1977-1993        |
| NM    | CROSSROADS 2             | 29-2207 | 15M                 | 33.5133  | -103.3403 | 4138      | NCEI    | 1975-2007        |
| NM    | CROSSROADS 2             | 29-2207 | HLY                 | 33.5133  | -103.3403 | 4138      | NCEI    | 1971-2007        |
| NM    | CROSSROADS 2             | 29-2207 | DLY                 | 33.5133  | -103.3403 | 4137      | NCEI    | 1929-2001        |
| NM    | DEMING                   | 29-2436 | 15M                 | 32.2531  | -107.7531 | 4300      | NCEI    | 1982-2011        |
| NM    | DEMING                   | 29-2436 | DLY                 | 32.2531  | -107.7531 | 4301      | NCEI    | 1892-2010        |
| NM    | DEMING 1.5 S             | 69-0350 | DLY                 | 32.2395  | -107.7526 | 4314      | NCEI    | 1998-2014        |
| NM    | DEMING 19 ENE            | 69-0352 | DLY                 | 32.2626  | -107.3970 | 4183      | NCEI    | 1998-2017        |
| NM    | DEMING FAA AP            | 29-2440 | 15M                 | 32.2500  | -107.7000 | 4302      | NCEI    | 1977-1982        |
| NM    | DEMING FAA AP            | 29-2440 | HLY                 | 32.2500  | -107.7000 | 4302      | NCEI    | 1961-1982        |
| NM    | DEMING MUNI              | 64-0426 | DLY                 | 32.2500  | -107.7170 | 4314      | NCEI    | 1973-2005        |
| NM    | DEMING MUNI AP           | 78-0030 | 15M                 | 32.2622  | -107.7206 | 4301      | NCEI    | 2005-2017        |
| NM    | DEMING MUNI AP           | 79-0124 | DLY                 | 32.2622  | -107.7206 | 4301      | NCEI    | 1961-2017        |
| NM    | DEMING MUNICIPAL AIRPORT | 55-0109 | HLY                 | 32.2622  | -107.7206 | 4314      | NCEI    | 2000-2007        |
| NM    | DEMING MUNICIPAL AIRPORT | 56-0188 | HLY                 | 32.2620  | -107.7210 | 4324      | NCEI    | 2007-2017        |
| NM    | DES MOINES               | 29-2453 | DLY                 | 36.7500  | -103.8333 | 6621      | NCEI    | 1916-1994        |
| NM    | DRIPPING SPRINGS         | 76-0015 | HLY                 | 32.3233  | -106.5867 | 6172      | RAWS    | 1994-2015        |
| NM    | ELIDA                    | 29-2854 | DLY                 | 33.9403  | -103.6572 | 4396      | NCEI    | 1910-2013        |
| NM    | ELK                      | 29-2865 | DLY                 | 32.9161  | -105.3381 | 5935      | NCEI    | 1895-2017        |
| NM    | ELKINS                   | 29-2871 | DLY                 | 33.7000  | -104.0667 | 4032      | NCEI    | 1909-1948        |
| NM    | FELIX                    | 29-3174 | DLY                 | 33.0000  | -105.1000 | 5102      | NCEI    | 1917-1964        |
| NM    | FLORIDA                  | 29-3225 | HLY                 | 32.4333  | -107.4833 | 4450      | NCEI    | 1947-1992        |
| NM    | FLORIDA                  | 29-3225 | DLY                 | 32.4333  | -107.4833 | 4449      | NCEI    | 1929-1992        |
| NM    | FLOYD                    | 29-3231 | DLY                 | 34.2167  | -103.5500 | 4120      | NCEI    | 1929-1959        |
| NM    | FLYING H                 | 29-3237 | DLY                 | 33.0000  | -105.1000 | 5102      | NCEI    | 1965-1978        |
| NM    | FT SUMNER                | 29-3294 | DLY                 | 34.4667  | -104.2319 | 4026      | NCEI    | 1909-2011        |
| NM    | FT SUMNER 5 S            | 29-3296 | DLY                 | 34.3942  | -104.2503 | 4049      | NCEI    | 1948-2016        |

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| NM    | GRENVILLE         | 29-3706 | DLY                 | 36.5939  | -103.6192 | 6001      | NCEI    | 1940-2017        |
| NM    | HATCH             | 29-3855 | DLY                 | 32.6775  | -107.1958 | 4075      | NCEI    | 1894-2008        |
| NM    | HOBBS             | 29-4026 | DLY                 | 32.7264  | -103.1314 | 3661      | NCEI    | 1912-2017        |
| NM    | HOBBS 13W         | 66-4030 | 15M                 | 32.7125  | -103.3538 | 3836      | NCEI    | 2013-2015        |
| NM    | HOBBS 13W         | 29-4030 | 15M                 | 32.7125  | -103.3539 | 3836      | NCEI    | 1996-2012        |
| NM    | HOBBS 13W         | 29-4030 | HLY                 | 32.7125  | -103.3539 | 3836      | NCEI    | 1996-2012        |
| NM    | HOBBS 13W         | 29-4030 | DLY                 | 32.7125  | -103.3539 | 3835      | NCEI    | 1996-2015        |
| NM    | HOOSIER RCH       | 29-4106 | DLY                 | 35.8667  | -104.1667 | 5682      | NCEI    | 1911-1949        |
| NM    | HOPE              | 66-4112 | 15M                 | 32.8110  | -104.7385 | 4085      | NCEI    | 2013-2017        |
| NM    | HOPE              | 29-4112 | 15M                 | 32.8111  | -104.7386 | 4085      | NCEI    | 1972-2013        |
| NM    | HOPE              | 29-4112 | HLY                 | 32.8111  | -104.7386 | 4085      | NCEI    | 1965-2013        |
| NM    | HOPE              | 29-4112 | DLY                 | 32.8111  | -104.7386 | 4085      | NCEI    | 1905-2017        |
| NM    | HOUSE             | 29-4175 | DLY                 | 34.6344  | -103.8903 | 4700      | NCEI    | 1940-2017        |
| NM    | HOUSE 0.1 S       | 69-0421 | DLY                 | 34.6459  | -103.9030 | 4701      | NCEI    | 2010-2017        |
| NM    | IONE              | 29-4306 | DLY                 | 35.7500  | -103.3000 | 4705      | NCEI    | 1910-1961        |
| NM    | JAL               | 29-4346 | DLY                 | 32.1103  | -103.1872 | 3054      | NCEI    | 1919-2017        |
| NM    | JORNADA EXP RANGE | 66-4426 | 15M                 | 32.6161  | -106.7404 | 4318      | NCEI    | 2013-2018        |
| NM    | JORNADA EXP RANGE | 29-4426 | 15M                 | 32.6161  | -106.7403 | 4318      | NCEI    | 1977-2013        |
| NM    | JORNADA EXP RANGE | 29-4426 | HLY                 | 32.6161  | -106.7403 | 4318      | NCEI    | 1947-2013        |
| NM    | JORNADA EXP RANGE | 29-4426 | DLY                 | 32.6161  | -106.7403 | 4318      | NCEI    | 1914-2017        |
| NM    | LAKE AVALON       | 29-4736 | DLY                 | 32.4833  | -104.2500 | 3212      | NCEI    | 1914-1979        |
| NM    | LAKE MC MILLAN    | 29-4747 | DLY                 | 32.5944  | -104.3473 | 3281      | NCEI    | 1940-1949        |
| NM    | LAS CRUCES 20 N   | 64-0600 | HLY                 | 32.6140  | -106.7410 | 4327      | NCEI    | 2007-2016        |
| NM    | LOGAN             | 29-5056 | DLY                 | 35.3667  | -103.4167 | 3832      | NCEI    | 1906-1960        |
| NM    | LOVINGTON 0.9 NNW | 69-0333 | DLY                 | 32.9578  | -103.3568 | 3930      | NCEI    | 2005-2017        |
| NM    | LOVINGTON 1.4 NW  | 69-0334 | DLY                 | 32.9610  | -103.3653 | 3937      | NCEI    | 2005-2010        |
| NM    | LOVINGTON 2 WNW   | 29-5204 | DLY                 | 32.9667  | -103.3833 | 3904      | NCEI    | 1919-1967        |
| NM    | MALJAMAR          | 29-5370 | 15M                 | 32.8567  | -103.7625 | 4154      | NCEI    | 1976-2012        |
| NM    | MALJAMAR          | 29-5370 | HLY                 | 32.8567  | -103.7625 | 4154      | NCEI    | 1948-2012        |
| NM    | MALJAMAR          | 29-5370 | DLY                 | 32.8567  | -103.7625 | 4154      | NCEI    | 1942-2012        |
| NM    | MAYHILL           | 54-0197 | DLY                 | 32.9096  | -105.4710 | 6634      | NADP    | 1984-2015        |
| NM    | MAYHILL RS        | 29-5502 | DLY                 | 32.8833  | -105.4833 | 6565      | NCEI    | 1917-1976        |

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| NM    | MCCARTY RCH          | 29-5516 | DLY                 | 35.6022  | -103.3644 | 4409      | NCEI    | 1983-2016        |
| NM    | MELROSE              | 29-5617 | DLY                 | 34.4278  | -103.6250 | 4600      | NCEI    | 1908-2017        |
| NM    | MONTOYA 10 SE        | 29-5874 | DLY                 | 35.0000  | -103.9333 | 4344      | NCEI    | 1909-1957        |
| NM    | MOSQUERO 1           | 29-5931 | DLY                 | 35.7833  | -103.9667 | 5584      | NCEI    | 1915-1943        |
| NM    | MOSQUERO 1 NE        | 29-5937 | DLY                 | 35.8022  | -103.9439 | 5466      | NCEI    | 1926-2017        |
| NM    | MTN PARK             | 29-5960 | DLY                 | 32.9539  | -105.8225 | 6804      | NCEI    | 1894-2017        |
| NM    | NARA VISA            | 29-6040 | DLY                 | 35.6167  | -103.1000 | 4193      | NCEI    | 1905-1966        |
| NM    | NEWKIRK              | 29-6115 | DLY                 | 35.0700  | -104.2575 | 4564      | NCEI    | 1926-2009        |
| NM    | OBAR                 | 29-6258 | DLY                 | 35.5500  | -103.2000 | 4104      | NCEI    | 1926-1968        |
| NM    | OCHOA                | 29-6281 | DLY                 | 32.1664  | -103.4250 | 3399      | NCEI    | 1942-2016        |
| NM    | OROGRANDE            | 29-6435 | 15M                 | 32.3789  | -106.0925 | 4221      | NCEI    | 1984-2013        |
| NM    | OROGRANDE            | 29-6435 | HLY                 | 32.3789  | -106.0925 | 4221      | NCEI    | 1947-2013        |
| NM    | OROGRANDE            | 29-6435 | DLY                 | 32.3789  | -106.0925 | 4222      | NCEI    | 1904-2015        |
| NM    | PADUCA               | 76-0019 | HLY                 | 32.1797  | -103.7217 | 3510      | RAWS    | 1990-2015        |
| NM    | PADUCA RAWLS 14W JAL | 85-0171 | HLY                 | 32.1797  | -103.7217 | 3530      | HADS    | 1995-2017        |
| NM    | PALO VERDE (1)       | 29-6540 | DLY                 | 35.9667  | -104.1833 | 5879      | NCEI    | 1911-1947        |
| NM    | PASAMONTE            | 29-6619 | DLY                 | 36.2994  | -103.7408 | 5650      | NCEI    | 1910-2017        |
| NM    | PEARL                | 29-6659 | 15M                 | 32.6500  | -103.3833 | 3800      | NCEI    | 1975-1996        |
| NM    | PEARL                | 29-6659 | HLY                 | 32.6500  | -103.3833 | 3800      | NCEI    | 1947-1996        |
| NM    | PEARL                | 29-6659 | DLY                 | 32.6500  | -103.3833 | 3799      | NCEI    | 1906-1996        |
| NM    | PENNINGTON           | 29-6728 | DLY                 | 36.3167  | -103.5833 | 5604      | NCEI    | 1925-1959        |
| NM    | PORTALES             | 29-7008 | DLY                 | 34.1742  | -103.3519 | 4009      | NCEI    | 1905-2017        |
| NM    | PORTER 2 E           | 29-7026 | DLY                 | 35.2333  | -103.2833 | 4078      | NCEI    | 1923-1984        |
| NM    | PRAIRIEVIEW          | 29-7054 | DLY                 | 33.1167  | -103.2000 | 3855      | NCEI    | 1911-1950        |
| NM    | QUAY 2 S             | 29-7168 | DLY                 | 34.9000  | -103.7500 | 4304      | NCEI    | 1923-1959        |
| NM    | QUEEN                | 29-7172 | DLY                 | 32.1936  | -104.7403 | 5840      | NCEI    | 2000-2005        |
| NM    | QUEEN RS             | 29-7176 | DLY                 | 32.2000  | -104.7333 | 5853      | NCEI    | 1963-1975        |
| NM    | RAGLAND 3 SSW        | 29-7226 | DLY                 | 34.7800  | -103.7492 | 4867      | NCEI    | 1935-2017        |
| NM    | RATON 26 ESE         | 79-0013 | DLY                 | 36.7778  | -103.9817 | 7231      | NCEI    | 2010-2014        |
| NM    | RINESTINE RCH        | 29-7451 | DLY                 | 35.6000  | -103.3333 | 4383      | NCEI    | 1968-1983        |
| NM    | ROY                  | 29-7638 | 15M                 | 35.9450  | -104.1981 | 5890      | NCEI    | 1974-2013        |
| NM    | ROY                  | 29-7638 | HLY                 | 35.9450  | -104.1981 | 5890      | NCEI    | 1947-2013        |

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| NM    | ROY                   | 29-7638 | DLY                 | 35.9450  | -104.1981 | 5889      | NCEI    | 1905-2014        |
| NM    | SACRAMENTO            | 29-7735 | HLY                 | 32.7924  | -105.5620 | 7316      | NCEI    | 1947-1974        |
| NM    | SACRAMENTO            | 29-7735 | DLY                 | 32.7924  | -105.5620 | 7316      | NCEI    | 1905-1951        |
| NM    | SACRAMENTO #2         | 29-7736 | 15M                 | 32.7908  | -105.5606 | 7382      | NCEI    | 1979-2013        |
| NM    | SACRAMENTO #2         | 29-7736 | HLY                 | 32.7908  | -105.5606 | 7382      | NCEI    | 1974-2013        |
| NM    | SAN JON               | 29-7867 | DLY                 | 35.1086  | -103.3283 | 4034      | NCEI    | 1907-2017        |
| NM    | SEDAN 7 NW            | 29-8187 | DLY                 | 36.2000  | -103.2167 | 4774      | NCEI    | 1911-1960        |
| NM    | ST VRAIN              | 29-7741 | DLY                 | 34.4167  | -103.5000 | 4452      | NCEI    | 1912-1946        |
| NM    | STATE UNIV            | 66-8535 | 15M                 | 32.2823  | -106.7598 | 3886      | NCEI    | 2013-2018        |
| NM    | STATE UNIV            | 29-8535 | 15M                 | 32.2822  | -106.7597 | 3886      | NCEI    | 1977-2013        |
| NM    | STATE UNIV            | 29-0131 | HLY                 | 32.2833  | -106.7500 | 3914      | NCEI    | 1947-1959        |
| NM    | STATE UNIV            | 29-8535 | HLY                 | 32.2822  | -106.7597 | 3886      | NCEI    | 1959-2013        |
| NM    | STATE UNIV            | 29-0131 | DLY                 | 32.2833  | -106.7500 | 3914      | NCEI    | 1892-1959        |
| NM    | STATE UNIV            | 29-8535 | DLY                 | 32.2822  | -106.7597 | 3888      | NCEI    | 1959-2017        |
| NM    | TATUM                 | 29-8713 | DLY                 | 33.2422  | -103.3611 | 4012      | NCEI    | 1919-2017        |
| NM    | TUCUMCARI             | 29-9148 | DLY                 | 35.1667  | -103.7000 | 4042      | NCEI    | 1909-1956        |
| NM    | TUCUMCARI 4 NE        | 66-9156 | 15M                 | 35.2005  | -103.6866 | 4086      | NCEI    | 2013-2017        |
| NM    | TUCUMCARI 4 NE        | 29-9156 | 15M                 | 35.2006  | -103.6867 | 4086      | NCEI    | 1971-2013        |
| NM    | TUCUMCARI 4 NE        | 29-9156 | HLY                 | 35.2006  | -103.6867 | 4086      | NCEI    | 1947-2013        |
| NM    | TUCUMCARI 4 NE        | 29-9156 | DLY                 | 35.2006  | -103.6867 | 4085      | NCEI    | 1904-2017        |
| NM    | TUCUMCARI MUNI AP     | 79-0117 | DLY                 | 35.1822  | -103.6031 | 4065      | NCEI    | 1948-2017        |
| NM    | UTE DAM               | 29-9284 | DLY                 | 35.3600  | -103.4433 | 3825      | NCEI    | 1965-2015        |
| NM    | WHITE SANDS NATL MON  | 66-9686 | 15M                 | 32.7822  | -106.1759 | 4006      | NCEI    | 2013-2018        |
| NM    | WHITE SANDS NATL MON  | 29-9686 | 15M                 | 32.7822  | -106.1758 | 4006      | NCEI    | 1984-2013        |
| NM    | WHITE SANDS NATL MON  | 29-9686 | HLY                 | 32.7822  | -106.1758 | 4006      | NCEI    | 1947-2013        |
| NM    | WHITE SANDS NATL MON  | 29-9686 | DLY                 | 32.7822  | -106.1758 | 4006      | NCEI    | 1939-2017        |
| OK    | ACME_4WNW             | 86-0136 | 15M                 | 34.8083  | -98.0233  | 1302      | OKM     | 1994-2015        |
| OK    | ACME_4WNW             | 86-0136 | DLY                 | 34.8083  | -98.0233  | 1302      | OKM     | 1994-2016        |
| OK    | ADA                   | 34-0017 | HLY                 | 34.7864  | -96.6850  | 1015      | NCEI    | 1957-1957        |
| OK    | ADA                   | 34-0017 | DLY                 | 34.7864  | -96.6850  | 1014      | NCEI    | 1907-2011        |
| OK    | ADA MUNICIPAL AIRPORT | 56-0211 | HLY                 | 34.8052  | -96.6741  | 1002      | NCEI    | 2007-2017        |
| OK    | ADA_2NNE              | 86-0137 | 15M                 | 34.7985  | -96.6691  | 968       | OKM     | 1994-2015        |

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| OK    | ADA_2NNE                    | 86-0137 | DLY                 | 34.7985  | -96.6691  | 972       | OKM     | 1994-2016        |
| OK    | ALTUS 3S MESONET            | 34-0180 | DLY                 | 34.5872  | -99.3381  | 1365      | NCEI    | 2009-2017        |
| OK    | ALTUS AFB                   | 79-0071 | DLY                 | 34.6500  | -99.2667  | 1358      | NCEI    | 1953-1970        |
| OK    | ALTUS AFB AIRPORT           | 64-0436 | DLY                 | 34.6500  | -99.2670  | 1382      | NCEI    | 1973-2016        |
| OK    | ALTUS DAM                   | 34-0184 | DLY                 | 34.8847  | -99.2964  | 1526      | NCEI    | 1945-2017        |
| OK    | ALTUS DAM, N FORK RED RIVER | 87-0001 | HLY                 | 34.8875  | -99.2964  | 1540      | USBR    | 1990-2016        |
| OK    | ALTUS IRIG RSCH STN         | 34-0179 | 15M                 | 34.5903  | -99.3344  | 1380      | NCEI    | 1970-2011        |
| OK    | ALTUS IRIG RSCH STN         | 34-0179 | HLY                 | 34.5903  | -99.3344  | 1380      | NCEI    | 1948-2011        |
| OK    | ALTUS IRIG RSCH STN         | 34-0179 | DLY                 | 34.5903  | -99.3344  | 1381      | NCEI    | 1903-2013        |
| OK    | ALTUS_3S                    | 86-0138 | 15M                 | 34.5872  | -99.3381  | 1365      | OKM     | 1994-2015        |
| OK    | ANADARKO                    | 85-0183 | HLY                 | 35.0850  | -98.2431  | 1194      | HADS    | 1995-2017        |
| OK    | ANADARKO 3 E                | 34-0224 | DLY                 | 35.0619  | -98.1989  | 1168      | NCEI    | 1893-2016        |
| OK    | ANTHON 6 W                  | 34-0242 | HLY                 | 35.7500  | -99.1000  | 1821      | NCEI    | 1947-1973        |
| OK    | ANTLERS                     | 34-0256 | 15M                 | 34.2208  | -95.6150  | 470       | NCEI    | 1971-2001        |
| OK    | ANTLERS                     | 34-0256 | HLY                 | 34.2208  | -95.6150  | 470       | NCEI    | 1947-2001        |
| OK    | ANTLERS                     | 34-0256 | DLY                 | 34.2208  | -95.6150  | 469       | NCEI    | 1918-2017        |
| OK    | ANTLERS_3WNW                | 86-0141 | 15M                 | 34.2497  | -95.6684  | 564       | OKM     | 1994-2015        |
| OK    | ANTLERS_3WNW                | 86-0141 | DLY                 | 34.2497  | -95.6684  | 565       | OKM     | 1994-2016        |
| OK    | ANTLERS_5W                  | 86-0142 | 15M                 | 34.2244  | -95.7006  | 587       | OKM     | 1994-2015        |
| OK    | ANTLERS_5W                  | 86-0142 | DLY                 | 34.2244  | -95.7006  | 593       | OKM     | 1994-2016        |
| OK    | APACHE                      | 34-0260 | DLY                 | 34.8892  | -98.3592  | 1306      | NCEI    | 1909-2017        |
| OK    | APACHE 0.4 W                | 69-0461 | DLY                 | 34.8891  | -98.3593  | 1293      | NCEI    | 2008-2017        |
| OK    | APACHE_4ENE                 | 86-0143 | DLY                 | 34.9142  | -98.2922  | 1454      | OKM     | 1994-2016        |
| OK    | ARAPAHO                     | 34-0277 | DLY                 | 35.5833  | -98.9667  | 1667      | NCEI    | 1893-1930        |
| OK    | ARDMORE                     | 66-0292 | 15M                 | 34.1773  | -97.1617  | 841       | NCEI    | 2013-2017        |
| OK    | ARDMORE                     | 34-0292 | 15M                 | 34.1772  | -97.1617  | 841       | NCEI    | 1981-2013        |
| OK    | ARDMORE                     | 34-0292 | HLY                 | 34.1772  | -97.1617  | 841       | NCEI    | 1957-2013        |
| OK    | ARDMORE                     | 34-0292 | DLY                 | 34.1772  | -97.1617  | 840       | NCEI    | 1901-2017        |
| OK    | ARDMORE #2                  | 34-0293 | 15M                 | 34.1500  | -97.1500  | 850       | NCEI    | 1971-1994        |
| OK    | ARDMORE #2                  | 34-0293 | HLY                 | 34.1500  | -97.1500  | 850       | NCEI    | 1960-1994        |
| OK    | ARDMORE DOWNTOWN EXEC ARPT  | 56-0210 | HLY                 | 34.1469  | -97.1225  | 844       | NCEI    | 2007-2017        |
| OK    | ARDMORE_3.5ENE              | 86-0144 | 15M                 | 34.1926  | -97.0857  | 873       | OKM     | 1994-2015        |

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|-------|---------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| OK    | ARDMORE_3ENE        | 86-0145 | 15M                 | 34.1922  | -97.0850  | 873       | OKM     | 1994-2015        |
| OK    | ARNETT 3NE          | 34-0332 | DLY                 | 36.1669  | -99.7214  | 2428      | NCEI    | 1911-2017        |
| OK    | ARNETT 8WSW MESONET | 34-0338 | DLY                 | 36.0719  | -99.9031  | 2359      | NCEI    | 2009-2017        |
| OK    | ARNETT_8WSW         | 86-0146 | 15M                 | 36.0720  | -99.9031  | 2359      | OKM     | 1994-2015        |
| OK    | ARNETT_8WSW         | 86-0146 | DLY                 | 36.0720  | -99.9031  | 2352      | OKM     | 1994-2016        |
| OK    | ATOKA               | 34-0391 | DLY                 | 34.3983  | -96.1400  | 564       | NCEI    | 1926-2017        |
| OK    | ATOKA DAM           | 34-0394 | DLY                 | 34.4500  | -96.0667  | 594       | NCEI    | 1963-1999        |
| OK    | BAIRD 4 N           | 34-0466 | DLY                 | 34.5333  | -98.1667  | 1089      | NCEI    | 1952-1980        |
| OK    | BATTIEST            | 34-0562 | DLY                 | 34.3850  | -94.8981  | 777       | NCEI    | 1948-1951        |
| OK    | BATTIEST            | 34-0567 | DLY                 | 34.3850  | -94.8981  | 777       | NCEI    | 1985-2017        |
| OK    | BEAR MTN TWR        | 34-0584 | DLY                 | 34.1394  | -94.9519  | 801       | NCEI    | 1938-1998        |
| OK    | BEAVER              | 34-0593 | DLY                 | 36.8125  | -100.5308 | 2464      | NCEI    | 1896-2017        |
| OK    | BEAVER_1SSW         | 86-0148 | 15M                 | 36.8025  | -100.5301 | 2487      | OKM     | 1994-2015        |
| OK    | BENGAL 4 NNW        | 34-0670 | 15M                 | 34.8822  | -95.0906  | 667       | NCEI    | 1971-2013        |
| OK    | BENGAL 4 NNW        | 34-0670 | HLY                 | 34.8822  | -95.0906  | 667       | NCEI    | 1947-2013        |
| OK    | BENGAL 4 NNW        | 34-0670 | DLY                 | 34.8822  | -95.0906  | 666       | NCEI    | 1900-2017        |
| OK    | BESSIE 4WNW MESONET | 34-0684 | DLY                 | 35.4017  | -99.0583  | 1677      | NCEI    | 2009-2017        |
| OK    | BESSIE_4WNW         | 86-0150 | 15M                 | 35.4019  | -99.0585  | 1677      | OKM     | 1994-2015        |
| OK    | BESSIE_4WNW         | 86-0150 | DLY                 | 35.4019  | -99.0585  | 1681      | OKM     | 1994-2016        |
| OK    | BOISE CITY 2        | 34-0912 | HLY                 | 36.7333  | -102.5000 | 4163      | NCEI    | 1965-1983        |
| OK    | BOISE CITY 2 E      | 66-0908 | 15M                 | 36.7236  | -102.4805 | 4133      | NCEI    | 2013-2017        |
| OK    | BOISE CITY 2 E      | 34-0908 | 15M                 | 36.7236  | -102.4806 | 4133      | NCEI    | 1983-2013        |
| OK    | BOISE CITY 2 E      | 34-0908 | HLY                 | 36.7236  | -102.4806 | 4133      | NCEI    | 1947-2013        |
| OK    | BOISE CITY 2 E      | 34-0908 | DLY                 | 36.7236  | -102.4806 | 4134      | NCEI    | 1908-2016        |
| OK    | BOISE CITY_3SSE     | 86-0153 | 15M                 | 36.6926  | -102.4971 | 4157      | OKM     | 1994-2015        |
| OK    | BOSWELL 1 S         | 34-0980 | DLY                 | 34.0211  | -95.8722  | 551       | NCEI    | 1941-1999        |
| OK    | BROKEN BOW          | 76-0021 | HLY                 | 34.0500  | -94.7372  | 500       | RAWS    | 1999-2015        |
| OK    | BROKEN BOW 1 N      | 34-1162 | DLY                 | 34.0497  | -94.7381  | 476       | NCEI    | 1917-2017        |
| OK    | BROKEN BOW DAM      | 34-1168 | HLY                 | 34.1333  | -94.7000  | 443       | NCEI    | 1964-1997        |
| OK    | BROKEN BOW DAM      | 34-1168 | DLY                 | 34.1333  | -94.7000  | 443       | NCEI    | 1964-2017        |
| OK    | BROKEN BOW RAWS     | 85-0192 | HLY                 | 34.0500  | -94.7400  | 518       | HADS    | 2004-2017        |
| OK    | BROKEN BOW_6.5E     | 86-0157 | 15M                 | 34.0433  | -94.6244  | 371       | OKM     | 1994-2015        |

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| OK    | BROKEN BOW_6.5E       | 86-0157 | DLY                 | 34.0433  | -94.6244  | 375       | OKM     | 1994-2016        |
| OK    | BROKEN BOW_7E         | 86-0147 | 15M                 | 34.0144  | -94.6131  | 371       | OKM     | 1994-2015        |
| OK    | BROKEN BOW_7E         | 86-0147 | DLY                 | 34.0144  | -94.6131  | 372       | OKM     | 1994-2016        |
| OK    | BUFFALO 1SW MESONET   | 34-1240 | DLY                 | 36.8314  | -99.6411  | 1834      | NCEI    | 2009-2017        |
| OK    | BUFFALO 2 SSW         | 34-1243 | DLY                 | 36.8003  | -99.6400  | 1932      | NCEI    | 1907-2013        |
| OK    | BUFFALO_0.5SW         | 86-0158 | 15M                 | 36.8313  | -99.6410  | 1834      | OKM     | 1994-2015        |
| OK    | BUFFALO_0.5SW         | 86-0158 | DLY                 | 36.8313  | -99.6410  | 1832      | OKM     | 1994-2016        |
| OK    | BUTLER 5SW MESONET    | 34-1270 | DLY                 | 35.5914  | -99.2706  | 1706      | NCEI    | 2009-2017        |
| OK    | BUTLER_5SW            | 86-0161 | 15M                 | 35.5915  | -99.2706  | 1706      | OKM     | 1994-2015        |
| OK    | BUTLER_5SW            | 86-0161 | DLY                 | 35.5915  | -99.2706  | 1704      | OKM     | 1994-2016        |
| OK    | BYARS 3ESE MESONET    | 34-1283 | DLY                 | 34.8494  | -97.0031  | 1132      | NCEI    | 2009-2017        |
| OK    | BYARS_3ESE            | 86-0162 | 15M                 | 34.8497  | -97.0033  | 1132      | OKM     | 1994-2015        |
| OK    | BYARS_3ESE            | 86-0162 | DLY                 | 34.8497  | -97.0033  | 1137      | OKM     | 1994-2016        |
| OK    | CAMARGO               | 34-1396 | DLY                 | 36.0167  | -99.2833  | 1942      | NCEI    | 1923-1975        |
| OK    | CAMARGO 4WNW MESONET  | 34-1404 | DLY                 | 36.0286  | -99.3464  | 1932      | NCEI    | 2009-2017        |
| OK    | CAMARGO_4WNW          | 86-0164 | DLY                 | 36.0287  | -99.3465  | 1924      | OKM     | 1994-2016        |
| OK    | CANEY 1 E             | 34-1437 | 15M                 | 34.2300  | -96.1950  | 565       | NCEI    | 1978-2010        |
| OK    | CANEY 1 E             | 34-1437 | DLY                 | 34.2300  | -96.1950  | 564       | NCEI    | 2000-2009        |
| OK    | CANEY 1 NNE           | 34-1436 | HLY                 | 34.2333  | -96.2167  | 531       | NCEI    | 1947-1978        |
| OK    | CANEY 1 NNE           | 34-1436 | DLY                 | 34.2333  | -96.2167  | 531       | NCEI    | 1947-1951        |
| OK    | CARNASAW TWR          | 34-1499 | DLY                 | 34.1442  | -94.6378  | 1001      | NCEI    | 1938-2001        |
| OK    | CARNEGIE 5 NE         | 34-1504 | DLY                 | 35.1756  | -98.5794  | 1480      | NCEI    | 1914-2005        |
| OK    | CARTER TWR            | 34-1544 | 15M                 | 34.2505  | -94.7812  | 1301      | NCEI    | 1971-2010        |
| OK    | CARTER TWR            | 34-1544 | HLY                 | 34.2505  | -94.7812  | 1301      | NCEI    | 1947-2010        |
| OK    | CARTER TWR            | 34-1544 | DLY                 | 34.2505  | -94.7812  | 1301      | NCEI    | 1939-2008        |
| OK    | CENTRAHOMA 1E MESONET | 34-1644 | DLY                 | 34.6089  | -96.3331  | 682       | NCEI    | 2009-2017        |
| OK    | CENTRAHOMA_1E         | 86-0167 | 15M                 | 34.6090  | -96.3331  | 682       | OKM     | 1994-2015        |
| OK    | CENTRAHOMA_1E         | 86-0167 | DLY                 | 34.6090  | -96.3331  | 687       | OKM     | 1994-2016        |
| OK    | CHATTANOOGA           | 34-1706 | DLY                 | 34.4225  | -98.6497  | 1148      | NCEI    | 1905-2017        |
| OK    | CHEYENNE              | 34-1738 | DLY                 | 35.6000  | -99.6833  | 2005      | NCEI    | 1923-1994        |
| OK    | CHEYENNE 11 NW        | 34-1744 | 15M                 | 35.7539  | -99.7628  | 2330      | NCEI    | 2003-2007        |
| OK    | CHEYENNE 11 NW        | 34-1744 | HLY                 | 35.7539  | -99.7628  | 2330      | NCEI    | 2003-2007        |



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| OK    | CHEYENNE 11 NW                 | 34-1744 | DLY                 | 35.7539  | -99.7628  | 2329      | NCEI    | 2003-2007        |
| OK    | CHEYENNE 6SW MESONET           | 34-1743 | DLY                 | 35.5461  | -99.7278  | 2277      | NCEI    | 2009-2017        |
| OK    | CHEYENNE_6SW                   | 86-0170 | 15M                 | 35.5461  | -99.7279  | 2277      | OKM     | 1994-2015        |
| OK    | CHEYENNE_6SW                   | 86-0170 | DLY                 | 35.5461  | -99.7279  | 2267      | OKM     | 1994-2016        |
| OK    | CHICKASAW NRA                  | 34-1745 | DLY                 | 34.5019  | -96.9717  | 1056      | NCEI    | 1978-2017        |
| OK    | CHICKASHA                      | 34-1747 | DLY                 | 35.0333  | -97.9500  | 1089      | NCEI    | 1901-1966        |
| OK    | CHICKASHA EXP STATION          | 66-1750 | 15M                 | 35.0488  | -97.9158  | 1085      | NCEI    | 2013-2017        |
| OK    | CHICKASHA EXP STATION          | 34-1750 | 15M                 | 35.0489  | -97.9158  | 1085      | NCEI    | 1971-2013        |
| OK    | CHICKASHA EXP STATION          | 34-1750 | HLY                 | 35.0489  | -97.9158  | 1085      | NCEI    | 1958-2013        |
| OK    | CHICKASHA EXP STATION          | 34-1750 | DLY                 | 35.0489  | -97.9158  | 1086      | NCEI    | 1953-2017        |
| OK    | CHRISTS 40 ACRE CAMP           | 85-0237 | HLY                 | 34.5283  | -94.9311  | 896       | HADS    | 1995-2017        |
| OK    | CLAYTON_3NNE                   | 86-0173 | 15M                 | 34.6566  | -95.3260  | 610       | OKM     | 1994-2015        |
| OK    | CLAYTON_3NNE                   | 86-0173 | DLY                 | 34.6566  | -95.3260  | 614       | OKM     | 1994-2016        |
| OK    | CLEBIT 2 ESE                   | 34-1873 | DLY                 | 34.3833  | -94.9833  | 830       | NCEI    | 1978-1982        |
| OK    | CLINTON                        | 34-1909 | DLY                 | 35.5014  | -98.9772  | 1572      | NCEI    | 1936-2005        |
| OK    | CLINTON 5.2 SSW                | 69-0520 | DLY                 | 35.4369  | -99.0096  | 1631      | NCEI    | 2008-2017        |
| OK    | CLINTON SHERMAN AP             | 79-0020 | DLY                 | 35.3400  | -99.2000  | 1910      | NCEI    | 1958-2017        |
| OK    | CLINTON-SHERMAN AIRPORT        | 55-0021 | HLY                 | 35.3400  | -99.2000  | 1910      | NCEI    | 1996-2007        |
| OK    | CLINTON-SHERMAN AIRPORT        | 56-0085 | HLY                 | 35.3400  | -99.2000  | 1910      | NCEI    | 2007-2017        |
| OK    | CLOUD CHIEF 2 SE               | 34-1927 | DLY                 | 35.2333  | -98.8167  | 1503      | NCEI    | 1893-1975        |
| OK    | CLOUDY_5SSE                    | 86-0174 | 15M                 | 34.2232  | -95.2487  | 725       | OKM     | 1994-2015        |
| OK    | CLOUDY_5SSE                    | 86-0174 | DLY                 | 34.2232  | -95.2487  | 735       | OKM     | 1994-2016        |
| OK    | COALGATE 1 WNW                 | 34-1954 | DLY                 | 34.5500  | -96.2333  | 610       | NCEI    | 1904-1982        |
| OK    | COMANCHE                       | 34-2054 | DLY                 | 34.3622  | -97.9736  | 1024      | NCEI    | 1952-2017        |
| OK    | CORDELL                        | 34-2125 | DLY                 | 35.3008  | -98.9958  | 1565      | NCEI    | 1936-2013        |
| OK    | CORDELL 0.8 SW                 | 69-0521 | DLY                 | 35.2901  | -98.9887  | 1558      | NCEI    | 2010-2013        |
| OK    | COX CITY 2 NE                  | 34-2196 | DLY                 | 34.7422  | -97.7039  | 1234      | NCEI    | 1980-2013        |
| OK    | CUSTER CITY 3 SE               | 34-2334 | 15M                 | 35.6472  | -98.8281  | 1755      | NCEI    | 1973-2004        |
| OK    | CUSTER CITY 3 SE               | 34-2334 | HLY                 | 35.6472  | -98.8281  | 1755      | NCEI    | 1973-2004        |
| OK    | DAISY 4 ENE                    | 34-2354 | DLY                 | 34.5433  | -95.6764  | 755       | NCEI    | 1944-2017        |
| OK    | DAM-TOM STEED LAKE-W.OTTER CRE | 85-0250 | HLY                 | 34.7333  | -98.9833  | 1453      | HADS    | 1995-2017        |
| OK    | DUNCAN                         | 34-2660 | DLY                 | 34.5011  | -97.9592  | 1125      | NCEI    | 1936-2017        |

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| OK    | DUNCAN 1 SSW          | 34-2665 | HLY                 | 34.4833  | -97.9667  | 1130      | NCEI    | 1947-1979        |
| OK    | DUNCAN 10 W           | 34-2668 | DLY                 | 34.4933  | -98.1419  | 1115      | NCEI    | 1981-2017        |
| OK    | DUNCAN AP             | 34-2654 | 15M                 | 34.4831  | -97.9578  | 1105      | NCEI    | 1979-2012        |
| OK    | DURANT                | 34-2678 | DLY                 | 34.0000  | -96.3686  | 600       | NCEI    | 1901-2017        |
| OK    | DURANT_6SSE           | 86-0178 | 15M                 | 33.9207  | -96.3203  | 646       | OKM     | 1994-2015        |
| OK    | DURANT_6SSE           | 86-0178 | DLY                 | 33.9207  | -96.3203  | 656       | OKM     | 1994-2016        |
| OK    | ELDORADO              | 34-2836 | DLY                 | 34.4667  | -99.6500  | 1460      | NCEI    | 1903-1975        |
| OK    | ELK CITY 4 W          | 34-2849 | 15M                 | 35.3925  | -99.5064  | 2120      | NCEI    | 1971-2008        |
| OK    | ELK CITY 4 W          | 34-2849 | HLY                 | 35.3925  | -99.5064  | 2120      | NCEI    | 1947-2008        |
| OK    | ELK CITY 4 W          | 34-2849 | DLY                 | 35.3925  | -99.5064  | 2119      | NCEI    | 1904-2017        |
| OK    | ELMORE CITY 3 SW      | 34-2872 | DLY                 | 34.6100  | -97.4222  | 1020      | NCEI    | 1947-2017        |
| OK    | ERICK                 | 85-0216 | HLY                 | 35.2064  | -99.8000  | 1991      | HADS    | 1995-2017        |
| OK    | ERICK                 | 34-2944 | DLY                 | 35.2164  | -99.8628  | 2060      | NCEI    | 1904-2017        |
| OK    | ERICK_4ESE            | 86-0181 | 15M                 | 35.2049  | -99.8034  | 1978      | OKM     | 1994-2015        |
| OK    | ERICK_4ESE            | 86-0181 | DLY                 | 35.2049  | -99.8034  | 1980      | OKM     | 1994-2016        |
| OK    | EVA                   | 66-3002 | 15M                 | 36.7975  | -101.9075 | 3574      | NCEI    | 2013-2017        |
| OK    | EVA                   | 34-3002 | 15M                 | 36.7975  | -101.9075 | 3574      | NCEI    | 1984-2013        |
| OK    | EVA                   | 34-3002 | HLY                 | 36.7975  | -101.9075 | 3574      | NCEI    | 1947-2013        |
| OK    | FARGO                 | 34-3070 | DLY                 | 36.3736  | -99.6244  | 2116      | NCEI    | 1942-2017        |
| OK    | FARRIS 3 WNW          | 34-3083 | DLY                 | 34.2667  | -95.9167  | 509       | NCEI    | 1944-1995        |
| OK    | FLASHMAN TWR          | 34-3182 | DLY                 | 34.4796  | -95.0101  | 1752      | NCEI    | 1938-1984        |
| OK    | FORT COBB 0.4 NNW     | 69-0468 | DLY                 | 35.1046  | -98.4443  | 1309      | NCEI    | 2013-2017        |
| OK    | FORT COBB_4NNW        | 86-0187 | 15M                 | 35.1489  | -98.4661  | 1385      | OKM     | 1994-2015        |
| OK    | FORT COBB_4NNW        | 86-0187 | DLY                 | 35.1489  | -98.4661  | 1381      | OKM     | 1994-2016        |
| OK    | FORT SILL             | 52-3300 | DLY                 | 34.6708  | -98.3869  | 1160      | FORTS   | 1870-1892        |
| OK    | FORT SILL             | 34-3300 | DLY                 | 34.6667  | -98.3833  | 1201      | NCEI    | 1870-1908        |
| OK    | FORT SUPPLY 4.2 SE    | 69-0525 | DLY                 | 36.5312  | -99.5179  | 2067      | NCEI    | 2011-2017        |
| OK    | FREDERICK             | 34-3353 | DLY                 | 34.3861  | -99.0200  | 1286      | NCEI    | 1904-2011        |
| OK    | FREEDOM               | 34-3358 | DLY                 | 36.7647  | -99.1128  | 1516      | NCEI    | 1948-2015        |
| OK    | FREEDOM 16NNE MESONET | 34-3660 | DLY                 | 36.9869  | -99.0108  | 1821      | NCEI    | 2009-2017        |
| OK    | FT COBB               | 34-3281 | 15M                 | 35.1036  | -98.4428  | 1285      | NCEI    | 1977-2007        |
| OK    | FT COBB               | 34-3281 | HLY                 | 35.1036  | -98.4428  | 1285      | NCEI    | 1952-2007        |

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| OK    | FT COBB                   | 34-3281 | DLY                 | 35.1036  | -98.4428  | 1286      | NCEI    | 1938-1975        |
| OK    | FT SILL POST FLD AF       | 79-0083 | DLY                 | 34.6500  | -98.4000  | 1211      | NCEI    | 1949-1970        |
| OK    | FT SUPPLY 3SE             | 34-3304 | HLY                 | 36.5442  | -99.5350  | 2030      | NCEI    | 1947-2012        |
| OK    | FT SUPPLY 3SE             | 34-3304 | DLY                 | 36.5442  | -99.5350  | 2031      | NCEI    | 1940-2013        |
| OK    | GAGE AIRPORT              | 55-0090 | HLY                 | 36.2970  | -99.7750  | 2202      | NCEI    | 1996-2007        |
| OK    | GAGE AIRPORT              | 56-0167 | HLY                 | 36.2967  | -99.7689  | 2202      | NCEI    | 2007-2017        |
| OK    | GAGE AP                   | 34-3407 | HLY                 | 36.2967  | -99.7689  | 2191      | NCEI    | 1948-2013        |
| OK    | GAGE AP                   | 79-0095 | DLY                 | 36.2967  | -99.7689  | 2192      | NCEI    | 1904-2017        |
| OK    | GATE                      | 34-3489 | DLY                 | 36.8500  | -100.0569 | 2251      | NCEI    | 1959-2017        |
| OK    | GLOVER RIVER              | 85-0230 | HLY                 | 34.1014  | -94.9061  | 427       | HADS    | 1995-2017        |
| OK    | GOODWELL RESEARCH STATION | 54-0204 | DLY                 | 36.5908  | -101.6175 | 3278      | NADP    | 1985-2015        |
| OK    | GOODWELL RSCH STN         | 66-3628 | 15M                 | 36.5913  | -101.6180 | 3278      | NCEI    | 2013-2017        |
| OK    | GOODWELL RSCH STN         | 34-3628 | 15M                 | 36.5914  | -101.6181 | 3278      | NCEI    | 1978-2013        |
| OK    | GOODWELL RSCH STN         | 34-3628 | HLY                 | 36.5914  | -101.6181 | 3278      | NCEI    | 1947-2013        |
| OK    | GOODWELL RSCH STN         | 34-3628 | DLY                 | 36.5914  | -101.6181 | 3278      | NCEI    | 1910-2017        |
| OK    | GOODWELL_2E               | 86-0188 | 15M                 | 36.6018  | -101.6013 | 3271      | OKM     | 1994-2015        |
| OK    | GRANDFIELD 4 NW           | 34-3709 | DLY                 | 34.2833  | -98.7333  | 1060      | NCEI    | 1941-1994        |
| OK    | GRANDFIELD_3.3W           | 86-0189 | 15M                 | 34.2394  | -98.7436  | 1119      | OKM     | 1994-2015        |
| OK    | GRANDFIELD_3.3W           | 86-0189 | DLY                 | 34.2394  | -98.7436  | 1121      | OKM     | 1994-2016        |
| OK    | GRANDFIELD_3WNW           | 86-0190 | 15M                 | 34.2392  | -98.7397  | 1122      | OKM     | 1994-2015        |
| OK    | GRANDFIELD_3WNW           | 86-0190 | DLY                 | 34.2392  | -98.7397  | 1122      | OKM     | 1994-2016        |
| OK    | GUYMON                    | 34-3835 | DLY                 | 36.7028  | -101.4781 | 3071      | NCEI    | 1909-2010        |
| OK    | GUYMON MUNI AP            | 79-0003 | DLY                 | 36.6817  | -101.5053 | 3123      | NCEI    | 1998-2017        |
| OK    | HAMMON 3 SSW              | 34-3871 | DLY                 | 35.5850  | -99.3953  | 1821      | NCEI    | 1920-2005        |
| OK    | HARDESTY                  | 34-3902 | DLY                 | 36.6167  | -101.1833 | 2904      | NCEI    | 1941-1957        |
| OK    | HEALDTON 3 E              | 34-4001 | DLY                 | 34.2333  | -97.4203  | 902       | NCEI    | 1894-2017        |
| OK    | HEE MTN TWR               | 34-4017 | DLY                 | 34.3413  | -94.6572  | 1503      | NCEI    | 1948-1995        |
| OK    | HENNEPIN                  | 34-4051 | 15M                 | 34.5167  | -97.3500  | 942       | NCEI    | 1971-1974        |
| OK    | HENNEPIN                  | 34-4051 | HLY                 | 34.5167  | -97.3500  | 942       | NCEI    | 1948-1974        |
| OK    | HENNEPIN                  | 34-4051 | DLY                 | 34.5167  | -97.3500  | 942       | NCEI    | 1948-1951        |
| OK    | HENNEPIN 5 N              | 66-4052 | 15M                 | 34.5797  | -97.3510  | 966       | NCEI    | 2013-2017        |
| OK    | HENNEPIN 5 N              | 34-4052 | 15M                 | 34.5797  | -97.3511  | 966       | NCEI    | 1974-2013        |

| State | Station name                 | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| OK    | HENNEPIN 5 N                 | 34-4052 | HLY                 | 34.5797  | -97.3511  | 966       | NCEI    | 1974-2013        |
| OK    | HENNEPIN 5 N                 | 34-4052 | DLY                 | 34.5797  | -97.3511  | 965       | NCEI    | 1993-2017        |
| OK    | HENRY POST AAF AIRPORT       | 64-0446 | DLY                 | 34.6500  | -98.4000  | 1189      | NCEI    | 1973-2016        |
| OK    | HOBART                       | 34-4202 | 15M                 | 35.0258  | -99.1058  | 1552      | NCEI    | 1971-2010        |
| OK    | HOBART                       | 34-4202 | HLY                 | 35.0258  | -99.1058  | 1552      | NCEI    | 1952-2010        |
| OK    | HOBART                       | 34-4202 | DLY                 | 35.0258  | -99.1058  | 1552      | NCEI    | 2010-2017        |
| OK    | HOBART MUNI AP               | 78-0045 | 15M                 | 34.9894  | -99.0525  | 1556      | NCEI    | 2005-2017        |
| OK    | HOBART MUNI AP               | 79-0158 | DLY                 | 34.9894  | -99.0525  | 1555      | NCEI    | 1910-2017        |
| OK    | HOBART MUNICIPAL AIRPORT     | 34-4204 | HLY                 | 34.9894  | -99.0525  | 1556      | NCEI    | 1947-2013        |
| OK    | HOBART MUNICIPAL AIRPORT     | 56-0276 | HLY                 | 34.9894  | -99.0525  | 1570      | NCEI    | 2007-2017        |
| OK    | HOBART_4SE                   | 86-0195 | 15M                 | 34.9897  | -99.0528  | 1552      | OKM     | 1994-2015        |
| OK    | HOLLIS 5E                    | 34-4249 | DLY                 | 34.6808  | -99.8136  | 1621      | NCEI    | 1922-2013        |
| OK    | HOLLIS 5E MESONET            | 34-4250 | DLY                 | 34.6856  | -99.8333  | 1631      | NCEI    | 2011-2017        |
| OK    | HOLLIS_3W                    | 86-0197 | 15M                 | 34.6855  | -99.8333  | 1631      | OKM     | 1994-2015        |
| OK    | HOLLIS_3W                    | 86-0197 | DLY                 | 34.6855  | -99.8333  | 1637      | OKM     | 1994-2016        |
| OK    | HOOKER                       | 34-4298 | DLY                 | 36.8650  | -101.2103 | 2989      | NCEI    | 1906-2017        |
| OK    | HOOKER_1W                    | 86-0198 | 15M                 | 36.8552  | -101.2255 | 2992      | OKM     | 1994-2015        |
| OK    | HOOKER_1W                    | 86-0198 | DLY                 | 36.8552  | -101.2255 | 2993      | OKM     | 1994-2016        |
| OK    | HUGO                         | 34-4384 | 15M                 | 34.0211  | -95.5381  | 520       | NCEI    | 1972-1999        |
| OK    | HUGO                         | 34-4384 | HLY                 | 34.0211  | -95.5381  | 520       | NCEI    | 1947-1999        |
| OK    | HUGO                         | 34-4384 | DLY                 | 34.0211  | -95.5381  | 522       | NCEI    | 1915-2007        |
| OK    | HUGO 7E - DAM - KIAMICHI RVR | 85-0235 | HLY                 | 34.0117  | -95.3803  | 423       | HADS    | 1995-2017        |
| OK    | HUGO DAM                     | 34-4386 | HLY                 | 34.0000  | -95.4000  | 466       | NCEI    | 1969-1997        |
| OK    | HUGO_2NW                     | 86-0199 | 15M                 | 34.0308  | -95.5401  | 574       | OKM     | 1994-2015        |
| OK    | HUGO_2NW                     | 86-0199 | DLY                 | 34.0308  | -95.5401  | 573       | OKM     | 1994-2016        |
| OK    | IDABEL                       | 34-4451 | DLY                 | 33.9336  | -94.8278  | 364       | NCEI    | 1907-2017        |
| OK    | IDABEL_5SW                   | 86-0200 | 15M                 | 33.8301  | -94.8803  | 361       | OKM     | 1994-2015        |
| OK    | IDABEL_5SW                   | 86-0200 | DLY                 | 33.8301  | -94.8803  | 368       | OKM     | 1994-2016        |
| OK    | INDIAHOMA                    | 85-0273 | HLY                 | 34.7744  | -98.7458  | 2037      | HADS    | 1995-2017        |
| OK    | KENTON                       | 34-4766 | DLY                 | 36.9031  | -102.9650 | 4350      | NCEI    | 1900-2006        |
| OK    | KENTON_5SE                   | 86-0203 | 15M                 | 36.8294  | -102.8782 | 4337      | OKM     | 1994-2015        |
| OK    | KENTON_5SE                   | 86-0203 | DLY                 | 36.8294  | -102.8782 | 4342      | OKM     | 1994-2016        |

| State | Station name                  | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|-------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| OK    | KESSLER FARM FIELD LABORATORY | 54-0202 | DLY                 | 34.9800  | -97.5214  | 1086      | NADP    | 1983-2015        |
| OK    | KETCHUM RANCH_7NW             | 86-0204 | 15M                 | 34.5289  | -97.7648  | 1119      | OKM     | 1994-2015        |
| OK    | KETCHUM RANCH_7NW             | 86-0204 | DLY                 | 34.5289  | -97.7648  | 1122      | OKM     | 1994-2016        |
| OK    | KINGSTON 4.9 SSE              | 69-0498 | DLY                 | 33.9374  | -96.6887  | 696       | NCEI    | 2012-2017        |
| OK    | KINGSTON 5 SSE                | 34-4865 | 15M                 | 33.9300  | -96.6961  | 684       | NCEI    | 1984-2009        |
| OK    | KINGSTON 5 SSE                | 34-4865 | HLY                 | 33.9300  | -96.6961  | 684       | NCEI    | 1947-2009        |
| OK    | KINGSTON 5 SSE                | 34-4865 | DLY                 | 33.9300  | -96.6961  | 686       | NCEI    | 1946-2008        |
| OK    | LANE 1WNW MESONET             | 34-5020 | DLY                 | 34.3086  | -95.9969  | 594       | NCEI    | 2009-2017        |
| OK    | LANE_1WNW                     | 86-0208 | 15M                 | 34.3088  | -95.9972  | 594       | OKM     | 1994-2015        |
| OK    | LANE_1WNW                     | 86-0208 | DLY                 | 34.3088  | -95.9972  | 599       | OKM     | 1994-2016        |
| OK    | LAVERNE                       | 34-5045 | DLY                 | 36.6992  | -99.8967  | 2116      | NCEI    | 1939-2010        |
| OK    | LAWTON                        | 34-5063 | DLY                 | 34.6097  | -98.4572  | 1152      | NCEI    | 1912-2017        |
| OK    | LAWTON 2N                     | 34-5068 | DLY                 | 34.6500  | -98.4000  | 1122      | NCEI    | 1936-1950        |
| OK    | LAWTON MUNI AP                | 79-0026 | DLY                 | 34.5583  | -98.4172  | 1070      | NCEI    | 1998-2017        |
| OK    | LAWTON-FORT SILL REG AP       | 55-0024 | HLY                 | 34.5680  | -98.4160  | 1108      | NCEI    | 1996-2007        |
| OK    | LAWTON-FORT SILL RGNL ARPT    | 56-0089 | HLY                 | 34.5680  | -98.4160  | 1108      | NCEI    | 2007-2017        |
| OK    | LEEDEY                        | 34-5090 | DLY                 | 35.8781  | -99.3433  | 2080      | NCEI    | 1941-2017        |
| OK    | LEHIGH 4 SW                   | 66-5108 | 15M                 | 34.4339  | -96.2717  | 695       | NCEI    | 2013-2017        |
| OK    | LEHIGH 4 SW                   | 34-5108 | 15M                 | 34.4339  | -96.2717  | 695       | NCEI    | 1984-2013        |
| OK    | LEHIGH 4 SW                   | 34-5108 | HLY                 | 34.4339  | -96.2717  | 695       | NCEI    | 1947-2013        |
| OK    | LEHIGH 4 SW                   | 34-5108 | DLY                 | 34.4339  | -96.2717  | 696       | NCEI    | 1893-2017        |
| OK    | LINDSAY 2 W                   | 34-5216 | DLY                 | 34.8261  | -97.6386  | 981       | NCEI    | 1938-2010        |
| OK    | MACKIE 4 NNW                  | 34-5463 | 15M                 | 35.7481  | -99.8178  | 2150      | NCEI    | 1974-2002        |
| OK    | MACKIE 4 NNW                  | 34-5463 | HLY                 | 35.7481  | -99.8178  | 2150      | NCEI    | 1970-2002        |
| OK    | MACKIE 4 NNW                  | 34-5463 | DLY                 | 35.7481  | -99.8178  | 2149      | NCEI    | 2000-2002        |
| OK    | MADILL                        | 34-5468 | DLY                 | 34.0919  | -96.7708  | 771       | NCEI    | 1936-2017        |
| OK    | MADILL 11WSW MESONET          | 34-5474 | DLY                 | 34.0356  | -96.9433  | 761       | NCEI    | 2009-2017        |
| OK    | MADILL_4.5NNW                 | 86-0209 | 15M                 | 34.0358  | -96.9439  | 761       | OKM     | 1994-2015        |
| OK    | MADILL_4.5NNW                 | 86-0209 | DLY                 | 34.0358  | -96.9439  | 765       | OKM     | 1994-2016        |
| OK    | MANGUM                        | 34-5509 | DLY                 | 34.8911  | -99.5017  | 1594      | NCEI    | 1920-2017        |
| OK    | MANGUM 5SE MESONET            | 34-5514 | DLY                 | 34.8358  | -99.4239  | 1509      | NCEI    | 2009-2017        |
| OK    | MANGUM_5SE                    | 86-0210 | 15M                 | 34.8359  | -99.4240  | 1509      | OKM     | 1994-2015        |

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|-------|-------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| OK    | MANGUM_5SE                    | 86-0210 | DLY                 | 34.8359  | -99.4240  | 1511      | OKM     | 1994-2016        |
| OK    | MARIETTA 5SW                  | 34-5563 | DLY                 | 33.8761  | -97.1642  | 801       | NCEI    | 1937-2017        |
| OK    | MARLOW 1 WSW                  | 34-5581 | DLY                 | 34.6367  | -97.9786  | 1263      | NCEI    | 1900-2017        |
| OK    | MAY RANCH_16NNE               | 86-0213 | 15M                 | 36.9871  | -99.0111  | 1821      | OKM     | 1994-2015        |
| OK    | MAY RANCH_16NNE               | 86-0213 | DLY                 | 36.9871  | -99.0111  | 1823      | OKM     | 1994-2016        |
| OK    | MAYFIELD                      | 66-5648 | 15M                 | 35.3391  | -99.8769  | 2005      | NCEI    | 2013-2017        |
| OK    | MAYFIELD                      | 34-5648 | 15M                 | 35.3392  | -99.8769  | 2005      | NCEI    | 1971-2013        |
| OK    | MAYFIELD                      | 34-5648 | HLY                 | 35.3392  | -99.8769  | 2005      | NCEI    | 1947-2013        |
| OK    | MCALESTER REGIONAL AIRPORT    | 34-5664 | 15M                 | 34.8822  | -95.7831  | 770       | NCEI    | 1980-2006        |
| OK    | MCALESTER RGNL AP             | 78-0060 | 15M                 | 34.8822  | -95.7830  | 770       | NCEI    | 2005-2017        |
| OK    | MCALESTER RGNL AP             | 79-0156 | DLY                 | 34.8822  | -95.7831  | 771       | NCEI    | 1893-2017        |
| OK    | MCALESTER_4S                  | 86-0214 | 15M                 | 34.8823  | -95.7810  | 755       | OKM     | 1994-2015        |
| OK    | MCGEE CREEK DAM               | 34-5713 | DLY                 | 34.3097  | -95.8675  | 673       | NCEI    | 1982-2017        |
| OK    | MEDICINE PARK_3W              | 86-0216 | 15M                 | 34.7292  | -98.5694  | 1598      | OKM     | 1994-2015        |
| OK    | MEDICINE PARK_3W              | 86-0216 | DLY                 | 34.7292  | -98.5694  | 1607      | OKM     | 1994-2016        |
| OK    | MEDICINE PK 3W MESONET        | 34-5775 | DLY                 | 34.7292  | -98.5694  | 1598      | NCEI    | 2009-2017        |
| OK    | MORAVIA 2 NNE                 | 34-6035 | DLY                 | 35.1464  | -99.4956  | 1690      | NCEI    | 1941-2017        |
| OK    | MUTUAL                        | 34-6139 | DLY                 | 36.2283  | -99.1700  | 1890      | NCEI    | 1915-2017        |
| OK    | N FORK RED RIVER AT CARTER    | 87-0006 | HLY                 | 35.1681  | -99.5069  | 1680      | USBR    | 1991-2016        |
| OK    | N FORK RED RIVER AT CARTER    | 87-0006 | DLY                 | 35.1681  | -99.5069  | 1680      | USBR    | 1990-2016        |
| OK    | N. CANADIAN RIVER             | 85-0259 | HLY                 | 36.1833  | -98.9167  | 1729      | HADS    | 1995-2017        |
| OK    | NINNEKAH                      | 34-6328 | HLY                 | 34.9500  | -97.9333  | 1161      | NCEI    | 1947-1966        |
| OK    | NINNEKAH_2NNW                 | 86-0223 | 15M                 | 34.9677  | -97.9520  | 1168      | OKM     | 1994-2015        |
| OK    | NINNEKAH_2NNW                 | 86-0223 | DLY                 | 34.9677  | -97.9520  | 1172      | OKM     | 1994-2016        |
| OK    | NORTH FORK RED RIVER NR SAYRE | 87-0029 | HLY                 | 35.2847  | -99.6217  | 1783      | USBR    | 1991-2016        |
| OK    | OPTIMA LAKE                   | 34-6740 | HLY                 | 36.6500  | -101.1333 | 2834      | NCEI    | 1973-1994        |
| OK    | OPTIMA LAKE                   | 34-6740 | DLY                 | 36.6500  | -101.1333 | 2835      | NCEI    | 1985-1994        |
| OK    | PAOLI 2 W                     | 66-6859 | 15M                 | 34.8230  | -97.2850  | 931       | NCEI    | 2013-2017        |
| OK    | PAOLI 2 W                     | 34-6859 | 15M                 | 34.8231  | -97.2850  | 931       | NCEI    | 1972-2013        |
| OK    | PAOLI 2 W                     | 34-6859 | HLY                 | 34.8231  | -97.2850  | 931       | NCEI    | 1947-2013        |
| OK    | PINE CREEK DAM                | 34-7080 | HLY                 | 34.1167  | -95.0833  | 490       | NCEI    | 1965-1997        |
| OK    | PINE CREEK DAM                | 34-7080 | DLY                 | 34.1167  | -95.0833  | 489       | NCEI    | 1994-2015        |

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|-------|----------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| OK    | PONTOTOC             | 34-7214 | DLY                 | 34.4997  | -96.6275  | 1024      | NCEI    | 1941-2017        |
| OK    | PUTNAM 3N MESONET    | 34-7343 | DLY                 | 35.8989  | -98.9603  | 1932      | NCEI    | 2009-2017        |
| OK    | PUTNAM_3N            | 86-0239 | 15M                 | 35.8990  | -98.9604  | 1932      | OKM     | 1994-2015        |
| OK    | PUTNAM_3N            | 86-0239 | DLY                 | 35.8990  | -98.9604  | 1934      | OKM     | 1994-2016        |
| OK    | RANDLETT 9 E         | 34-7403 | DLY                 | 34.1578  | -98.3108  | 997       | NCEI    | 1941-2016        |
| OK    | RANGE                | 66-7412 | 15M                 | 36.5447  | -101.0841 | 2710      | NCEI    | 2013-2017        |
| OK    | RANGE                | 34-7412 | 15M                 | 36.5447  | -101.0842 | 2710      | NCEI    | 1976-2013        |
| OK    | RANGE                | 34-7412 | HLY                 | 36.5447  | -101.0842 | 2710      | NCEI    | 1947-2013        |
| OK    | RANGE                | 34-7412 | DLY                 | 36.5447  | -101.0842 | 2710      | NCEI    | 1948-2012        |
| OK    | RED RIVER            | 85-0266 | HLY                 | 33.8833  | -97.9333  | 869       | HADS    | 1995-2017        |
| OK    | REGNIER              | 34-7534 | DLY                 | 36.9425  | -102.6314 | 4019      | NCEI    | 1890-2006        |
| OK    | RETROP               | 34-7565 | DLY                 | 35.1597  | -99.3658  | 1781      | NCEI    | 1980-2017        |
| OK    | RETROP 2S MESONET    | 34-7570 | DLY                 | 35.1228  | -99.3600  | 1765      | NCEI    | 1959-2015        |
| OK    | RETROP_10ENE         | 86-0241 | 15M                 | 35.1228  | -99.3600  | 1765      | OKM     | 1994-2015        |
| OK    | RETROP_10ENE         | 86-0241 | DLY                 | 35.1228  | -99.3600  | 1766      | OKM     | 1994-2016        |
| OK    | REYDON 2SSE          | 34-7579 | DLY                 | 35.6256  | -99.9106  | 2385      | NCEI    | 1941-2007        |
| OK    | REYDON 7 NNE         | 34-7588 | HLY                 | 35.7500  | -99.8667  | 2172      | NCEI    | 1947-1965        |
| OK    | RIVERSIDE 4 W        | 66-7660 | 15M                 | 36.7888  | -100.4183 | 2450      | NCEI    | 2013-2017        |
| OK    | RIVERSIDE 4 W        | 34-7660 | 15M                 | 36.7889  | -100.4183 | 2450      | NCEI    | 1976-2013        |
| OK    | RIVERSIDE 4 W        | 34-7660 | HLY                 | 36.7889  | -100.4183 | 2450      | NCEI    | 1947-2013        |
| OK    | ROFF 2 WNW           | 66-7705 | 15M                 | 34.6373  | -96.8821  | 1255      | NCEI    | 2013-2017        |
| OK    | ROFF 2 WNW           | 34-7705 | 15M                 | 34.6372  | -96.8822  | 1255      | NCEI    | 1971-2013        |
| OK    | ROFF 2 WNW           | 34-7705 | HLY                 | 34.6372  | -96.8822  | 1255      | NCEI    | 1947-2013        |
| OK    | ROFF 2 WNW           | 34-7705 | DLY                 | 34.6372  | -96.8822  | 1257      | NCEI    | 1901-1951        |
| OK    | ROLL                 | 34-7714 | HLY                 | 35.7833  | -99.7167  | 2303      | NCEI    | 1947-1970        |
| OK    | ROOSEVELT            | 34-7727 | DLY                 | 34.8511  | -99.0208  | 1463      | NCEI    | 1943-2017        |
| OK    | SAYRE                | 34-7952 | DLY                 | 35.3061  | -99.6275  | 1900      | NCEI    | 1936-2017        |
| OK    | SEILING 7WNW MESONET | 34-8027 | DLY                 | 36.1903  | -99.0403  | 1788      | NCEI    | 2009-2017        |
| OK    | SEILING_7WNW         | 86-0244 | 15M                 | 36.1903  | -99.0403  | 1788      | OKM     | 1994-2015        |
| OK    | SEILING_7WNW         | 86-0244 | DLY                 | 36.1903  | -99.0403  | 1788      | OKM     | 1994-2016        |
| OK    | SHATTUCK             | 34-8092 | DLY                 | 36.2667  | -99.8833  | 2241      | NCEI    | 1921-1948        |
| OK    | SHATTUCK 1NW         | 66-8101 | 15M                 | 36.2892  | -99.8932  | 2195      | NCEI    | 2013-2017        |

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|-------|-------------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| OK    | SHATTUCK 1NW                  | 34-8101 | 15M                 | 36.2892  | -99.8933  | 2195      | NCEI    | 1976-2013        |
| OK    | SHATTUCK 1NW                  | 34-8101 | HLY                 | 36.2892  | -99.8933  | 2195      | NCEI    | 1947-2013        |
| OK    | SHATTUCK 1NW                  | 34-8101 | DLY                 | 36.2892  | -99.8933  | 2195      | NCEI    | 1943-1954        |
| OK    | SLAPOUT_8W                    | 86-0247 | 15M                 | 36.5975  | -100.2619 | 2539      | OKM     | 1994-2015        |
| OK    | SLAPOUT_8W                    | 86-0247 | DLY                 | 36.5975  | -100.2619 | 2546      | OKM     | 1994-2016        |
| OK    | SMITHVILLE                    | 34-8285 | DLY                 | 34.4660  | -94.6589  | 823       | NCEI    | 1888-2008        |
| OK    | SNYDER 1 N                    | 34-8299 | DLY                 | 34.6867  | -98.9483  | 1371      | NCEI    | 1906-2013        |
| OK    | SOBOL TWR                     | 34-8305 | DLY                 | 34.1335  | -95.2389  | 751       | NCEI    | 1952-1991        |
| OK    | STAPP CCC                     | 34-8462 | DLY                 | 34.7500  | -94.6333  | 684       | NCEI    | 1940-1942        |
| OK    | STUART_3SE                    | 86-0251 | 15M                 | 34.8764  | -96.0698  | 840       | OKM     | 1994-2015        |
| OK    | STUART_3SE                    | 86-0251 | DLY                 | 34.8764  | -96.0698  | 841       | OKM     | 1994-2016        |
| OK    | SULPHUR 4NNE MESONET          | 34-8570 | DLY                 | 34.5658  | -96.9503  | 1050      | NCEI    | 2009-2017        |
| OK    | SULPHUR PLATT NAT'L PK        | 34-8587 | DLY                 | 34.5000  | -96.9667  | 991       | NCEI    | 1917-1978        |
| OK    | SULPHUR_4NNE                  | 86-0252 | 15M                 | 34.5661  | -96.9505  | 1050      | OKM     | 1994-2015        |
| OK    | SULPHUR_4NNE                  | 86-0252 | DLY                 | 34.5661  | -96.9505  | 1049      | OKM     | 1994-2016        |
| OK    | SUPPLY 1 E                    | 34-8627 | DLY                 | 36.5667  | -99.5500  | 1972      | NCEI    | 1893-1975        |
| OK    | TALIHINA_4SE                  | 86-0255 | 15M                 | 34.7107  | -95.0115  | 669       | OKM     | 1994-2015        |
| OK    | TALIHINA_4SE                  | 86-0255 | DLY                 | 34.7107  | -95.0115  | 679       | OKM     | 1994-2016        |
| OK    | TALOGA                        | 34-8708 | 15M                 | 36.0406  | -98.9625  | 1715      | NCEI    | 1971-2013        |
| OK    | TALOGA                        | 34-8708 | HLY                 | 36.0406  | -98.9625  | 1715      | NCEI    | 1957-2013        |
| OK    | TALOGA                        | 34-8708 | DLY                 | 36.0381  | -98.9592  | 1706      | NCEI    | 1900-2017        |
| OK    | TALOGA NEAR                   | 34-8711 | DLY                 | 36.0500  | -98.9667  | 1650      | NCEI    | 1938-1944        |
| OK    | TIPTON 4S MESONET             | 34-8879 | HLY                 | 34.4397  | -99.1375  | 1269      | NCEI    | 1947-1955        |
| OK    | TIPTON 4S MESONET             | 34-8879 | DLY                 | 34.4397  | -99.1375  | 1270      | NCEI    | 1938-2017        |
| OK    | TIPTON_4S                     | 86-0256 | 15M                 | 34.4397  | -99.1376  | 1270      | OKM     | 1994-2015        |
| OK    | TIPTON_4S                     | 86-0256 | DLY                 | 34.4397  | -99.1376  | 1272      | OKM     | 1994-2016        |
| OK    | TISHOMINGO NATL WR            | 34-8884 | DLY                 | 34.1925  | -96.6442  | 643       | NCEI    | 1902-2017        |
| OK    | TOM STEED RSVR (MTN PARK DAM) | 87-0040 | HLY                 | 34.7381  | -98.9881  | 1408      | USBR    | 1991-2016        |
| OK    | TURPIN 4 SSE                  | 34-9017 | DLY                 | 36.8136  | -100.8636 | 2707      | NCEI    | 1982-2013        |
| OK    | TURPIN 6.1 SSE                | 69-0454 | DLY                 | 36.7878  | -100.8392 | 2602      | NCEI    | 2013-2017        |
| OK    | TUSKAHOMA                     | 34-9023 | 15M                 | 34.6147  | -95.2803  | 600       | NCEI    | 1984-2013        |
| OK    | TUSKAHOMA                     | 34-9023 | HLY                 | 34.6147  | -95.2803  | 600       | NCEI    | 1947-2013        |



| State | Station name                | SID     | Formatting interval | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|-----------------------------|---------|---------------------|----------|-----------|-----------|---------|------------------|
| OK    | TUSKAHOMA                   | 34-9023 | DLY                 | 34.6147  | -95.2803  | 600       | NCEI    | 1917-2013        |
| OK    | VALLIANT 3 W                | 34-9118 | DLY                 | 33.9981  | -95.1433  | 476       | NCEI    | 1941-2015        |
| OK    | VELMA 7NW MESONET           | 34-9130 | DLY                 | 34.5289  | -97.7647  | 1119      | NCEI    | 2009-2017        |
| OK    | VICI                        | 34-9172 | DLY                 | 36.1508  | -99.3003  | 2264      | NCEI    | 1955-2017        |
| OK    | VINSON                      | 34-9212 | DLY                 | 34.9003  | -99.8614  | 1880      | NCEI    | 1940-2017        |
| OK    | WALTERS                     | 34-9278 | DLY                 | 34.3603  | -98.3006  | 1004      | NCEI    | 1914-2013        |
| OK    | WALTERS_1NW                 | 86-0264 | 15M                 | 34.3647  | -98.3203  | 1010      | OKM     | 1994-2015        |
| OK    | WALTERS_1NW                 | 86-0264 | DLY                 | 34.3647  | -98.3203  | 1017      | OKM     | 1994-2016        |
| OK    | WALTERS_4NW                 | 86-0263 | 15M                 | 34.3996  | -98.3457  | 1060      | OKM     | 1994-2015        |
| OK    | WALTERS_4NW                 | 86-0263 | DLY                 | 34.3996  | -98.3457  | 1051      | OKM     | 1994-2016        |
| OK    | WASHINGTON 6SSW MESONET     | 34-9346 | DLY                 | 34.9819  | -97.5208  | 1132      | NCEI    | 2009-2017        |
| OK    | WASHINGTON_6SSW             | 86-0265 | DLY                 | 34.9822  | -97.5211  | 1131      | OKM     | 1994-2016        |
| OK    | WASHITA RIVER               | 85-0198 | HLY                 | 35.5317  | -98.9658  | 1499      | HADS    | 1995-2017        |
| OK    | WASHITA RIVER NEAR ANADARKO | 87-0002 | HLY                 | 35.0850  | -98.2431  | 1157      | USBR    | 1991-2016        |
| OK    | WASHITA RIVER NEAR CHEYENNE | 87-0044 | HLY                 | 35.6264  | -99.6681  | 1923      | USBR    | 1990-2016        |
| OK    | WAURIKA                     | 34-9395 | DLY                 | 34.1747  | -97.9964  | 912       | NCEI    | 1910-2008        |
| OK    | WAURIKA 1ENE MESONET        | 34-9400 | DLY                 | 34.1678  | -97.9883  | 928       | NCEI    | 2009-2017        |
| OK    | WAURIKA_0.5ENE              | 86-0267 | 15M                 | 34.1677  | -97.9882  | 928       | OKM     | 1994-2015        |
| OK    | WAYNOKA                     | 66-9404 | 15M                 | 36.5758  | -98.8797  | 1508      | NCEI    | 2013-2017        |
| OK    | WAYNOKA                     | 34-9404 | 15M                 | 36.5758  | -98.8797  | 1508      | NCEI    | 1984-2013        |
| OK    | WAYNOKA                     | 34-9404 | HLY                 | 36.5758  | -98.8797  | 1508      | NCEI    | 1947-2013        |
| OK    | WAYNOKA                     | 34-9404 | DLY                 | 36.5758  | -98.8797  | 1509      | NCEI    | 1938-2017        |
| OK    | WICHITA                     | 76-0023 | HLY                 | 34.7744  | -98.7458  | 1800      | RAWS    | 1992-2015        |
| OK    | WICHITA MTN WR              | 66-9629 | 15M                 | 34.7325  | -98.7125  | 1665      | NCEI    | 2013-2017        |
| OK    | WICHITA MTN WR              | 34-9629 | 15M                 | 34.7325  | -98.7125  | 1665      | NCEI    | 1979-2013        |
| OK    | WICHITA MTN WR              | 34-9629 | HLY                 | 34.7325  | -98.7125  | 1665      | NCEI    | 1947-2013        |
| OK    | WICHITA MTN WR              | 34-9629 | DLY                 | 34.7325  | -98.7125  | 1667      | NCEI    | 1906-2017        |
| OK    | WILBURTON 9 ENE             | 34-9634 | DLY                 | 34.9458  | -95.1546  | 636       | NCEI    | 1921-2004        |
| OK    | WILLOW                      | 34-9668 | DLY                 | 35.0522  | -99.5125  | 1745      | NCEI    | 1980-2017        |
| OK    | WOODWARD                    | 34-9760 | DLY                 | 36.4408  | -99.3817  | 1886      | NCEI    | 1895-2017        |
| OK    | WOODWARD FLD STN            | 34-9762 | HLY                 | 36.4167  | -99.4000  | 1987      | NCEI    | 1949-1979        |
| OK    | WOODWARD FLD STN            | 34-9762 | DLY                 | 36.4167  | -99.4000  | 1991      | NCEI    | 1936-1979        |

| <b>State</b> | <b>Station name</b> | <b>SID</b> | <b>Formatting interval</b> | <b>Latitude</b> | <b>Longitude</b> | <b>Elev (ft)</b> | <b>Dataset</b> | <b>Period of record</b> |
|--------------|---------------------|------------|----------------------------|-----------------|------------------|------------------|----------------|-------------------------|
| OK           | WOODWARD_2WSW       | 86-0274    | 15M                        | 36.4233         | -99.4168         | 2051             | OKM            | 1994-2015               |
| OK           | WOODWARD_2WSW       | 86-0274    | DLY                        | 36.4233         | -99.4168         | 2036             | OKM            | 1994-2016               |
| OK           | ZOE 1 S             | 34-9985    | DLY                        | 34.7500         | -94.6333         | 640              | NCEI           | 1951-1987               |

Table A.1.5. Metadata for n-minute stations used in derivation of 5- and 10-minute scaling factors (see Section 4.6.3) showing each station's state, name, SID, latitude, longitude, elevation, dataset identifier (see Table 4.2.1), and the period of record.

| State | Station name                   | SID     | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|----------|-----------|-----------|---------|------------------|
| AR    | DE QUEEN SEVIER CO AP          | 78-0027 | 34.0500  | -94.4008  | 355       | NCEI    | 2005-2017        |
| AR    | TEXARKANA WEBB FLD             | 78-0078 | 33.4536  | -94.0074  | 361       | NCEI    | 1998-2017        |
| CO    | SPRINGFIELD COMANCHE           | 78-0072 | 37.2833  | -102.6139 | 4383      | NCEI    | 2005-2017        |
| LA    | ALEXANDRIA INTL AP             | 78-0004 | 31.3347  | -92.5586  | 84        | NCEI    | 2005-2017        |
| LA    | FT POLK FULLERTON LNDG STRIP   | 78-0013 | 31.1500  | -92.9667  | 310       | NCEI    | 2006-2017        |
| LA    | LAKE CHARLES REGIONAL AP       | 16-5078 | 30.1247  | -93.2283  | 9         | NCEI    | 1973-1998        |
| LA    | LAKE CHARLES RGNL AP           | 78-0055 | 30.1247  | -93.2283  | 9         | NCEI    | 1998-2017        |
| LA    | PEASON RIDGE RANGE             | 78-0008 | 31.4000  | -93.2833  | 365       | NCEI    | 2006-2017        |
| LA    | SHREVEPORT DWTN AP             | 78-0032 | 32.5428  | -93.7450  | 179       | NCEI    | 2005-2017        |
| LA    | SHREVEPORT REGIONAL AP         | 16-8440 | 32.4472  | -93.8244  | 254       | NCEI    | 1973-1998        |
| LA    | SHREVEPORT RGNL AP             | 78-0070 | 32.4472  | -93.8244  | 254       | NCEI    | 1998-2017        |
| NM    | CARLSBAD CAVERN CITY AP        | 78-0020 | 32.3335  | -104.2580 | 3232      | NCEI    | 2005-2017        |
| NM    | CLAYTON MUNI AIR PK            | 78-0017 | 36.4486  | -103.1539 | 4960      | NCEI    | 1998-2017        |
| NM    | CLAYTON MUNICIPAL AIR PARK     | 29-1887 | 36.4486  | -103.1539 | 4960      | NCEI    | 1973-1998        |
| NM    | DEMING MUNI AP                 | 78-0030 | 32.2622  | -107.7206 | 4301      | NCEI    | 2005-2017        |
| NM    | TUCUMCARI MUNI AP              | 78-0075 | 35.1822  | -103.6031 | 4045      | NCEI    | 2005-2017        |
| OK    | CLINTON-SHERMAN AP             | 78-0024 | 35.3568  | -99.2042  | 1922      | NCEI    | 1998-2017        |
| OK    | FREDERICK MUNI AP              | 78-0036 | 34.3520  | -98.9840  | 1255      | NCEI    | 2005-2017        |
| OK    | GAGE AP                        | 78-0039 | 36.2967  | -99.7689  | 2191      | NCEI    | 1998-2017        |
| OK    | GUYMON MUNI AP                 | 78-0044 | 36.6817  | -101.5053 | 3113      | NCEI    | 2004-2017        |
| OK    | HOBART MUNI AP                 | 78-0045 | 34.9894  | -99.0525  | 1556      | NCEI    | 2005-2017        |
| OK    | LAWTON MUNI AP                 | 78-0052 | 34.5584  | -98.4172  | 1069      | NCEI    | 1998-2017        |
| OK    | MCALESTER RGNL AP              | 78-0060 | 34.8822  | -95.7830  | 770       | NCEI    | 1998-2017        |
| TX    | ABILENE REGIONAL AP            | 41-0016 | 32.4105  | -99.6822  | 1790      | NCEI    | 1973-1998        |
| TX    | ABILENE RGNL AP                | 78-0002 | 32.4105  | -99.6822  | 1790      | NCEI    | 1998-2017        |
| TX    | ALICE INTL AP                  | 78-0006 | 27.7411  | -98.0247  | 173       | NCEI    | 2005-2017        |
| TX    | AMARILLO INTERNATIONAL AIRPORT | 41-0211 | 35.2295  | -101.7042 | 3604      | NCEI    | 1973-1998        |
| TX    | AMARILLO INTL AP               | 78-0007 | 35.2295  | -101.7042 | 3604      | NCEI    | 1998-2017        |
| TX    | ANGLETON BRAZORIA AP           | 78-0054 | 29.1097  | -95.4619  | 25        | NCEI    | 2005-2017        |
| TX    | ARLINGTON MUNI AP              | 78-0042 | 32.6636  | -97.0939  | 622       | NCEI    | 2005-2017        |

| State | Station name                   | SID     | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|--------------------------------|---------|----------|-----------|-----------|---------|------------------|
| TX    | AUSTIN BERGSTROM AP            | 78-0010 | 30.1831  | -97.6799  | 480       | NCEI    | 1998-2017        |
| TX    | AUSTIN-CAMP MABRY              | 41-0428 | 30.3208  | -97.7604  | 670       | NCEI    | 1973-1998        |
| TX    | AUSTIN-CAMP MABRY              | 78-0009 | 30.3208  | -97.7604  | 670       | NCEI    | 1999-2017        |
| TX    | BORGER HUTCHINSON CO AP        | 78-0012 | 35.6950  | -101.3950 | 3042      | NCEI    | 1998-2017        |
| TX    | BROWNSVILLE INTL AP            | 78-0016 | 25.9141  | -97.4230  | 24        | NCEI    | 1998-2017        |
| TX    | BROWNSVILLE S PADRE ISLAND INT | 41-1136 | 25.9141  | -97.4230  | 24        | NCEI    | 1973-1998        |
| TX    | BURNET MUNI AP                 | 78-0014 | 30.7406  | -98.2354  | 1288      | NCEI    | 2005-2017        |
| TX    | CHILDRESS MUNI AP              | 78-0018 | 34.4272  | -100.2831 | 1951      | NCEI    | 1998-2017        |
| TX    | COLLEGE STN                    | 78-0019 | 30.5892  | -96.3647  | 305       | NCEI    | 1998-2017        |
| TX    | CONROE MONTGOMERY CO AP        | 78-0025 | 30.3567  | -95.4139  | 230       | NCEI    | 1998-2017        |
| TX    | CORPUS CHRISTI CABANISS FLD    | 78-0062 | 27.7000  | -97.4333  | 19        | NCEI    | 2007-2017        |
| TX    | CORPUS CHRISTI INTL AP         | 41-2015 | 27.7742  | -97.5122  | 44        | NCEI    | 1973-1998        |
| TX    | CORPUS CHRISTI INTL AP         | 78-0022 | 27.7742  | -97.5122  | 44        | NCEI    | 1998-2017        |
| TX    | CORSICANA CAMPBELL FLD         | 78-0023 | 32.0311  | -96.3989  | 443       | NCEI    | 2005-2017        |
| TX    | COTULLA LA SALLE CO AP         | 78-0021 | 28.4567  | -99.2183  | 476       | NCEI    | 2005-2017        |
| TX    | DAL-FTW WSCMO AP               | 41-2242 | 32.8978  | -97.0189  | 560       | NCEI    | 1978-1998        |
| TX    | DAL-FTW WSCMO AP               | 78-0028 | 32.8978  | -97.0189  | 560       | NCEI    | 1998-2017        |
| TX    | DALHART FAA AP                 | 78-0029 | 36.0167  | -102.5500 | 3990      | NCEI    | 2005-2017        |
| TX    | DALLAS FAA AP                  | 41-2244 | 32.8519  | -96.8555  | 440       | NCEI    | 1973-1997        |
| TX    | DALLAS FAA AP                  | 78-0026 | 32.8519  | -96.8555  | 440       | NCEI    | 1999-2017        |
| TX    | DALLAS REDBIRD AP              | 78-0066 | 32.6808  | -96.8681  | 658       | NCEI    | 2005-2017        |
| TX    | DEL RIO INTERNATIONAL AP       | 41-2360 | 29.3784  | -100.9270 | 999       | NCEI    | 1973-1998        |
| TX    | DEL RIO INTL AP                | 78-0031 | 29.3784  | -100.9270 | 999       | NCEI    | 1998-2017        |
| TX    | DENTON MUNI AP                 | 78-0033 | 33.2061  | -97.1989  | 646       | NCEI    | 2005-2017        |
| TX    | DRYDEN TERRELL CO AP           | 78-0001 | 30.0481  | -102.2131 | 2303      | NCEI    | 2005-2017        |
| TX    | EL PASO INTL AP                | 41-2797 | 31.8111  | -106.3758 | 3918      | NCEI    | 1973-1998        |
| TX    | EL PASO INTL AP                | 78-0035 | 31.8111  | -106.3758 | 3918      | NCEI    | 1998-2017        |
| TX    | FORT WORTH WB AP               | 41-3283 | 32.8333  | -97.0500  | 574       | NCEI    | 1973-1998        |
| TX    | FT STOCKTON PECOS AP           | 78-0037 | 30.9119  | -102.9167 | 3010      | NCEI    | 1998-2017        |
| TX    | FT WORTH ALLIANCE AP           | 78-0005 | 32.9733  | -97.3181  | 685       | NCEI    | 2005-2017        |
| TX    | FT WORTH MEACHAM FLD           | 78-0038 | 32.8192  | -97.3614  | 687       | NCEI    | 1998-2017        |
| TX    | GALVESTON                      | 41-3430 | 29.3333  | -94.7717  | 10        | NCEI    | 1973-1994        |

| State | Station name                  | SID     | Latitude | Longitude | Elev (ft) | Dataset | Period of record |
|-------|-------------------------------|---------|----------|-----------|-----------|---------|------------------|
| TX    | GALVESTON SCHOLDS FLD         | 78-0043 | 29.2733  | -94.8592  | 5         | NCEI    | 1998-2017        |
| TX    | HARLINGEN RIO GRANDE AP       | 78-0048 | 26.2281  | -97.6542  | 34        | NCEI    | 2005-2017        |
| TX    | HONDO MUNI AP                 | 78-0046 | 29.3601  | -99.1742  | 920       | NCEI    | 2005-2017        |
| TX    | HOUSTON CLOVER FLD            | 78-0057 | 29.5189  | -95.2417  | 40        | NCEI    | 2005-2017        |
| TX    | HOUSTON HOBBY AP              | 78-0047 | 29.6381  | -95.2819  | 44        | NCEI    | 2005-2017        |
| TX    | HOUSTON HOOKS MEM AP          | 78-0034 | 30.0675  | -95.5561  | 153       | NCEI    | 2005-2017        |
| TX    | HOUSTON INTERCONT AP          | 78-0049 | 29.9800  | -95.3600  | 95        | NCEI    | 1998-2017        |
| TX    | HOUSTON INTERCONTINENTAL AP   | 41-4300 | 29.9800  | -95.3600  | 95        | NCEI    | 1973-1998        |
| TX    | HOUSTON SUGARLAND MEM         | 78-0069 | 29.6219  | -95.6567  | 84        | NCEI    | 2005-2017        |
| TX    | HOUSTON WB CITY               | 41-4305 | 29.7667  | -95.3667  | 52        | NCEI    | 1973-1990        |
| TX    | HUNTSVILLE MUNI AP            | 78-0080 | 30.7439  | -95.5861  | 348       | NCEI    | 2005-2017        |
| TX    | JUNCTION KIMBLE CO AP         | 78-0051 | 30.5108  | -99.7664  | 1713      | NCEI    | 2005-2017        |
| TX    | LONGVIEW E TX RGNL AP         | 78-0041 | 32.3847  | -94.7117  | 365       | NCEI    | 1998-2017        |
| TX    | LUBBOCK INTERNATIONAL AP      | 41-5411 | 33.6656  | -101.8231 | 3254      | NCEI    | 1973-1998        |
| TX    | LUBBOCK INTL AP               | 78-0053 | 33.6658  | -101.8233 | 3268      | NCEI    | 1998-2017        |
| TX    | LUFKIN ANGELINA CO AP         | 78-0056 | 31.2361  | -94.7544  | 288       | NCEI    | 2005-2017        |
| TX    | MCALLEN MILLER INTL AP        | 78-0059 | 26.1839  | -98.2539  | 100       | NCEI    | 1998-2017        |
| TX    | MCKINNEY MUNI AP              | 78-0076 | 33.1835  | -96.5895  | 565       | NCEI    | 2005-2017        |
| TX    | MIDLAND INTERNATIONAL AP      | 41-5890 | 31.9475  | -102.2086 | 2862      | NCEI    | 1973-1998        |
| TX    | MIDLAND INTL AP               | 78-0058 | 31.9475  | -102.2086 | 2862      | NCEI    | 1998-2017        |
| TX    | MINERAL WELLS AP              | 78-0061 | 32.7817  | -98.0603  | 930       | NCEI    | 2005-2017        |
| TX    | NEW BRAUNFELS MUNI AP         | 78-0011 | 29.7089  | -98.0458  | 645       | NCEI    | 2005-2017        |
| TX    | ODESSA SCHLEMEYER FLD         | 78-0063 | 31.9206  | -102.3867 | 3001      | NCEI    | 2005-2017        |
| TX    | PALACIOS MUNI AP              | 78-0065 | 28.7247  | -96.2536  | 12        | NCEI    | 2005-2017        |
| TX    | PINE SPRINGS NP               | 78-0040 | 31.8331  | -104.8089 | 5456      | NCEI    | 2005-2017        |
| TX    | PORT ARTHUR SE TX AP          | 78-0015 | 29.9506  | -94.0206  | 16        | NCEI    | 1998-2017        |
| TX    | PORT ARTHUR SE TX REGIONAL AP | 41-7174 | 29.9506  | -94.0206  | 16        | NCEI    | 1973-1998        |
| TX    | PORT ISABEL CAMERON AP        | 78-0064 | 26.1658  | -97.3458  | 12        | NCEI    | 2005-2017        |
| TX    | ROCKPORT ARANSAS CO AP        | 78-0067 | 28.0836  | -97.0464  | 22        | NCEI    | 2005-2017        |
| TX    | SAN ANGELO MATHIS FIELD       | 41-7943 | 31.3517  | -100.4950 | 1916      | NCEI    | 1973-1998        |
| TX    | SAN ANGELO MATHIS FLD         | 78-0071 | 31.3517  | -100.4950 | 1916      | NCEI    | 1998-2017        |
| TX    | SAN ANTONIO INTL AP           | 41-7945 | 29.5443  | -98.4839  | 789       | NCEI    | 1973-1998        |

| <b>State</b> | <b>Station name</b>        | <b>SID</b> | <b>Latitude</b> | <b>Longitude</b> | <b>Elev<br/>(ft)</b> | <b>Dataset</b> | <b>Period of<br/>record</b> |
|--------------|----------------------------|------------|-----------------|------------------|----------------------|----------------|-----------------------------|
| TX           | SAN ANTONIO INTL AP        | 78-0068    | 29.5443         | -98.4839         | 789                  | NCEI           | 1998-2017                   |
| TX           | SAN ANTONIO STINSON AP     | 78-0074    | 29.3389         | -98.4720         | 571                  | NCEI           | 2005-2017                   |
| TX           | TERRELL MUNI AP            | 78-0077    | 32.7100         | -96.2672         | 475                  | NCEI           | 2005-2017                   |
| TX           | TYLER POUNDS FLD           | 78-0079    | 32.3542         | -95.4025         | 544                  | NCEI           | 1998-2017                   |
| TX           | VICTORIA REGIONAL AP       | 41-9364    | 28.8614         | -96.9303         | 115                  | NCEI           | 1973-1998                   |
| TX           | VICTORIA RGNL AP           | 78-0081    | 28.8614         | -96.9303         | 115                  | NCEI           | 1998-2017                   |
| TX           | WACO REGIONAL AP           | 41-9419    | 31.6189         | -97.2283         | 500                  | NCEI           | 1973-1998                   |
| TX           | WACO RGNL AP               | 78-0003    | 31.6189         | -97.2283         | 500                  | NCEI           | 1998-2017                   |
| TX           | WICHITA FALLS MUNI AP      | 78-0073    | 33.9786         | -98.4928         | 1017                 | NCEI           | 1998-2017                   |
| TX           | WICHITA FALLS MUNICIPAL AP | 41-9729    | 33.9786         | -98.4928         | 1017                 | NCEI           | 1973-1998                   |
| TX           | WINKLER CO AP              | 78-0050    | 31.7801         | -103.2018        | 2807                 | NCEI           | 2005-2017                   |

Table A.1.6. List of stations for which additional data were digitized (Section 4.2) showing each station's state, name, SID, formatting interval, dataset identifier (Table 4.2.1), and the period(s) of record for which data were digitized.

| State | Station name             | SID     | Formatting interval | Dataset | Period of record     |
|-------|--------------------------|---------|---------------------|---------|----------------------|
| TX    | ABILENE                  | 41-0016 | HLY                 | NCEI    | 1905-1940            |
| TX    | AMARILLO                 | 99-0212 | HLY                 | NCEI    | 1902-1940            |
| TX    | AUSTIN                   | 63-0193 | HLY                 | NCEI    | 1926-1940            |
| TX    | BIG SPRING               | 79-0113 | DLY                 | NCEI    | 1900-1950            |
| TX    | BRACKETTVILLE/FORT CLARK | 41-1007 | DLY                 | NCEI    | 1853-1899            |
| TX    | BRENNHAM                 | 41-1048 | DLY                 | NCEI    | 1886-1901            |
| TX    | CAMP VERDE               | 41-1395 | DLY                 | NCEI    | 1988-1996            |
| TX    | CORPUS CHRISTI           | 41-2014 | HLY                 | NCEI    | 1902-1940            |
| TX    | CORSICANA 8 E            | 41-2020 | DLY                 | NCEI    | 1955-1989            |
| TX    | COTULLA                  | 41-2048 | DLY                 | NCEI    | 1902-2002            |
| TX    | DALLAS WB CITY           | 99-2243 | HLY                 | NCEI    | 1913-1940            |
| TX    | DEL RIO WB CITY          | 41-2360 | HLY                 | NCEI    | 1906-1940            |
| TX    | EL PASO                  | 75-0009 | HLY                 | NCEI    | 1906-1940            |
| TX    | FORT BROWN/BROWNSVILLE   | 79-0043 | DLY                 | NCEI    | 1849-1900            |
| TX    | FORT WORTH MEACHAM       | 41-3284 | HLY                 | NCEI    | 1903-1940            |
| TX    | FORT WORTH WB CITY       | 99-0001 | HLY                 | NCEI    | 1899-1940            |
| TX    | FREEPORT                 | 41-3340 | DLY                 | NCEI    | 1920-1930            |
| TX    | GALVESTON                | 41-3430 | HLY                 | NCEI    | 1892-1940, 1947      |
| TX    | GONZALES                 | 41-3622 | DLY                 | NCEI    | 1904-1939            |
| TX    | HEARNE/VALLEY JUNCTION   | 41-9280 | DLY                 | NCEI    | 1888-1946            |
| TX    | HEWITT                   | 41-4122 | DLY                 | NCEI    | 1894-1899            |
| TX    | HOUSTON WB CITY          | 41-4305 | HLY                 | NCEI    | 1910-1940            |
| TX    | HOUSTON WB CITY          | 79-0056 | DLY                 | NCEI    | 1883-1909            |
| TX    | KERRVILLE                | 41-4782 | DLY                 | NCEI    | 1895-1901            |
| LA    | LAKE CHARLES CHENAULT    | 16-5077 | HLY                 | NCEI    | 1940-1947            |
| TX    | MIDLAND 4 ENE            | 41-5891 | DLY                 | NCEI    | 1885-1891            |
| TX    | MISSOURI CITY            | 41-4325 | DLY                 | NCEI    | 1939-1948            |
| TX    | NORTH HOUSTON            | 41-4327 | DLY                 | NCEI    | 1939-1947            |
| TX    | ORANGE                   | 41-6664 | DLY                 | NCEI    | 1883-1903, 1914-1937 |
| TX    | PALESTINE 2 NE           | 79-0153 | DLY                 | NCEI    | 1882-1929            |
| TX    | PANDALE                  | 41-6780 | DLY                 | NCEI    | 1943-1947            |

| <b>State</b> | <b>Station name</b> | <b>SID</b> | <b>Formatting interval</b> | <b>Dataset</b> | <b>Period of record</b> |
|--------------|---------------------|------------|----------------------------|----------------|-------------------------|
| TX           | PORT ARTHUR CITY    | 41-7173    | HLY                        | NCEI           | 1917-1939               |
| TX           | REFUGIO 3 SW        | 41-7529    | DLY                        | NCEI           | 1988-1991               |
| TX           | RICHMOND            | 41-7594    | DLY                        | NCEI           | 1935-1946               |
| TX           | RILEY BEN RANCH     | 41-8877    | DLY                        | NCEI           | 1942-1948               |
| TX           | ROCKLAND            | 41-7700    | DLY                        | NCEI           | 1903-1940               |
| TX           | SAN ANTONIO         | 41-7945    | HLY                        | NCEI           | 1903-1940               |
| TX           | SAN MARCOS          | 41-7983    | DLY                        | NCEI           | 1897-1901               |
| TX           | TARPLEY             | 41-8845    | DLY                        | NCEI           | 1978-1996               |
| TX           | TAYLOR              | 99-8861    | HLY                        | NCEI           | 1902-1933               |
| TX           | VANDERPOOL 10N      | 41-9312    | DLY                        | NCEI           | 1986-1996               |
| TX           | WEATHERFORD         | 41-9532    | DLY                        | NCEI           | 1883-1901               |
| TX           | WINNSBORO           | 41-9836    | DLY                        | NCEI           | 1944-1947               |



## Appendix A.2. Annual maximum series trend analysis

### 1. Selection of statistical tests for detection of trends in AMS

The precipitation frequency analysis methods used in NOAA Atlas 14 assume that annual maximum series (AMS) data used in the analysis are stationary. Several parametric and non-parametric statistical tests were used for the detection of trends in AMS mean and variance. The selection of statistical tests was made in consideration of the data tested and the limitations of each of the tests.

First, AMS were graphed to observe types of trends in the data for all stations in the project area at 1-hour and 1-day durations. Visual inspection of time series plots did not detect any abrupt changes or apparent cycles in the AMS but suggested the possibility of slight trends at some locations. Changes appeared to be gradual and approximately linear.

The null hypotheses that there are no trends in AMS mean and/or variance were tested on 1-day and 1-hour AMS data at each station in the project area. The hypotheses were tested at the level of significance  $\alpha = 5\%$ . The hypothesis that there are no trends in AMS means was also tested for each climate region (see Figure 4.1.2) as a whole.

Levene's test (Levene, 1960) was used to test for homogeneity of variance in the AMS data. The test has been proven to be less sensitive to non-normality in data than some other commonly used tests (such as the Barlett test). The test statistic,  $W$ , is defined as follows:

$$W = \frac{(N - k) \sum_{i=1}^k N_i (Z_i - Z_{..})^2}{(k - 1) \sum_{i=1}^k \sum_{j=1}^{N_i} N_i (Z_{ij} - Z_i)^2}$$

where  $k$  is the number of sub-groups,  $N$  is the sample size,  $N_i$  is the sample size of the  $i^{\text{th}}$  subgroup,  $Y_{ij}$  is the value of the  $j^{\text{th}}$  sample from the  $i^{\text{th}}$  subgroup, and  $Z_{ij}$  is the absolute deviation of  $Y_{ij}$  from the mean of the  $i^{\text{th}}$  subgroup. Levene's test rejects the hypothesis that the variances are equal if

$W > F_{\alpha, k-1, N-k}$ , where  $F_{\alpha, k-1, N-k}$  is the upper critical value of the  $F$  distribution with  $k-1$  and  $N-k$  degrees of freedom at a significance level of  $\alpha$ .

At-station trends in AMS means were inspected using the parametric  $t$ -test and non-parametric Mann-Kendall test (e.g., Maidment, 1993). Both tests are extensively used for trend analysis in environmental sciences and are appropriate for records that have undergone a gradual change. The tests are fairly robust, readily available, and easy to use and interpret. Since each test is based on different assumptions and different test statistics, the rationale was that if both tests have similar outcomes there can be more confidence about the results; if the outcomes are different, it would provide an opportunity to investigate reasons for discrepancies.

Parametric tests in general have been shown to be more powerful than non-parametric tests when the data are approximately normally distributed and when the assumption of homoscedasticity (homogeneous variance) holds (e.g., Hirsch et al., 1991), but are less reliable when those assumptions do not hold. The parametric  $t$ -test for trend detection is based on linear regression, and therefore checks only for a linear trend in data. A linear trend assumption seemed adequate here, since time series plots indicated, if any, monotonic, linear changes in AMS. The Pearson correlation coefficient ( $r$ ) was used as a measure of linear association between annual maximum series data and time for the  $t$ -test. The hypothesis that the data are not dependent on time (and also that they are independent and normally distributed values) was tested using the  $t$ -statistic that follows Student's distribution defined as:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

where  $n$  is the record length of the AMS. The hypothesis is rejected when the absolute value of the computed  $t$ -statistic is greater than the critical value obtained from Student's distribution with  $(n - 2)$  degrees of freedom and exceedance probability of  $\alpha/2$  %, where  $\alpha$  is the significance level. The sign of the  $t$ -statistic indicates the direction of the trend, positive or negative.

Non-parametric tests have advantages over parametric tests since they make no assumption of probability distribution and are performed without specifying whether trend is linear or nonlinear. They are also more resilient to outliers in data because they do not operate on data directly. One of the disadvantages of non-parametric tests is that they do not account for the magnitude of the data. The Mann-Kendall test (M-K test) was selected among various non-parametric tests because it can accommodate missing values in a time series, which was a frequent occurrence in the AMS data. The Mann-Kendall test compares the relative magnitudes of annual maximum data. If annual maximum values are indexed based on time, and  $x_i$  is the annual maximum value that corresponds to year  $t_i$ , then the Mann-Kendall statistic is given by:

$$S = \sum_{k=1}^{n-1} \sum_{i=k+1}^n \text{sign}(x_i - x_k)$$

The test statistic  $Z$  is then computed using a normal approximation and standardization of the statistic  $S$ . The null hypothesis that there is no trend in the data is rejected at significance level  $\alpha$  if the computed  $Z$  value is greater, in absolute terms, than the critical value obtained from a standard normal distribution that has probability of exceedance of  $\alpha/2$  %. The sign of the statistic indicates the direction of the trend, positive or negative.

In addition to an at-station trend analysis, the relative magnitude of any trend in AMS for each of three climate regions (see Figure 4.1.2) as a whole was assessed by linear regression techniques. 1-hour and 1-day station-specific AMS for stations with at least 70 years of data for the 1-day duration and with at least 40 years of data for the 1-hour duration were rescaled by corresponding mean annual maximum values and then regressed against time, where time was defined as year of occurrence minus 1900. The regression results from all stations were tested against a null hypothesis of zero serial correlation (zero regression slopes).

## 2. Trend analysis results and conclusion

The stationarity assumption was tested by applying a parametric  $t$ -test and non-parametric Mann-Kendall test for trends in means and the Levene's test for trends in variance in the 1-day and 1-hour AMS data at 5% significance level. For the 1-day duration, testing was done on stations with at least 70 years of data; for the 1-hour duration, the minimum number of data years was lowered to 40 to increase the sample size. 164 and 325 stations satisfied the record length criterion for the 1-hour duration and 1-day duration, respectively. For 1-hour, the  $t$ -test and Mann-Kendall test indicated no statistically significant trends in the mean at about 90% and 87% of stations, respectively. In the 1-day dataset, the  $t$ -test and Mann-Kendall test results, no trends were detected at about 90% and 88% of stations, respectively. Levene's test indicated non-homogeneous variance in less than 5% of stations for both the 1-hour duration and 1-day durations. More details are provided in Table A.2.1. The spatial distribution of the results for all three tests for 1-hour and 1-day AMS are shown in Figures A.2.1 and A.2.2, respectively. Small clusters of stations where tests indicated positive trends are often due to AMS data sampled from the same storm events at several nearby locations.

Results from the regional trend analysis also indicated that the null hypothesis, that there are no trends in AMS, could not be rejected at the 5% significance level for either climate region for the 1-hour and 1-day durations.

Because tests at both the 1-hour and 1-day durations indicated no statistically significant trends in the data, the assumption of stationary AMS was accepted for this project area and no adjustment to AMS data was recommended.

Table A.2.1. Trend analysis results for 1-hour and 1-day AMS data.

| Number of stations | 1-hour         |          |          | 1-day          |          |          |
|--------------------|----------------|----------|----------|----------------|----------|----------|
|                    | <i>t</i> -test | M-K test | Levene's | <i>t</i> -test | M-K test | Levene's |
| no trend           | 148            | 142      | 157      | 294            | 287      | 308      |
| positive trend     | 16             | 21       | 7        | 29             | 34       | 17       |
| negative trend     | 0              | 1        |          | 2              | 4        |          |

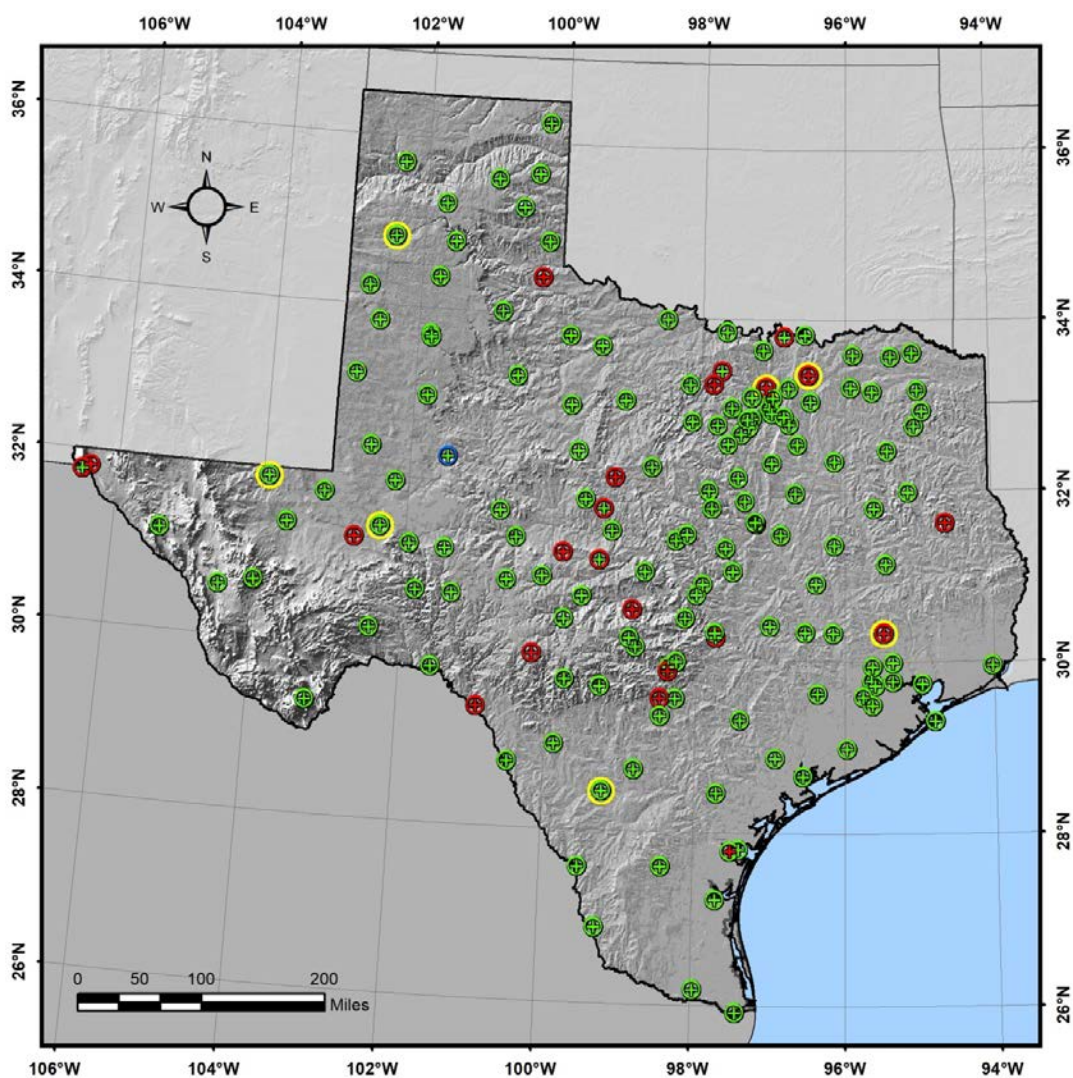


Figure A.2.1. Spatial distribution of results of *t*-, Mann-Kendall, and Levene's tests for 1-hour AMS. Circles (except yellow) were used to present *t*-test results and plus signs were used to present Mann-Kendal test results. Red color indicates positive trends, green no trend, and blue negative trends. Yellow circles show locations where Levene's test detected changes in variance.

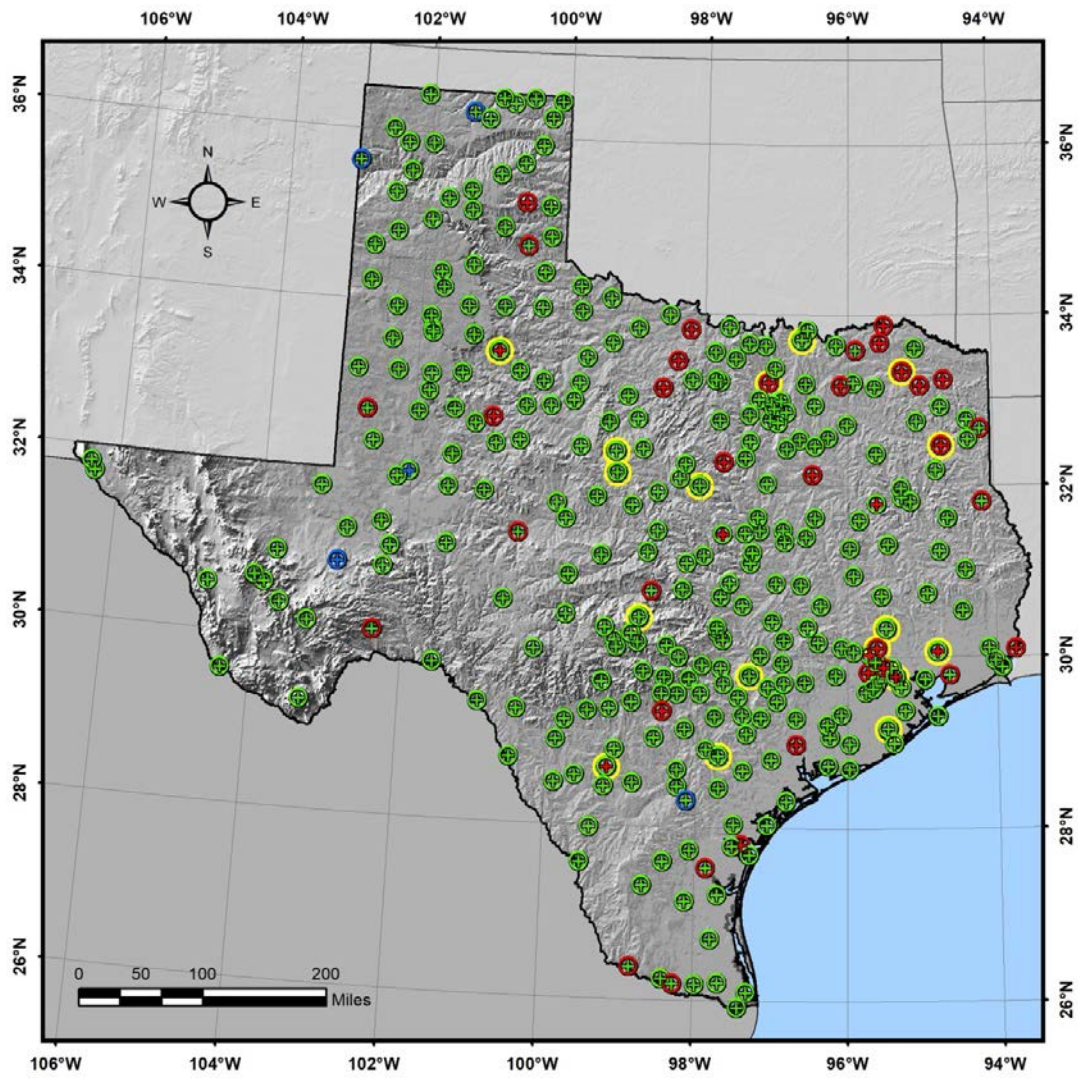


Figure A.2.2. Same as in Figure A.2.1, but for 1-day duration.

## **Appendix A.3. PRISM report**

### **Final Report**

#### **Production of Rainfall Frequency Grids for Texas Using a Specifically Optimized PRISM System**

#### **Prepared for**

National Weather Service, Hydrometeorological Design Service Center  
Silver Spring, Maryland

#### **Prepared by**

Christopher Daly  
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October 2018

### **1. Project goal**

The Hydrometeorological Design Studies Center (HDSC) within the Office of Water Prediction of NOAA's National Weather Service is updating precipitation frequency estimates for the state of Texas. In order to complete the spatial interpolation of point estimates, HDSC requires spatially interpolated grids of MAM (Mean Annual Maximum) precipitation. The contractor, the PRISM Climate Group at Oregon State University (OSU), was tasked with producing a series of grids for rainfall frequency estimation using an optimized system based on the Parameter-elevation Regressions on Independent Slopes Model (PRISM) and HDSC-calculated point estimates for Texas.

### **2. Background**

HDSC used L-moment based regional frequency analysis approach to estimate precipitation frequencies. In this approach, the mean of the underlying precipitation frequency distribution is estimated at point locations with a sufficient history of observations. The form of the distribution and its parameters are estimated regionally. Once the form of the distribution has been selected and its parameters have been estimated, precipitation frequency estimates can be computed from grids of the MAM. The grids that are the subject of this report are spatially interpolated grids of the point estimates of the MAM for various precipitation durations. The point estimates of the MAM were provided by HDSC. HDSC selected an appropriate precipitation frequency distribution along with regionally estimated parameters and used this information with the grids of the MAM to derive grids of precipitation frequency estimates.

The PRISM Climate Group has performed similar work previously to produce spatially interpolated MAM grids for updates of precipitation frequency estimates in the Semiarid Southwest United States, the Ohio River Basin and Surrounding States, Puerto Rico/US Virgin Islands, Hawaiian Islands, California, Alaska, Midwest/Southeast, and Northeast study areas.

### 3. Report

This report describes tasks performed to produce mean annual maximum (MAM) grids for 17 precipitation durations: 15 and 30 minutes; 1, 2, 3, 6, and 12 hours; and 1, 2, 3, 4, 7, 10, 20, 30, 45, and 60 days for Texas. The tasks described were not necessarily performed in the order described, nor were they performed just once. The process was dynamic and had numerous feedbacks.

#### 3.1. Adapting the PRISM system

The PRISM modeling system was adapted for use in this project after a small investigation was performed for the Semiarid Southwest United States, and subsequently used in the Ohio River Basin and Surrounding States, Puerto Rico/Virgin Islands, Hawaiian Islands, California, Alaska, Midwest/Southeast, and Northeast study areas. This investigation and adaptation procedure is summarized below.

PRISM is a knowledge-based system that uses point data, a digital elevation model (DEM), and many other geographic data sets to generate gridded estimates of climatic parameters (Daly et al. 1994, 2002, 2003, 2006, 2008) at monthly to daily time scales. Originally developed for precipitation estimation, PRISM has been generalized and applied successfully to temperature, among other parameters. PRISM has been used extensively to map precipitation, dew point, minimum and maximum temperature, and vapor pressure deficit over the United States, Canada, China, and other countries. Details on PRISM formulation can be found in Daly et al. (2002, 2003, 2008, 2015), which are available from <http://prism.oregonstate.edu/docs/>.

Adapting the PRISM system for mapping precipitation frequencies required an approach slightly different than the standard modeling procedure. The amount of station data available to HDSC for precipitation frequency was much less than that available for high-quality precipitation maps, such as the peer-reviewed PRISM 1971-2000 mean precipitation maps (Daly et al. 2008). Data sources suitable for long-term mean precipitation but not for precipitation frequency included snow courses, short-term COOP stations, remote storage gauges, and others. In addition, data for precipitation durations of less than 24 hours were available from hourly precipitation stations only. This meant that mapping precipitation frequency using HDSC stations would sacrifice a significant amount of the spatial detail present in the long-term mean precipitation maps.

A pilot project to identify ways of capturing more spatial detail in the precipitation frequency maps was undertaken. Early tests showed that mean annual precipitation (MAP) was an excellent predictor of precipitation frequency in a local area, much better than elevation, which is typically used as the underlying, gridded predictor variable in PRISM applications. In these initial tests, the DEM, the predictor grid in PRISM, was replaced by the official USDA digital map of MAP for the lower 48 states (USDA-NRCS 1998, Daly et al. 2000). Detailed information on the creation of the USDA PRISM precipitation grids is available from Daly and Johnson (1999). MAP was found to have superior predictive capability over the DEM for locations in the southwestern US. The relationships between MAP and precipitation frequency were strong because many of the effects of various physiographic features on mean precipitation patterns had already been incorporated into the MAP grid from PRISM. Preliminary PRISM maps of 2-year and 100-year, 24-hour precipitation were made for the Semiarid Southwest and compared to hand-drawn HDSC maps of the same statistics. Differences were minimal, and mostly related to differences in station data used.

Further investigation found that the square-root transformation of MAP produced more linear, tighter and cleaner regression functions, and hence, more stable predictions, than the untransformed values; this transformation was incorporated into subsequent model applications. Square-root MAP was a good local predictor of not only longer-duration precipitation frequency statistics, but for short-duration statistics, as

well. Therefore, it was determined that a modified PRISM system that used square-root MAP as the predictive grid was suitable for producing high-quality precipitation frequency maps for this project.

For this study, the latest official USDA grid of MAP for the study region (1981-2010 average) was used (Figure A.3-1). This grid was developed under funding from the USDA Natural Resources Conservation Service, and is an update to the 1971-2000 grids described in Daly et al. (2008).

### 3.2. PRISM configuration and operation for Texas

In general, PRISM interpolation consists of a local moving-window regression function between a predictor grid and station values of the element to be interpolated. The regression function is guided by an encoded knowledge base and inference engine (Daly et al., 2002, 2008). This knowledge base/inference engine is a series of rules, decisions and calculations that set weights for the station data points entering the regression function. In general, a weighting function contains knowledge about an important relationship between the climate field and a geographic or meteorological factor. The inference engine sets values for input parameters by using default values, or it may use the regression function to infer grid cell-specific parameter settings for the situation at hand. PRISM acquires knowledge through assimilation of station data, spatial data sets such as MAP and others, and a control file containing parameter settings.

The other center of knowledge and inference is that of the user. The user accesses literature, previously published maps, spatial data sets, and a graphical user interface to guide the model application. One of the most important roles of the user is to form expectations for the modeled climatic patterns, i.e., what is deemed “reasonable.” Based on knowledgeable expectations, the user selects the station weighting algorithms to be used and determines whether any parameters should be changed from their default values. Through the graphical user interface, the user can click on any grid cell, run the model with a given set of algorithms and parameter settings, view the results graphically, and access a traceback of the decisions and calculations leading to the model prediction.

For each grid cell, the moving-window regression function for MAM vs. MAP took the form

$$\text{MAM value} = \beta_1 * \text{sqrt}(\text{MAP}) + \beta_0 \quad (1)$$

where  $\beta_1$  is the slope and  $\beta_0$  is the intercept of the regression equation, and MAP is the grid cell value of mean annual precipitation.

Upon entering the regression function, each station was assigned a weight that is based on several factors. For PRISM MAP mapping (used as the predictor grid in this study), the combined weight of a station was a function of distance, elevation, cluster, vertical layer, topographic facet, coastal proximity, and effective terrain weights, respectively. A full discussion of the general PRISM station weighting functions is available from Daly et al. (2008).

Given that the MAP grid incorporated detailed information about the complex spatial patterns of precipitation, only a subset of these weighting functions was needed for this study. For Texas, the combined weight of a station was a function of distance and clustering, respectively. A station is down-weighted when it is relatively distant from the target grid cell, or when it is clustered with other stations (which can lead to over-representation).

The moving-window regression function was populated by station data provided by the HDSC. A PRISM GUI snapshot of the moving-window relationship between sqrt(MAP) and 24-hour MAM in west Texas is shown in Figure A.3-2.

There were relatively few stations with data for durations of 12 hours or less from which to perform the interpolation. In addition, it was clear that the spatial patterns of durations of 12 hours or less could be

very different than those of durations of 24 hours or more. This issue was encountered in a previous study for Puerto Rico. During that study the following procedure was developed, and adopted here:

- (1) Convert available  $\leq 12$ -hour station values to an MAM/24-hr MAM ratio (termed R24) by dividing by the 24-hour values;
- (2) using the station R24 data in (1), interpolate R24 values for each  $\leq 12$ -hour duration (15, 30, and 60 minutes; and 2, 3, 6, and 12 hours) using PRISM;
- (3) using bi-linear interpolation from the cells in the R24 grids from (2), estimate R24 at the location of each station having data for  $\geq 24$ -hour durations only;
- (4) multiply the estimated R24 values from (3) by the 24-hour value at each  $\geq 24$ -hour station to obtain estimated  $\leq 12$ -hour values;
- (5) append the estimated stations from (4) to the  $\leq 12$ -hour station list to generate a station list that matches the density of that for  $\geq 24$  hours; and
- (6) interpolate MAM values for  $\leq 12$ -hour durations with PRISM, using MAP as the predictor grid.

Investigation of the little available data failed to provide convincing evidence that the spatial patterns of R24 values in Texas were strongly affected by coastal proximity, topographic facets, or other physiographic factors. Therefore, the slope of the moving-window regression function for R24 vs. MAP of the form

$$R24 = \beta_1 * \text{sqrt}(\text{MAP}) + \beta_0 \quad (2)$$

was forced to zero everywhere. This meant that the interpolated value of R24 was a function of distance and cluster weighting only (essentially inverse-distance weighting).

Relevant PRISM parameters for applications to 60-minute R24 and 24-hour MAM statistics are listed in Tables 1 and 2, respectively. Further explanations of these parameters and associated equations are available in Daly et al. (2002, 2008).

The values of radius of influence ( $R$ ), the minimum number of total ( $s_r$ ) stations required in the regression were based on information from user assessment via the PRISM graphical user interface, and on a jackknife cross-validation exercise, in which each station was deleted from the data set one at a time, a prediction made in its absence, and mean absolute error statistics compiled (see Results section).

The input parameter that changed readily among the various durations was the default slope ( $\beta_{1d}$ ) of the regression function. Slopes are expressed in units that are normalized by the average observed value of the precipitation in the regression data set for the target cell. Evidence gathered during PRISM model development indicates that this method of expression is relatively stable in both space and time (Daly et al. 1994).

Bounds were put on the slopes to minimize unreasonable slopes that might occasionally be generated due to local station data patterns; if the slope is out of bounds and cannot be brought within bounds by the PRISM outlier deletion algorithm, the default slope is invoked (Daly et al., 2002). The maximum slope bound was set to a uniformly high value of 30.0, to accommodate a large range of valid slopes; lower values were not needed to handle extreme values, because all values were within reasonable ranges. Slope default values were based on PRISM diagnostics that provided information on the distribution of slopes across the modeling region. The default value was set to approximate the average regression slope calculated by PRISM. For these applications, default slopes typically increased with increasing duration (Table A.3-3). In general, the longer the duration, the larger the slope. This is primarily a result of higher precipitation amounts at the longer durations, and the tendency for longer-duration MAM statistics to bear a stronger and steeper relationship with MAP than shorter-duration statistics.



### **3.3. Preparation and review of draft grids**

Draft grids for the 60-minute, 24-hour and 10-day durations were produced and made available to HDSC for evaluation. All of the necessary station data were provided by HDSC. The process began with a careful scrutiny of the station data and PRISM behavior. A version of PRISM which predicts for stations locations in the absence of each station (termed jackknifing) was run, and stations predicted poorly by PRISM were identified, and sent to HDSC for review. HDSC removed the stations, modified their values, or determined that the stations were accurate as-is. This process was performed iteratively, until an acceptable station data set was produced. The draft PRISM grids were subsequently completed and submitted to HDSC for review. HDSC submitted the draft PRISM grids for external review, and revised the station data accordingly.

### **3.4. Final grids**

Having found the revised draft grids acceptable, HDSC requested that grids for all durations be completed. Before delivering the final grids to HDSC, the PRISM Climate Group checked them for internal consistency. In other words, the value of the MAM at each grid point for each duration must have been greater than the value for shorter durations at the same grid point. If an inconsistency of this nature occurred, the convention was to start with the 24 duration as a baseline, and set longer durations to slightly higher values and shorter durations to slightly lower values.

The final delivered grids inherited the spatial resolution of the latest 1981-2010 PRISM mean annual precipitation grids for Texas, which is 30 arc-seconds (~800 meters). The grid cell units are in mm\*100. Final MAM grids delivered to HDSC are as follows (17 durations): 15-minute, 30-minute, 60-minute, 2-hour, 3-hour, 6-hour, 12-hour, 24-hour, 48-hour, 3-day, 4-day, 7-day, 10-day, 20-day, 30-day, 45-day, 60-day.

### **3.5. Performance evaluation**

PRISM cross-validation statistics for 60-minute/24-hour MAM ratio and the 60-minute and 24-hour MAM intensities were compiled and summarized in Table A.3-4. These errors were estimated using an omit-one jackknife method, where each station is omitted from the data set, estimated in its absence, then replaced. Since the 60-minute/24-hour MAM ratio was expressed as a percent, the percent bias and mean absolute error are the given as the bias and MAE in the original percent units (not as a percentage of the percent).

For the 60-minute/24-hour MAM ratio, the overall percent bias was -0.15% and the mean absolute error (MAE) 2.09 percent. For the 60-minute, 24-hour, and 10-day MAM intensities, biases were 0.14 percent or less, and the MAEs less than 4 percent. Biases were less than 0.5% for all durations. MAEs generally decreased from 3.8 percent at the 15-minute duration to 2.9 percent at the 60-day duration. Given the lack of independent data at durations of less than 24 hours, one would have expected the 15-minute to 12-hour MAM errors to be substantially higher than those for the 24-hour to 60-day MAMs. A likely reason why this was not the case was that the addition of many synthesized stations, derived from a PRISM interpolation of R24 values, resulted in a station data set that was spatially consistent, and thus, somewhat easier to interpolate with each station deleted from the data set. Therefore, it is likely that the true interpolation errors for the 60-minute MAM are higher than those shown in Table A.3-4.

Table A.3-1. Values of relevant PRISM parameters for interpolation of 60-minute/24-hour mean annual maximum ratio (60-minute R24) for Texas. See Daly et al. (2002) for details on PRISM parameters.

| Name                       | Description   | Value            |
|----------------------------|---|------------------|
| <u>Regression Function</u> |   |                  |
| $R$                        | Radius of influence   | 10 km*           |
| $s_t$                      | Minimum number of total stations desired in regression                        | 45 stations      |
| $\beta_{1m}$               | Minimum valid regression slope  | 0.0 <sup>+</sup> |
| $\beta_{1x}$               | Maximum valid regression slope  | 0.0 <sup>+</sup> |
| $\beta_{1d}$               | Default valid regression slope  | 0.0 <sup>+</sup> |
| <u>Distance Weighting</u>  |   |                  |
| $A$                        | Distance weighting exponent   | 2.0              |
| $F_d$                      | Importance factor for distance weighting                                      | 1.0              |
| $D_m$                      | Minimum allowable distance  | 0.0 km           |
| <u>Elevation Weighting</u> |   |                  |
| $B$                        | MAP weighting exponent  | NA/NA            |
| $F_z$                      | Importance factor for MAP weighting   | NA/NA            |
| $\Delta z_m$               | Minimum station-grid cell MAP difference below which MAP weighting is maximum | NA/NA            |
| $\Delta z_x$               | Maximum station-grid cell MAP difference above which MAP weight is zero       | NA/NA            |

\* Expands to encompass minimum number of total stations desired in regression ( $s_t$ ).

<sup>+</sup> Slopes are expressed in units that are normalized by the average observed value of the precipitation in the regression data set for the target cell. Units here are  $1/[\text{sqrt}(\text{MAP}(\text{mm})) * 1000]$ .

Table A.3-2. Values of relevant PRISM parameters for modeling of 24-hour mean annual maximum statistics for the Texas. See Daly et al. (2002) for details on PRISM parameters.

| Name                       | Description  | Value             |
|----------------------------|--|-------------------|
| <u>Regression Function</u> |  |                   |
| $R$                        | Radius of influence  | 3 km*             |
| $s_t$                      | Minimum number of total stations desired in regression   | 25 stations       |
| $\beta_{1m}$               | Minimum valid regression slope   | 0.0 <sup>+</sup>  |
| $\beta_{1x}$               | Maximum valid regression slope   | 30.0 <sup>+</sup> |
| $\beta_{1d}$               | Default valid regression slope   | 2.8 <sup>+</sup>  |
| <u>Distance Weighting</u>  |  |                   |
| $A$                        | Distance weighting exponent  | 2.0               |
| $F_d$                      | Importance factor for distance weighting   | 1.0               |
| $D_m$                      | Minimum allowable distance   | 0.0 km            |
| <u>Elevation Weighting</u> |  |                   |
| $B$                        | Elevation weighting exponent   | 0.0               |
| $F_z$                      | Importance factor for elev weighting   | 0.0               |
| $\Delta z_m$               | Minimum station-grid cell elev difference below which MAP weighting is maximum                 | NA                |
| $\Delta z_x$               | Maximum station-grid cell elevation difference above which station is eliminated from data set | NA                |

\* Expands to encompass minimum number of total stations desired in regression ( $s_t$ ).

<sup>+</sup> Slopes are expressed in units that are normalized by the average observed value of the precipitation in the regression data set for the target cell. Units here are  $1/[\text{sqrt}(\text{MAP}(\text{mm}))*1000]$ .

Table A.3-3. Values of PRISM slope parameters for modeling of MAM statistics for Texas for all durations. For durations of 12 hours and below, station data were expressed as the ratio of the given duration's MAM value to the 24-hour MAM value, and interpolated; this was followed by an interpolation of the actual MAM values. See text for details. See Table A.3-1 for definitions of parameters.

| Duration      | Slope Parameters |              |              |
|---------------|------------------|--------------|--------------|
|               | $\beta_{1m}$     | $\beta_{1x}$ | $\beta_{1d}$ |
| 15m/24h ratio | 0.0              | 0.0          | 0.0          |
| 30m/24h ratio | 0.0              | 0.0          | 0.0          |
| 1h/24h ratio  | 0.0              | 0.0          | 0.0          |
| 2h/24h ratio  | 0.0              | 0.0          | 0.0          |
| 3h/24h ratio  | 0.0              | 0.0          | 0.0          |
| 6h/24h ratio  | 0.0              | 0.0          | 0.0          |
| 12h/24h ratio | 0.0              | 0.0          | 0.0          |
| 15 minute MAM | 0.0              | 30.0         | 2.3          |
| 30 minute MAM | 0.0              | 30.0         | 2.3          |
| 1 hour MAM    | 0.0              | 30.0         | 2.3          |
| 2 hour MAM    | 0.0              | 30.0         | 2.3          |
| 3 hour MAM    | 0.0              | 30.0         | 2.4          |
| 6 hour MAM    | 0.0              | 30.0         | 2.5          |
| 12 hour MAM   | 0.0              | 30.0         | 2.7          |
| 24 hour MAM   | 0.0              | 30.0         | 2.8          |
| 48 hour MAM   | 0.0              | 30.0         | 3.0          |
| 3 day MAM     | 0.0              | 30.0         | 3.1          |
| 4 day MAM     | 0.0              | 30.0         | 3.2          |
| 7 day MAM     | 0.0              | 30.0         | 3.6          |
| 10 day MAM    | 0.0              | 30.0         | 3.8          |
| 20 day MAM    | 0.0              | 30.0         | 4.2          |
| 30 day MAM    | 0.0              | 30.0         | 4.5          |
| 45 day MAM    | 0.0              | 30.0         | 4.6          |
| 60 day MAM    | 0.0              | 30.0         | 4.8          |

Table A.3-4. PRISM cross-validation errors for 60-minute/24-hour MAM ratio, and 60-minute, 24-hour, and 10-day MAM applications to Texas. Since the 60-minute/24-hour MAM ratio was expressed as a percent, the percent bias and mean absolute error are given as the bias and MAE in the original percent units (not as a percentage of the percent).

| <b>Statistic</b>       | <b>N</b> | <b>% Bias</b> | <b>% MAE</b> |
|------------------------|----------|---------------|--------------|
| 60-min/24-hr MAM ratio | 214      | -0.15         | 2.09         |
| 60-minute MAM          | 701      | 0.14          | 3.48         |
| 24-hour MAM            | 701      | 0.14          | 3.55         |
| 10-day MAM             | 701      | 0.02          | 3.29         |

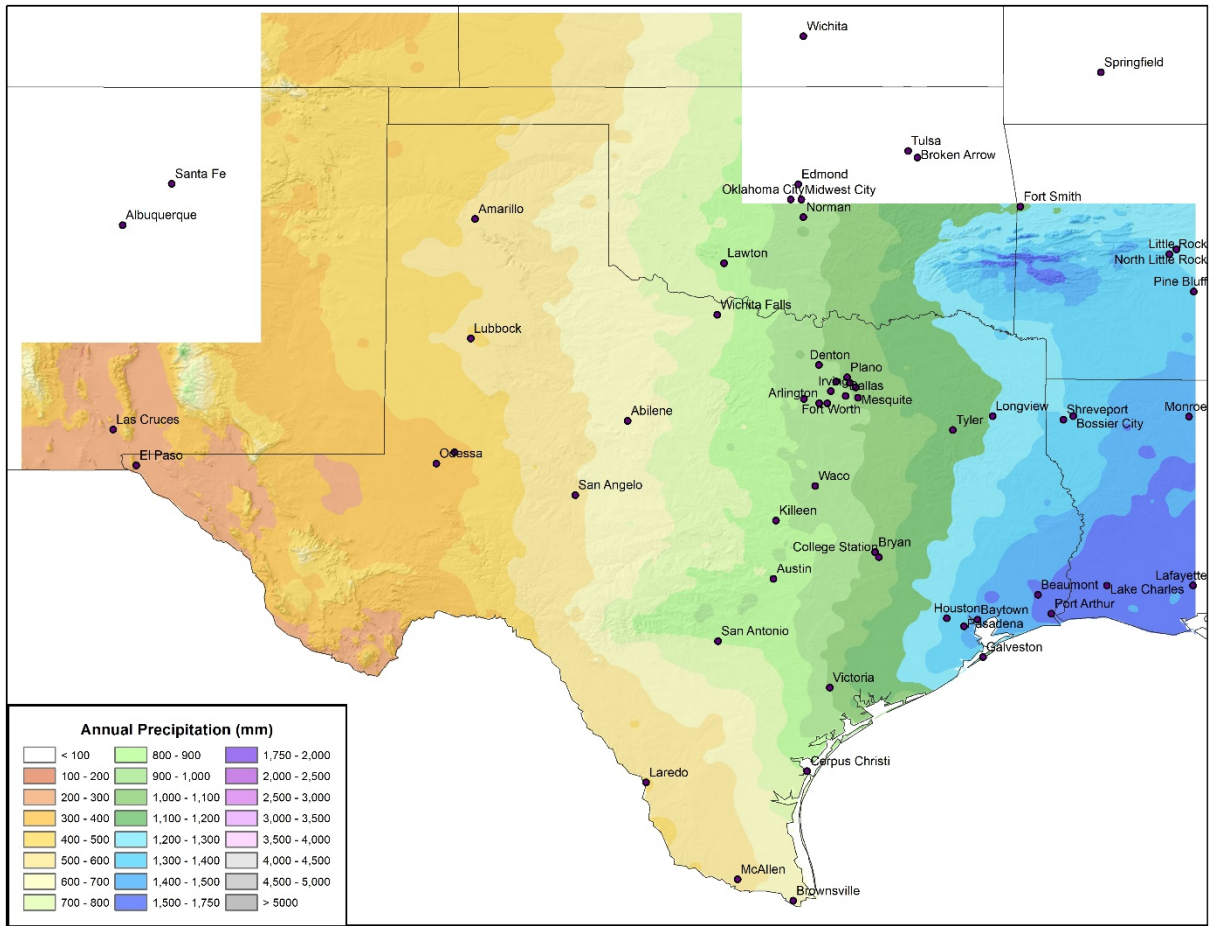


Figure A.3-1. PRISM 1981-2010 mean annual precipitation (MAP) grid for the Texas study region.

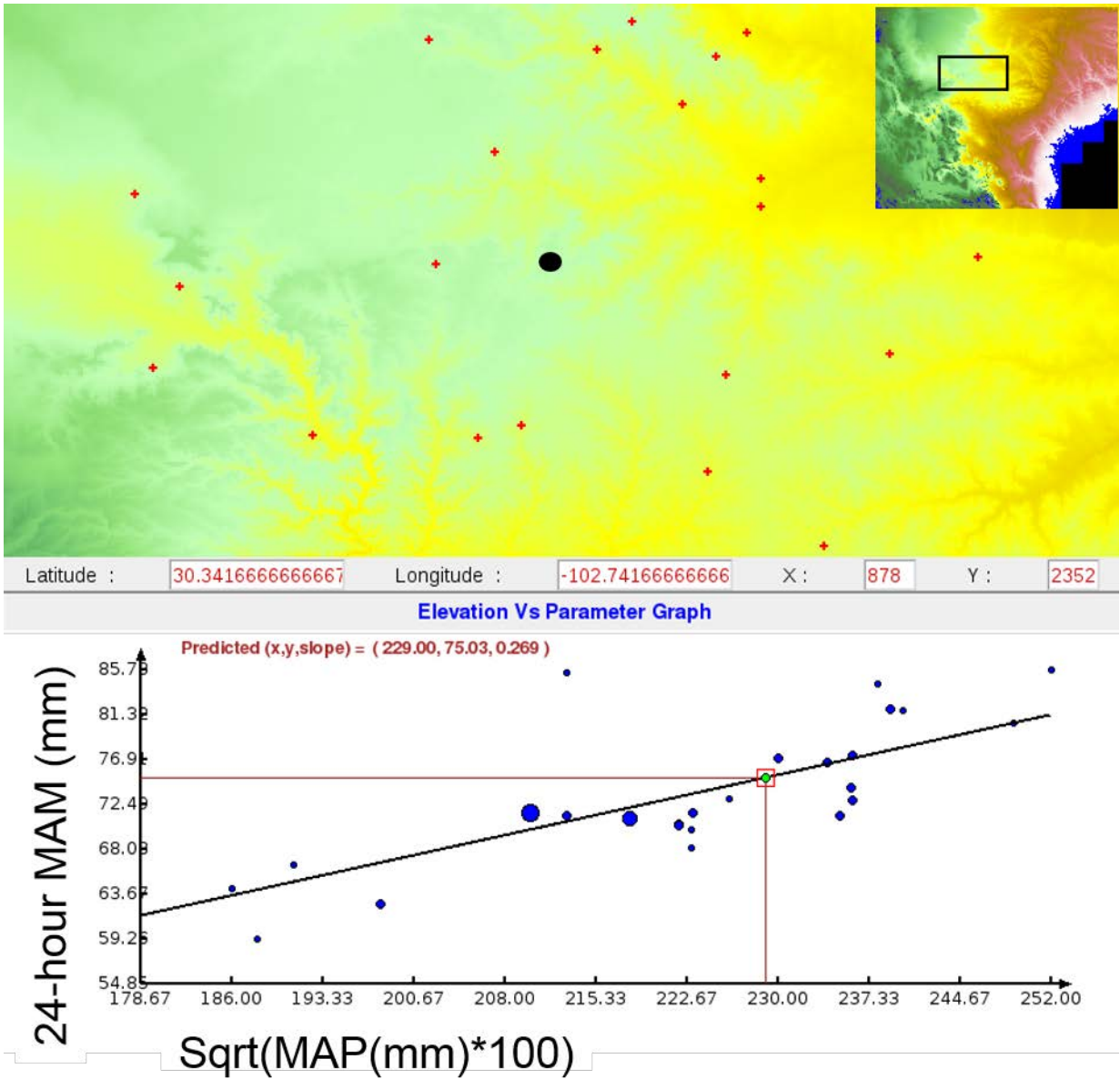


Figure A.3-2. PRISM GUI snapshot of the moving-window weighted regression between the square root of mean annual precipitation and 24-hour mean annual maximum precipitation (MAM) in west Texas. Model is being run for the black dot location; stations are shown as red pluses.

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## Appendix A.4. Peer review comments and responses

A peer review of preliminary results for the NOAA Atlas 14 (NA14) Volume 11 precipitation frequency project was carried out in the period between 20 November 2017 and 19 January 2018. The request for review was sent via email to individuals who were suggested by agencies that funded this work as potential reviewers, expressed interest in participating in the review, or who have subscribed to the HDSC mailing list-server.

The review package included the following items:

a. Station metadata. Reviewers were asked to examine the accuracy of stations' metadata and provide comments on suggested stations' deletions and merges. Stations were presented in three tables:

*NA14Vol11\_Stations used\_TX.xlsx* for Texas stations used in frequency analysis,

*NA14Vol11\_Stations used\_Other.xlsx* for stations outside Texas that assisted in the analysis, and

*NA14Vol11\_Stations not used.xlsx* for stations that were examined but not retained for the analysis.

The metadata tables included information on each station's name, state, name of agency that provided the data, latitude, longitude, elevation, and period of record. The tables also included basic information on other stations that contributed data to that station for sub-hourly, hourly, and daily durations, if applicable. If station data was collected but not used in the analysis, a brief comment on why the data was not used was also provided. Generally, stations were not used either because there was another nearby station with a longer period of record, station data were assessed unreliable for this specific purpose, or the station's period of record was not long enough and the station was not a candidate for merging with any nearby station.

b. At-station depth-duration-frequency (DDF) curves. Reviewers were asked to examine the DDF curves for stations retained in the analysis for 60-minute to 10-day durations and for 2-year through 100-year average recurrence intervals and to comment on their reasonableness.

c. Spatially-interpolated estimates. Reviewers were invited to comment on the overall and local spatial patterns in spatially-interpolated precipitation frequency estimates for 2-year and 100-year ARIs and for 60-minute, 6-hour, 24-hour, and 10-day durations. To illustrate how much estimates changed in the project area, cartographic maps showing differences between NOAA Atlas 14 and superseded NOAA estimates (see Section 5.4 of this Appendix) for 100-year ARI and 60-minute, 6-hour, 24-hour, and 10-day durations were also shared.

As part of the peer review process, several meetings and panel discussions were arranged to address any questions or concerns reviewers may have after looking over the information shared.

Comments were received from twenty-six individuals representing various federal, state, and local agencies. Their reviews provided critical feedback that improved the estimates.

Reviewers' comments and HDSC's responses (in italic font) are shown below. The comments and their respective HDSC responses have been grouped into following sections:

1. Metadata
  - 1.1. Metadata errors
  - 1.2. Period of record vs record length
2. Station cleanup
  - 2.1. Merges and extensions
  - 2.2. Deletes
3. Data quality
  - 3.1 Data QC
  - 3.2. Historic events missing in records
4. Depth-duration-frequency (DDF) curves
  - 4.1. General
  - 4.2. Hurricane Harvey's effect on DDF
5. Spatial patterns, general
  - 5.1. Regionalization and stations density
  - 5.2. Terrain and smoothing
  - 5.3. Influence of Hurricane Harvey and other extreme events
  - 5.4. Comparisons between NA14 and HYDRO35/TP 40/TP49
  - 5.5. Discrepancies at boundaries with other NA14 Volumes
  - 5.6. Other
6. Spatial patterns, specific duration-frequency combination
  - 6.1. 60-minute patterns
  - 6.2. 6-hour patterns
  - 6.3. 24-hour patterns
  - 6.4. 10-day patterns
7. NA14 terminology and methods
  - 7.1. Terminology
  - 7.2. Statistical extrapolation
  - 7.3. Confidence limits
  - 7.4. AMS trends and effects of non-stationary climate on estimates

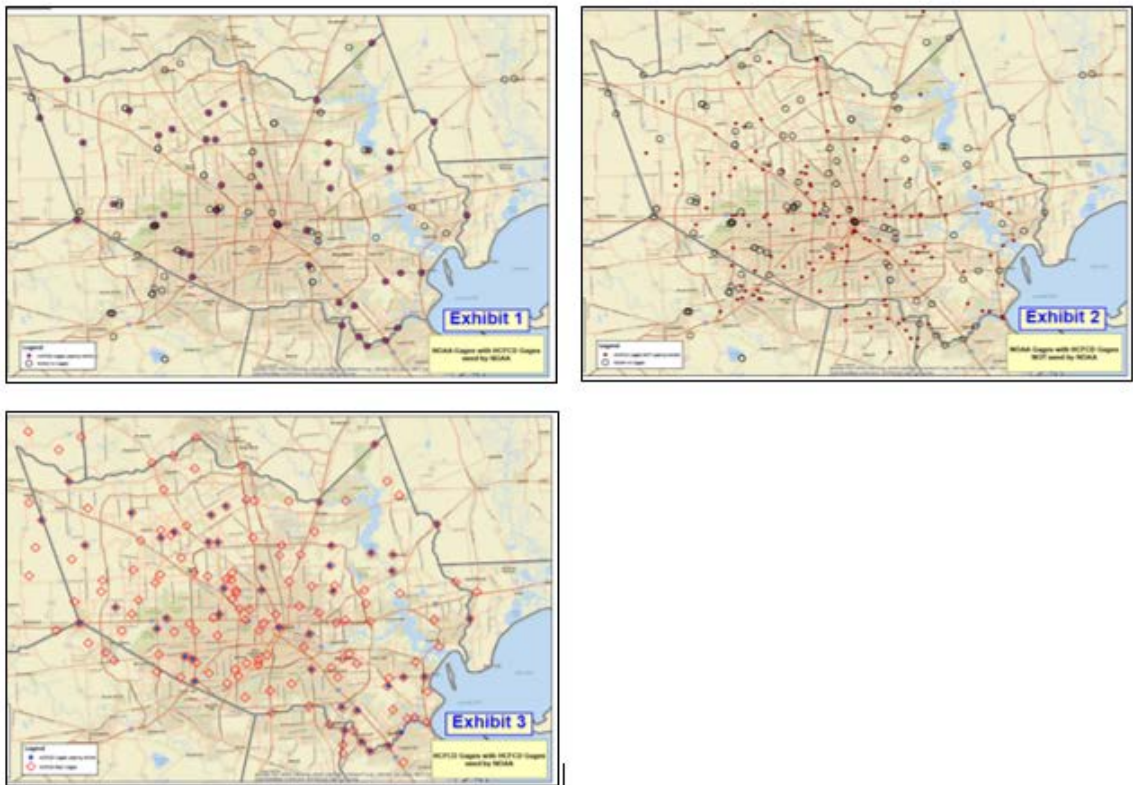
# 1. METADATA

## 1.1. Metadata errors

1.1.1. For several HCFCO gauges used, the lat/long information did not match HCFCO's information. For the most part, the differences appear to be inconsequential.

- 60-0006
- 60-0065
- 60-0091
- 60-0098
- 60-0116
- 60-0122
- 60-0124
- 60-0134

Three exhibits are attached. Exhibit 1 shows the HCFCO gauges used by NOAA (this illustrates a number of sites used that were not HCFCO sites). Exhibit 2 shows HCFCO gauges not used by NOAA (illustrating the density of HCFCO sites and NOAA sites). Exhibit 3 shows the HCFCO gauges (with HCFCO lat/long) used by NOAA with all gauges used by NOAA (with NOAA lat/long) to indicate location differences based on the two sets of lat/long. It is noted that the differences indicated in Exhibit 3 are not significant.



We screen metadata for each station considered in the analysis to make sure it appears accurate according to the station's name, elevation, historical records and satellite imagery. Stations that are clearly misplaced (often due to no seconds recorded in latitude and longitude information provided to us) are re-located based on inspection of satellite images and maps. Elevation information is compared with elevation estimates from the EPA's NHDPlus Ver.2 National Elevation dataset, which for Texas has a resolution of at least 1/3-arc sec (~10-m), and modified as appropriate.

For the stations listed above, we did not alter the original coordinates, but rounded them to four decimal points for consistency with other datasets. For example, we rounded the original lat/lon coordinates of 29.7913400/-95.6235600 to 29.7913/-95.6236 for HCFCD station 60-0006 15M (see an excerpt from the peer review “NA14Vol11\_Stations used\_TX.xlsx” file in Figure A.4-1). We merged this station with 60-0005 15M and co-located with 41-4309 HLY and assigned 41-4309 HLY coordinates (29.7689 /-95.6439) for their combined records (see also the response to comment 2.1.1 on merges and co-locations).

| Station ID | Type | Latitude | Longitude | Elevation (ft) | Original period of record | Final period of record | Co-located stations for sub-hourly, hourly and daily durations | Merged stations          | Contributed data to stations |
|------------|------|----------|-----------|----------------|---------------------------|------------------------|--|--------------------------|------------------------------|
| 60-0006    | 15M  | 29.7913  | -95.6236  | 82             | 01/2000 - 10/2017         |                        |  |                          | 60-0005 15M, 41-4309 HLY     |
| 60-0005    | 15M  | 29.7697  | -95.6466  | 101            | 01/2000 - 10/2017         | 01/1984 - 10/2017      | 60-0005 15M, 41-4309 HLY, 41-4309 HLY                          | 41-4309 15M, 60-0006 15M |                              |
| 41-4309    | HLY  | 29.7689  | -95.6439  | 91             | 01/1984 - 04/1997         |                        |  |                          | 60-0005 15M, 41-4309 HLY     |

Figure A.4-1. An excerpt from the “NA14Vol11\_Stations used\_TX.xlsx” file.

- 1.1.2. On the DDF for the Lampasas River near Kempner, Lampasas is spelled incorrectly. Dalhart's DDF is labeled only as "Municipal Airport" in the pull down menu.

We corrected stations' names according to the information provided.

## 1.2. Period of record vs record length

- 1.2.1. Several of the gauges have gaps in the data, particularly for the longer period of record gauges such as Austin, Houston, and others. When these gauges have gaps, it would be good to know the coverage of the period of record like the NCDC presents in their datasets, so that the only visible metric of historic data is not just the overall period of record. For example: Houston WB (79-0056 DLY) has a record from 1883-2017, however there is a substantial gap (missing approximately 12% of the records for 88% data coverage) between the 41-4305 HLY records in 1970 to the 60-0135 15M records in 1986.

We make a distinction between the entire period of record and record length (or data years), which characterizes the number of years for which an annual maximum was extracted and retained after it passed all quality control tests. In the metadata tables shared with reviewers, we showed only the period of record for each station, as record lengths often vary with duration. Since we provide online access to AMS data for stations used in the analysis ([Time series data](#)), record lengths for any station of interest could be retrieved with ease. For example, the AMS file for Houston WB (79-0056 DLY) shows that there is only a gap in the hourly record, but that it has a nearly continuous daily record from 1889 until 2017 ([ftp://hdsc.nws.noaa.gov/pub/hdsc/data/TimeSeries\\_stations/TX\\_79-0056\\_ams.txt](ftp://hdsc.nws.noaa.gov/pub/hdsc/data/TimeSeries_stations/TX_79-0056_ams.txt)).

For consistency, all AMS data are shown as constrained values, even if the recorded value captured the true-interval maximum amount, so correction factors must be applied to the published AMS data in order to estimate unconstrained values. More information on conversion factors for Texas is available in Section 4.5.3.

- 1.2.2. Austin (41-0420 DLY) has a period of record from 1849 to 2017, however there are gaps between the FORTS dataset (52-0420 DLY) ending in 1892 to the Montopolis Bridge (41-0432 DLY) beginning in 1903, and from the Montopolis Bridge (41-0432 DLY) ending in 1963 to the

Webberville Road (65-0089 15M) beginning in 1986. The Austin gauge is missing approximately 20% of the records, for 80% data coverage.

*Please refer to comment 1.2.1.*

- 1.2.3.** In the station metadata, it appears that stations have variations in periods of records. Given that sample size is an important factor in a statistical approach, longer records at stations are naturally preferred. However, there is not a very clear indicator showing the actual sample size of data after the filtering, organizing and merging processes.

*Please refer to comment 1.2.1.*

- 1.2.4.** For Galveston, I found this following information:

**GALVESTON, TX (52-3430 DLY)**

Agency: FORTS, Agency ID: USC00413430  
 Latitude: 29.3072, Longitude: -94.7917, Elevation: 6 ft  
 Period of record: 07/1865 - 12/1892  
 Co-located stations:  
 Merged stations:  
 Contributed data to stations: 79-0055 DLY

Is the period of record correct, 1865 to 1892? It appears that periods of missing record are not listed. This is inconsistent with the climate summary for Galveston. That source indicates multiple times to site was relocated and incomplete weather records for 1871.

*As indicated, the period of record for the Galveston, TX (52-3430 DLY) station is 07/1865 - 12/1892 and this station contributed data to station 79-0055 DLY.*

*An excerpt from the “NA14Vol11\_Stations used\_TX.xlsx” file, in Figure A.4-2 below, shows that the 79-0055 DLY station was co-located with 41-3430 HLY, whose record was extended using data from 99-3430 HLY (99-xxxx indicates data that we digitized from NCEI’s paper records), and that their combined period of record is 01/1892 - 08/2011. The table also shows that at daily durations, three stations contributed data to 79-0055 DLY: 41-3430 HLY (merged with 99-3430 HLY) and 52-3430 DLY.*

*After all the merges and extensions, the final period of record for 79-0055 DLY is 07/1865 to 09/2011. Please note that its record length at a given duration could be shorter than its period of record (refer to comment 1.2.1).*

| Station name | Station ID | Station type | Agency/dataset | Original period of record | Final period of record | Co-located stations for sub-hourly, hourly and daily durations | Merged stations                             | Contributed data to stations |
|--------------|------------|--------------|----------------|---------------------------|------------------------|--|---|------------------------------|
| GALVESTON    | 79-0055    | DLY          | NCEI           | 01/1897 - 03/2011         | 07/1865 - 09/2011      | N/A,<br>41-3430 HLY,<br>79-0055 DLY                            | 99-3430 HLY,<br>41-3430 HLY,<br>52-3430 DLY |                              |
| GALVESTON    | 41-3430    | HLY          | NCEI           | 01/1940 - 08/2011         | 01/1892 - 08/2011      | N/A,<br>41-3430 HLY,<br>79-0055 DLY                            | 99-3430 HLY                                 |                              |
| GALVESTON    | 52-3430    | DLY          | FORTS          | 07/1865 - 12/1892         |                        |  |   | 79-0055 DLY                  |
| GALVESTON    | 99-3430    | HLY          | NCEI           | 01/1892 - 02/1948         |                        |  |   | 41-3430 HLY,<br>79-0055 DLY  |
| GALVESTON    | 41-3431    | HLY          | NCEI           | 01/1948 - 12/2013         |                        |  |   | 56-0111 HLY,<br>79-0047 DLY  |

*Figure A.4-2. An excerpt from the “NA14Vol11\_Stations used\_TX.xlsx” file.*

## 2. STATION CLEANUP

### 2.1. Merges and extensions

- 2.1.1.** It is not clear how the merging of data and extending of the period of record was done. Can NOAA clarify?

*We define co-located stations as stations that have the same (or very similar) geospatial data, but report precipitation amounts at different time intervals. The screening of co-located stations is described in Section 4.4.*

*We also examine nearby stations to determine if they can be merged to form a single longer record. We perform merges with consideration to elevations and locations in respect to the coast and mountain ridges, visual inspection of AMS plots at three base durations (15-minute, 1-hour and 1-day), and statistical tests (double-mass-curve and correlation analyses) where possible. Once we determine that stations are good candidates for merging, their records (or parts of the records) are combined. For overlapping periods of record, we use time series plots to decide which station to use. For the combined records, we usually assign the station ID of the station that has the longest record or is currently in service.*

*We showed all merges and co-locations in the “NA14Vol11\_Stations used\_TX.xlsx” file. The “Contributed data to stations” column indicates if a station’s data was used to extend records at nearby stations, and the “Co-located stations for sub-hourly, hourly and daily durations” and “Merged stations” columns show if data from other station(s) were used to extend its record and for which durations. For example, as shown in Figure A.4-3, we appended data from the 1986-1995 period from station 60-0083 15M to the station 60-0082 15M record, and assigned the 60-0082 15M ID to the merged records.*

| Station ID | Type | Latitude | Longitude | Elevation (ft) | Original period of record | Final period of record | Co-located stations for sub-hourly, hourly and daily durations | Merged stations | Contributed data to stations |
|------------|------|----------|-----------|----------------|---------------------------|------------------------|--|-----------------|------------------------------|
| 60-0082    | 15M  | 30.0244  | -95.4764  | 85             | 01/1996 - 10/2017         | 04/1986 - 10/2017      |  | 60-0083 15M     |                              |
| 60-0083    | 15M  | 30.0066  | -95.5119  | 92             | 04/1986 - 10/2017         |                        |  |                 | 60-0082 15M                  |

*Figure A.4-3. An excerpt from the “NA14Vol11\_Stations used\_TX.xlsx” file.*

- 2.1.2.** The following information is not available for review, but they are crucial, thus should be included in future published documentation. What were the criteria for merging different stations? It seems that merging involves aggregating data of smaller interval into data of larger interval, but what exactly did “merging” involve?

*Please refer to comment 2.1.1.*

- 2.1.3.** In the NOAA Atlas 14 Vol. 9, merging has been applied to extend period of record based on a 3 mile distance. What was the logic behind this threshold and does it differ for various durations and frequencies? Has there been an examining step that investigates the spatial correlation of point rainfall values and makes sure the threshold distance doesn’t overlook variation at short spatial lag?

*Please refer to comment 2.1.1.*

- 2.1.4.** The period of record for Station 41-4323 was extended by assuming that 60-0115 was co-located. Why this station and not 60-0056 which appears to be a little closer (1.8 miles vs. 2.1 miles)? Why choose one over the other (both 60-0056 and 60-0115 have same period of record)?

*Geographic proximity is only one of several criteria we use to determine if stations are good candidates for merging (see also comment 2.1.1). We considered both the 60-0056 15M and 60-0115 15M stations for extending the 41-4323 DLY record and decided that 60-0115 15M was a slightly better fit to 41-4323 DLY based on inspection of 1-day AMS plots of their overlapping data. As a result of this merge, we extended the daily record at station 41-4323 DLY by 30 years.*

- 2.1.5.** Alvin gauge (41-0204 DLY) can be merged or populated with Alvin 1.6 SW (69-0719 DLY) and Chocolate Bayou nr Alvin (85-0287 HLY) to get a continuous record from 1898 to present. The Alvin gauge (41-0204 DLY) was discontinued in 2010, with a few additional measurements in 2013. Since other gauges in Southeast Texas were specifically augmented with data so that the effects of Hurricane Harvey would be included in the analysis, it is important to account for Hurricane Harvey in Alvin and provide consistency by augmenting this gauge with nearby gauge data. Further, there may be other gauges within the state with a similar issue that were not identified in this analysis.

*We accepted the recommendation to merge 41-0204 DLY with 69-0719 DLY. The combined record for the Alvin gauge now extends until the end of 2017 and accounts for Hurricane Harvey. We decided against merging station 85-0287 HLY as it is about 5.2 miles away from 41-0204 DLY, did not capture any rainfall during Hurricane Harvey, and has some data quality issues.*

- 2.1.6.** Several Harris County gauges had less than 20 years of data (all of these appear to have been used only to contribute data to other stations).

- |           |           |           |
|-----------|-----------|-----------|
| ▪ 60-0006 | ▪ 60-0160 | ▪ 60-0220 |
| ▪ 60-0039 | ▪ 60-0169 | ▪ 60-0221 |
| ▪ 60-0098 | ▪ 60-0194 | ▪ 60-0227 |
| ▪ 60-0129 | ▪ 60-0219 | ▪ 60-0235 |

*Stations with less than 30 years of data at daily durations or 20 years of data at sub-daily durations are not used in frequency analysis except in some extremely data sparse areas, especially at higher elevations. Though the stations listed above have less than 20 years of data, they were merged with other stations to create longer periods of record, so their data is being used in this project.*

## **2.2. Deletes**

- 2.2.1.** The following information is not available for review, but they are crucial, thus should be included in future published documentation. What data were removed or modified and why these decisions were made?

*In the “NA14Vol11\_Stations not used.xlsx” file, we provide the most influential reason for the removal of each station, but often there was more than one reason. We typically deleted stations for the following reasons: data quality concerns (missing, accumulated, repeating, or erroneous data unsuitable for extraction of AMS), data sampling issues (inconsistency in mean annual maximum data with nearby stations with longer records), location in close proximity of other stations that had similar data with longer records, or inadequate number of years with reliable annual maxima (after all merges and extensions were implemented and extracted AMS were quality controlled).*

*We reviewed AMS data for all stations across all durations up to 60 days using a set of criteria designed to extract only reasonable maxima (see Sections 4.3 and 4.5.1 for more information).*

*We retained only stations with more than 30 years of usable AMS data at daily durations or 20 years at sub-daily durations except in some data sparse areas, especially at higher elevations. Figure 4.4.1 shows ranges of record lengths for stations used in frequency analysis across daily, hourly, and sub-hourly durations.*

**2.2.2.** Many of the data sets excluded in Texas were due to short-periods of record. Was 20 years the minimum period?

*Please refer to comment 2.2.1.*

**2.2.3.** What is the minimum period of record for inclusion? Should that threshold be mentioned somewhere?

*Please refer to comment 2.2.1.*

**2.2.4.** Several HCFCD gauges were omitted from consideration even though they had 30+ years of record. Each of these fell into three categories for omission (listed below). For the “duplicate data” and “data dense area” categories, why were certain gauges chosen over others?

AMS quality concerns

- |           |           |           |
|-----------|-----------|-----------|
| ▪ 60-0029 | ▪ 60-0055 | ▪ 60-0107 |
| ▪ 60-0032 | ▪ 60-0096 | ▪ 60-0123 |
| ▪ 60-0033 | ▪ 60-0099 | ▪ 60-0125 |
| ▪ 60-0035 | ▪ 60-0102 | ▪ 60-0126 |
| ▪ 60-0047 | ▪ 60-0103 | ▪ 60-0128 |
| ▪ 60-0050 | ▪ 60-0105 | ▪ 60-0132 |

Duplicate data

- |           |           |           |
|-----------|-----------|-----------|
| ▪ 60-0023 | ▪ 60-0057 | ▪ 60-0109 |
| ▪ 60-0045 | ▪ 60-0081 | ▪ 60-0117 |

Data dense areas

- |           |           |           |
|-----------|-----------|-----------|
| ▪ 60-0015 | ▪ 60-0036 | ▪ 60-0070 |
| ▪ 60-0027 | ▪ 60-0052 | ▪ 60-0114 |
| ▪ 60-0031 | ▪ 60-0063 | ▪ 60-0137 |

*For the overview of reasons why some stations were not used in the frequency analysis, please see our response to comment 2.2.1. The following two examples illustrate why a station with 30+ years of data may still be omitted from frequency analysis:*

*We deleted station 60-0023 15M from the “Duplicate data” list above in favor of nearby station 60-0022 15M (3.57 miles away) that had more reliable data for the same period of record.*

*We deleted station 60-0015 15M from the “Data dense area” group because 3 miles away is station 79-0042 DLY with 85 years of AMS data and 4.9 miles away is the 85-0558 HLY station. 85-0558 HLY was co-located with 60-0026 15M, which has AMS data for the same period as 60-0015 15M for sub-hourly durations and a much longer record for hourly durations.*

**2.2.5.** Several stations used were identified as “HCFCD,” which are owned and operated by TxDOT or the Trinity River Authority (it is noted that they show up in the HCFCD database of monitoring sites at [www.harriscountyfws.org](http://www.harriscountyfws.org)). It is my understanding that these stations may not be maintained as well as those owned and operated by HCFCD, and therefore may not be as reliable as those maintained by HCFCD.

- |           |           |           |
|-----------|-----------|-----------|
| ▪ 60-0160 | ▪ 60-0219 | ▪ 60-0227 |
| ▪ 60-0169 | ▪ 60-0220 | ▪ 60-0235 |
| ▪ 60-0194 | ▪ 60-0221 |           |



*The “Agency” label does not show the agency that owns/operates the data. It is based on the agency that provided the data to us (either directly or we downloaded the data from the agency’s web page).*

*We used stations from the list above primarily to assist in calculation of corrections for constrained 1-hour observations (for more information see Section 4.5.3). We also used their data to fill in record gaps at nearby stations, but only after we confirmed that the data for the period of interest were reasonable. For example, we used 60-0219 15M to replace data in 60-0135 15M during hurricane Allison (5-15 June 2001) that were low, and for the 1 October 2008 - 30 April 2009 period which contained only zeros in the record.*

### **3. DATA QUALITY**

#### **3.1. Data QC**

- 3.1.1.** In layman or general technical terms, what is considered the AMS standard of quality for a station to be included?

*We conduct tests for high outliers on the annual maximum series for every station. High outliers are then examined further by comparing the raw data, observation forms, nearby stations, radar data, and storm data documentation in order to determine if the event is real. Please see Sections 4.3 and 4.5.1 for an in-depth explanation of our AMS extraction and quality control processes.*

- 3.1.2.** There is concern about the quality of some of the agencies precipitation data based on inadequate station maintenance. We would like to request NOAA to double check the data quality from non-HCFCD stations on the regional Flood Warning System website.

*Please refer to comment 2.2.5.*

- 3.1.3.** Recently I have undertaken some internal analysis of stations used within the HDSC Volume 11 Version 1 effort. During the course of my analysis I have come across a couple of anomalies. These are included below for your reference.

Floresville, TX (41-3201 DLY). Significant rain event noted on 5/23/1993 & 5/24/1993 – both days shown as 7.55” for total of 15.1”. Values look suspect, especially given that two-day total rainfall was much less at Karnes City 2N (0.96”) and Runge (1.65”). Karnes City, TX (41-4696 DLY). Bad value (90) on 18-Feb-1982.

*Repeating, significant rainfall values are often indicators of suspect data. For the Floresville, TX (41-3201 DLY) station, the COOP observer form confirmed 7.55 inches of rain on 23 May 1993, but not on the 24th, so we corrected it to zero inches. Another COOP station, Stockdale 6 N (41-8658 DLY, approximately 18 miles away), measured 5.66 inches on the 23rd and no rain on the 24th. We also confirmed this event in [NOAA Storm Data Publication](#) for May 1993, which mentions that on the 23rd, 8 to 11 inches of rain fell across most of Wilson County.*

*We exclude physically impossible values, like 90 inches per day, early in the quality control process. For the Karnes City, TX station (41-4696 DLY), we set the 18 February 1982 value to zero after looking at the original COOP form for the station.*

## 3.2. Historic events missing in records

- 3.2.1.** Given that most of the data sets end in December 2016, I am pleased to see the incorporation of extreme rainfall associated with Hurricane Harvey (August 2017); use of the 2017 AMS data for many of the stations affected by the hurricane seems imperative to avoid many of the problems associated with TP40's legacy data. Kudos for making this addition.

*For the peer review, most of the data sets ended in December 2016, but we appended 2017 AM data for a number of stations affected by Hurricane Harvey. After the peer review, we extended records for all stations through December 2017 (where available).*

- 3.2.2.** Many of the extreme events were not included in the prior studies and I am curious were the early events that only have short periods of record such as 1921 Thrall flood, were these included? I realize this is a very open-ended question with all the tropical storm graveyard over TX but that would obviously lead to some big bullseyes or at least a boost the range of possibilities from the earlier TP40/49 evaluations.

*We looked at various historical weather events publications, monthly storm data reports, and climatological observation forms in search of historic events that could be missing or underestimated in datasets we obtained.*

*Among others, we investigated the 8-10 September 1921 event centered at Thrall, TX. The often cited maximum 24-hour rainfall amount of 38.2 inches recorded near Thrall was from a bucket survey. For the closest NWS/Weather Bureau's recording station Taylor (41-8861 DLY/41-8862 DLY, approximately 7 miles away from Thrall), we had digital data for the 01/1929 - 12/2016 period. To extend its record, we digitized daily data for 1902-1928 and hourly data for 1902-1933 from NWS paper records. For this event, 16.11 inches in one day was recorded at the daily station (this amount was considered in the TP40 analyses), but we estimated from hourly data that the actual 24-hour amount was about 23.11 inches (with 14.16 inches falling in 6 hours) and we used those values in analysis.*

*We added back or adjusted 1-day/24-hour amounts for several other historic events; more details are provided in Section 4.5.2. As we normally do at the completion of each volume, we will send all implemented data corrections to the National Centers for Environmental Information for consideration.*

- 3.2.3.** Will the study include more analyzed TX events such as Memorial Day, Brenham, Tax Day, etc.?

*All of the events listed, together with other historic events, were included in the NA14 analysis (also, refer to comment 3.2.2). However, if this comment is in reference to our annual exceedance probability (AEP) maps, we provide analysis and create AEP maps only for selected historic storms, typically in response to requests from NWS regional offices or other federal agencies. More details on the analysis and the up-to-date list of analyzed storms are available on the [AEP storm analysis page](#). So far, we have created AEP maps for the following six TX events: San Antonio, 25 May 2013; Central Texas, 23 May 2015; Corsicana, 24 October 2015; Austin, 30 October 2015; and Hurricane Harvey, 25 August 2017.*

- 3.2.4.** Examination of the Corpus Christi station graph shows no unusual precipitation in 1919, when Corpus Christi was struck by a devastating hurricane. Stations farther inland reported as much as 12" of rainfall. Please check the Corpus Christi rainfall totals. It may be appropriate to impute a value for 1919 if the existing value is suspicious.

Speaking of historical precipitation, I am aware of a few observations of exceptional precipitation amounts in sparsely observed areas at stations with short periods of record. One particularly worth mentioning is the July 1899 event in central Texas, in which Hearne reportedly received 35" of rainfall. Rainfall observations are sparse, but observations of disastrous flooding downstream along the Brazos River are plentiful. The event demonstrates the possibility of very heavy and widespread rainfall farther inland than seems to be indicated by the one-day and multi-day 100-year maps. I don't know if the event is included in the input data, or whether anything can be done if it's not.

*For Corpus Christi, the 24-hour rainfall from the 1919 hurricane was estimated at 3.33 inches from the original monthly record of observations for September 1919. From the Climatological Data section document for Texas in September 1919, we found the following rainfall totals (in inches) recorded at nearby stations in the coastal area on the 15th or 16th: 10.50 in Alice, 8.85 in Ricardo, 8.00 in Mathis, and 4.53 at Woodsboro, so it is likely that the Corpus Christi estimate is low. We decided against the adjustment since the adjustment would have minimal effect on estimates; we already had several significant 24-hour AM values in Corpus Christi's record and the event was accounted for, as it was captured at the Alice station that was included in Corpus Christi station's region.*

*NCEI's Valley Junction station (41-9280), before being relocated from nearby Hearne, captured the June 1899 Hearne event but was not available in the digitized dataset. We found additional data forms and digitized data for a missing period. Records show that the gauge overflowed at 24 inches on June 30th, but the observer estimated that about 30 inches fell during a 24-hour period. Through regionalization (see comment 5.1.1), the inclusion of this event helped ensure that estimates are not underestimated at this station as well as other stations in the area, such as Brenham and College Station.*

- 3.2.5.** If a gauge went out in Harvey but not in previous events, was the dataset still used? If so, was the Harvey data adjusted for the study or thrown out?

*If a station didn't capture Harvey or any other significant event, we likely would not extract annual maxima for that year at least for some durations but would keep the station if it passed other criteria (see Sections 4.3 and 4.5.1). Since we use a regional frequency approach that uses data from several stations to calculate estimates at one station (see Section 4.6.2), it is likely that the event will be accounted for through another station in the region that captured rainfall amounts for the event.*

## 4. DEPTH-DURATION-FREQUENCY (DDF) CURVES

### 4.1. General

- 4.1.1. Comparison was made between NOAA Atlas 14 and standard HCFCD rainfall near downtown Houston (HCFCD data was derived from USGS WRIR 98-4044). A summary of this comparison is presented in the following table.

| Duration | 2-Year HCFCD | 2-Year NOAA | Diff (inches) | Diff (%) | 100-Year HCFCD | 100-Year NOAA | Diff (inches) | Diff (%) |
|----------|--------------|-------------|---------------|----------|----------------|---------------|---------------|----------|
| 60-min   | 2.0          | 2.3         | 0.3           | 15%      | 4.3            | 4.9           | 0.6           | 14%      |
| 6-hr     | 3.1          | 3.8         | 0.7           | 23%      | 8.9            | 11.8          | 2.9           | 33%      |
| 24-hr    | 4.4          | 5.2         | 0.8           | 18%      | 13.2           | 16.7          | 3.5           | 27%      |
| 10-day   | N/A          | 8.4         |               |          | N/A            | 25.5          |               |          |

*Without having the data used in the HCFCD analysis and knowing all the details about the frequency analysis methods used by HCFCD, it is hard to discuss with certainty what factors contributed the most to differences in estimates.*

*We believe that differences in 2-year estimates from the table above are mainly because NA14 estimates shown in the table are partial duration (PDS)-based and HCFCD estimates are AMS-based. Differences in magnitudes of corresponding estimates from two time series are negligible for ARIs greater than 10-year, but notable at smaller ARIs, where PDS-based estimates are higher than corresponding AMS-based estimates. Please refer to Section 4.6.4 for more information.*

*We speculate that differences in 100 year-estimates are also primarily due to data, although at least some could be due to the use of different frequency analysis methods in the two studies (regional NA14 vs. at-station HCFCD, use of different distributions, etc.). We found several significant events in this area missing in original datasets. For example, we identified a significant event missing in the NCEI's digitized record for the Houston Hobby Airport (79-0042 DLY) station, as well as two events that were being underestimated due to the fixed 24-hour observation interval. Figure A.4-4 (left panel) shows the original (black) and adjusted (red) 24-hour AMS for this location. Just through addition of the missing event and adjusted values, the 100-year 24-hour estimate, for example, increased from 15 to 17.2 inches (right panel).*

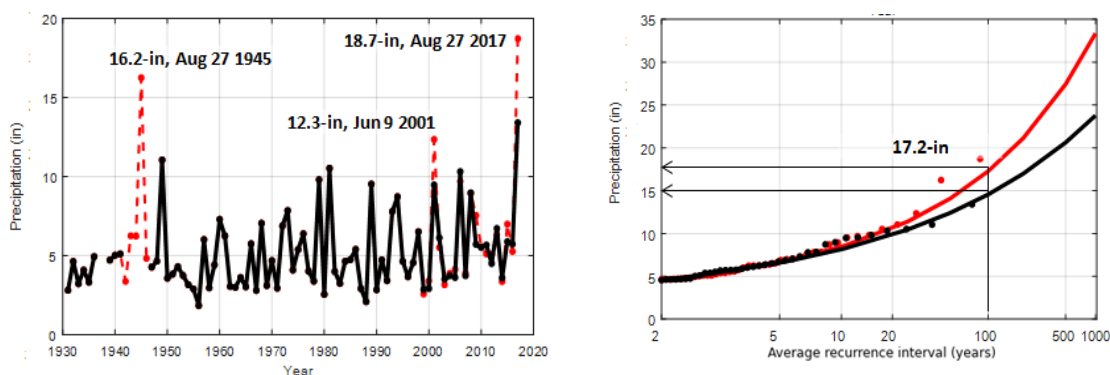


Figure A.4-4. 24-hour AMS data (left panel) and GEV frequency curves (right panel) for Houston Hobby Airport station before (black) and after (red) adjustments.

- 4.1.2. On the 100-year difference maps, there is an interesting contrast between the 6-hour and 10-day versions in the area around Palestine in East Texas. The 6-hour values have gotten wetter in this area while the 10-day values have gotten drier. Data from multiple sites support this, and the DDF charts have a noticeable "convex" shape (steep then gentle slope from shorter to longer durations).

"Concave" shapes (steepening slope with increasing duration) tend to dominate the I-20 corridor to the Red River. I'm not sure why these artifacts are regionally consistent, but it must mean something.

*Since precipitation mechanisms influencing heavy precipitation events and the climatologies of heavy precipitation are similar for nearby stations, it is to be expected that DDF curves will be regionally consistent. Convex or concave shape would indicate how they change with duration.*

- 4.1.3.** Based on a review of the DDF from Volume 9 (Southern States) and the data prepared so far for Volume 11 (Texas), it appears that the webpage/map will give you a different rainfall depth depending on where you click (i.e., where you place the crosshairs). This will be impractical for design. Harris County will need to define appropriate DDF precipitation for regions of the county, or for each watershed.

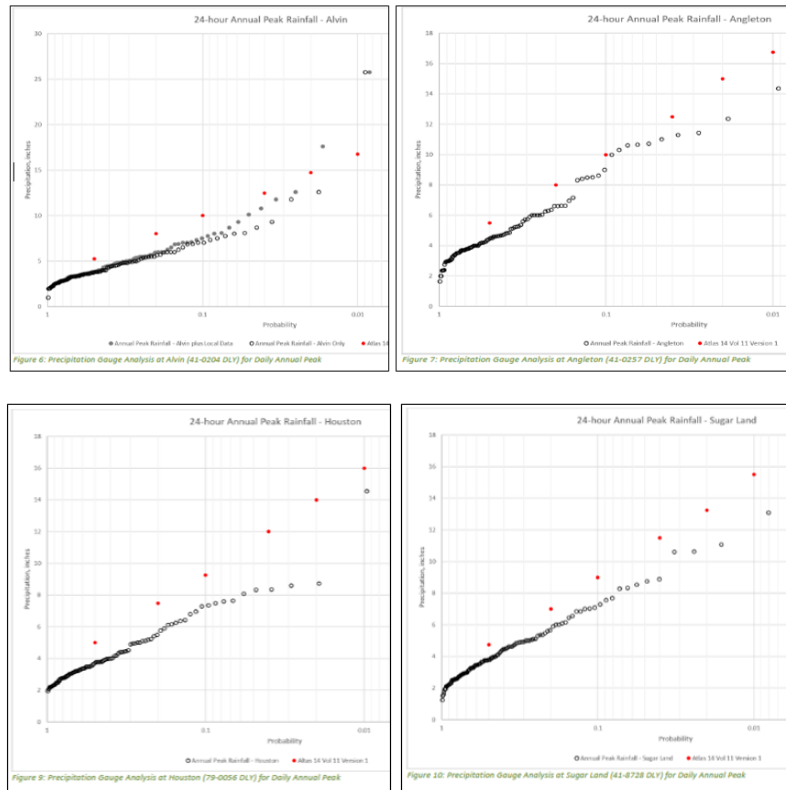
*NA14 precipitation frequency estimates are used in a very wide variety of applications, and that is why we provide estimates at high spatial resolution (30-arc sec) for a range of durations (5-min to 60-day) and frequencies (1-year to 1000-year). When estimates are needed for a specific location, the simplest way to retrieve estimates is from an interactive map on the [PFDS](#). When estimates are needed for a region, they can be retrieved from the [GIS Grids](#) page which accesses the gridded data directly.*

*Keep in mind that NA14 estimates are point estimates and are not directly applicable to a larger region. An average of point estimates for a region can be easily obtained from the GIS grids by averaging estimates from grid cells inside the region. However, for applications relying on areal estimates, the average of the point estimates within the region also must be converted to an areal estimate, which is usually done by multiplying it with an appropriate areal reduction factor (ARF). ARF is generally a function of the size of an area and the duration of the precipitation. The depth-area-duration curves from the [Technical Paper No. 29](#) (U.S. Weather Bureau, 1957), developed for the contiguous U.S., can be used for this purpose if no more accurate ARF information is available.*

*For regions spanning more than one NA14 volume, precipitation frequency estimates can be retrieved from the [NA14 Conus product](#). This product combines NA14 estimates for durations between 60-minute and 7-day from published NA14 Volumes that cover contiguous US states. The estimates along the volumes' boundaries were altered to reduce discrepancies, which are unavoidable as each volume was completed independently and at a different time (see comment 5.5.1). For more information on this product and for instructions on how to extract estimates for a user-specified area defined by a latitude-longitude bounding box, please see [AEP storm analysis](#).*

- 4.1.4.** Are precipitation frequency estimates at the station what you expect? No. Point analysis of several gauges indicate a significant deviation from the expected value based on individual point analysis. Simple rank plotting of distributions  $P=m/(1+n)$  indicates that many of the DDF charts show a substantial difference between the Atlas 14 DDF values and the rank-plotted gauge values.

In Figure 6, the gauge at Alvin shows a pronounced difference in the proposed DDF when the additional gauge data referenced above in the suggested merges and co-locations section. There is an overestimation of 25-year and smaller events, and an underestimation of the 100-year event, especially if the suggested merge of 41-0204 DLY with 69-0719 DLY and 85-0287 HLY is accepted. A 100-year, 24-hour depth at this location should be 20 inches at a minimum.



Existing practice in selection of a distribution is, among others, to look at its ability to fit the observed data with plotting position determined using the Weibull formula. We also use that formula in visual inspection of probability plots during the distribution selection task (see Section 4.6.3 for more information). However, one must keep in mind that fit also depends on the selection of plotting position formula. There are many plotting position formulas with various justifications; they all give similar plotting positions in the middle of a distribution but produce considerably different positions near the tails, so it is not uncommon that the largest of the extremes look like outliers when relying on an arbitrary plotting position.

For the station at Alvin (41-0204 DLY with suggested merges), we determined that the differences between NA14 and recommended estimates are mainly due to differences in frequency analysis approaches. In NA14 we rely on regional frequency approaches to calculate estimates at a station by using data from several stations with similar attributes of interest (see Section 4.6.2 for more information). For Alvin, for example, we calculated the 100-year 24-hour frequency estimate of 17.09 inches based on the regional statistics that included information from 23 stations. Cumulatively these 23 stations carry information on 1,737 annual maximum amounts. If we used only 104 AM data extracted at Alvin, the corresponding estimate would end up being above 20 inches (exact value is 21.24 inches). After the peer review, we re-investigated the regional information for this and surrounding stations. The final 100-yr 24-hour estimate did increase to 17.7 inches after improvements were made to the station’s region and to AMS improvements at nearby stations. Please refer to comment 6.3.3 for more information.

## 4.2. Hurricane Harvey’s effect on DDF

Please refer to Section 5.3 of this Appendix.

## 5. SPATIAL PATTERNS, GENERAL

### 5.1. Regionalization and stations density

- 5.1.1.** Recommend using a much larger regional zone in developing the precipitation frequency estimate at each gauge. This is especially true for precipitation frequency estimates that have shorter or insufficient effective records; E.G. larger than 50 year periods or shorter than 6 hour durations.

*In NA14 we rely on regional frequency approaches that pull together data from several stations to calculate regional statistics that are then used to calculate precipitation frequency estimates at one station. We use a so-called region-of-influence approach, where each station has its own region with a potentially unique combination of nearby stations, and we calculate regional statistics by averaging corresponding station-specific estimates weighted by record lengths. This approach avoids discontinuities in estimates across regional boundaries, which is relevant for the mapping of precipitation frequency estimates.*

*We assign stations to a target station's region based on their distance and similarities in selected attributes, including elevation, location with respect to the coast and mountain ridges, progression of relevant L-moment statistics across durations, etc. When determining the maximum allowable distance and selecting an optimal number of stations to assign to a target station's region, we aim to include enough stations to smooth variability in at-station estimates, but also still adequately represent local conditions. In this volume, regions typically comprise between 15 and 25 stations with at least 1000 cumulative data years for daily durations and 500 for sub-daily durations (numbers could be lower in areas with low station density). For more information, please see Section 4.6.2.*

*For Version 1 we considered stations up to 50 miles from the target station, but in response to comments received during the peer review and to achieve more realistic patterns in areas with low station density and along the coast, we expanded the search to 75 miles for Version 2. In station dense areas, we consider that AM at nearby stations are often extracted from the same storm events, and as such could bias estimates. We use cross-correlation analysis results to decide what stations to keep. After the peer review, we inspected regions from Version 1 for stations in urban areas and further improved them to minimize that effect.*

- 5.1.2.** There is too much local spatial variation for the maps of shorter duration. Since these maps are the main bases for hydrologic and hydraulic practices, they should be given extra consideration. Regionalization techniques can potentially reduce some of the existing variation at small spatial scales.

*Please refer to comment 5.1.1.*

- 5.1.3.** When it comes to regionalization, I would like to see a larger area within the regionalization circle. Also, increase the grouping of closest station. I think on the phone call you all said that you included 10, but I would like to see the 25 closest stations.

*Please refer to comment 5.1.1.*

- 5.1.4.** Questions concerning effects of gage density continue to surface. Explanations have been provided and discussed supporting non-effect, but results just seem to be somewhat reflective in some, maybe explainable, way. Have you compared a gage density difference map from the previous study to this one? Or maybe even a period of record (POR) map?

*Please refer to comment 5.1.1.*

**5.1.5.** Is the density of the stations in the Houston and Beaumont areas affecting the results?

*Please refer to comment 5.1.1.*

**5.1.6.** The use of 875+ stations outside of Texas, including those in Mexico, is laudable and densifies the overall data sets. The large numbers appear appropriate to balance in state data. Stations Examined But [Not] Used appear appropriate as, largely, their period of record is too short to be relevant.

*No action required.*

**5.1.7.** Station density used to develop the DDF curves is appropriate, particularly in urbanized areas. Stations becomes less dense in less developed areas of the state, which is expected.

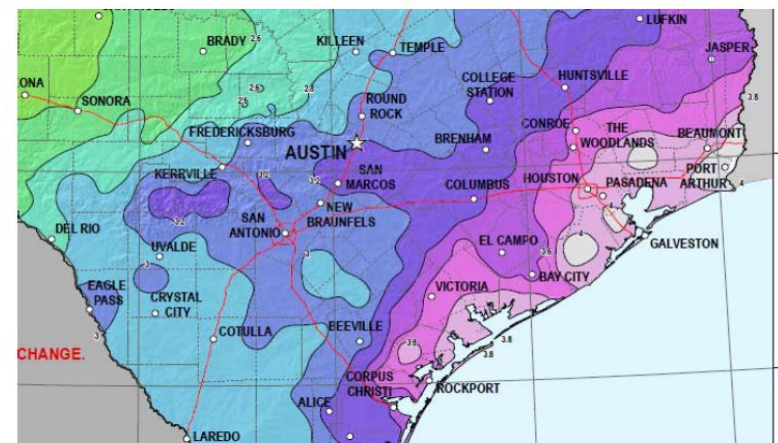
*No action required.*

## **5.2. Terrain and smoothing**

**5.2.1.** Does NOAA Atlas 14 Volume 11 account for mountainous effects (TP 40 did not)?

*We use the hybrid statistical-geographical PRISM-based interpolation technique for mapping climate data to account for mountainous effects and this allows for significant improvements in areas of complex terrain when compared to TP40. In addition, more stations are now available in mountainous areas and while their records are still not as long as records at other stations retained for the analysis, the data we have there provide valuable information. For more information on the NA14 interpolation method, please see Section 4.8.*

**5.2.2.** Check all frequency and duration maps for unexplainable bull's eyes and smooth accordingly. For example, see the 2-year, 6-hour precip-freq map below.



2-year, 6-hour Version 1 Precipitation-Frequency Map

*NA14 interpolation at each duration starts with the PRISM-based MAM grid. At-station ratios between the 2-year estimates and corresponding MAM estimates are then interpolated to a grid and multiplied by corresponding MAM grids to create a grid of 2-year precipitation frequency estimates. In the subsequent run, ratios between the 5-year and 2-year estimates are interpolated and used to calculate the 5-year precipitation grid from the 2-year grid, and so forth (see Section 4.8 for more information).*

*We use a natural neighbor interpolation method to interpolate ratios that is based on construction of Thiessen polygons from the Delauney triangulation of irregularly spaced gauged locations. The*



advantage of this method is that it remains true to the estimates at gauged locations and the resulting function is continuous everywhere within the project area. The disadvantage is that station-driven contour lines pop up in cartographic maps. Most of the contours are driven by small differences in MAM estimates at nearby stations and the selected mapping contour interval.

For the peer review we deliberately applied only a minimal smoothing across the whole project area and that is why so many bullseyes, especially in flat terrain areas, were showing up in the maps. For the final product, we applied a dynamic filter to the precipitation frequency grids to reduce the number of station-driven contours. Parameters of the filter, which control the amount of smoothing, are a function of elevation gradients and proximity to the coastline. Parameters were selected such that no smoothing was applied in the mountains, some smoothing was applied along the coast, maximum smoothing was applied in flat terrain, and the transition from one to another was gradual. This smoothing provided more visually appealing maps while still preserving gradients where appropriate. Figure A.4-5 shows Version 2 of the 2-year 6-hour precipitation frequency map for the same area as in the Figure above.

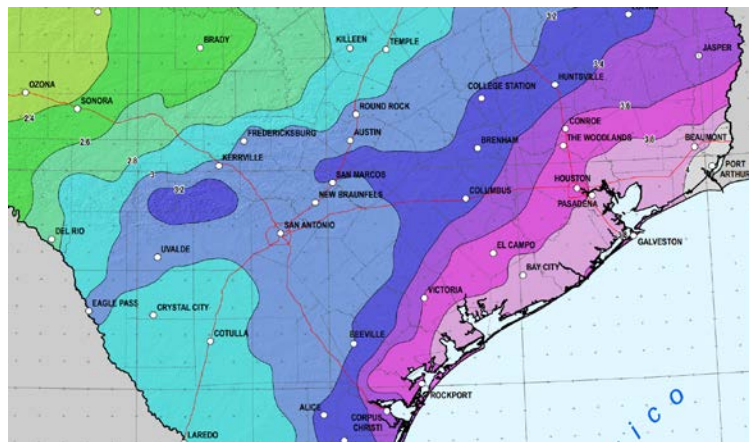


Figure A.4-5. An excerpt from the revised 2-year 6-hour map.

**5.2.3.** In looking over the information, believe some smoothing of the concentration around Harris Co. and the Beaumont areas as well the western increase at the one location by the E/W NM border may be warranted, especially for the 100 year and 500 year RI storms.

*Please refer to comments 5.2.1 and 5.2.2.*

**5.2.4.** Unphysical gradients: Texas topography does influence precipitation in a variety of ways. I have commented about suspicious gradients and have advocated greater smoothing in extreme cases. However, there are parts of Texas where strong gradients are appropriate. An obvious example is the high-relief area of the Trans Pecos. Another less obvious area is the Balcones Escarpment, where a strong north-south gradient in central Texas (with high precipitation along the south-facing slope and lower precipitation farther to the north) is physically correct. Addressing issues in the low-relief areas of southeast Texas should be done in a way that does not degrade the physically-justified strong gradient over the Hill Country.

On the other hand, Eagle Pass is a bit far removed from the Balcones Escarpment for one to expect it to be a local maximum of heavy rainfall. Probably that area has simply been historically unlucky, and thus probably won't be so unlucky in the future.

*Please refer to comments 5.2.1 and 5.2.2 for general comments. We reviewed estimates for the Eagle Pass area and we think that the patterns are reasonable and supported by the data from two*

*very long record stations at Eagle Pass and Del Rio, which have 114 and 111 years of data, respectively. For example, over the course of their records, Eagle Pass has consistently observed larger events and has a 24-hour mean annual maximum that is 16% higher than at Del Rio. This justifies estimates to be slightly higher at Eagle Pass, which is reflected in the current patterns. The 100-year 24-hour estimate of 12.27 inches at Eagle Pass has also already been twice exceeded significantly, in 1936 and 2014.*

- 5.2.5.** For [areas with local peaks/sinks with no apparent topographic/orographic explanation], I'm wondering if some smoothing techniques should be used to eliminate most or all of these. I believe it would be an interesting contour comparison to plot isohyetal map, using same contouring method, of max precip value of a given duration within the frequency of highest accumulation. Another comparison would be average precip within frequency intervals (2yr, 10yr, 30yr, POR).

*Please refer to comments 5.2.1 and 5.2.2 on contouring and Section 4.6.2 on how POR was accounted for in calculation of regional statistics.*

- 5.2.6.** For areas with local peaks/sinks with no apparent topographic/orographic explanation], I'm wondering if some smoothing techniques should be used to eliminate most or all of these. In general, the lower frequency (ie. 100yr) maps compared with same durations have more of this definition that is concerning compared to the higher frequency maps (ie. 2yr). While I can't prove it, I do believe that it may be an artifact of data POR... meaning that the further out on the curve one goes, the more uncertainty with values there will be.

*Please refer to comments 5.2.1 and 5.2.2 on contouring and Section 4.6.2 on how POR was accounted for in calculation of regional statistics.*

- 5.2.7.** The bullseyes near Austin (excess), Del Rio-Eagle Pass (excess), and Victoria-Beeville (deficit) on the 100-year, 60-minute and 6-hour charts have no clear meteorological/ climatological explanation. Application of a moderate smoothing function may help, but of course, the statistical integrity of the analysis must be maintained. The 100-year, 24-hour and 10-day charts look good.

*Please refer to comment 5.2.2.*

- 5.2.8.** I would like to see smoother and more-defined contours. For example, on the 24 hour, 100-yr, the 8-9inch contour juts out into Fort Worth and the 9-10inch contour juts out NW of Brownwood. I would to see a smooth line drawn between these. There are many more instances throughout these maps, so I won't go into detail on each map, but smoother, less "blobby" iso contours would be appreciated and in my opinion, more likely to give a reliable PF estimate.

*Please refer to comment 5.2.2.*

- 5.2.9.** Try to eliminate Bulls-eyes as much as possible. I know there are some Bullseyes that make meteorological sense, such as in the Hill Country/Balcones Escarpment area. But for example, on the 2 year -24 hour map, the bulls-eyes around Crystal City, and Del Rio need to be smoothed over. Also, the multiple bulls-eyes Southeast of Kerrville, need to either be merged or smoothed over.

*Please refer to comment 5.2.2.*

- 5.2.10.** The contour legend used in this version might contain a little too many levels. The patterns can be smoother from the less contour levels, reducing the circular patterns at small regional scales.

*Please refer to comment 5.2.2.*

### 5.3. Influence of Hurricane Harvey and other extreme events

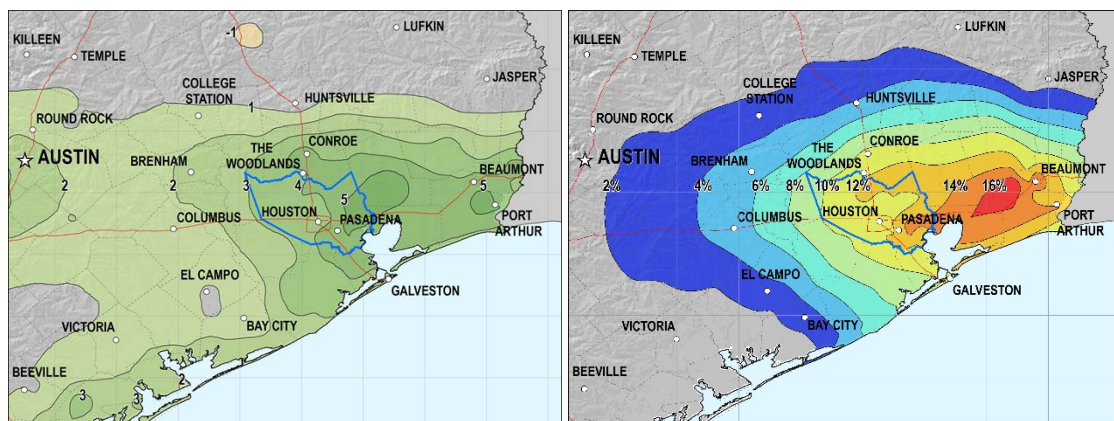
#### 5.3.1. Most all of the Version 1 precip-freq maps appear to be influenced by the Harvey event. Was Harvey tested as a potential outlier? How would the maps look without Harvey?

*The NA14 precipitation frequency analysis approach is based on statistical analysis of AMS data. High (and low) outliers in AMS, which we define as annual maxima that significantly depart from the trend of the corresponding remaining maxima, could considerably affect precipitation frequency estimates. We investigate high outliers carefully and correct or remove them from the AMS only if due to measurement errors, as they benefit the analysis.*

*For the peer review, most of the data sets ended in December 2016, but we appended 2017 AM data for several stations affected by Hurricane Harvey. [After the peer review, we extended records for all stations through December 2017 (where available) and double checked 2017 AM extracted before the peer review to ensure we have accurate values.]*

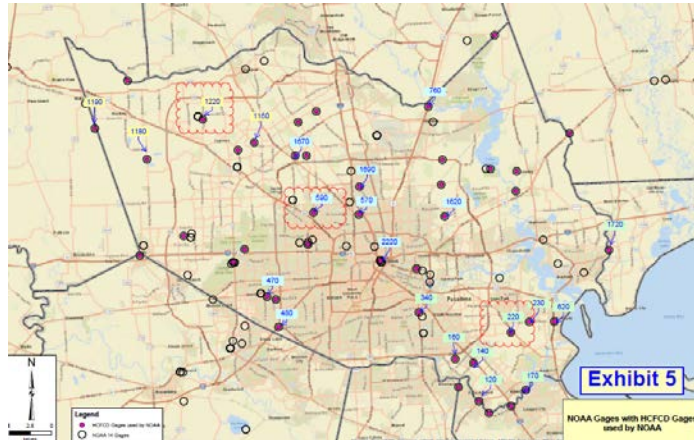
*Estimates in the Houston area did increase significantly relative to TP40 across all durations and frequencies, but that is not all due to Hurricane Harvey. In fact, Harvey's effect is noteworthy only at longer durations and rarer frequencies (100-year ARI or above). Increases in and around the Harris County observed in 2-year maps are mainly due to higher mean annual maxima (MAM) that reflect increased annual rainfall for this area when compared to surrounding areas. Also, three out of the five highest continental U.S. storm total rainfall amounts are in or around Harris County, indicating that this area is more prone to higher rainfall amounts than its surrounding areas. Other factors contributing to the increase include longer records, additional significant events that occurred in the area in more recent years, better spatial coverage, and improved frequency analysis methods for NA14. As an example, Figure A.4-6 shows differences in inches between NA14 Version 1 and TP40 24-hour 100-year estimates for the area (left figure) and how much NA14 estimates increased after Hurricane Harvey's data was added in the analysis (right figure).*

*After the peer review, we inspected and further improved the regions delineated for stations in the area to minimize potential biasing of estimates through inclusion of multiple stations sampling from the same historic events and ultimately improved patterns of precipitation frequency estimates across all durations and frequencies.*



*Figure A.4-6. Left figure shows difference in inches between 24-hour 100-year estimates from NA14 Vol11 Ver1 and TP40 in Houston area. Right figure shows how much NA14 estimates changed (in percent) after Hurricane Harvey's data was added to the analysis.*

**5.3.2.** A subsequent analysis was undertaken using the Extreme Value Probability (Gumbel) Type I distribution for five gauges in the Houston area. Three of the gauges are HCFCF sites. Exhibit 5 illustrates the range of possible sites that could be examined for the analysis of HCFCF gauges. The labeled gauge stations are representative of sites with 30+ years of data (although 32 appears to be the maximum length of record).



The HCFCF gauges chosen for this evaluation were Stations 0220, 0590, and 1220, all with 32 years of record and all used in the NOAA analysis. These gauges were chosen based on the availability of continuous rainfall records (minimum of 30 years with 1-hour increments), colocation with rain gauges used in the Atlas 14 analysis (see Exhibit 1 in comment 2.1.2), and locations in each of the three identified hydrologic regions in Harris County, respectively, to provide adequate representation across the County. The two remaining sites consist of several sets of merged historic records from National Weather Service gauges at Hobby Airport (Station 41-4307 for the periods 1948 to 1952, 1968 to 1970, and 1998 to 2013, while Stations 722435-12918 and 999999-12918 were used for the period 2013 to 2017 and to fill in gaps in the previous record), and Bush Airport (Station 41-4300 for the period 1973 to 2013, Station 999999-12960 for the period 1969 to 1972, and Station 722430-12960 for the period 2013 to 2017 and to fill in gaps in the previous records). These sites were chosen based on availability and continuity of data. NWS gauges at Alief (Station 41-4311), Addicks (Station 41-4307), and Ellington Field Airport (Station 722436-12906) were also investigated but lacked sufficient records to complete an analysis. After merging records, the two sites and Hobby and Bush airports consisted of 26 and 48 years of record, respectively. These sites were analyzed for the 2-year and 100-year (3-hour, 6-hour, and 24-hour) events for comparison with the NOAA Atlas 14 data.

The Extreme Value Type 1 (Gumbel) distribution is one of the most common and generally accepted methods for statistical analysis of rainfall data and was used in the development of TP40. Using parametric methods to fit a given dataset to the Gumbel distribution, the rainfall depth associated with different recurrence intervals (i.e. exceedance probabilities) can be determined. Although the distribution can be approximated with probability-weighted moments using the mean and standard deviation of the sample dataset (Product-Moments), these product-moment estimators have been found to be highly dependent upon sample size and contain bias for both large and small sample sizes (Wallis et al., 1974). A more recent alternative method, using L-Moments, is generally accepted as an unbiased predictor of the underlying probability distribution for small sample sizes because it decreases the influence of outlier values (Vogel and Fennessey, 1993). As a result, the L-Moment method was opted for use in the analysis of these gauging stations.

By removing Harvey from the period of record, it is noted that the 100-year rainfall is reduced significantly for the each gauge analyses (Figures 6a through 6e). Similar reductions might be expected if Harvey is omitted from the NOAA analysis.

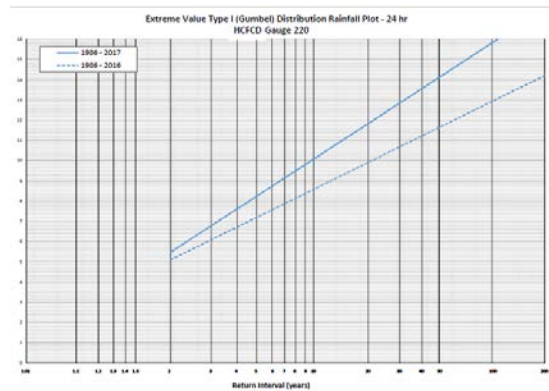


Exhibit 6a

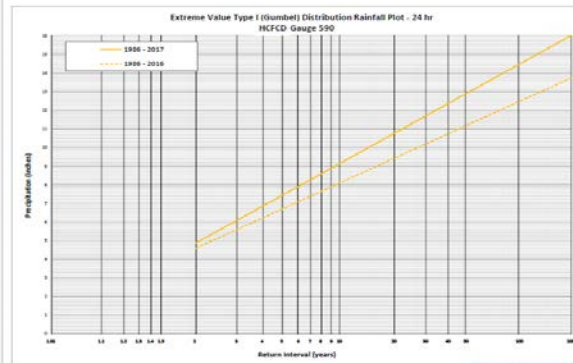


Exhibit 6b

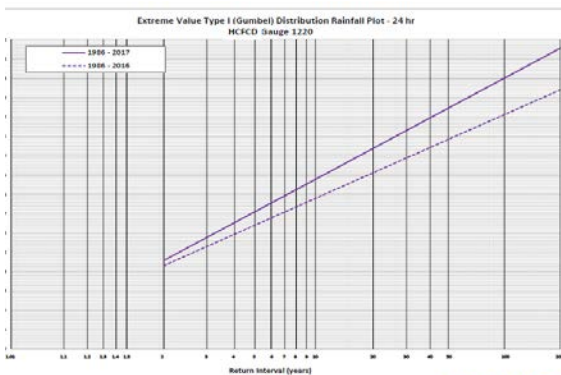


Exhibit 6c

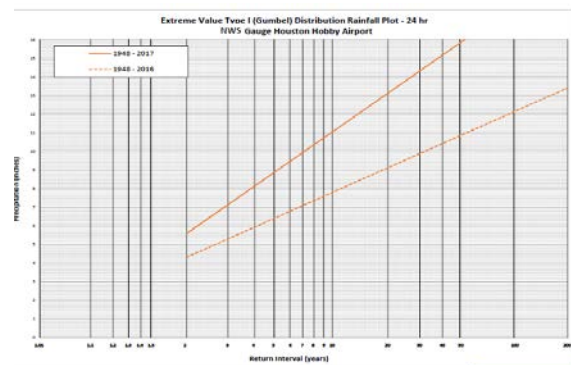


Exhibit 6d

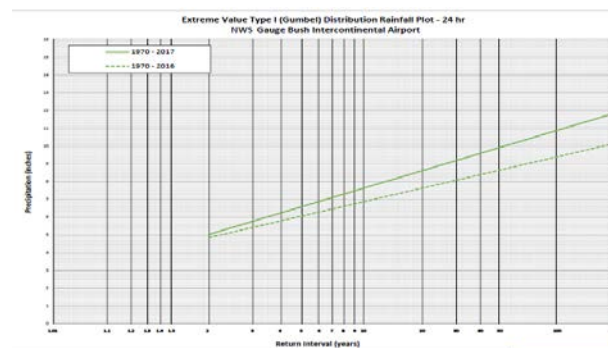
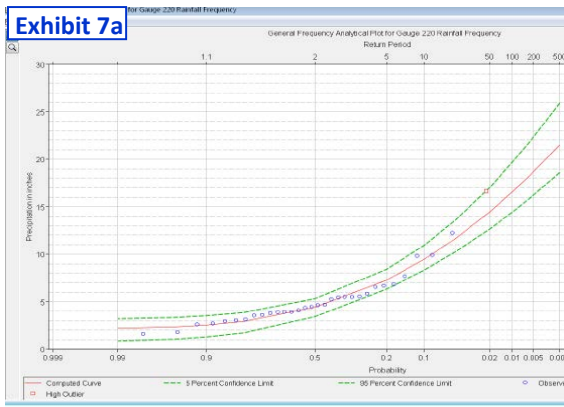
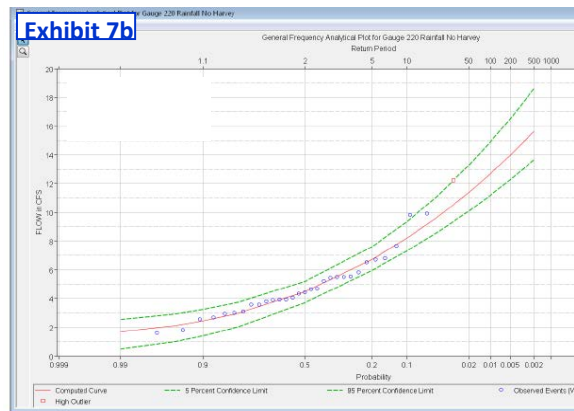


Exhibit 6e

Subsequently and to quickly verify the general trend of these results, HCFCO Gauge 220 was also analyzed using the HEC-SSP program which allows for analysis of rainfall using the General Frequency Analysis option to fit curves to the data using a Pearson Type III distribution. As with the Gumbel analysis, the removal of Harvey from the dataset significantly reduced the estimate of the 24-hour 100-year rainfall (Figures 7a and 7b).



HCFCD Gauge 220 - Generalized Frequency Analysis (Full Record)



HCFCD Gauge 220 - Generalized Frequency Analysis (Omits Hurricane Harvey)

The figures above indicate that precipitation frequency estimates would reduce significantly if Hurricane Harvey’s data were not used in the analysis. The reduction is especially prominent at the Houston Hobby Airport location (Exhibit 6d). A statement was made that “similar reductions might be expected if Harvey is omitted from the NOAA analysis.”

To investigate how much NA14 estimates would decrease if Harvey data were not considered, we performed analysis for the Houston Hobby Airport station (79-0042 DLY) with and without the 2017 AM value and plotted frequency curves for the 24-hour duration (Figure A.4-7). For easier comparison we estimated precipitation amounts for several ARIs from Exhibit 6d and displayed them in the figure as well. As can be seen from the figure, inclusion/exclusion of Harvey had a considerably smaller effect on NA14 estimates than on the estimates shown in Exhibit 6d. Initially we attributed this outcome to differences in frequency analysis approaches: the regional frequency approach used in NA14 vs. the at-station frequency approach used in derivation of Exhibit 6d. However, frequency curves derived using only 85 (or 84 without Harvey) AM values extracted at Hobby airport looked very similar to corresponding curves developed using regional methods.

Without knowing details on the frequency analysis methods used and not having the data used to create the figures above, it is hard to explain the differences in results. Based on the information provided in the comment and judging from Exhibits 7a and 7b, we speculate that the frequency curves shown in the figures above were developed from very short records (less than 50 years) for which inclusion of a historic event like Harvey would have a profound effect on estimates.

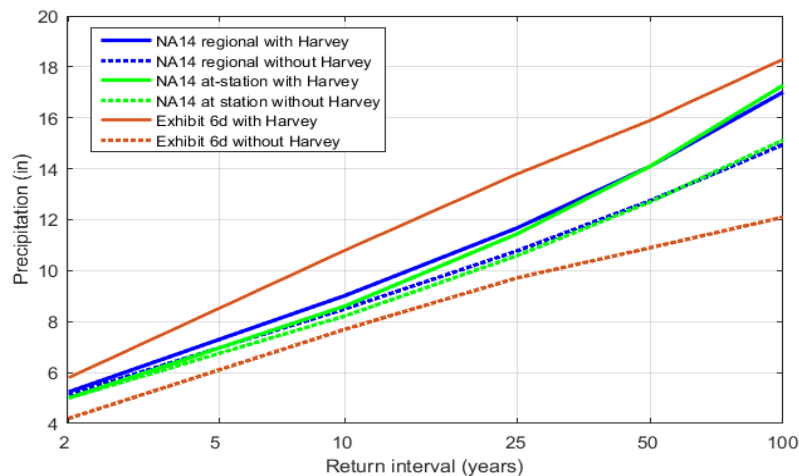


Figure A.4-7. Variants of 24-hour frequency curves at Houston Hobby Airport.

- 5.3.3.** A subsequent analysis was undertaken using the Extreme Value Probability (Gumbel) Type I distribution for five stations in the Houston area. By removing Harvey from the period of record, it is noted that the 100-year rainfall is reduced significantly. Would similar results be expected if Harvey were omitted from the NOAA analysis?

*Please refer to comments 5.3.1 and 5.3.2.*

- 5.3.4.** Is there a way we can see the DDF curves before Harvey was added to the study?

*Please refer to comments 5.3.1 and 5.3.2.*

- 5.3.5.** The maps look like they were influenced by Harvey. Was Harvey tested as a potential outlier?

*Please refer to comments 5.3.1 and 5.3.2.*

- 5.3.6.** How would the maps look without Harvey?

*Please refer to comments 5.3.1 and 5.3.2.*

- 5.3.7.** The cartographic map showing the 100-year 24-hour estimates appears to mirror maximum rainfalls consistent with H. Harvey and earlier extreme events.

*Please refer to comments 5.3.1 and 5.3.2.*

- 5.3.8.** Comparing the contour maps of 2-year and 100-year maps of various durations, one can tell distinct difference in the patterns around Harris County. Is this much related to Hurricane Harvey?

*Please refer to comments 5.3.1 and 5.3.2.*

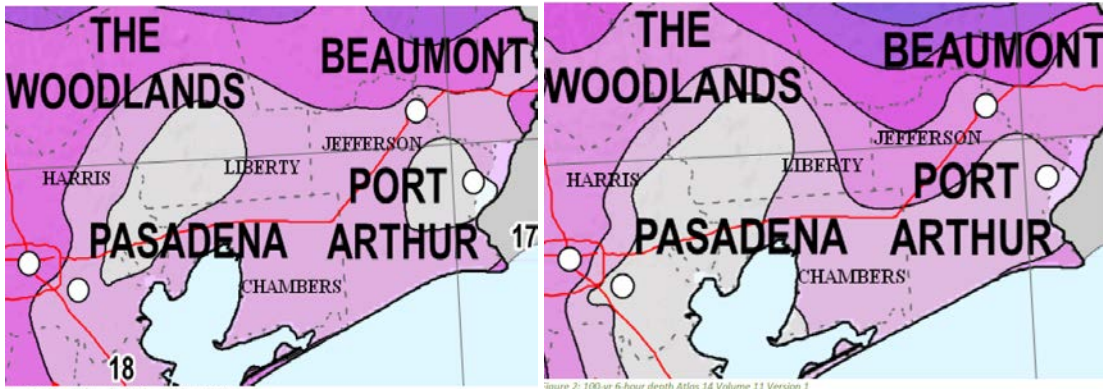
- 5.3.9.** There is little doubt that Hurricane Harvey was an unusually heavy rainfall event. However, the previous CONUS record of 48” (1899) and now 51” for a 4 day rainfall event appears to undermine some reports that Harvey was in excess of a 500-year recurrence interval event. Any findings that project beyond a 500-year event ignore the less than 220 years limitations of the data availability.

*When talking about the frequency of a n-year event, the following three elements should be specified: duration, location, and area size. For example, the same amount of point rainfall for a given location can be categorized as a 1000-year event or a 10-year event, depending on duration (please see FAQs “3.2. What is a 100-year rainfall event and how often is it exceeded?” and “3.3. Why do 1000-year (100-year) events happen so often?” on the [FAQ page](#) for more information).*

*We analyzed annual exceedance probabilities (AEPs) for Hurricane Harvey and created an [AEP map](#) for 4-day duration that showed the lowest exceedance probabilities (less than 1/1000-year or more than 1000-year ARI) for the largest area. For more information on the AEP analysis please see the [AEP storm analysis page](#).*

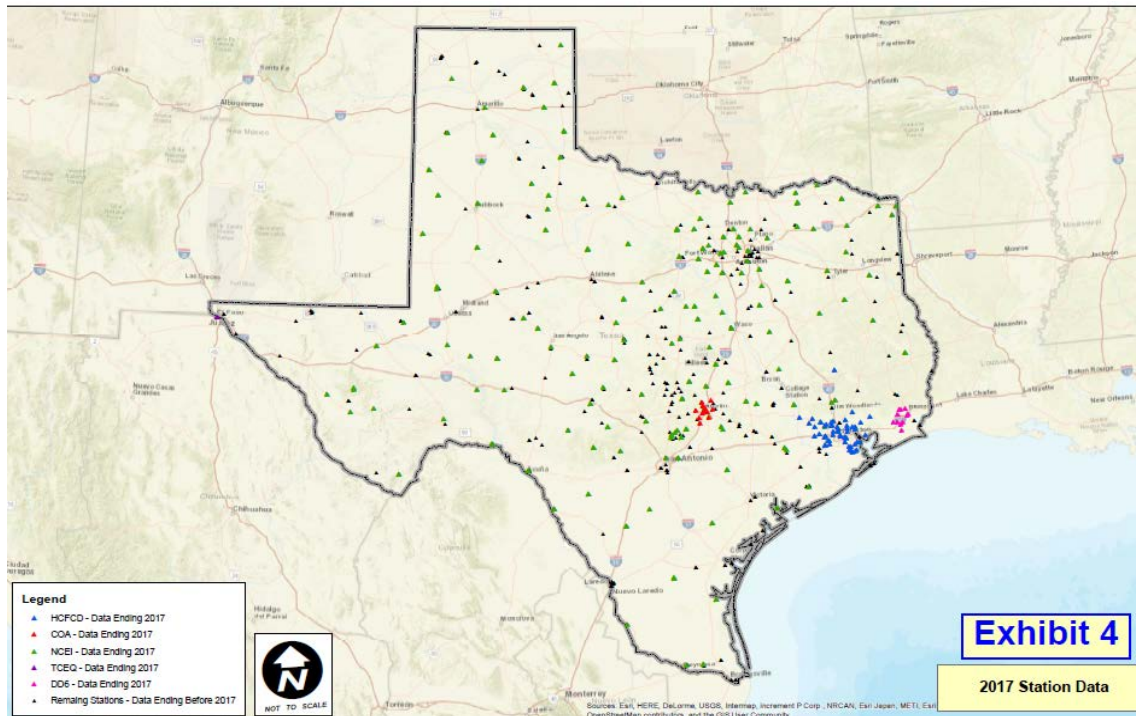
- 5.3.10.** Spatial patterns appear to have been influenced by recent storm events, as shown in the locations which have substantial increases in 24-hour depths such as the Austin area (Halloween storms) and Southeast Texas (Harvey). In Harris County, 89 of 343 total available gauges (26%) were used to develop the point rainfall statistics for Atlas 14, whereas in neighboring Chambers County only 1 of the 33 total gauges (3%) was used. In Jefferson County, 19 of 103 total gauges (18%) were used in the calculations. The mapped depths in Chambers County are visibly different than depths in Harris and Jefferson Counties (refer to Figure 1 and Figure 2), and even different than depths in Liberty County to the north, which did record substantial Harvey rainfall depths. The resulting interpolation of many gauges on either side of a single gauge shows that the single gauge

in Chambers County has undue influence over the output. Using more than one gauge in Chambers County may resolve these problems.



*For analysis of the effects of Hurricane Harvey on estimates, please refer to comments 5.3.1 and 5.3.2. For discussion on regionalization and interpolation, please see comments 5.1.1 and 5.2.2.*

**5.3.11.** It is noted that most of the stations that have data to 2017 are concentrated in a few areas. Of the 104 stations containing data from 2017, which would include Harvey, 52% of them are in the Houston area (HCFCD), 11% in the Beaumont area (DD6), 7% are in the Austin area (COA and TCEQ), and the remaining 30% are scattered across the State of Texas (NCEI). Wouldn't that skew the data toward the areas hardest hit by Harvey due to the heavy concentration of data in these localized areas, especially when these stations have 32 years of record or less? Exhibit 4 is attached showing this geographic distribution of the stations used in the NOAA Atlas 14 study.



*For analysis of effects of Hurricane Harvey on estimates, please refer to comments 5.3.1 and 5.3.2. For discussion on regionalization and interpolation, please see comments 5.1.1 and 5.2.2.*



#### 5.4. Comparisons between NA14 and HYDRO35/TP 40/TP49

5.4.1. Does NOAA Atlas 14 Volume 11 account for mountainous effects (TP 40 did not)?

*Please refer to comment 5.2.1.*

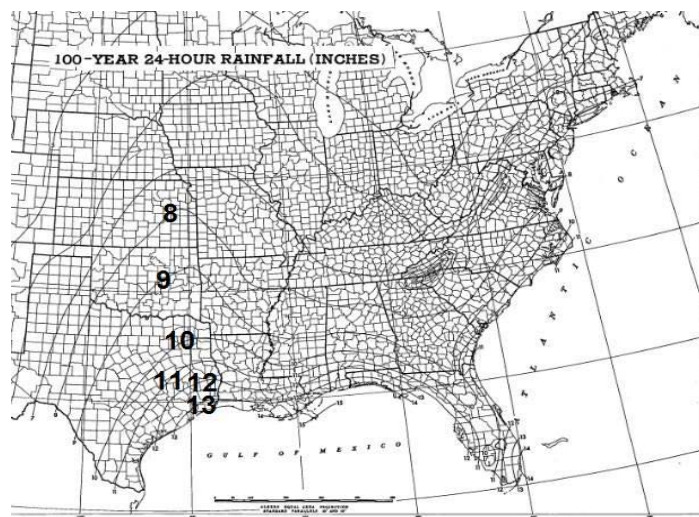
5.4.2. The cartographic maps of precipitation frequency estimates appear consistent and logical. The differences in 100-year 24-hour estimates between NA14 and TP40 appear consistent with expectations, particularly given that TP40 data was compiled circa 1961 and published following what we now recognize was a lengthy and largely nationwide period of drought.

*No action required.*

5.4.3. 60-minute values on the 100-year difference maps are markedly drier for much of the state. With a wet trend since the previous iteration, this is not what I would've expected.

*The differences in HYDRO35 and NA14 estimates could be attributed to a number of factors. Firstly, differences in data quality control procedures and frequency analysis approaches (distribution selection, parameter estimation method, regional versus at-station methods) affect estimates, especially at higher ARIs. Secondly, differences in spatial interpolation techniques impact estimates at ungauged locations. Isopluvials in HYDRO35 were based solely on station data without incorporating topographic features; NA14 estimates were based on PRISM products that integrate topography (see Section 4.8). Finally, the increase in the amount of available data from HYDRO35 to NA14, both in the number of stations and their record lengths, has a considerable effect on estimates. HYDRO35 was published in 1977, so potentially about 40 additional years of data at existing stations were available for the NA14 analyses. Also, many stations that were not suitable for frequency analysis in HYDRO35 due to short records could be included in NA14. We have fairly long hourly record lengths in many locations which should help in reasonably estimating the 100-year storm for 60-min.*

5.4.4. Draft Atlas 14 does bump up values compared to the underestimated TP40 values. However, the analysis does not take into account that Harvey rainfall could occur anywhere in Texas. Using observed rainfall records only to estimate design rainfalls, Atlas 14 misses this point. Let's start by looking at TP40's 100-year 24-hour:



Despite what we now know to be pretty substantial underestimates, the appeal of TP40 is the simplicity. There are basically two processes responsible for the map above: proximity to the coastline (which provides an access to large reservoir of high dewpoint air), and the bulge in the Great Plains that I guess to be related to the well-studied Great Plains Low Level Jet – essentially a temporary increase in winds about 2-4K feet above the ground that can increase moisture advection and hence rainfall rates as storms come off the Rocky Mts. That basically summarizes the whole map.

Atlas 14 takes an entirely different mindset – instead using physical mechanism first, they just assume that all of those processes will be “baked” into the individual rain gage time series. And the baking will be very efficient if multiple stations are used, which aggregate many, many extreme events together and hopefully smooth out the local noise. This is the essence of the ‘Regional Precip-Frequency Curve’ method that Atlas 14 uses. Unfortunately, it does not appear that our rain gage record is long enough to be able to fully dismiss the arguments of the physical process method. Hence, we end up with totally spurious “hot spots” as seen in the TX prelim 100-year 24-hour values.

*TP40 and NA14 methodologies are actually very similar conceptually; they are both statistical frequency analysis methods that calculate precipitation frequency estimates by fitting a mathematical model to annual maximum series extracted from the historical record. In contrast, traditional Probable Maximum Precipitation (PMP) methods are more in line with the approach discussed in the comment that is based on the analysis of physical mechanisms. The precipitation frequency estimates and PMP estimates are not the same products and are used in different applications.*

*The differences in TP40 and NA14 estimates could be attributed to several factors, including availability of data in terms of number of stations and record lengths, quality control procedures, and frequency analysis approaches and interpolation techniques, all of which have improved since the 1960s when the TP40 study was done.*

*The simplicity of the TP40, referred to in the comment as an advantage of that study, is primarily due to the very limited data that was available for the analysis at the time. For comparison, only 250 daily gauges within Texas with an average record length of 23 years were used in the TP40 analysis, while in NA14 we used data from more than 2,500 gauges with an average record length of 60 years for daily durations. Lack of stations with adequate data resulted in very smooth spatial patterns in TP40, but because of that it failed to reproduce local characteristics of extreme precipitation that are of interest for many applications.*

**5.4.5.** I didn't take the time for rigorous examination of local areas, but some that consistently stick out with regard to product contouring (frequency or difference maps) being unusual with peaks/sinks are the following:

- Guadalupe Peak
- Big Bend
- Eagle Pass
- Southern metros (Austin, Corpus, Houston).

*The TP40 and TP49 studies were done on a national level using relatively few stations and consequently cartographic maps show very smooth isohyets representing large scale patterns in precipitation frequency estimates (see also the response to comment 5.4.3). In contrast, NA14 maps were produced from high resolution gridded estimates derived from a significantly larger pool of stations with longer records and using spatial interpolation techniques that integrate topography. That is why some of the largest differences compared to past studies are seen in the*

*Guadalupe Peak and Big Bend areas. In addition, some of the other areas mentioned (such as the Eagle Pass/Del Rio area extending east to Austin) have all seen consistent increases in precipitation magnitudes. We comment in more detail about those areas in response to comments in Sections 5.1, 5.2, 5.3 and 6 of this Appendix.*

- 5.4.6.** On the 100yr est. difference map analysis... is it reasonable to assume a consistent percent increase/decrease among the different durations? For example in the Austin area, the 60min duration shows 0.5in increase (111%); the 6hr shows 3in increase (142%); the 24hr shows 2.5in increase (124%); and the 10day shows +/-2in, but lets assume ~2in increase (112%).

*Percent increase/decrease between NA14 and TP40 estimates does not have to be similar across durations.*

## **5.5. Discrepancies at boundaries with other NA14 Volumes**

- 5.5.1.** My comment is broad in scope and not specifically related to any particular observation location. Although the usage of all available data for each of the volumes is understandable, the relatively slow update process has caused significant discrepancies between the analyzed time period for each area analyzed (now exceeding a decade).

*Under the current model, funding for NOAA Atlas 14 work comes from external sources. This funding approach requires that work is completed in volumes determined by state boundaries and each volume is completed independently and at different times depending on funding availability. Typically, that is a one-time funding opportunity and, consequently, there is no funding in place to update the already published volumes. We recognize how this process is inefficient and creates issues for NOAA and for users. We are working with other federal agencies to change the Atlas 14 funding approach from one-time developments that are requested and funded by the users to more consistent and reliable funding where estimates would be updated for the whole country simultaneously in regular intervals (10-15 years). However, it is uncertain if or when that will happen.*

*To provide some continuity in estimates at boundaries of adjacent volumes, we extend the analysis beyond each volume's geographic domain. However, differences in estimates at project boundaries are inevitable, and are generally more pronounced for rarer frequencies. We considered different approaches to address the issue, but none of them are practical. Adjusting present-day estimates to blend them with estimates from previous volumes would be straightforward, but not an ideal approach, considering more recent estimates are developed with longer records and current data. Adjusting estimates from older volumes along the boundaries of the newest volume is not a trivial task since it requires modification and republishing of numerous underlying grids of data, cartographic maps and other associated information (documentation, temporal analysis results, etc.). Unfortunately, as mentioned above, we have no funding in place to support such efforts.*

*For now, for larger-scale applications such as frequency analysis of historic storm events, we recommend use of the [NOAA Atlas 14 CONUS product](#) that combines blended NA14 precipitation frequency estimates for durations between 60 minutes and 7 days from volumes that cover contiguous US states. The estimates along the volumes' boundaries in this product were altered to reduce discrepancies. More information on this product and instructions on how to use it are available from the [AEP storm analysis page](#).*

- 5.5.2.** I'm also curious about how these results compare/align with similar studies with neighboring states. In some brief comparison with the 100/2yr10d and 100/2yr60min products, I did notice discontinuities across state boundaries (ie. TX/LA), not to mention the use of inconsistent/different color scales. These maps will no doubt be mosaic'd by some user communities and these artifacts naturally questioned. To me, these discontinuities speak toward the data density and analysis methods. I would recommend that some exercise be utilized to ensure continuity across political boundaries and the use of consistent color scales among maps of same product.

*NA14 cartographic maps are created for selected ARIs and durations to serve as visual aids only. We advise to retrieve estimates from the [GIS Grids](#) page which accesses the gridded data used in development of maps directly. We use the same color map for all maps, but scale is adjusted so there are between 10 and 15 contours for each map. Since precipitation ranges vary among volumes, they are not consistent across all volumes. Also, please refer to our response to comment 5.5.1 regarding discontinuities along volumes' boundaries.*

- 5.5.3.** This discrepancy in base period and methodology has contributed to spatial discrepancies in the rainfall frequency data which may not be of concern for small-scale engineering applications but is already noticeable for larger-scale applications such as storm event analysis.

*Please refer to comment 5.5.1.*

- 5.5.4.** How will inconsistencies between isohyets across state lines be adjusted (differences are noticeable along the Sabine River between Louisiana and Texas)? If indeed it turns out that Texas (Volume 11) is dramatically affected by Harvey, should the Southern States (Volume 9) be updated to reflect Harvey?

*Please refer to comment 5.5.1.*

- 5.5.5.** How will inconsistencies between isohyets across state lines be adjusted such as along the Sabine River between Louisiana and Texas?

*Please refer to comment 5.5.1.*

- 5.5.6.** As currently indicated, NOAA Atlas 14 Vol 11 will include rainfall data spanning Hurricane Harvey, a particularly extreme and record-breaking event which will likely leave a significant impact on the resulting rainfall frequency calculations. This could produce one of the largest discrepancies yet when looking at NOAA Atlas 14 as a whole, although this could not be quantified because the resulting data was not made available in such a way that a comparison between Texas and Oklahoma/Arkansas/Louisiana could be easily made. I would strongly suggest that the HDSC weigh the benefits of using the additional rainfall data which spans Hurricane Harvey against the costs, which include reduced consistency between volumes and spatial discrepancies which have to be addressed by the end-user.

*Please refer to comment 5.5.1.*

- 5.5.7.** Will the southern Gulf States (Volume 9) be updated to reflect Harvey?

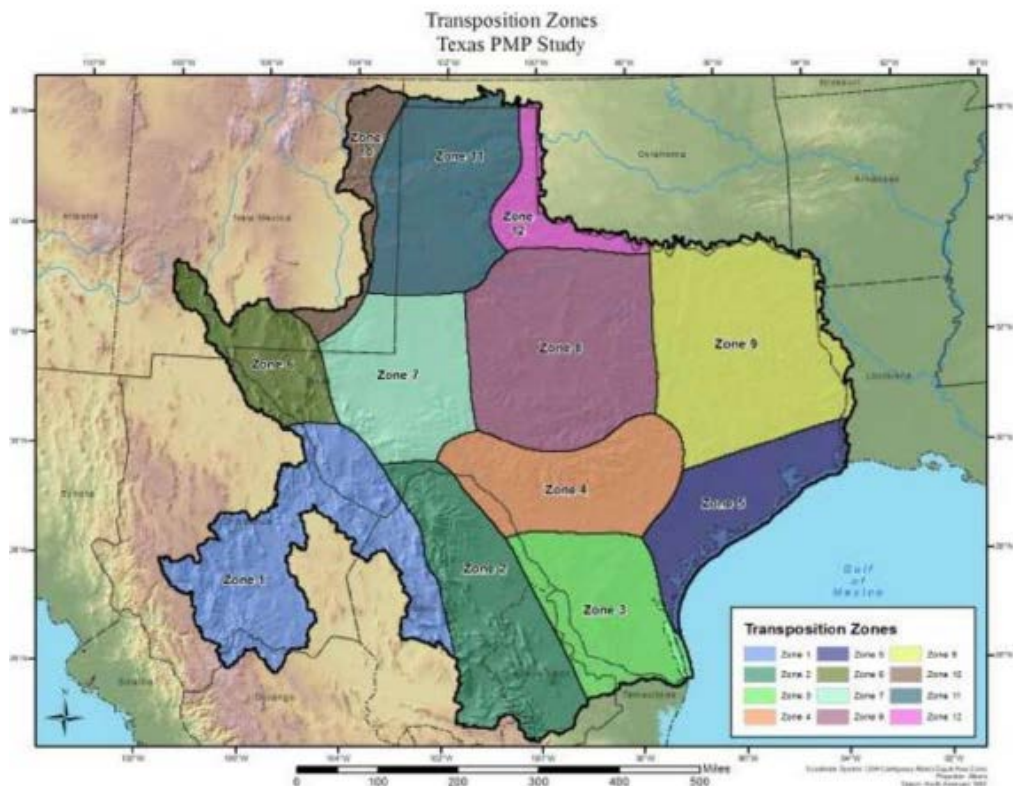
*Please refer to comment 5.5.1.*

## 5.6. Other

**5.6.1.** Spatial patterns of the increases also do not match recent analysis of PMP in Texas (by TCEQ, published in January 2017). For the purposes of comparison, we will use the 10-sq. mi. storm since Atlas 14 is based on point precipitation at the 6-hour and 24-hour durations and those are the only comparable storm durations between the two products.

The PMP analysis (Figure 3 and Figure 4) shows a ten percent reduction or more in the 6-hour duration depths for Zones 3, 4, and 5, and a four percent reduction in the 24-hour duration depths for Zones 4 and 5, and a nine percent reduction in Zone 3. These reductions are inconsistent with the Atlas 14 dataset (Figure 5) as the major increases of rainfall depth are in Zones 4 and 5 where the 10-sq. mi. PMP has slightly decreased. For Alvin, Angleton, Austin, Houston, and Sugar Land, the 100-year 6-hour storm depth is increasing by a minimum of 30 percent (Sugar Land) up to a maximum of 44 percent (Houston). For the same locations, the 100-year 24-hour storm depth is increasing by a minimum of 18 percent (Austin) and a maximum of 31 percent (Alvin).

When comparing the Atlas 14 depths to the PMP depths at Alvin, Angleton, Austin, Houston, and Sugar Land (Zone 4 and Zone 5), the 100-year 6-hour storm is approximately 40 percent of the PMP depth for a 10-sq. mi. storm. The 100-year 24-hour storm is approximately 35 percent of the PMP depth for a 10-sq. mi. storm. When comparing the Atlas 14 Depths to the PMP depths at Dallas (Zone 9), the 100-year 6-hour storm is approximately 25 percent of the PMP depth for a 10-sq. mi. storm, and the 100-year 24-hour storm is approximately 23 percent of the PMP depth for a 10-sq. mi. storm. PMP values for the 10-sq. mi. storm in Dallas also decreased by a comparable amount for the 6-hour and 24-hour durations, and the Atlas 14 DDF values are consistent with this change. Generally, the currently accepted precipitation depths as documented by Asquith and Roussel in 2004 are approximately 25 percent of the PMP depth for a 10-sq. mi. storm, as shown in Table 11.4 of the PMP analysis reproduced below.



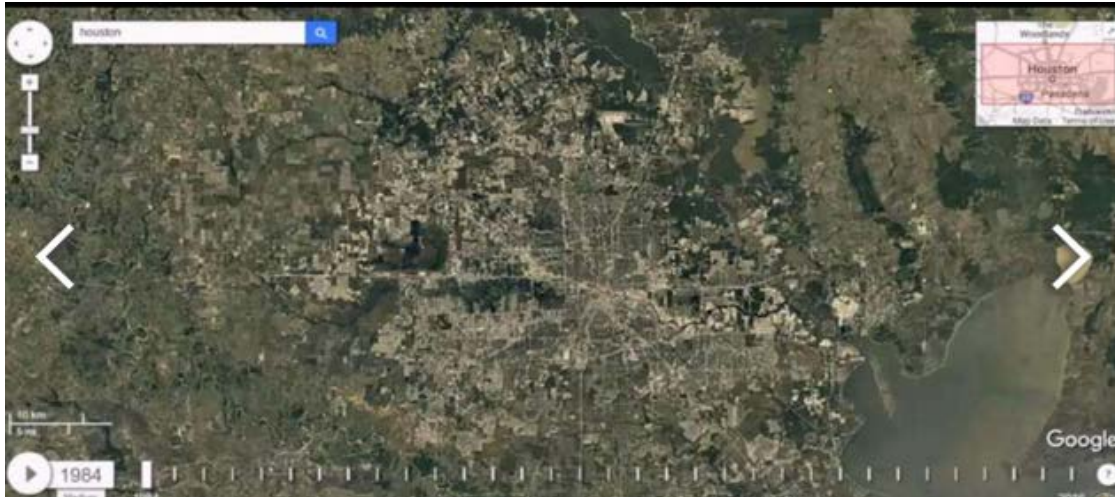
| Duration | Area        | Zone 3 | Zone 4 | Zone 5 | Zone 7 | Zone 8 | Zone 9 | Zone 10 | Zone 11 | Zone 12 |
|----------|-------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|
| 6-hour   | 10-sqmi     | -18%   | -10%   | -11%   | -31%   | -16%   | -15%   | -28%    | -28%    | -20%    |
| 6-hour   | 200-sqmi    | -14%   | -8%    | -3%    | -30%   | -15%   | -11%   | -31%    | -27%    | -19%    |
| 6-hour   | 1,000-sqmi  | -13%   | -7%    | -11%   | -35%   | -20%   | -12%   | -37%    | -33%    | -23%    |
| 6-hour   | 5,000-sqmi  | -10%   | -5%    | 3%     | -39%   | -15%   | -2%    | -51%    | -47%    | -20%    |
| 6-hour   | 10,000-sqmi | -18%   | -14%   | -3%    | -40%   | -23%   | -7%    | -47%    | -42%    | -27%    |
| 6-hour   | 20,000-sqmi | -19%   | -11%   | -7%    | -38%   | -25%   | -9%    | -49%    | -38%    | -30%    |
| 12-hour  | 10-sqmi     | -9%    | -4%    | -3%    | -34%   | -18%   | -7%    | -37%    | -33%    | -21%    |
| 12-hour  | 200-sqmi    | -9%    | -2%    | -5%    | -26%   | -10%   | -5%    | -29%    | -24%    | -11%    |
| 12-hour  | 1,000-sqmi  | -18%   | -10%   | -10%   | -25%   | -14%   | -8%    | -25%    | -21%    | -13%    |
| 12-hour  | 5,000-sqmi  | -4%    | 0%     | 9%     | -29%   | -12%   | 9%     | -41%    | -34%    | -16%    |
| 12-hour  | 10,000-sqmi | -4%    | 2%     | 11%    | -35%   | -10%   | 11%    | -44%    | -37%    | -16%    |
| 12-hour  | 20,000-sqmi | -7%    | 0%     | 7%     | -28%   | -11%   | 5%     | -43%    | -33%    | -15%    |
| 24-hour  | 10-sqmi     | -9%    | -3%    | -4%    | -33%   | -15%   | -4%    | -33%    | -27%    | -15%    |
| 24-hour  | 200-sqmi    | -10%   | -2%    | -8%    | -18%   | -2%    | -4%    | -15%    | -10%    | 2%      |
| 24-hour  | 1,000-sqmi  | -10%   | -3%    | -16%   | -10%   | 4%     | -7%    | -3%     | 2%      | 13%     |
| 24-hour  | 5,000-sqmi  | -13%   | -3%    | -2%    | -17%   | -7%    | 2%     | -12%    | -8%     | -1%     |
| 24-hour  | 10,000-sqmi | -4%    | 8%     | 8%     | -17%   | 2%     | 12%    | -29%    | -20%    | 3%      |
| 24-hour  | 20,000-sqmi | 7%     | 18%    | 21%    | -9%    | 11%    | 21%    | -36%    | -14%    | 12%     |
| 48-hour  | 10-sqmi     | -8%    | -5%    | -9%    | -23%   | -5%    | -8%    | -22%    | -16%    | -3%     |
| 48-hour  | 200-sqmi    | 4%     | 10%    | -4%    | -5%    | 15%    | 6%     | -3%     | 4%      | 19%     |
| 48-hour  | 1,000-sqmi  | -1%    | 6%     | -4%    | -2%    | 13%    | 2%     | 1%      | 8%      | 21%     |
| 48-hour  | 5,000-sqmi  | -12%   | -5%    | 4%     | -15%   | -4%    | 4%     | -10%    | -7%     | 1%      |
| 48-hour  | 10,000-sqmi | -9%    | 1%     | 4%     | -22%   | -5%    | 7%     | -21%    | -19%    | -6%     |
| 48-hour  | 20,000-sqmi | -2%    | 8%     | 12%    | -16%   | 2%     | 14%    | -30%    | -18%    | 1%      |
| 72-hour  | 10-sqmi     | -14%   | -9%    | -15%   | -25%   | -10%   | -13%   | -25%    | -19%    | -8%     |
| 72-hour  | 200-sqmi    | -6%    | 0%     | -9%    | -10%   | 5%     | -3%    | -6%     | -1%     | 12%     |
| 72-hour  | 1,000-sqmi  | -10%   | -4%    | -1%    | -10%   | 2%     | 0%     | -4%     | 1%      | 11%     |
| 72-hour  | 10,000-sqmi | -20%   | -8%    | 4%     | -22%   | -9%    | 3%     | -18%    | -14%    | -6%     |
| 72-hour  | 10,000-sqmi | -23%   | -11%   | -1%    | -27%   | -11%   | -1%    | -29%    | -25%    | -9%     |
| 72-hour  | 20,000-sqmi | -20%   | -10%   | -4%    | -25%   | -13%   | -4%    | -34%    | -23%    | -12%    |

Figure 4: Percent Change of Texas PMP Zones, TCEQ 2017

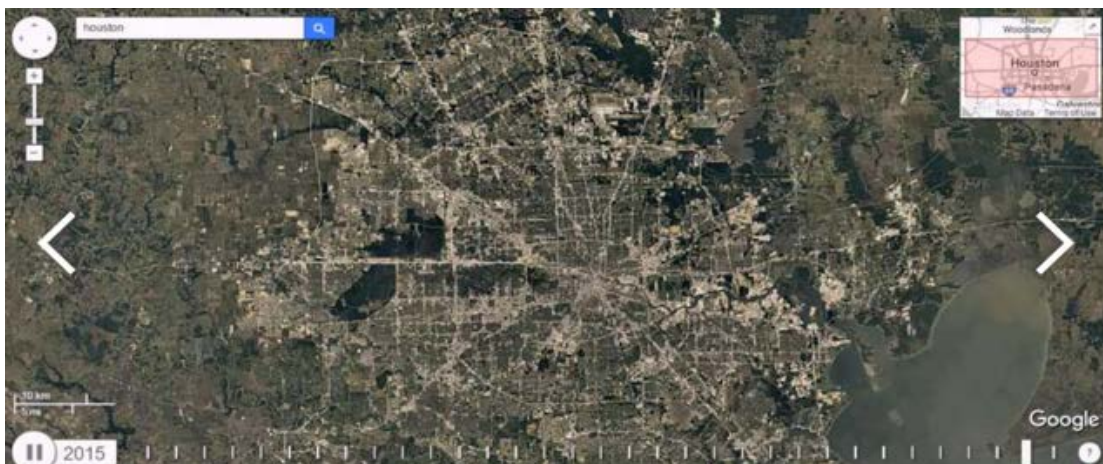
| Gridded Average by Transposition Zone |                                     |                            |                                  |                                   |
|---------------------------------------|-------------------------------------|----------------------------|----------------------------------|-----------------------------------|
| Transposition Zone                    | 24hr 10mi <sup>2</sup> PMP (inches) | 100yr 24hr Precip (inches) | 100yr 24hr Precip Percent of PMP | Ratio of PMP to 100yr 24hr Precip |
| Zone 1                                | 20.67                               | 4.94                       | 24%                              | 4.2                               |
| Zone 2                                | 31.78                               | 7.09                       | 22%                              | 4.5                               |
| Zone 3                                | 41.38                               | 8.98                       | 22%                              | 4.6                               |
| Zone 4                                | 41.29                               | 9.24                       | 22%                              | 4.5                               |
| Zone 5                                | 45.86                               | 12.35                      | 27%                              | 3.7                               |
| Zone 6                                | 16.89                               | 4.19                       | 25%                              | 4.0                               |
| Zone 7                                | 23.86                               | 5.68                       | 24%                              | 4.2                               |
| Zone 8                                | 33.88                               | 8.09                       | 24%                              | 4.2                               |
| Zone 9                                | 42.01                               | 10.71                      | 25%                              | 3.9                               |
| Zone 10                               | 21.58                               | 5.48                       | 25%                              | 3.9                               |
| Zone 11                               | 24.93                               | 6.17                       | 25%                              | 4.0                               |
| Zone 12                               | 31.31                               | 7.60                       | 24%                              | 4.1                               |

Without having the data and knowing all the details of this analysis, we cannot comment on why NA14 spatial patterns do not match recent analysis of PMP in Texas. Also, please see our response to comment 5.4.3.

5.6.2. While I understand the observation sites east of Houston do record more rainfall, due to their proximity to the Gulf of Mexico moisture maximums and tropical system tracks, I suggest NOAA further considers my proposed adjustment based on documented empirical observations due to urban impervious surfaces, because there is no predicted slow-down to the development (and addition of new concrete) to this region. Here's a satellite view of the Houston metro from 1984 when the population was approximately 1.6 million.



Here's the same view from 2015: Notice how expansive the building has become in the last 30 years with more neighborhoods, plazas and highways, with a population of approximately 2.5 million.



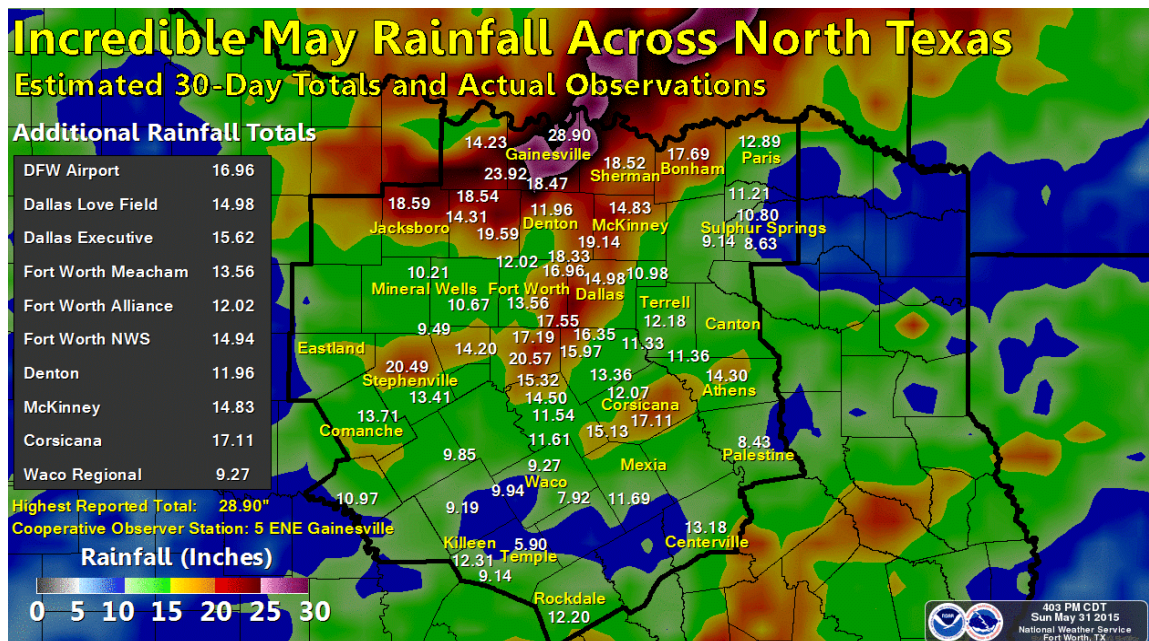
Further, due to geological considerations with clay-based oceanic crust, the growingly heavy city has experienced documented land subsidence ([link](#)), compounding the flooding problem and reducing the total inches needed on any rainfall event to threaten life and property. When huge events like Harvey happen, the city sink further. According to NASA, Houston sank up to 2cm [under the weight of flood water](#) from Harvey. This effect becomes amplified when the tide is high in Galveston Bay, preventing the bayou drainage systems (which go to the Bay) to expel stormwater, much as New Orleans experiences when the tide is high from storm surge or astronomical events. Houston's many underpasses actually go beneath the water table and are sealed only by concrete retaining structures. They commonly experience pump failures in times of heavy rain, leading to extreme and sudden flooding to roadways and adjacent property. The largely unregulated and expanding hydrophobic surfaces continue to promoting rapid and severe flooding with even, "lessor" events with no sign of any slow-down in this expansion.

*Factors you mentioned, including urbanization, could have a profound effect on the flood frequency estimates used in engineering design. The U.S. Geological Survey provides guidance on how to account for some of those factors ([Bulletin 17C](#)). NA14 precipitation frequency estimates are developed based on statistical analysis of precipitation data. Effects of urbanization, etc. would be accounted for only indirectly if reflected in the precipitation data.*

## 6. SPATIAL PATTERNS, SPECIFIC DURATION-FREQUENCY COMBINATION

### 6.1. 60-minute patterns

- 6.1.1. 60-minute 2-year. On the 2-year frequency estimate maps, the 60-minute bull's eye near Gainesville is supported by a couple of extreme events (June 2007 and May 2015). May 2015 is likely a significant contributor to the similar bull's eye near Stephenville in multiple durations of the 2-year frequency estimate maps, but since it's even more pronounced than Gainesville's, there must be something else involved. (I haven't had the chance to research this.) Below is a map of monthly precipitation totals from May 2015.



*The Gainesville hourly station's (41-3415 HLY) digitized record has three 1-hour events above 3.5 inches (1989, 1999 and 2007), but the station did not capture the 2015 event. After the peer review, we accounted for that event as well through regionalization and that elevated estimates at longer durations and improved spatial patterns in the area surrounding Gainesville. The local peak that previously existed centered at Gainesville is now gone, as estimates were smoothed down slightly to below 1.8 inches. The pattern near Stephenville did not change significantly at 2-year 60-minute other than the slight improvement in the pattern from smoothing.*

- 6.1.2. 60-minute 100-year. The 2-year map looks fine, but the 100-year map has a lot of patchiness that is untethered to any geographical or meteorological phenomena. There seems to be no reason that San Antonio would have a value 0.76" lower than Austin to the northeast and 1.25" lower than Eagle Pass to the southwest, other than the randomness of weather over the past century. Likewise, it seems odd that College Station would be 1" lower than locations both to the northwest and southeast. It seems that greater smoothing is appropriate, perhaps in the higher-order moments, enforcing greater fidelity to the pattern of normal precipitation.

*The regional frequency analysis approach we use in NA14 helps reduce the effect of weather randomness on patterns through pooling together information from multiple stations in the analysis (see Section 4.6.2). After the peer review, we made some improvements to MAM estimates (which are the basis for calculation of gridded precipitation frequency estimates), revisited and*



*improved at-station and regional statistics where needed, and applied a dynamic filter to precipitation frequency grids (see comment 5.2.2 for more details) which reduced patchiness and improved patterns in the area.*

*However, Eagle Pass/Del Rio and Austin (and stations in the Houston area) have had some of the largest 60-minute rainfall measurements for the entire project area. The Eagle Pass station, for example, had two 1-hour measurements over 5 inches in its 66-year-long hourly record, so we think that estimates are reasonable.*

*100-year 60-minute estimates at College Station (79-0017) are actually very similar to estimates at locations both to the northwest and southeast. The bullseye near College Station in the Version 1 map was merely an artifact of the contour interval chosen, with values varying only slightly on either side of the contour. In the new version, the variability of estimates has decreased and patterns have been improved, with local peaks and sinks removed in the vicinity of Austin, Eagle Pass, and San Antonio. Additionally, the 4.25-inch contour now extends the entire length of the hill country.*

## **6.2. 6-hour patterns**

- 6.2.1. 6-hour 100-year. The southeastern half of the map seems to be dominated by a small handful of widespread precipitation events. Locations affected by Beulah, Allison, Harvey, the October 1994 flood, and the October 1998 flood seem to stand out, while places not affected, such as Victoria and McAllen, have relatively small values. Unlike the 2-year map, where apparent stochastically-generated misestimates are at most 4%, here differences are 8% or more. The spatial pattern of the 24-hour 100-year map is much more consistent with my expectations for extreme rainfall patterns, and I think that most 6-hour maxima correspond to 24-hour maxima on the same day (this is testable). Since the 24-hour 100-year map was directly influenced by a much greater number of stations, it should be more objectively realistic, confirming my subjective expectations. I don't know what approach can be taken to force the 6-hour 100-year values to spatially conform more closely to the 24-hour 100-year values, but something should be done. Perhaps use a larger smoothing radius, and/or use the 24-hour patterns as a first guess for the 6-hour patterns. I understand that the current algorithm uses the previous higher-frequency analysis as a first guess. The problem with this is that inadequately-sampled and randomly inhomogeneous weather events reinforce themselves in the spatial pattern as the analysis progresses to higher and higher return periods. Despite the duration gap, I think that even the 100-year 60-minute pattern would be drastically improved by better correspondence to the 100-year 24-hour pattern.

*Assessing the correspondence between two types of estimates from cartographic maps may be misleading, as selection of the number of contours and contouring intervals also plays a role. To ensure consistency in estimates across all durations and frequencies, we normally apply several duration-frequency based internal consistency checks, all of them initiated at 24-hour duration since we consider it to be the most reliable. During the AM quality control and regionalization tasks we also investigate relationships in magnitudes and dates of occurrence of n-hour and 24-hour AM, and while there are substantial similarities in both attributes between 24-hour and 12-hour data, they diminish quickly as duration shortens. After the peer review, however, we improved patterns at hourly durations across the whole project area through regionalization and enhanced smoothing (see comments 5.1.1 and 5.2.2). Significant improvements were made in the vicinities of Victoria, Bay City, and El Campo in the new 100-year 6-hour map.*

- 6.2.2. 6-hour 100-year. In the timespan of a 6 hours 100-year event, I would suggest reducing the [Houston's 100 year precip threshold] from 11.5-12"/6hrs, to 10.5"-11"/6hrs. (The Memorial Day flooding event would serve as clear evidence of the impacts of said rainfall in that period of time.)

*After the peer review, we made some improvements to the MAM estimates that are the basis for calculation of gridded precipitation frequency estimates, revisited and improved at-station and regional statistics where needed, and applied a dynamic filter to precipitation frequency grids to improve spatial patterns (see comments 5.1.1 and 5.1.2 for more details). However, after re-inspecting the AMS data, statistics, and DDF curves for stations in the area, we think that estimates in the Houston area are reasonable.*

### **6.3. 24-hour patterns**

- 6.3.1. 24-hour 2-year. Even in the 2-year map, which ought to be statistically quite robust, there's evidence of influence of a couple of statistical flukes. The most remarkable is the relative lack of extreme daily rainfall at Bay City and surrounding stations and the relative and more localized surplus of extreme daily rainfall at Angleton. Angleton was a bulls-eye even in the annual normal precipitation using the 1971-2000 reference period. Back then, I looked at the Angleton data, and I could not identify any obvious problems in the patterns of the data. Even now, the annual maxima time series show 10 events for Angleton and 1 for Bay City. I cannot completely rule out a gauge bias, but I think it's just one of those things. Meanwhile, while Bay City and surrounding stations have historically received less intense 1-day rainfall than stations up or down the coast, the multi-station observations and lack of any explanatory geographical features suggest that this is a statistical fluke. There is a 10% difference between the 2-year amounts for Bay City and Angleton, so larger smoothing to reflect the expected large-scale pattern would have as much as a 4% change in the values, which is not a whole lot.

*After the peer review, we re-examined the AMS data at Bay City (41-0569) and Angleton (41-0257 DLY) stations, and while Bay City has had only one 24-hour rainfall amount exceeding 10 inches in the record, Angleton has had 10 exceedances and that translates to differences in MAMs. In NA14, MAM grids together with at-station 2-year precipitation frequency estimates are the basis for calculation of 2-year gridded precipitation frequency estimates, and patterns in 2-year estimates closely match MAM patterns (correlation coefficients are regularly above 0.99). After the peer review, we did revise MAM information for some stations in the area and, together with regionalization improvements and increased smoothing along the coastline, that benefited 24-hour 2-year patterns (see comments 5.1.1 and 5.2.2 for more details).*

- 6.3.2. 24-hour 2-year map. Looks very good. The suspicious features, such as the Bay City/Angleton thing and the strong north-south gradient near Corpus Christi, are relatively minor in amplitude.

*Please refer to comment 6.3.1.*

- 6.3.3. 24-hour 100-year map. The most noticeable suspicious aspect to this map is in Southeast Texas, where the 100-year amounts seem to have been strongly affected by a small number of recent events such as Allison and Harvey that could equally well have happened a few counties farther east or west. I would expect, for example, similar return periods for Conroe and Bay City, but the randomness of the weather has apparently resulted in an estimate at Conroe that's 20% higher than the estimate at Bay City.

To test the effect of storm locations, I took the largest 1-day precipitation amounts in Conroe and Brenham (obtained from ACIS) and compared them (see ConroeVBrenham spreadsheet). Note

that this is not the same as the annual maxima, but it should have similar statistical characteristics. The sorted amounts consistently have Conroe's values about 11% higher than Brenham's values until the highest 13 (and especially the highest 8) values are reached. For those, Conroe is substantially higher, as much as 67%, except for the very highest value. (See the graph labeled "Actual".) This sort of difference would preferentially affect the higher-order moments and thus the tails of the distributions, and would affect the overall estimates if the same pattern shows up at other stations.

It turns out that about half of the heaviest one-day events at Conroe coincided with heavy one-day events at Brenham, so it appears that these events have a large enough footprint to persist after geographical smoothing. I examined the dates of the recent events and found that most of them were very or moderately likely to be swappable in my opinion, meaning that the weather pattern could just as easily have happened at the other station and produced a similar precipitation total. These events, and their associated highest daily totals, are:

|                | Brenham | Conroe  |
|----------------|---------|---------|
| October 1994   | 10.38   | 14.35   |
| October 1998   | 10.25   | 6.50    |
| June 2001      | 3.71    | 12.50   |
| September 2008 | 2.30    | 9.93    |
| October 2015   | 6.88    | 2.25    |
| May 2016       | 20.50   | Missing |
| August 2017    | 7.48    | 13.64   |

When I simply swap these events between Conroe and Brenham, the scatter diagram looks well-behaved even at the extremes (see the graph labeled "Swapped"), and the regression line gives a constant of proportionality of 11%, the same value obtained from the lesser totals.

Based on this evidence and my experience, I believe that Brenham has been historically lucky and Conroe has been historically unlucky. More broadly, because of a handful of events that happened to affect many gauges in the Houston area, I believe that the 100-year rain event is overestimated in the Houston area and underestimated in places such as Jasper, Huntsville, El Campo, and Victoria.

*We use a regional frequency analysis method to calculate estimates and that helps in reducing the effects of historically unlucky/lucky stations. However, in choosing stations to assign to a region for a station of interest, we still want to adequately represent local conditions (see comment 5.1.1). Since Bay City and Conroe are approximately 100 miles apart, the stations that contributed to their regions are largely different. Historically, many more intense 1-day rainfalls have occurred at Conroe compared to Bay City (eight versus one event with more than 10 inches in 24 hours), so it is not surprising that 24-hour 100-year estimates at Bay City are a bit lower. After the peer review, we re-examined AMS data and estimates in the area, especially around Bay City, to ensure they are not too low compared to areas to the east. Through regionalization and revised smoothing for coastal areas, we did improve patterns but estimates themselves did not change much.*

*Estimates in the El Campo area went up after the peer review primarily because we found and corrected two among the largest 24-hour AM values that were being considerably underestimated. The first one is for El Campo station (41-2786), where 8.03 inches and 8.00 inches were recorded for 21 and 22 November 2004 (as a result, we extracted 8.03 inches as an AM value for that year). This was a major flood event for the area, and through analysis of storm data and radar data, we determined that approximately 16 inches of rain fell during 24 hours. Similarly, we initially estimated the 24-hour AM value for 1945 at Danevang station (41-2266) as a half of 19.29 inches measured in 2-days starting on 27 August 1945. Through post-storm analysis documents, we*

*determined that the actual 24-hour maximum amount from the storm was close to 18.7 inches. After we adjusted both AM values, 100-year estimates increased and patterns in the area improved.*

*Conroe and Brenham are both long record stations. More intense 1-day rainfalls have been consistently measured at Conroe resulting in the 1-day MAM being about 17% higher at Conroe and that translated to differences in precipitation frequency estimates. While estimates did not change much, we did improve patterns in the area through regionalization and revised smoothing for coastal areas (see comments 5.1.1 and 5.2.2).*

- 6.3.4. 24-hour 100-year. The high density of rain gauges near populous areas tends to skew the results and cause substantial gradients in the total depth. For example, the 24-hour 100-year depth is 14 inches on the west side of Fort Bend County and 16.5 inches on the east side.

*Please refer to comments 5.1.1 and 5.2.2. After we improved regions in the area and increased smoothing, precipitation frequency estimates' gradients in the area also improved.*

- 6.3.5. 24-hour 100-year. In the Atlas 14 data, I found no META data errors but would strongly recommend that NOAA consider empirical factors such as urban sprawl, city subsidence and tidal impacts with Houston's drainage system. In determining 100-year precipitation. I would suggest pushing the maximum isopluvial values farther east of Houston, therefore reducing Houston's 100 year precip in a 24 hour period from 16"-17", to 15"-16" and curve the isopluvials to match the current and projected future boundaries of urban landscape. (I'd recommend everything inside of Beltway 8" be reduced in estimated rainfall to be classified as a 100 year event.).

*After the peer review, we re-examined AMS data, statistics, and at-station estimates in this area. They did not change much, but spatial patterns improved as a result of improvements in regionalization and smoothing (see comments 5.1.1 and 5.2.2).*

- 6.3.6. Looking at the 100-year/24-hour event on the NOAA Atlas 14 maps provided, what makes the Houston-Beaumont area climatologically/atmospherically/orographically so different from Corpus Christi? Could the differences in rainfall estimates be due to the density of the gauges in the Houston area? It is noted that USGS WRIR 98-4044 (which HCFCD uses for determining DDF) and TP40 indicate similar 100-year/24-hour rainfall for Houston-Beaumont and Corpus Christi, with a difference of 1.0 inch maximum between the two locations. NOAA Atlas 14 seems to indicate a 2.5-inch minimum difference.

*The NA14 frequency analysis approach relies on statistical analysis of historical data. We use a regional frequency analysis method to calculate estimates and carefully consider which stations to retain in station dense areas in order to not bias estimates. While we aim to reduce the effects of historically unlucky/lucky stations on estimates, we still expect regions to adequately represent local conditions.*

*In contrast to stations in the Corpus Christi area that did not record a single 1-day value greater than 17 inches, the stations in the Houston area and vicinity have measured 20 inches or more in a single day. In fact, some HCFCD gauges have seen two events exceeding 20 inches in 24 hours or less in approximately 31 years. There have been multiple events that are contributing to the higher estimates in the Houston area, such as Claudette in 1979, the October 1994 flood event, Allison in June 2001, and Harvey in August 2017. Also, we decided against adjusting the 1-day AM value of 25.75 inches from Claudette in 1979 at Alvin station (41-0204), although (at least) 43 inches is a widely accepted estimate for a nearby location, and that would further increase 100-year 24-hour precipitation estimates in the area.*

Regarding Corpus Christi, Houston, and Beaumont estimates – they went up at all three locations, but differences among estimates are similar to some other studies. 24-hour 100-year estimates for those locations are ~11.5, ~12.5, and ~13 inches respectively according to TP40, and ~12, ~12, ~14.5 inches, respectively from the USGS DDF Atlas (2003). In both studies the Beaumont estimate is the highest and according to the USGS study it is also about 2.5 inches higher than estimates at the other two locations.

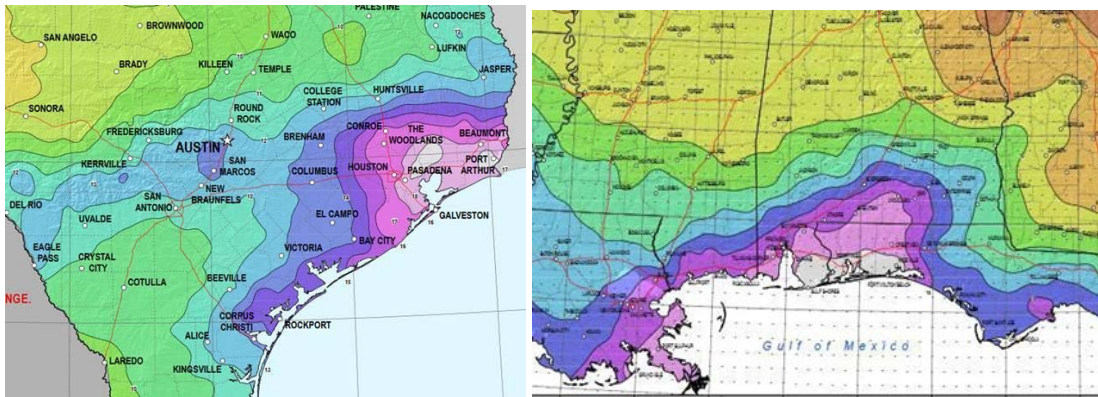
After the peer review, we re-examined estimates in this area, and while they did not change much, spatial patterns improved as a result of improvements in regionalization and smoothing (see comments 5.1.1 and 5.2.2).

- 6.3.7. Regarding the 100-year/24-hour Version 1 precip-freq map (screen shot shown below), what makes the Houston-Beaumont area climatologically so different from El Campo and Corpus Christi?

Please refer to comment 6.3.6.

- 6.3.8. There's absolutely no basis why Houston should be 17-18 while El Campo is 13-14. Or why Austin has a local maxima probably related to the high rain gage density there.

In fact, these spurious local maxima can be seen elsewhere too. For example, southern Alabama.



The only way to fix these issue would involve a substantial re-working of the whole method. The current method is simply: Precipitation Frequency Curve (PF) = function (gages within 50 or 100 miles around a gage of interest). Whereas the more rigorous method should be: PF Curve = function (gages within 50 or 100 miles, topography, distance from coastline, local/regional atmospheric enhancement). If you were to do that, the whole coast from Corpus Christi through Wilmington or Cape Hatteras would probably be 16+ inches for a 100-year 24-hour event, a significant increase over current values.

*In NA14 we rely on regional frequency approaches to calculate estimates at one station. We use a so-called region-of-influence approach where each station has its own region with a potentially unique combination of nearby stations. We assign stations to a target station's region not only based on their distance, but also based on similarities in selected attributes that include elevation, location with respect to the coast and mountain ridges, etc., (see discussion and an example in Section 4.6.2). Stations close to the coastline, for example, will typically have regions that are elongated along the coast. In addition to considering elevation during regionalization, the effects of topography are also included using PRISM-based MAM grids that initiate interpolation (see comment 5.2.2 for more information).*

*We disagree with the assessment that the 100-year 24-hour estimates along the coast from Corpus Christi through Wilmington or Cape Hatteras should be similar in values but do agree that Version 1 estimates in the El Campo area were low. We discuss how we improved estimates there in response to comment 6.3.3.*

*We also disagree that Austin's local maxima is related to the high rain gauge density there (see comment 5.1.1) and think that estimates are reasonable. Both Austin and San Marcos are consistently more prone to extreme rainfall compared to surrounding gauges such as Taylor, which is contributing to slight maxima over Austin. Both Taylor and Austin (~30 miles distance) have very long records, but the Austin gauge has measured 11 instances of events exceeding 7 inches in a single day while the gauge at Taylor has only done so twice. The difference is also evident in the PRISM-derived MAM grids. Also, contouring on the cartographic map makes the differences look bigger than they actually are; they are on average around 5%.*

#### **6.4. 10-day patterns**

6.4.1. 10-day 100-year. The 2-year map looks fine. The 100-year map looks fine except for southeast Texas, where Harvey and to a lesser extent Allison produced large multi-day totals. According to ACIS, the 10-day maxima for Liberty, TX are:

|      |       |
|------|-------|
| 2017 | 41.75 |
| 1994 | 26.77 |
| 2015 | 24.55 |
| 1915 | 21.21 |
| 1949 | 17.55 |
| 1998 | 16.35 |
| 2006 | 16.30 |
| 1981 | 16.04 |
| 1989 | 14.97 |
| 1943 | 14.85 |

Frankly, it's frightening how many of these events are in recent years, and this phenomenon presumably contributed to the large change in odds of multi-day events estimated by Risser and Wehner (2017 GRL) in the context of Harvey.

The gradient in the 100-year 10-day amounts heading southwest toward Corpus Christi is plausible, since a large multi-day total is aided by a pure tropical influx of moisture, and continental influences are stronger under cyclonic flow farther southwest. But eastward transposition might possible, probably for any of the events listed for Liberty. Here's the corresponding list for Orange:

|      |       |
|------|-------|
| 2017 | 36.39 |
| 1963 | 24.16 |
| 1959 | 17.15 |
| 2002 | 16.39 |
| 1958 | 16.05 |
| 2001 | 15.51 |
| 1979 | 13.48 |
| 1983 | 12.67 |
| 1970 | 12.33 |
| 1998 | 12.26 |

Orange is systematically drier than Liberty at the extremes, and it doesn't look like two or three different storms would matter much. The 1994 and 1998 events in particular might have required upper-air patterns that could exist over central Texas but not over eastern Texas, so maybe the geographical pattern is warranted.

Harvey was an extremely unusual multi-day event. Its largest impact on return period amounts should be at the multi-day rare end of the spectrum, such as 10-day 100-year amounts. I'm working on research to assess exactly how rare Harvey was. We already know that it broke plenty of rainfall records. In the context of the behavior of Harvey that led to extreme rainfall (an intense tropical cyclone stalling along the coast), preliminary research I presented in December 2017 at AGU found that the storm behavior was unprecedented along the United States coast but had happened at other locations in the Atlantic Basin. I do not yet have an estimate for the return period of a storm behaving like Harvey, but it seems from preliminary analysis that such a storm is equally likely anywhere along the Gulf and Atlantic coasts from Victoria Texas to Charleston South Carolina. If this is so, the 100-year multi-day amounts should be overestimated in southeast Texas and underestimated elsewhere else along the Gulf Coast.

I don't know whether anything can be done to the official numbers now that is scientifically justifiable, but in the future it may be possible to do something like the following: take the amounts estimated including Harvey and the amounts estimated excluding Harvey, and interpolate using the estimated return period of Harvey. In order to lay the groundwork for this, the return probabilities and amounts should be calculated with and without Harvey. I suppose the numbers including Harvey should be used now, but once a scientifically rigorous and robust estimate of Harvey's return period (which may emerge over the next few months) is available, knowledge of the exceptional nature of Harvey could be used to better infer the true probability distribution of extreme rain.

*10-day 100-year spatial patterns reflect the largest multi-day events being measured in the Houston-Beaumont area, but 100-year estimates in the range of 24-30 inches do not seem unreasonable given that 10-day measurements exceeding 35 inches (in some locations even 40 inches) were recorded at several stations during Hurricanes Allison and Harvey. Also, 10-day MAM is about 33 percent higher in Liberty than further to the west at Brenham, so it is to be expected that 100-year estimates in Liberty will also be higher in Liberty than in Brenham where 100-year estimates are around 19 inches.*

*We did notice that large multi-day events, particularly Hurricane Harvey, skew GEV distribution parameterization and consequently estimates, especially for ARI > 100 years across a range of daily durations (see discussion in Section 4.6.3 and Figure 4.6.5).*

## **7. NA14 TERMINOLOGY AND METHODS**

### **7.1. Terminology**

- 7.1.1. For the benefit/education of users, should an explanation of return period vs. probability of exceedance be included?

*We describe NA14 terminology, methods and products in enough depth to allow the knowledgeable user to understand the basis of the estimates and their scope and applicability in the NA14 documentation accompanying each volume. We provide an explanation on average*

*recurrence interval (return period) vs. annual exceedance in Section 4.6.1. Similar information is provided on the [FAQ page](#) in response to FAQ 3.1.*

- 7.1.2. As a way to facilitate media and public understanding of ARIs, could a statement in the Atlas narrative discussion be included along the lines of: "The ARIs (or probabilities) are regionalized values for design purposes. For many heavy rainfall events, one or more raingauge observations may exceed a given ARI. This does not imply the entire area be characterized as receiving a 1-in-N event.

*We discuss issues related to interpretation and uses of ARIs/AEPs in NA14 documentation (Sections 4.6.1 and 5.4) and on the [FAQ page](#) (in response to FAQs "3.2. What is a 100-year rainfall event and how often is it exceeded?" and "3.3. Why do 1000-year (100-year) events happen so often?") but will consider adding additional interpretation similar to what you suggest.*

*We agree that it is important to emphasize that NA14 precipitation frequency estimates are point estimates and they indicate only ARIs/AEPs for a limited area around a location for which they were extracted. The conversion of a point to an areal estimate is usually done by applying an appropriate areal reduction factor to the average of the point estimates within the area of interest. Areal reduction factors are generally a function of the size of an area and the duration of the precipitation.*

## **7.2. Statistical extrapolation**

- 7.2.1. My only question I continue to struggle with is when we NOAA publish the 1/1000th event. A 1000-year event or <0.001 storm seems a mathematical stretch when we have say 100-150 years of data. I still prefer the way the USGS does it and once they hit a 0.2% they just go <.2% chance event or 500 year event.

*We understand that there is a great deal of uncertainty associated with computing precipitation frequency estimates for rarer frequencies (ARI > 100-year) given that the average record lengths of daily stations is about 63 years and 41 years for hourly stations. We use regional statistical approaches to reduce the uncertainty in rare frequency estimates and provide 95% confidence limits on estimates to quantify them (for more information, please see Section 4.6.5).*

*In 2003, we considered discontinuing publishing 500-year and 1000-year estimates on the PFDS, but ultimately decided against that in response to solicited opinions from our federal partners and state agencies relying on this product (for more information, please see [1000-yr responses.pdf](#)). However, while we strongly discourage extrapolation of NA14 estimates beyond 1,000-year ARI, we are aware that some users routinely extrapolate them up to 1,000,000-year or even more.*

- 7.2.2. The following information is not available for review, but they are crucial, thus should be included in future published documentation. Was statistical extrapolation for a certain return period applied on the existing station record regardless of the length of record? Or was there any decision-making process that differentiates the lengths of record?

*NA14 frequency analysis relies on regional statistical approaches that use data from several stations that are expected to have similar characteristics of extreme precipitation. The contribution of each station in calculation of regional statistics is weighted based on its record length. For details, please see comment 5.1.1 and Section 4.6.*



### 7.3. Confidence limits

- 7.3.1. On the topic of uncertainty or confidence intervals... are there any methods for applying a kind of sensitivity analysis to the statistical methods used for this precip freq analysis to answer some questions concerning "what are the most sensitive parameters in this analysis?" and "given those sensitivities, how can we show or address uncertainty."

*NA14 frequency estimates are calculated from sample data and represent "average" estimates of the population frequency curves. On the [PFDS](#), we also provide lower and upper bounds of the 90% confidence interval on the estimates. The purpose for publishing confidence limits is to help users recognize that the actual value might be different from an "average" value and to encourage them to look at a range of possible scenarios in their designs. The widths of confidence intervals are affected by several factors; record lengths, distribution selection/ parameterization, and ARI/AEP all have a profound effect on estimates.*

### 7.4. AMS trends and effects of non-stationary climate on estimates

- 7.4.1. Selection of statistical tests for detection of trends in AMS for the State of Texas: for all other studied areas of the United States, the results suggest "little consistent observable effects of climate change on the annual maximum series." I wanted to verify that this was also true for Texas.

*In all NA14 volumes we use several parametric and non-parametric statistical tests to search for trends in the AMS data, both in term of long-term averages and in variability; please see Appendix A.2 for more information on the type of tests used.*

*Like in previous volumes, tests applied on the AMS data for this project area did not detect statistically significant trends in over 80% of stations tested (we looked only at stations with at least 70 years of data). We did not observe any consistent large-scale patterns in tests' results. However, it is possible that testing done on the AMS data biases results. For more information on our current efforts to detect and address non-stationarity, please see comment 7.4.4.*

- 7.4.2. Will trends be analyzed for Volume 11 as they were in Volume 9 for temporal changes? What about testing for seasonality of rainfall intensities?

*Similar to what we did in previous NA14 volumes, we delineated climate regions based on characteristics of annual maxima data and looked at seasonal characteristics of annual maxima. The seasonality analysis was done by tabulating the number of annual maxima exceeding precipitation frequency estimates for several selected threshold frequencies. More details on this analysis is provided in Appendix A.6. Please refer to our response to comment 7.4.1 regarding AMS trend analysis.*

- 7.4.3. Will trends be analyzed for Volume 11 as they were in Volume 9 for seasonal or temporal changes? What about testing for seasonality of rainfall intensities? Based on the 1/11/2018 conference call with NOAA, it appears that a temporal trend analysis was done across the state, with varying results.

*Please refer to our responses to comments 7.4.1 and 7.4.2.*

- 7.4.4. While it's beyond the scope of the Atlas to include the potential effects of climate change,[.],research indicates an increasing frequency of heavy rain events. Given one primary use

of the Atlas is the design of hydrologic structures, could a statement be included along the lines of: "Atlas ARIs are based on observed historical data. Users should consider the potential effects of climate change in addition to Atlas values."

*Current NOAA Atlas 14 frequency analysis methods assume stationarity in both the historical data used in making the estimates and in the future conditions. We test the assumption of stationarity by applying various statistical tests to the AMS data. So far, tests have shown very little observable or geographically consistent temporal change in these data (see comment 7.4.1).*

*There has been a growing concern among users of NA14 products that they have been developed for stationary conditions and as such may not be appropriate in the presence of non-stationary climate. For example, estimates are calculated from AMS data that, in contrast to PDS data, is not sensitive to changes in the rate of extreme events if not accompanied with a significant change in magnitudes and also by assuming that distribution parameterization is constant in time.*

*To understand the potential impact of non-stationary climate conditions on precipitation frequency estimates, the Federal Highway Administration tasked HDSC to conduct a pilot project to look into this issue. With help from academia, we aim to develop a method that will allow non-stationary climate effects to be integrated into the NA14 process and that will, at the same time, produce credible precipitation frequency estimates which can be relied upon by Federal water agencies.*

*So far, we have investigated and selected several methods for performing frequency analysis under non-stationary conditions and started testing the feasibility of incorporating climate projections into precipitation frequency analysis and assessing the added value of new precipitation frequency estimates with respect to traditional NA14 estimates. Despite the significant effort we put into this task, we still do not have a definite answer to whether a non-stationary approach is advantageous for the NA14 process (similar conclusions have been reported in several recently published papers on the subject). For additional comments, please see our response to comment 7.4.5; for more information on the progress of this project, please follow our Quarterly Progress Reports available here: [Current Projects](#).*

- 7.4.5. In the future, or even right now, people may wish to make climate-change-informed estimates of return frequencies by making some assumption about the rate of increase with time or with global temperature. To make such an estimate possible, it is necessary to know how much the existing estimates might already be out-of-date because of climate change. This will vary from place to place, because the period of record of precipitation observations varies from place to place. A location whose observations date from the 1950s will have an estimate more consistent with current climate than a location whose observations date from the 1880s.

It would be great if you could use your data and software to produce estimates of the extent to which a background trend would affect the return period values. (And I'd be happy to help with this.) I propose using two reference values: 7% per century linear trend, and 7% per degree C dependence on smoothed global temperatures. For example, for the linear trend, all historical precipitation data would be multiplied by 1.0007 times the number of years prior to 2017. Then, if somebody wants to assume that there actually is a global-warming-caused 7% per century increase in extreme rainfall, they can use your 7% scenario output as a starting point and then add an additional 0.0007 per year for a future adjustment. I suspect that things scale linearly, so that users would easily be able to apply different trend values using the information contained in the conventional and reference return period amounts.

*Please refer to our response to comment 7.4.4 that describes in more detail NA14 assumptions and our ongoing work on investigating the effects of non-stationary climate on estimates. As indicated,*

*we are still uncertain if non-stationary methods are advantageous for performing precipitation frequency analysis. There is substantial uncertainty associated with modeling precipitation frequency estimates associated with different components of the process and uncertainty due to the stationarity assumption must be evaluated relative to other sources that often have a significantly larger impact on estimates. As an example, in order to address non-stationarity we would have to change the current distribution parameterization method, and that change often has a larger impact on estimates than inclusion/exclusion of non-stationarity. Also, there is tremendous uncertainty associated with our ability to predict future extreme precipitation at high resolution spatial and temporal scales of interest to NA14 products. Nonetheless, as mentioned in response to comment 7.4.4, we continue investigation on this topic with our partners from academia. We will gladly accept any suggestion or contribution. If you would like to follow the progress of this project, please check the latest [Quarterly Progress Report](#) published here: [Current Projects](#).*

- 7.4.6. For report inclusion, may be helpful to address how non-stationary may affect analysis methods (ie. violate statistical method assumptions).

*Please refer to our responses to comments 7.4.4 and 7.4.5.*

- 7.4.7. Climate change: I recognize that standard practice does not allow for consideration of climate change effects, partly due to the uncertainty of estimating such effects. That is a shame. The observed increase in heavy rain intensity is associated with medium to high confidence with climate change. If indeed there is an underlying linear trend in extreme rainfall (or more physically likely, extreme rainfall increasing at a rate proportional to global temperatures), the new estimates are already out of date, because the temporal smoothing inherent in the frequency analysis means they apply to some fuzzy period decades ago.

*Please refer to our responses to comments 7.4.4 and 7.4.5.*

- 7.4.8. I suggest that NOAA be aware that the Houston-Galveston region is growing at an immense rate. Those of us who are residents of the New England (myself) and much of the east coast are astounded when visiting TX, which I do at least yearly. My point is that the on-going growth there creates a well known factor in skewing extreme rainfall. Prior data from long-term gaging stations cannot reflect these increases in impervious area. The changes are not simply in housing expansion (which in TX are almost never mitigated), but in highway widening and commercial/industrial construction.

I am aware the NA14 exercise is one of projecting probable rainfall events based on historic data, and that the atlas data becomes only one aspect of flooding projections. Regardless, the rate of urbanization, particularly in Houston, Austin and the Dallas areas is similar to what was seen in older urban areas of this country between 1880-1960. The region is not static, and predictions should be sensitive, whenever possible, to this phenomena.

*When we discuss non-stationarity in extreme precipitation, we typically bring up the effects of non-stationary climate on precipitation frequency estimates. We do not look at underlying causes of non-stationarity, so all potentially relevant factors would be collectively considered in the analysis. For more information on non-stationary NA14 methods, please refer to comments 7.4.4 and 7.4.5.*

## Appendix A.5. Temporal distributions

### 1. Introduction

Temporal distributions of precipitation amounts exceeding precipitation frequency estimates for the 2-year recurrence interval are provided for 6-, 12-, 24-, and 96-hour durations. The temporal distributions are expressed in probability terms as cumulative percentages of precipitation totals at various time steps. To provide detailed information on the varying temporal distributions, separate temporal distributions were also derived for four precipitation cases defined by the duration quartile in which the greatest percentage of the total precipitation occurred.

Stations were grouped into three climate regions, shown in Figure 4.1.1, and separate temporal distributions were derived for each climate region. Regions were delineated based on the climatology of extreme precipitation and the seasonality analysis of annual maxima from stations through the project area.

### 2. Methodology and results

The methodology used to produce the temporal distributions is like the one developed by Huff (1967) except in the definition of precipitation cases. In accordance with the way a precipitation case (“event”) was defined for the precipitation frequency analysis, a precipitation case for the temporal distribution analysis was computed as the total accumulation over a specific duration (6-, 12-, 24-, or 96-hours) and may contain parts of one or more storms. Because of that, temporal distribution curves presented here may be different from corresponding temporal distribution curves obtained from the analysis of single storms. Also, precipitation cases for this project always start with precipitation but do not necessarily end with precipitation, resulting in potentially more front-loaded cases when compared with distributions derived from the single storm approach. Cases were selected from all events of a given duration that exceeded the 2-year average recurrence interval at each station.

For each precipitation case, cumulative precipitation amounts were converted into percentages of the total precipitation amount at one-hour time increments. All cases for a specific duration were then combined and probabilities of occurrence of precipitation totals were computed at each hour. The temporal distribution curves for nine deciles (10% to 90%) were smoothed using a linear programming method (Bonta and Rao, 1988) and plotted in the same graph.

The cases were further divided into four categories by the quartile in which the greatest percentage of the total precipitation occurred. Table A.5.1 shows the total number of precipitation cases and number of cases in each quartile for each region and duration. Unlike the cases of 12-, 24-, and 96-hour durations in which the number of data points can be equally divided by four, the cases of 6-hour duration contain only six data points and they cannot be evenly distributed into four quartiles. Therefore, in this analysis, for the 6-hour duration, the first quartile contains precipitation cases where the most precipitation occurred in the first hour, the second quartile contains precipitation cases where the most precipitation occurred in the second and third hours, the third quartile contains precipitation cases where the most precipitation occurred in the fourth hour, and the fourth quartile contains precipitation cases where the most precipitation occurred in the fifth and sixth hours. This uneven distribution affects the number of cases contained in each quartile for the 6-hour duration.

From the [PFDS page for Texas](#), regional temporal distribution data are available in a tabular form for a selected location under the “Supplementary information” tab or through the [Temporals](#) page. For 6-, 12-

and 24-hour durations, temporal distribution data are provided in 0.5-hour increments and for 96-hour duration in hourly increments.

*Table A.5.1. Total number of precipitation cases and number (and percent) of cases in each quartile for selected durations for Interior Highlands (1), Central Plains (2) and Gulf Coast (3) regions.*

| <b>Duration</b> | <b>Region</b> | <b>All</b> | <b>First quartile</b> | <b>Second quartile</b> | <b>Third quartile</b> | <b>Fourth quartile</b> |
|-----------------|---------------|------------|-----------------------|------------------------|-----------------------|------------------------|
| 6-hour          | 1             | 1,530      | 916 (60%)             | 353 (23%)              | 174 (11%)             | 87 (06%)               |
|                 | 2             | 6,206      | 2,574 (41%)           | 2,002 (32%)            | 1,073 (17%)           | 557 (09%)              |
|                 | 3             | 2,331      | 735 (32%)             | 806 (35%)              | 525 (23%)             | 265 (11%)              |
| 12-hour         | 1             | 1,559      | 983 (63%)             | 277 (18%)              | 190 (12%)             | 109 (07%)              |
|                 | 2             | 6,318      | 3,124 (49%)           | 1,570 (25%)            | 1,029 (16%)           | 595 (09%)              |
|                 | 3             | 2,306      | 883 (38%)             | 656 (28%)              | 477 (21%)             | 290 (13%)              |
| 24-hour         | 1             | 1,516      | 892 (59%)             | 223 (15%)              | 188 (12%)             | 213 (14%)              |
|                 | 2             | 6,153      | 3,027 (49%)           | 1,196 (19%)            | 1,099 (18%)           | 831 (14%)              |
|                 | 3             | 2,243      | 866 (39%)             | 507 (23%)              | 472 (21%)             | 398 (18%)              |
| 96-hour         | 1             | 1,409      | 656 (47%)             | 290 (21%)              | 262 (19%)             | 201 (14%)              |
|                 | 2             | 5,886      | 2,753 (47%)           | 1,283 (22%)            | 1,001 (17%)           | 849 (14%)              |
|                 | 3             | 2,093      | 894 (43%)             | 443 (21%)              | 399 (19%)             | 357 (17%)              |

### 3. Interpretation

Figures A.5.1 through A.5.4 show, as an example, temporal distribution curves for the first-, second-, third-, and fourth-quartile cases in the Interior Highlands region for 6-hour, 12-hour, 24-hour and 96-hour durations, respectively. First-quartile plots show temporal distribution curves for cases where the greatest percentage of the total precipitation fell during the first quarter of the duration (e.g., the first 3 hours of a 12-hour duration). The second, third, and fourth quartile plots are similarly for cases where the most precipitation fell in the second, third, or fourth quarter of the duration. Figure A.5.5 shows the temporal distribution curves of all precipitation cases in the Interior Highlands region for the 6-, 12-, 24-, and 96-hour durations. For these plots, time steps were converted into percentages of total durations for easier comparison.

The temporal distribution curves represent averages of many cases and illustrate the temporal distribution patterns with 10% to 90% occurrence probabilities in 10% increments. For example, the 10% curve in any figure indicates that 10% of the corresponding precipitation cases had distributions that fell above and to the left of the curve. Similarly, 10% of the cases had temporal distribution falling to the right and below the 90% curve. The 50% curve represents the median temporal distribution.

Temporal distribution curves are provided in order to show the range of possibilities. Care should be taken in the interpretation and use of temporal distribution curves. For example, the use of different temporal distribution data in hydrologic models may result in very different peak flow estimates. Therefore, they should be selected and used in a way to reflect users' objectives.

The following is an example of how to interpret the results using the figure in the upper left panel of Figure A.5.1 for 6-hour first-quartile cases in the Interior Highlands region (region 1):

- In 10% of the first-quartile cases, 50% of the total precipitation fell in half an hour and 90% of the total precipitation fell in less than 1.5 hours.
- A median case of this type will drop half of the precipitation (50% on the y-axis) in approximately 1.25 hours.
- In 90% of the cases, 50% of the total precipitation fell by 2.1 hours and 90% of precipitation fell in less than 5.1 hours.

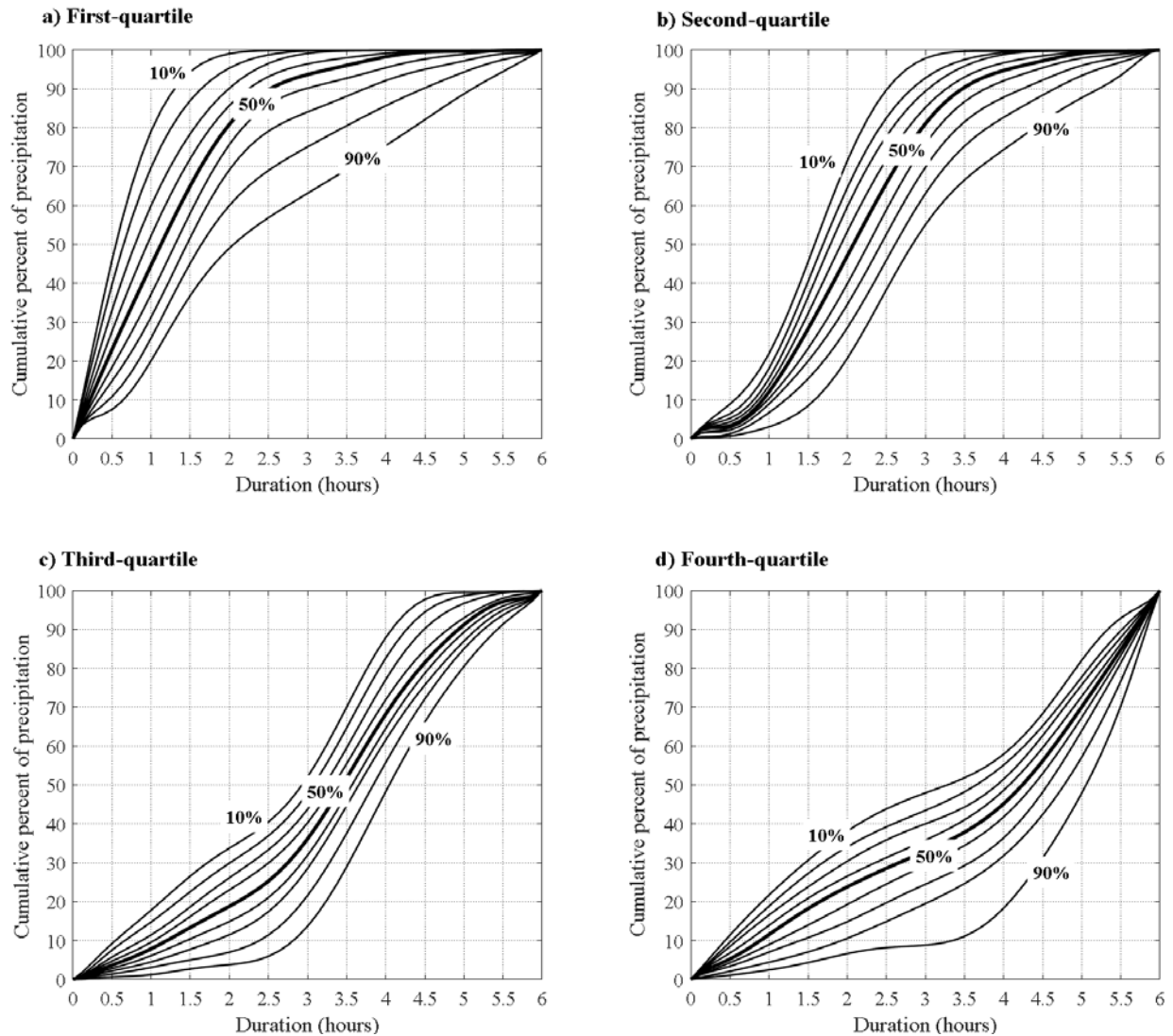
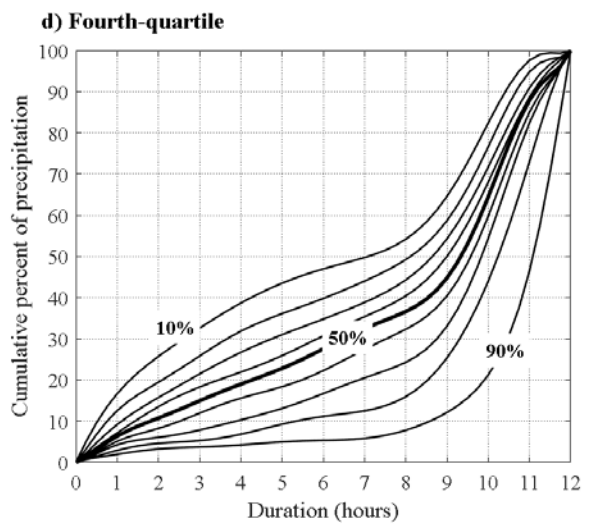
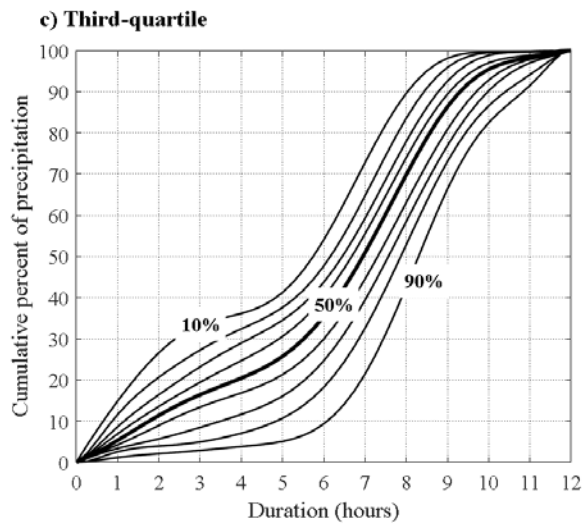
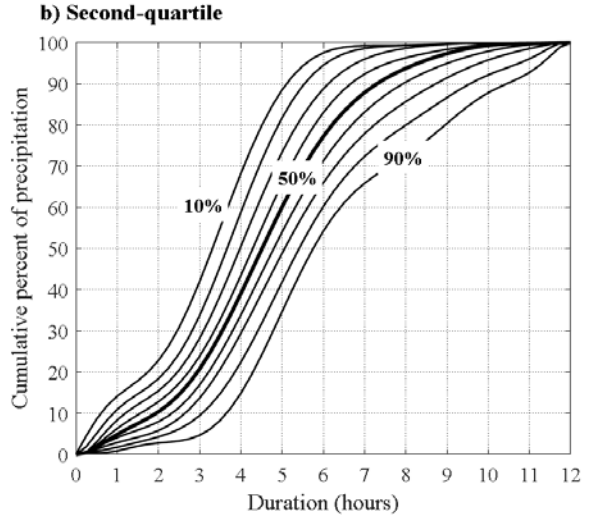
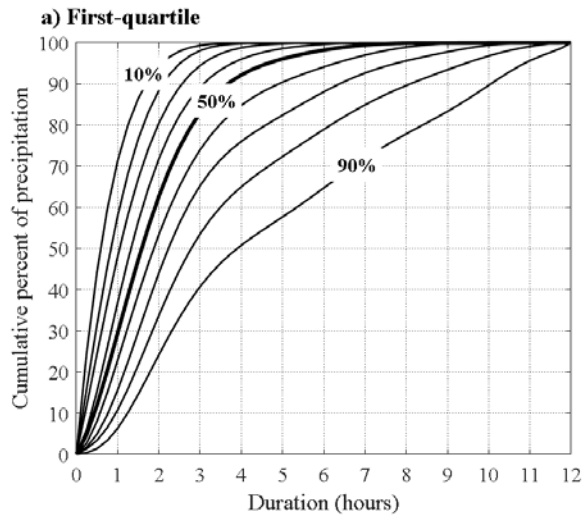


Figure A.5.1. 6-hour temporal distribution curves for the Interior Highlands region (region 1): a) first-quartile, b) second-quartile, c) third-quartile, and d) fourth-quartile cases.



*Figure A.5.2. 12-hour temporal distribution curves for the Interior Highlands region (region 1): a) first-quartile, b) second-quartile, c) third-quartile, and d) fourth-quartile cases.*

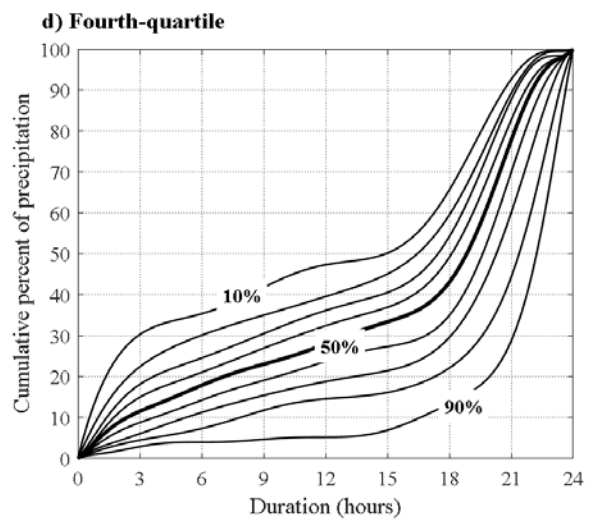
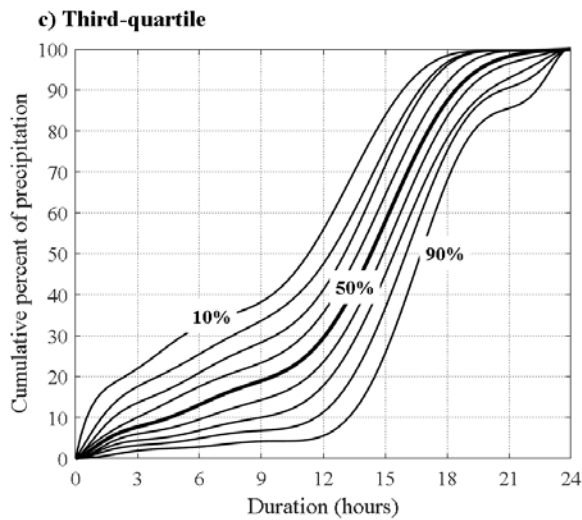
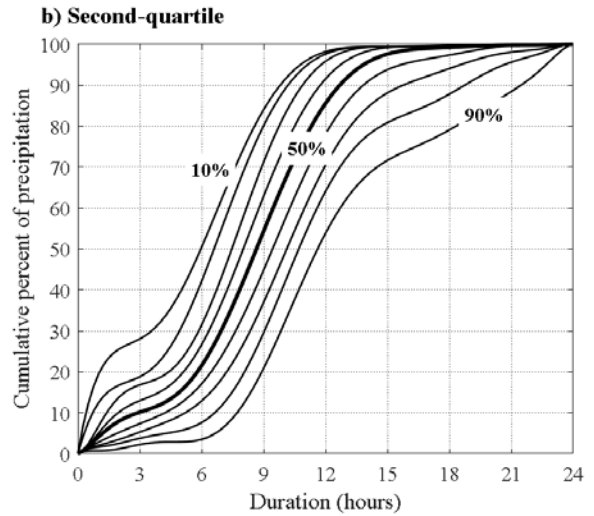
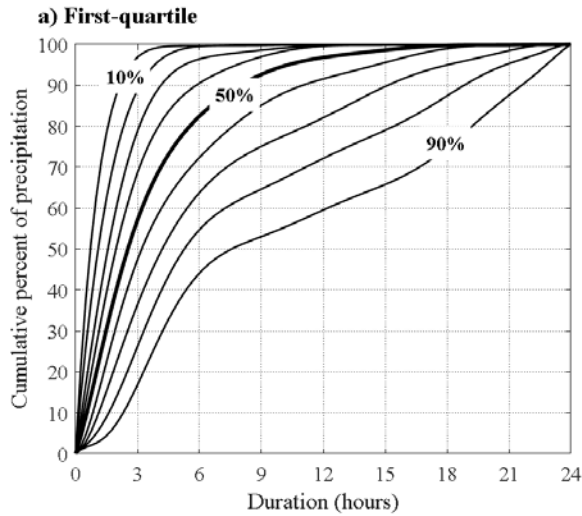
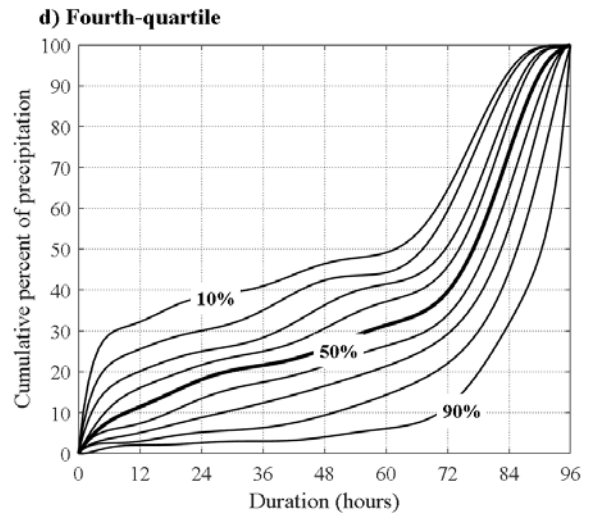
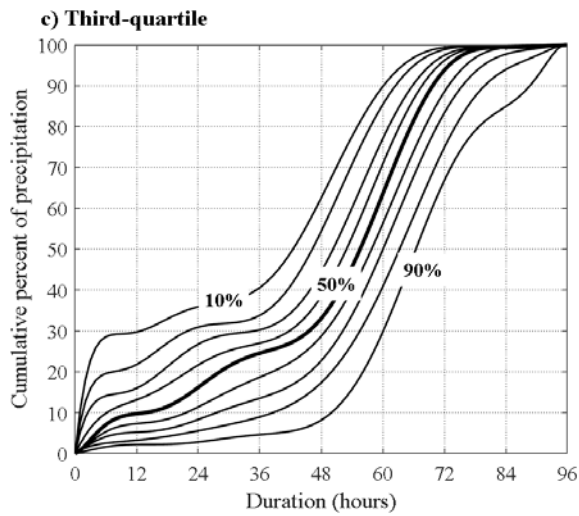
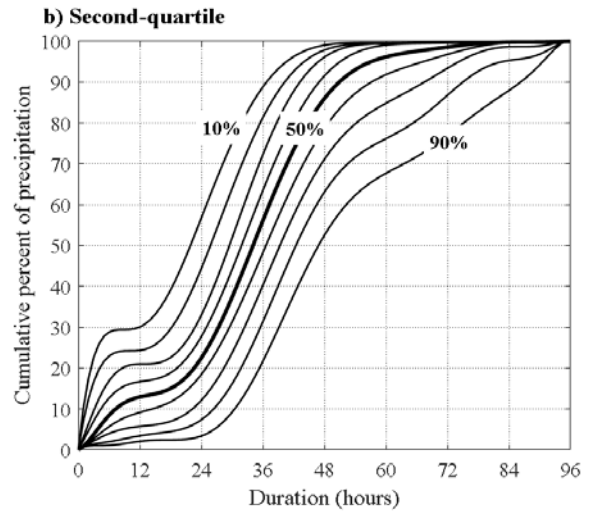
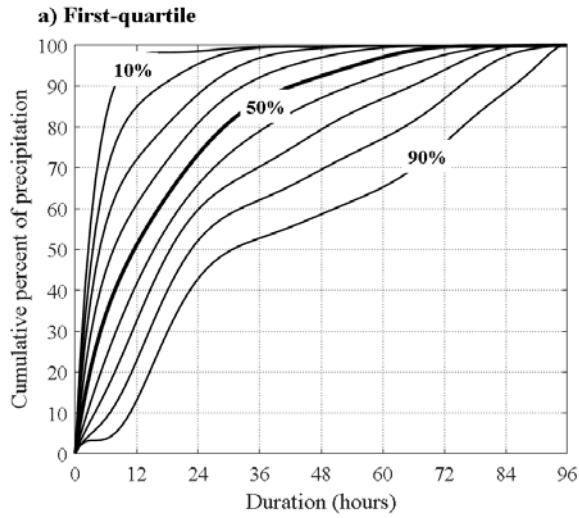


Figure A.5.3. 24-hour temporal distribution curves for the Interior Highlands region (region 1): a) first-quartile, b) second-quartile, c) third-quartile, and d) fourth-quartile cases.





*Figure A.5.4. 96-hour temporal distribution curves for the Interior Highlands region (region 1): a) first-quartile b) second-quartile, c) third-quartile, and d) fourth-quartile cases.*

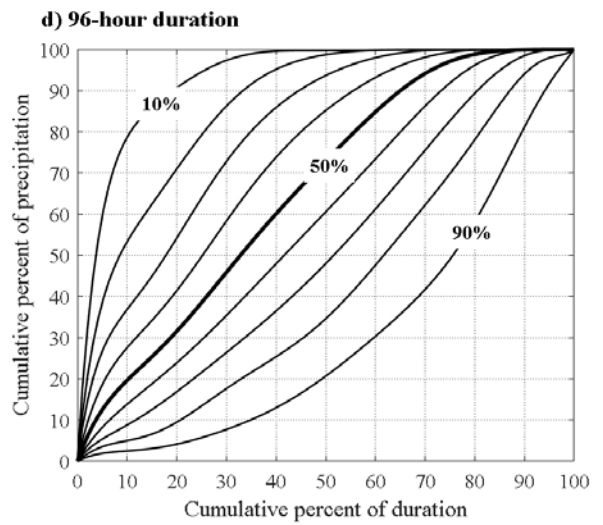
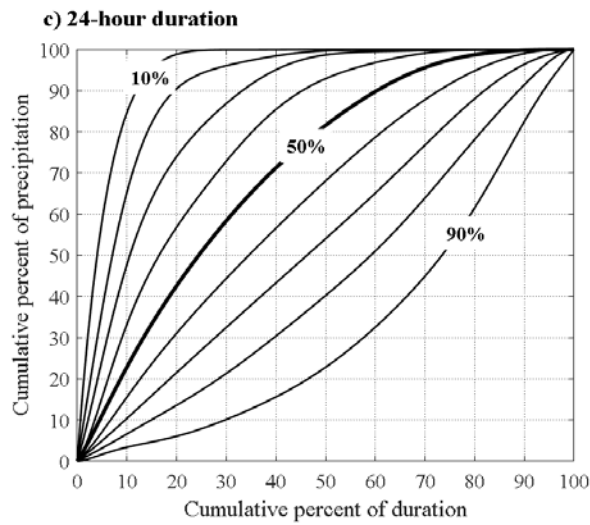
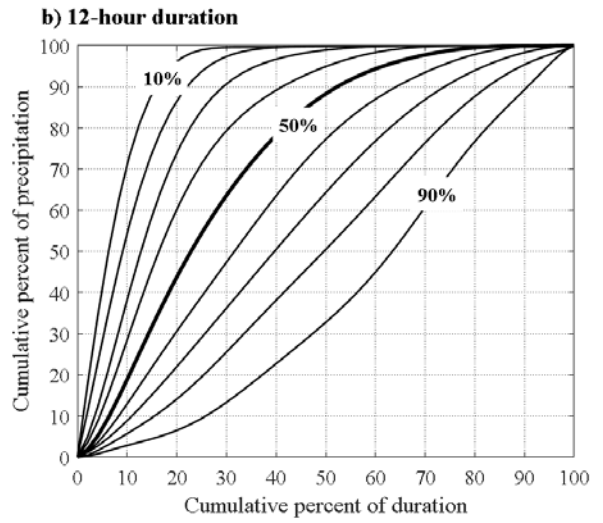
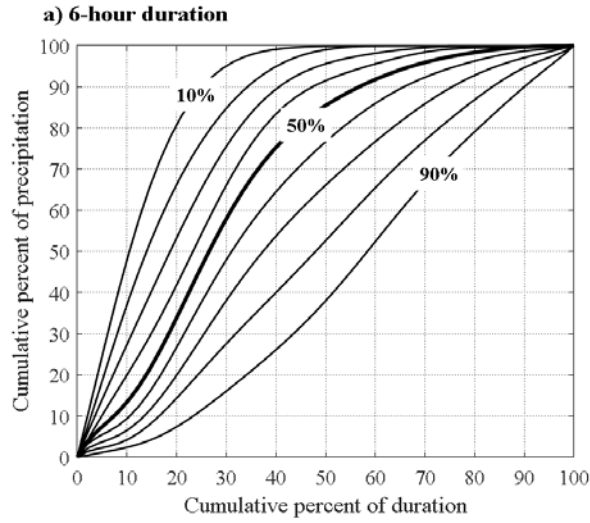


Figure A.5.5. Temporal distribution curves of all precipitation cases for the Interior Highlands region (region 1) for: a) 6-hour, b) 12-hour, c) 24-hour, and d) 96-hour durations.

## Appendix A.6. Seasonality

### 1. Introduction

To portray the seasonality of extreme precipitation throughout the project area, annual maxima that exceeded precipitation frequency estimates (quantiles) with selected annual exceedance probabilities (AEPs) for chosen durations were examined for the three climate regions described in Section 4.1. Graphs showing the monthly variation of the exceedances for a region are provided for each location in the project area via the [Precipitation Frequency Data Server \(PFDS\)](#). For a selected location, seasonal exceedance graphs can be viewed by selecting “V. Seasonality analysis” from the “Supplementary information” tab on the output page.

### 2. Method

Separate seasonal exceedance graphs were created for each of three delineated regions shown in Figure 4.1.2. They show the percentage of annual maxima for a given duration from all stations in a region that exceeded corresponding precipitation frequency estimates at selected AEP levels in each month. Results are provided for 60-minute, 24-hour, 2-day, and 10-day durations and for AEPs of 1/2, 1/5, 1/10, 1/25, 1/50, and 1/100.

To prepare the graphs, first the number of annual maxima exceeding the precipitation frequency estimate at a station for a given AEP was tabulated for each duration. Those numbers were then combined for all stations in the region, sorted by month, normalized by the total number of data years in the region, and finally plotted via the PFDS.

### 3. Results

The exceedance graphs for a selected location (example in Figure A.6.1) indicate percent of annual maxima exceeding the quantiles with selected AEPs for various durations. The percentages are based on regional statistics. On average, 1% of annual maxima for a given duration in a year (i.e., the sum of percentages of all twelve months) are expected to exceed the 1/100 AEP quantile, 4% is expected to exceed the 1/25 AEP quantile, etc.

Note that seasonality graphs are not intended to be used to derive seasonal precipitation frequency estimates.

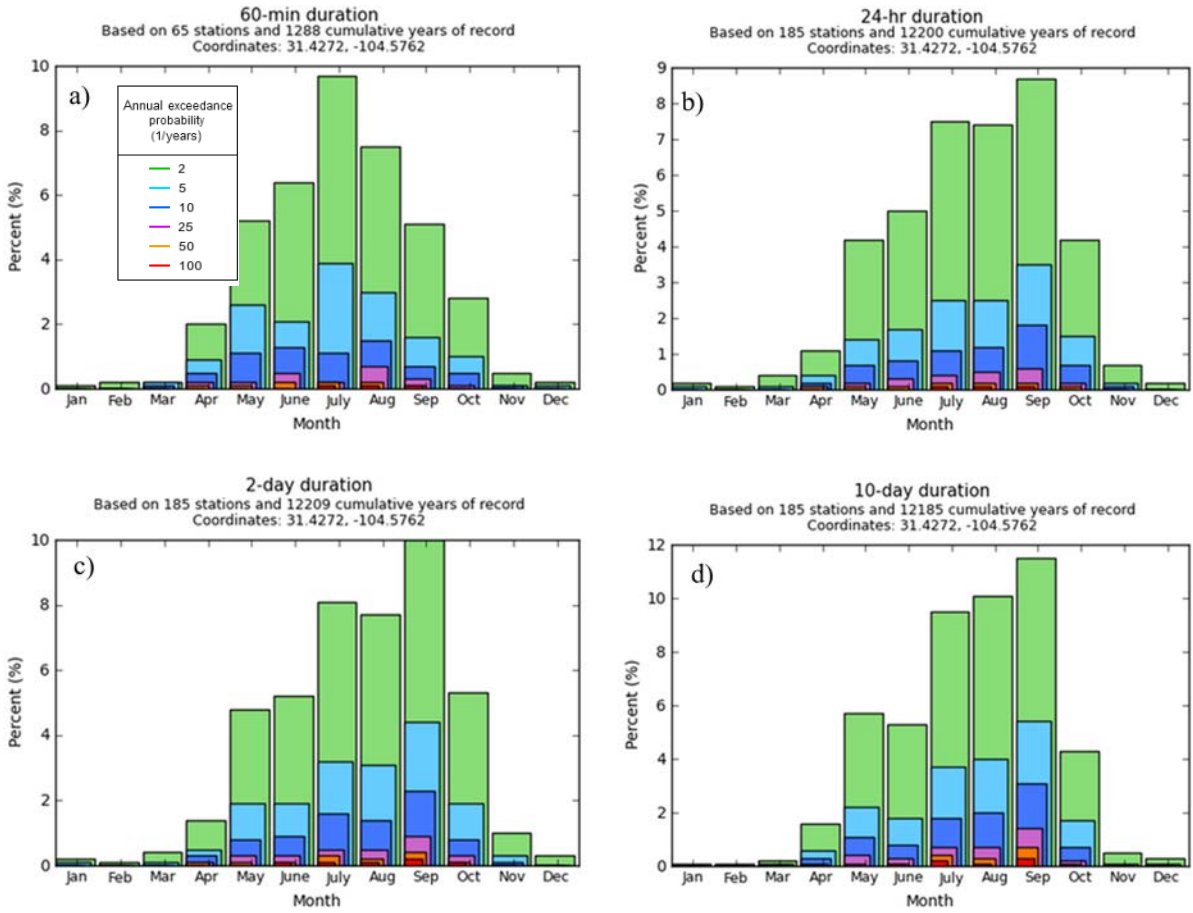


Figure A.6.1. Example of seasonal exceedance graphs for a location in the Interior Highlands region (region 1) for the: a) 60-minute, b) 24-hour, c) 2-day, and d) 10-day durations.

## Acknowledgments

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Jesse Bickel, Freddy Camacho, Kelley Eicher and James Manderson from the OWP developed web pages for the peer review, and Timothy McCalmant and his team from Orion Network Solutions Inc. built final PFDS web pages for this volume. Maureen O'Leary, NOAA/NWS Communications Office was instrumental in coordinating communications with various media outlets, and Geoffrey Bonnin (retired), Mark Glaudemans and Ken Pavelle from the OWP provided wide-ranging support.

We would like to thank them all for their help and apologize in advance to those who were unintentionally omitted.

## Acronyms, abbreviations

(For list of abbreviations used to identify data sources, please see Table 4.2.1.)

|       |   |
|-------|---|
| AEP   | Annual Exceedance Probability                               |
| AMS   | Annual Maximum Series                                       |
| ARI   | Average Recurrence Interval                                 |
| ASCII | American Standard Code for Information Interchange          |
| ASOS  | Automated Surface Observing System                          |
| CDMP  | Climate Database Modernization Program                      |
| COOP  | NWS Cooperative Observer Program                            |
| CV    | Coefficient of Variation                                    |
| DEM   | Digital Elevation Model                                     |
| GEV   | Generalized Extreme Value                                   |
| GHCN  | Global Historical Climatology Network                       |
| HDSC  | Hydrometeorological Design Studies Center                   |
| MAM   | Mean Annual Maximum   |
| MAP   | Mean Annual Precipitation                                   |
| NA14  | NOAA Atlas 14   |
| NCEI  | National Centers for Environmental Information              |
| NOAA  | National Oceanic and Atmospheric Administration             |
| NWS   | National Weather Service                                    |
| OWP   | Office of Water Prediction                                  |
| PCHIP | Piecewise Cubic Hermite Interpolating Polynomial            |
| PDS   | Partial Duration Series                                     |
| PFDS  | Precipitation Frequency Data Server                         |
| PMP   | Probable Maximum Precipitation                              |
| POR   | Period of Record  |
| PRISM | Parameter-Elevation Regressions on Independent Slopes Model |
| SID   | Station Identification Number                               |
| TC    | Tropical Cyclone  |
| TP    | Technical Publication                                       |
| USACE | U.S. Army Corps of Engineers                                |
| USDA  | U.S. Department of Agriculture                              |
| USGS  | U.S. Geological Survey                                      |
| WPA   | NOAA's Work Projects Administration                         |

## Glossary

*(All definitions are given relative to precipitation frequency analyses in NOAA Atlas 14 Volume 11.)*

**ANNUAL EXCEEDANCE PROBABILITY (AEP)** – The probability associated with exceeding a given amount in any given year at least once; the inverse of AEP provides a measure of the average time between years (and not events) in which a particular value is exceeded at least once. The term is associated with analysis of annual maximum series (see also AVERAGE RECCURENCE INTERVAL).

**ANNUAL MAXIMUM SERIES (AMS)** – Time series of the largest precipitation amounts in a continuous 12-month period (calendar or water year) for a specified duration at a given station.

**ASCII GRID** – Grid format with a 6-line header, which provides location and size of the grid and precedes the actual grid data. The grid is written as a series of rows, which contain one ASCII integer or floating point value per column in the grid. The first element of the grid corresponds to the upper-left corner of the grid.

**AVERAGE RECURRENCE INTERVAL (ARI; a.k.a. RETURN PERIOD, AVERAGE RETURN PERIOD)** – Average time between *cases of a particular precipitation magnitude* for a specified duration and at a given location; the term is associated with the analysis of partial duration series. However, ARI is frequently calculated as the inverse of AEP for the annual maximum series; in this case it represents the average period between years in which a given precipitation magnitude is exceeded at least once.

**CONSTRAINED OBSERVATION** – A precipitation measurement or observation bound by clock hours and occurring in regular intervals. This observation requires conversion to an unconstrained value (see UNCONSTRAINED OBSERVATION) because maximum 60-minute or 24-hour amounts seldom fall within a single hourly or daily observation period.

**DATA YEARS** – See RECORD LENGTH.

**DEPTH-DURATION-FREQUENCY (DDF) CURVE** – Graphical depiction of precipitation frequency estimates in terms of depth, duration, and frequency (ARI or AEP).

**DISTRIBUTION FUNCTION (CUMULATIVE DISTRIBUTION FUNCTION)** – Mathematical description that completely describes frequency distribution of a random variable, here precipitation. Distribution functions commonly used to describe precipitation data include 3-parameter distributions such as Generalized Extreme Value (GEV), Generalized Normal, Generalized Pareto, Generalized Logistic, and Pearson type III, the 4-parameter Kappa distribution, and the 5-parameter Wakeby distribution.

**FREQUENCY** – General term for specifying the average recurrence interval or annual exceedance probability associated with specific precipitation magnitude for a given duration.

**FREQUENCY ANALYSIS** – Process of derivation of a mathematical model that represents the relationship between precipitation magnitudes and their frequencies.

**FREQUENCY ESTIMATE** – Precipitation magnitude associated with specific average recurrence interval or annual exceedance probability for a given duration.

**INTENSITY-DURATION-FREQUENCY (IDF) CURVE** – Graphical depiction of precipitation frequency estimates in terms of intensity, duration and frequency.

**INTERNAL CONSISTENCY** – Term used to describe the required behavior of the precipitation frequency estimates from one duration to the next or from one frequency to the next. For instance, it is required that the 100-year 3-hour precipitation frequency estimates be greater than (or at least equal to) corresponding 100-year 2-hour estimates.

**L-MOMENTS** – L-moments are summary statistics for probability distributions and data samples. They are analogous to ordinary moments, providing measures of location, dispersion, skewness, kurtosis, and other aspects of the shape of probability distributions or data samples, but are computed from linear combinations of the ordered data values (hence the prefix L).

**MEAN ANNUAL PRECIPITATION (MAP)** – The average precipitation for a year (usually calendar) based on the whole period of record or for a selected period (usually 30 year period such as 1971-2000).

**PARTIAL DURATION SERIES (PDS)** – Time series that includes all precipitation amounts for a specified duration at a given station above a pre-defined threshold regardless of year; it can include more than one event in any particular year.

**PRECIPITATION FREQUENCY DATA SERVER (PFDS)** – The on-line portal for all NOAA Atlas 14 deliverables, documentation, and information (<https://hdsc.nws.noaa.gov/hdsc/pfds/>).

**PARAMETER-ELEVATION REGRESSIONS ON INDEPENDENT SLOPES MODEL (PRISM)** – Hybrid statistical-geographic approach to mapping climate data developed by Oregon State University's PRISM Climate Group.

**QUANTILE** – Generic term to indicate the precipitation frequency estimate associated with either ARI or AEP.

**RECORD LENGTH** – Number of years in which enough precipitation data existed to extract meaningful annual maxima in a station's period of record (or data years).

**UNCONSTRAINED OBSERVATION** – A precipitation measurement or observation for a defined duration. However, the observation is not made at a specific repeating time, rather the duration is a moveable window through time.

**WATER YEAR** – Any 12-month period, usually selected to begin and end during a relatively dry season. In Volume 11, it is defined as the calendar year (January 1 to December 31).



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