



Blue Ridge Thunder



Newsletter of the NWS Blacksburg, VA

Welcome to the Spring 2019 edition of 'Blue Ridge Thunder' the biannual newsletter of the National Weather Service (NWS) office in Blacksburg, VA. In this issue you will find articles of interest on the weather and climate of our region and the people and technologies needed to bring accurate forecasts and warnings to the public.

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Weather Highlight

April 2019 Tornadoes

Peter Corrigan, Senior Service Hydrologist

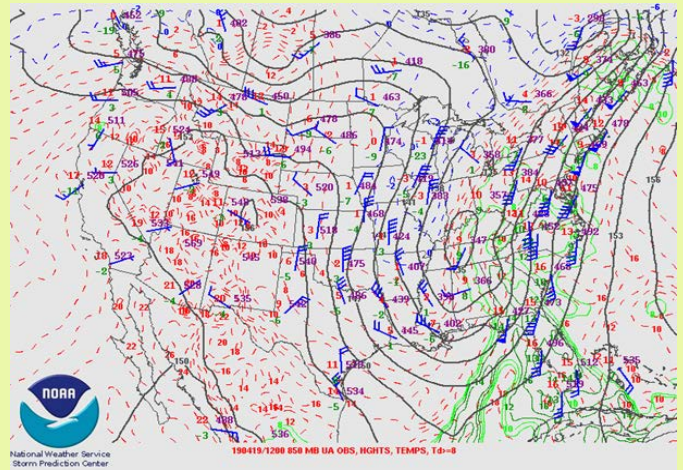
Nearly one year ago in this space ([Blue Ridge Thunder, Spring 2018](#)) we were writing about one the most significant tornado outbreaks in Southwest Virginia history, occurring on April 15, 2018. Almost exactly a year later two events nearly challenged that claim, and certainly did in terms of tornado warnings issued. Five tornado warnings were issued on April 15, 2018 (with 7 confirmed tornadoes). On April 14-15, 2019, a total of 14 tornado warnings were issued for the Blacksburg County Warning Area (CWA) but there were no confirmed tornadoes (some damage was reported). Just a few days later however, on April 19, 2019 another 17 tornado warnings were issued, this time with two confirmed tornadoes including an EF-3 on the [Enhanced Fujita Scale](#) in Franklin County, VA (see photo below).



Photo of Franklin County, VA Tornado - Apr 19, 2019

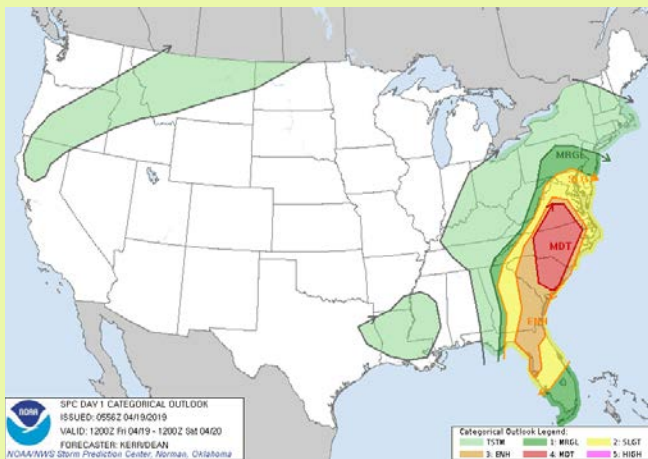
(Photo Courtesy T. Woody)

The southern Franklin County tornado near Oak Level had wind speeds estimated at close to 160 mph. This makes it the second EF-3 in our area since last April (that one being in Amherst County near Elon, VA). And it is only the fourth confirmed EF-3 tornado since 1994 in our forecast area. No EF-4s or EF-5s have been documented. The first was the March 20th, 1998 (Stoneville-Mayodan), the second was February 24th, 2016 in Appomattox County (Evergreen). The Franklin County tornado was on the ground for just over 8 miles with a maximum width of 250 yards and caused 2 injuries. A second tornado formed north of Thaxton, VA in Bedford County, but was weaker with estimated winds of just over 90 mph, which rates as an EF-1. Severe weather was not a surprise on April 19th, as the [Storm Prediction Center](#) (SPC) had upgraded from an 'Enhanced' to a rare 'Moderate' risk for severe weather across parts of the Southeastern U.S. (figure below) during the early morning hours.



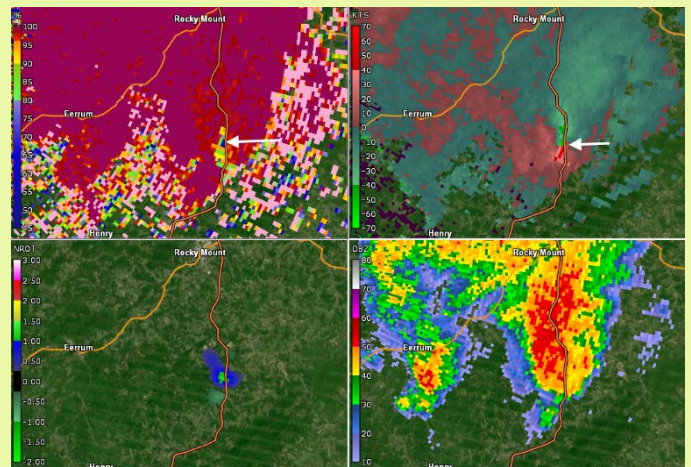
850 mb Heights and Moisture 1200 UTC (8 AM EDT) April 19, 2019

The first of the 17 Tornado Warnings issued came early, at 941 AM EDT for Stokes and Patrick counties. This fact alone suggested that an unusual day was in store, as less than 3% of all observed tornadoes in the Blacksburg CWA have been observed between 8 AM and 10 AM (per local [Severe Weather Climatology](#) study by Stonefield and Jordan). The [Tornado Warning](#) for the Franklin storm was issued at 1003 AM, with the post-storm damage survey showing that the tornado touched down around 1025 AM providing an excellent lead time of 22 minutes. The figure below shows a 4-panel view of the storm at 1028 AM (3 minutes after touch-down) with Correlation Coefficient (CC) in the upper left, Storm-Relative Velocity in the upper right, Normalized Rotation in the lower left and Base Reflectivity in the lower right. The radar 'signatures'



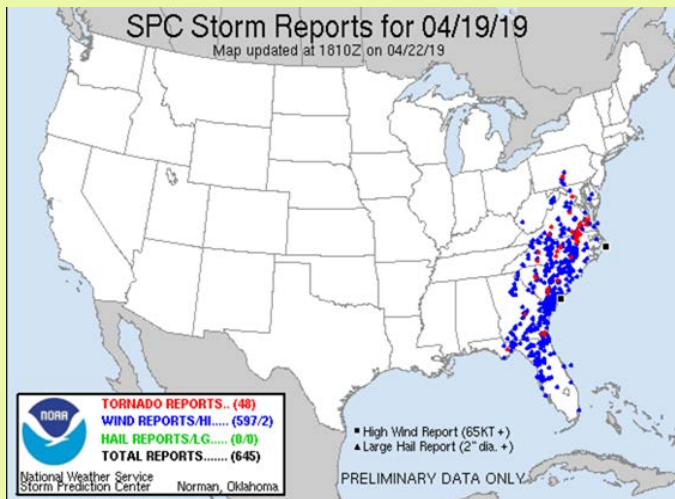
SPC Convective Outlook 0600 UTC (1 AM EDT) April 19, 2019

The morning SPC outlook discussed expected strong cyclogenesis and upper trough amplification over the eastern U.S. with very strong southerly flow (50-70+ knots) in the lower levels. Strong wind shear was forecast to accompany a squall line that was forecast to shift eastward and during the day. At the same time a tremendous surge of moisture with increasing instability was also set to push north under deep southerly flow along and ahead of a surface cold front pushing into the region.



shown are fairly impressive examples for a tornadic storm in our part of the country where the circulations tend to be more subtle and sometimes ambiguous than supercells occurring in 'Tornado Alley' across the central U.S.

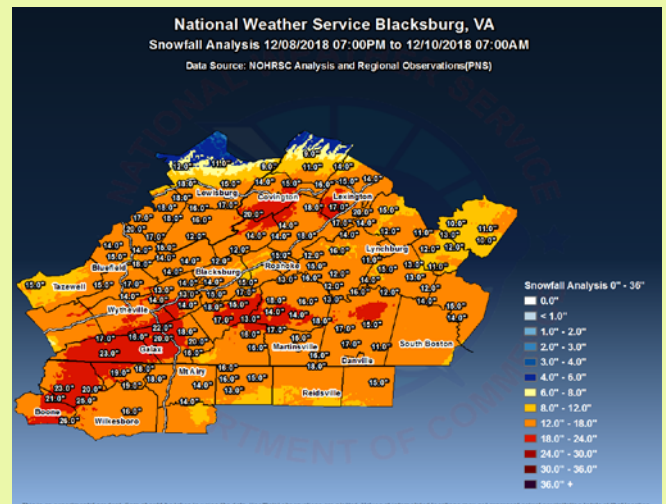
While this was not the greatest tornado outbreak on record for our immediate area, there were 15 tornadoes confirmed across the state of Virginia on April 19th, making this day the 4th largest Virginia outbreak on record. The record belongs to September 17, 2004 with 38 (Hurricane Ivan), followed 19 on April 27-28, 2011 and 18 on August 6, 1993 in the 'Tri-Cities' (greater Richmond area). The map below shows all the preliminary storm reports across the southeast and Mid-Atlantic from this event with tornadoes reported from Florida all the way north to Pennsylvania.



SPC Storm Reports April 19, 2011

Winter Weather Highlight: Snowstorm of Dec. 9-10, 2018

The only widespread heavy snowstorm of the entire winter occurred on December 9-10, 2018, and was one of the earliest storms of this magnitude in parts of the CWA. The storm developed as low pressure tracking eastward along the Gulf Coast spread moisture northward toward the Mid- Atlantic. Meanwhile, high pressure to the north allowed temperatures to fall into the 20s, which caused the moisture to mostly fall as heavy snow along with some sleet and freezing drizzle. The snow caused hundreds of traffic accidents, left thousands of people without power and caused one indirect fatality in Yadkin County, NC. Average snowfall accumulations ranged from ten to twenty inches over the CWA and was somewhat remarkable in that every county in the CWA reached winter storm warning criteria of 5 (piedmont) or 6 (mountains) inches in 24 hours. At Lynchburg (11.7 inches) it was the earliest snowfall of 5 inches or greater since November 14, 1971 (5.7 inches) and at Danville (15.2 inches) the earliest since December 6, 1954 (6 inches). For all five climate sites it was the earliest date for snowfall of that magnitude.



**Map of Storm Total Snowfall in the Blacksburg
CWA – Dec. 9-10, 2018**

Winter 2018-2019 Climate Summary

Peter Corrigan, Senior Service Hydrologist

The 'meteorological' winter of 2018-2019 (defined as December 1 – February 28) was relatively uneventful with only one major winter storm, along with several 'nuisance' events. In fact, the December 9-10, 2018 storm accounted for nearly the entire winter snow at some stations and the majority of snow at most. Liquid precipitation was abundant however, maintaining the trend of the very wet 2018. All the official climate sites had well above normal precipitation for the season with December leading the way. The combined COOP/ASOS network (about 61 stations) across the CWA had 6.60 inches in December, nearly double the 1981-2010 climate normal of 3.32 inches. It was the 2nd wettest December in the 23-year office history (after 2009) and several river flood events occurred due to the wet pattern. January was much closer to normal at 3.73 inches versus the normal mean of 3.32 inches but February saw a return to very wet conditions and more flooding. Mean February precipitation (nearly all rain) was 5.93 inches versus the climatological mean of 3.03 inches or again nearly double normal. For the winter season several fairly long-term COOP sites set precipitation records including Transou, NC with 21.57 inches (previous record 20.35 inches in 1997-98 and data available back to 1947); W. Kerr Scott Reservoir 20.82 inches (old record 19.07 inches in 2009-10 and data back to 1966); and Mount Airy, NC at 20.45 inches (old record 18.72 inches in 1937 and data back to 1893).

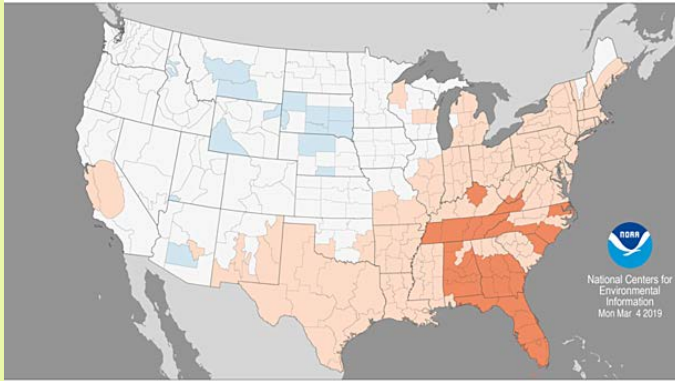
Temperatures were unremarkable this winter with few extremes, especially on the cold side. 'Snow Miser' was not happy! Not a single official station set a low temperature record during the winter and the only extremes occurred with record warmth. Most notable was February 6-7 when nearly all the official sites set a high temperature record, including 80°F at Danville on the 7th which broke a record for the date by 6 degrees. The winter as a whole was about 2 degrees above normal with a slightly colder than average January more than offset by warmer than normal temperatures in December and especially February. At Blacksburg it was the 11th warmest February on record (since 1953) but 2018 and 2017 ranked #1 and #2, respectively for February warmth. The table below shows winter season statistics for the 5 official climate sites in the CWA. Additional data can be found on the NWS RNK [Climate web page](#).

Climatological Statistics for winter 2018-2019 (Dec-Feb).

Climate Site	Average Temperature (Anomaly)	Total Precipitation (Anomaly)	Total Snowfall (Normal)	Period of Record
Bluefield, WV	36.5 (+0.3)	11.71 (+3.14)	24.6 (25.3)	1909-2019
Blacksburg, VA	35.4 (+2.3)	12.94 (+4.10)	21.4 (16.2)	1952-2019
Roanoke, VA	40.4 (+2.1)	14.36 (+5.61)	19.5 (14.2)	1912-2019
Lynchburg, VA	39.1 (+2.2)	14.79 (+5.48)	19.6 (10.2)	1893-2019
Danville, VA	41.8 (+2.3)	14.86 (+5.16)	15.2 (9.3)	1916-2019

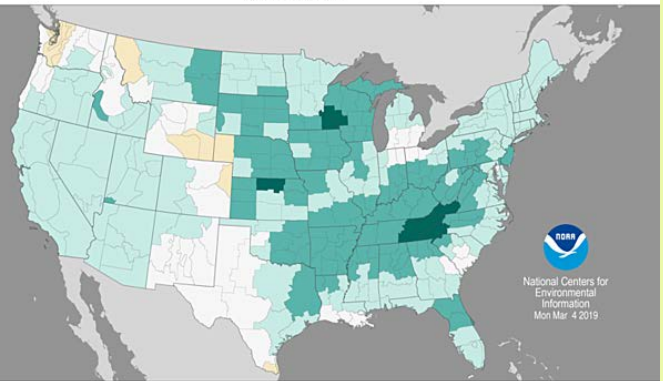
The two figures below show climate division rankings for temperature (left) and precipitation (right) from 1895-2010 across the lower 48 states for the winter period. The winter was both substantially warmer and wetter than average in our region. A full report on recent climate observations and trends can be found at the [NOAA/NCEI climate web page](#).

Divisional Average Temperature Ranks
December 2018–February 2019
Period: 1895–2019



Record Coldest Much Below Average Below Average Near Average Above Average Much Above Average Record Warmest

Divisional Average Precipitation Ranks
December 2018–February 2019
Period: 1895–2019

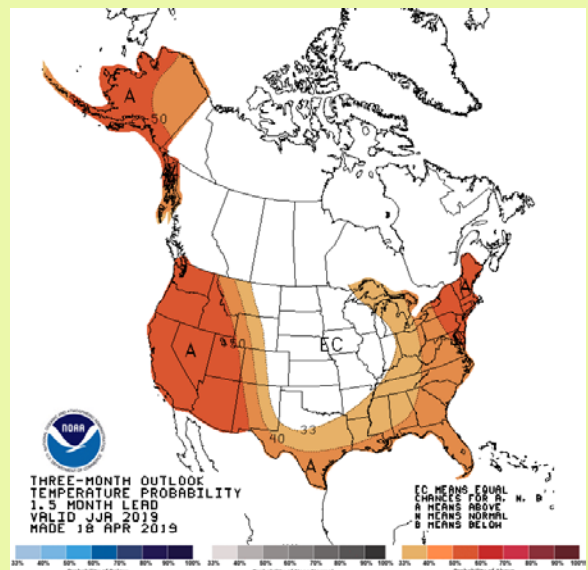


Record Driest Much Below Average Below Average Near Average Above Average Much Above Average Record Wettest

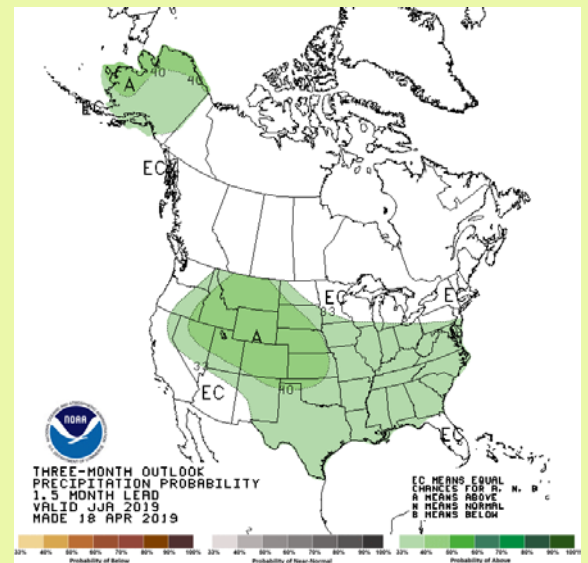
Summer 2019 Outlook: Warm and Wet Again?

Peter Corrigan, Sr. Service Hydrologist

Long-range forecasting remains an uncertain science, with many factors contributing to the difficulty in making such outlooks. Much of the predictive skill in such forecasts derives from the status of the El Niño/Southern Oscillation (ENSO). Since the strength of ENSO typically weakens in the summer, those seasonal forecasts can be even trickier. As of this writing we remain in an El Niño Advisory with the central Pacific Ocean sea-surface temperature anomaly (ONI, Feb-Apr 2019) of +0.8°C, versus the El Niño threshold of +0.5°C. The consensus of forecasts from [CPC/IRI](#) for the summer and into next fall is for this El Niño to weaken but possibly remain above the 0.5°C threshold and persist through the summer into next fall. This would be a rare, if not unprecedented, occurrence according to the [NOAA ENSO blog](#), although reliable data only exists back to 1950. The effects of this actually occurring on our local summer weather however, is likely to be subtle and perhaps not even noticeable. Hot and humid weather will likely prevail either way, but with slightly elevated chances for an even warmer and wetter than average summer. Which of course means mostly hot and humid, only more so.



Summer Temperature Outlook (June-Aug)



Summer Precipitation Outlook (June-Aug)

Less Active 2019 Atlantic Hurricane Season?

Jim Hudgins, Senior Forecaster

After seeing a very destructive hurricane season in the Atlantic in 2018, a slightly below to near average outlook is expected for the upcoming 2019 season. This is after 15 named storms in 2018 (Fig. 1), of which 8 became hurricanes, and 2 reached the major level of Category 3 or stronger. This was the third year in a row with above-average Atlantic hurricane activity that has resulted in nearly \$50 billion in damages and around 173 fatalities.

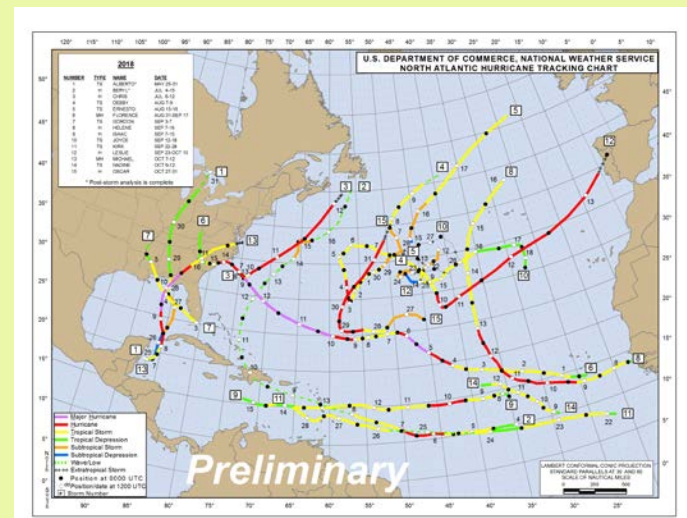
The big story in 2018 was Hurricane Michael which made landfall along the Florida panhandle on October 10, 2018 as a high-end Category 4 storm on the [Saffir-Simpson Hurricane Wind scale](#). The storm was later reclassified by the National Hurricane Center (NHC) as a Category 5 storm (winds of at least 157 mph). This was the first Cat-5 storm to make a mainland U.S. landfall since 1992 and becomes the 4th strongest storm documented to have hit the U.S., trailing only the Labor Day Hurricane of 1935, Hurricane Camille in 1969 and Hurricane Andrew in 1992. Hurricanes Florence and Michael brought significant impacts to the local area with flooding from Florence, and the added impacts of wind damage and significant flash and river flooding from Michael (including five flood fatalities in our CWA). An [NHC summary](#) of the 2018 season can be found on their website.

Numerous academic and research groups are involved in seasonal hurricane prediction but one of the longest-running is the outlook provided by [Colorado State University \(CSU\)](#). The April 4, 2019 CSU prediction indicates the likelihood of seeing a bit less tropical activity in 2019 with a forecast of 13 named storms, including 5 hurricanes and 2 majors.

These numbers would be near but slightly below the 30 year normal of 12 named storms, including 6 hurricanes, and 3 major storms. The CSU forecast will be updated in early June and the official NOAA forecast will be issued in late May.

This reduced activity appears primarily to be associated with the lingering El Niño event (see previous article) that is forecast to persist through the summer of 2019. The increased wind shear that normally accompanies an El Niño is generally not favorable for hurricane development and maintenance. Also working against an active season are cooler than normal ocean water temperatures that are present in parts of the Atlantic basin, which can have a suppressive effect on hurricane activity. Finally, stronger than normal high pressure across the eastern Atlantic, including the U.S. East Coast, could contribute to lessened activity.

The storm names for the 2019 Atlantic season include: Andrea, Barry, Chantal, Dorian, Erin, Fernand, Gabrielle, Humberto, Imelda, Jerry, Karen, Lorenzo, Melissa, Nestor, Olga, Pablo, Rebekah, Sebastien, Tanya, Van, and Wendy. The hurricane season officially starts on June 1st and ends on November 30th, 2019,



2018 Atlantic Basin Tropical Cyclone Tracks

The Hurricane Awareness Tour comes to Roanoke!

Jim Hudgins, Senior Forecaster

With the severe local impacts of the 2018 Hurricane season just behind us, the NOAA [Hurricane Awareness Tour](#) (HAT) made a timely first-ever stop in the local area, visiting the Roanoke-Blacksburg Regional Airport on May 8, 2019. The event was a huge success with estimated attendance of 2000-2500. In previous years the tour, which NOAA has conducted for some 40 years, has stuck mainly to coastal locations typically in the direct path of oncoming hurricanes such as Florida, Texas and Puerto Rico. But as the inland impacts of hurricanes, tropical storms and their remnants has become more apparent it was decided for 2019 to bring the Tour to inland cities. Among those selected this year were Roanoke, VA; Harrisburg, PA and Charlotte, NC. Hurricane experts from NOAA who fly on 'hurricane hunter' aircraft including the USAF Reserve WC-130J aircraft and the NOAA Lockheed WP-3D Orion aircraft were on hand (photo below).



The Director of the National Hurricane Center (NHC) Ken Graham, along with other experts from NHC and NOAA, answered questions from the public and conducted numerous media interviews. Many organizations and groups involved in emergency

management and flood safety along with staff from the NWS Blacksburg office were also on hand. Among the groups with information booths were the U.S. Army Corps of Engineers, VDEM, VDOT, VA DCR, City of Roanoke Stormwater and Emergency Management, Roanoke County Emergency Management, VA Silver Jackets, FLASH (Federal Alliance for Safe Homes)



Ken Graham, Director of the NHC and USAF Reserve Pilot with 'Owlie SKYWARN'



NHC and NWS Blacksburg personnel at the 2019 Hurricane Awareness Tour

Focus on COOP: New COOP site in Giles County, VA

Nick Fillo, Observing Program Leader

The longest serving Cooperative Observer in the Blacksburg CWA stepped down in late 2018 after a long and distinguished period of service. Frank Strader, who took observations at Staffordsville 3 ENE (NWS ID: STFV2) in Giles County, VA for many years (since 1951) and received several awards including the John Campanius Holm Award (see [Blue Ridge Thunder, Fall 2015](#)) has retired from observing—many thanks to Frank!

Luckily the NWS was able to recruit a new observer in a compatible location allowing climate records to maintain a level of continuity. Long-term stations remaining in the same location are preferable for climatological purposes, but in this busy and mobile world, it is difficult to keep such stations. The next best thing is a 'compatible' site that is close enough to the old site to expect records to be comparable and thus retain the ID and longevity characteristics of the original site. Mark Allamong will take over observations in Giles County from his site 4 miles SSE of Pearisburg (but only 1.5 miles from the Staffordsville 3 ENE site) beginning May 1, 2019. In addition to reporting daily precipitation and snowfall, his location along the banks of Walker Creek will also provide an extra set of eyes along this important tributary of the New River in Giles County.

Recent WFO Staff Changes

Turnover has been low at the Blacksburg WFO of late but we did fill a vacant spot in the Meteorologist ranks very recently. Reginald 'Reggie' Roakes reported to the WFO in mid-May. Here is his story in his own words:

My whole family is originally from the Lynchburg area but after several moves we finally ended up in Moundville, AL (near Tuscaloosa) where I went from 4th grade all the way to graduation. Right now, I am engaged to Ashley Max. We met at Mississippi State and she currently works for Smith and Nephew in Memphis, TN. Our wedding is set for October 5th this year and we are super excited! Growing up, I have always been big in the outdoors. That said, Blacksburg is like a dream-come-true for me! Kayaking, hiking, and caving are my top picks for getting outside, but anything outdoors is good to me. Since graduating high school, I have been attending school at Mississippi State. I earned my bachelor's degree last May and started working on my masters this past fall while working as a TA in the meteorology program. Finally, I'll wrap up with my weather experience: I started interning on the weekends for a local news station (WVUA TV) in Tuscaloosa my freshman year of college and became active in my local NWA AMS chapter freshman year and have remained active through my school career. My junior year, I started helping with the Vortex-SE research project and this year I have taken the responsibility of being the Memphis WFO launching site coordinator since MSU was requested to launch for them since they do not launch balloons.



New RNK Meteorologist, Reggie Roakes

Weather Safety 101 and SKYWARN

Spring and summer bring with them warm temperatures and outdoor activities along with the possibility of a whole range of weather hazards including severe storms, tornadoes, flooding and lightning. The NWS [Weather Safety web page](#) provides a wealth of information on all types weather and water hazards. If you are interested in helping the NWS in storm spotting and verification consider participating in the [SKYWARN](#) program. In addition, the NWS can always use new rain/snow observers for the [CoCoRaHS](#) network, especially in West Virginia!

Don't Just Stand There, Report Severe Weather!

Trained spotters or the public should report severe weather or flooding to the NWS via the [Blacksburg WFO website](#) Social Media (Twitter/Facebook) or SKYWARN: 1-800-221-2856.

'Is hail the size of a tennis ball is large enough to report?'



Blue Ridge Thunder

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