NORTHEASTERN STORM BUSTER

Spring, 2017 - VOL. 22, NO. 2

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FEATURES

DEPARTMENTS

Northeastern StormBuster is a semiannual publication of the National Weather Service Forecast Office in Albany, New York, serving the weather spotter, emergency manager, cooperative observer, ham radio, scientific and academic communities, and weather enthusiasts, all of whom share a special interest or expertise in the fields of meteorology, hydrology and/or climatology.

TEN NEAT CLOUDS

Evan L. Heller
Meteorologist, NWS Albany

There exist a number of cloud types based on genera as classified in the International Cloud Atlas. Each of these can also be sub-classified into one of several possible species. These can further be broken down into one of several varieties, which, in turn, can be further classified with supplementary features. This results in hundreds of different possibilities for cloud types, which can be quite a thrill for cloud enthusiasts. We will take a look at 10 of the rarer and more interesting clouds you may or may not have come across.

A. CLOUDS INDICATING TURBULENCE

1. **Altocumulus castellanus** – These are a species of mid-level clouds occurring from about 6,500 to 16,500 feet in altitude. They are very white and may take on the appearance of small battlements or jellyfish, usually containing both wispy and puffy parts. They are associated with moderate turbulence and a high mid-latitude lapse rate, and when these clouds are observed during the morning hours, they are an indication of high instability and a good likelihood of late afternoon and early evening thunderstorms. When seen in the late afternoon, however, they foretell of a fair weather night. While not a particularly rare cloud, they are more commonly seen in the Northeast during the warmer months.

Altocumulus castellanus over Sacramento, California on the morning of August 12, 2014. Photo courtesy of NWS Sacramento, CA.

2. **Kelvin-Helmholtz wave clouds** – Also known as "fluctus" or "billow" clouds, these are a special variety of cloud, occurring with Cirrus, Altocumulus, Stratocumulus, Stratus, and occasionally Cumulus, and are most often associated with mountainous terrain. When seen, they typically stick around for only a few minutes, making them especially rare to see. This is a cloud that occasionally occurs over the Adirondacks, and is the result of two layers of winds traveling at sharply different velocities caused by the effect of friction by the terrain on the lower layer. This results in the formation of turbulent eddies, and the typical vertical swirl pattern seen in rows of these clouds. They are a fascinating sight.

Kelvin-Helmholtz Wave Clouds. **Photo Courtesy of the National Center for Atmospheric Research (NCAR).**

3. **Lenticular clouds –** Often referred to as "mountain wave clouds" or "standing lenticular" (SL), these bright, stand-out clouds can be a species of: low-level Stratocumulus (SCSL), when they are also known as rotor clouds, or; high-level cirrocumulus clouds (CCSL). But in the Northeast, they are most often associated with mid-level altocumulus (altocumulus lenticularis, or ACSL). Their appearance can vary from 'subtle' to 'dramatic', the former of which is the one most observed in our neck of the woods, and the latter of which is usually reserved for more mountainous regions. Lenticular clouds form when wind encounters an obstruction, most often a mountain, and is forced into strong upflow, eventually condensing into clouds near the cold mountaintop. It appears to remain stationary for long durations, but is actually being subject to rapid changes in appearance due to strong shear. The size and overall dimension of a cloud is dependent upon the wind speed and the size of the obstruction.

Lenticular clouds in less mountainous regions tend to be more subtle, have a shorter lifespan, and can completely change appearance in the matter of just a minute or two. Aircraft avoid these regions because of the turbulent eddies that form within the cloud region. Due to the shape of these clouds, they are often mistaken for UFOs.

Lenticular Rotor Cloud (SCSL) over Dublin, Ireland. Photo courtesy of Omnisource5.

Lenticular altocumulus (ACSL) of duplicatus variety near Albuquerque, New Mexico on December 21, 2010. Note the multiple layers. Photo courtesy of Ethan Nelson (Source: NWS Albuquerque, NM).

4. **Mammatus clouds** – The "big mamma" of clouds, this is a species of cloud associated with several types of low-, mid- and upper-level clouds. Most of the time occurring in conjunction with thunderstorms, these dramatic bubbly-looking dark clouds result from the broad sinking of air through the cloud base, usually behind departing anvil thunderstorms. Contrary to popular belief, these clouds are almost never directly associated with tornadoes, and actually develop the vast majority of the time on the back side of a thunderstorm or cumulonimbus cloud, and are an indication of rapid stabilization of the atmosphere. These clouds can appear in one of many shades of gray, brown, green, blue, or even red.

Mammatus clouds. **Photo courtesy of NOAA.**

B. MUSHROOM CLOUDS

These are the same clouds as produced by the atomic bomb, but are more commonly produced from volcanic eruptions, and are not classified as a genera of cloud as they are vertically-induced special clouds existing through a deep column. The condensation is the result of super-hot air from the volcano driven miles high into the super-cold upper levels of the atmosphere, where these clouds are typically driven globally and can persist for days or longer. Bigger volcanic eruptions have resulted in short-term global cooling; the 1815 eruption of Mount Tambora in the

Dutch East Indies is an extreme example that produced the "Year Without a Summer" in 1816, which, as it was, occurred during a period called 'the little ice age". In North America, food shortages, and snow in July were some of the repercussions of this eruption due to the massive cloud shield that obstructed the insolation needed to produce normal summer warmth. Mushroom clouds can be produced on an even smaller scale, such as with large localized fires or explosions, whether natural or man-made. Mushroom clouds often have a thunderstorm-like anvil where the air at the top disperses high up in the atmosphere. Lightning may also be produced. Also like a thunderstorm, there tends to be debris fallout; but this is from the solid particulate matter associated with the eruption or explosion, rather than from water-derived rain or hail. As one can see in the image below, mushroom clouds can spread out at various altitudes, producing other cloud types.

Ascending cloud from Redoubt Volcano, Alaska, from an eruption on April 21, 1990. The mushroom-shaped plume rose from avalanches of hot pyroclastic flows that cascaded down the north flank of the volcano.
Photo courtesy of The U.S. Geological Survey.

C. SPECIAL UPPER-ATMOSPHERIC CLOUDS

1. **Nacreous clouds–** Also known as "polar stratospheric cloud (PSC)" or "mother-of-pearl", this rare cloud comes in two types. All typically portray iridescence. The first of these is broken down into three sub-types: type 1a contains large, irregular solid particles of nitric acid trihydrate ($HNO_3 \cdot 3H_2O$); type 1b contains small supercooled liquid spheres of sulfuric acid (H_2SO_4) mixed with water, and; type 1c contains a mix of water-rich, solid nitric acid particles (not chemically bound with the water as in type 1a). Type 2 is more straight-forward, and consists of only water ice. This is probably the most common type. Nacreous

clouds occur at altitudes between 49,000 and 82,000 feet, just above the level of the highest cirrus clouds, and are best visible during civil twilight, or several hours after sunset, and mainly in winter. They are mostly limited to Scandinavia, Alaska and northern Canada, but can also form with mountain wave clouds (which they may somewhat resemble) at lower latitudes, although this is rare.

Type 2 nacreous cloud, brightly lit above darker tropospheric clouds around sunset.
Photo courtesy of Mark R. Schoeberl, NASA GSFC.

2. **Noctilucent clouds–** Made up entirely of ice crystals, these highest of all clouds can be observed throughout the night because they exist way up in the upper atmosphere at altitudes of typically 47 to 53 miles, where diffuse sunlight reflects off the ice particles deep into the night. These clouds are as rare as the existence of ice particles at these altitudes that make them up. They bear a resemblance to the soft look of cirrus, and the color is generally white to pale blue, but may also tend toward red or green. Usually seen at latitudes from 50° to 65° in the Northern Hemisphere, they have very rarely been seen at even lower latitudes. They are a sight to behold!

Sign up for a spring SKYWARN session.
Find your location.
Listings beginning on page 13.

Noctilucent clouds over Stockholm, Sweden, July 12, 2014. Photo courtesy of Kevin Cho.

D. ARCUS CLOUDS: DIRECTLY RELATED TO THUNDERSTORMS

1. **Roll clouds-** This first of the two main types of arcus clouds is a low, horizontal tube-shaped cloud associated with a thunderstorm gust front, or cold front along a line of thunderstorms. It forms as the result of cool, sinking air at the leading edge of the front undercutting and lifting the warm air being drawn into the storm's updraft, which condenses and rolls with the shear of the winds. Unlike shelf clouds, which stay with the thunderstorm, roll clouds 'roll out' well ahead of the storm.

A roll cloud associated with a severe thunderstorm over Racine, Wisconsin. (Source: public domain)

2. **Shelf clouds –** Most often associated with thunderstorm gust fronts, this is a horizontal wedge-shaped arcus cloud. Unlike a roll cloud, it remains attached to the base of a portion of the cloud that is part of the thunderstorm. This is because they lack the amount of vertical shear associated with roll clouds. It usually takes a trained eye to be certain which of the two types of arcus clouds is being observed because young roll clouds can look very similar to shelf clouds.

A gust front shelf cloud on the leading edge of a derecho-producing convective system on the evening of July 10, 2008 in Hampshire, Illinois. The derecho had formed around noon in southern Minnesota.
Photo courtesy of Brittney Misialek (Source: NOAA's Storm Prediction Center).

E. A "NEW" CLOUD: ASPERITAS

Proposed in 2009 and classified in March 2017 as a new type (formerly undulatus asperatus), this cloud, resembling traditional undulatus, is actually a stable cloud type which has been observed to be unassociated with storm formations. Its appearance is dark, wild and foreboding, and although considered a rarity, chances are you've seen it at least a couple of times and possibly mistaken it for one of the various undulatus varieties. The sight of this cloud covering the sky is not something one soon forgets. It is an awesome sight yet it is as harmless as a mouse. In the U.S., they are actually most popular in the Plains following overnight or early-day thunderstorms, behind the system that brought them. Based on research, evidence suggested they were not actually related to undulatus, thus the new classification. It is the first new classification of a cloud type by the World Meteorological Organization (WMO) in more than 65 years. They are known as either Stratocumulus stratiformis opacus asperitas or Altocumulus stratiformis opacus asperitas, depending upon their altitude.

Altocumulus stratiformis opacus asperitas over Shorewell Park, Australia on February 20, 2004.
Photo courtesy of Gary McArthur. (Source: The International Cloud Atlas)

There are many other interesting and unusual cloud types, but these ten could easily contend for Top 10 status. If you would like to access a world of information about clouds, visit the on-line International Cloud Atlas at:
https://www.wmocloudatlas.org/home.html

BECOME A WEATHER-READY NATION AMBASSADOR!

Christina Speciale
Meteorologist, NWS Albany

Are you a leader in your community or work place? Do you want to ensure you and the ones you work with are ready for whatever Mother Nature throws your way? If so, consider becoming a Weather-Ready Nation (WRN) Ambassador! It is an initiative run by the National Oceanic and Atmospheric Administration (NOAA) aimed at improving the nation's preparedness for, and resilience against, extreme weather phenomenon, ranging from snow and ice storms to flash floods, severe weather and lightning, and everything in between. NOAA strives to recognize and collaborate with our core partners at the local, state and federal levels to unify our efforts in building a nation that is ready for, and

responsive to, all types of weather. Let's join forces and help mitigate Mother Nature's impacts together!

Becoming an ambassador is simple! All you need is to have a commitment to communicate Weather-Ready Nation messages to your stakeholders, engage and collaborate with NOAA employees, and educate others on weather preparedness and safety strategies. Of course, we want to hear from you the next time a weather hazard affects your area. Tell us how the Weather Ready Nation strategies improved your recovery time and minimized the impacts.

Keep in mind that NOAA is here to help you become an ambassador and will provide you with all the tools you need to become a weather leader in your community or work place, and an inspiration to others. You can expect plenty of outreach and educational content from us explaining weather hazard safety tips for both the warm and cold season, and how to interpret watches, warnings and advisories issued by the National Weather Service. You'll learn how to reduce your weather risks, and you'll have an opportunity to work with us…your local National Weather Service Office here in Albany…to determine how we can reach the people in your community or organization and work towards a common goal of fulfilling the Weather-Ready Nation mission.

Ambassadors serve as crucial partners and are a vital piece of the larger-scale, national connecting hub of agencies including: emergency managers; city planners; members of the media; nonprofit organizations; school officials, and environmental groups; all working together to improve our national resiliency against extreme weather events. Become an ambassador at:
http://www.nws.noaa.gov/com/weatherreadynation/amb_tou.html, or contact NWS Albany meteorologist Brian Montgomery at **brian.montgomery@noaa.gov** if you have any questions.

AMBASSADOR™
WRN
WEATHER-READY NATION

INTERESTED IN CoCoRaHS?

Jennifer Vogt Miller
Meteorologist, NWS Albany, NY

CoCoRaHS stands for the Community Collaborative Rain, Hail and Snow Network. It was founded in 1998 by the Colorado Climate Center at Colorado State University after a severe flood affected Fort Collins the previous year.

CoCoRaHS is a network of volunteers of varying ages from across New York and the United States, Canada, and the Bahamas who collect precipitation data on a daily basis. This information is then used by several organizations and professionals across the country, such as the National Weather Service, State Climatology Offices, meteorologists, hydrologists, etc., to create maps and other educational tools necessary for the understanding of local and national climatology.

Left: A 4-inch diameter rain gauge that CoCoRaHS observers use to collect rainfall. The large diameter allows a representative amount of precipitation to filter into the gauge so observers can record an accurate total for each event.

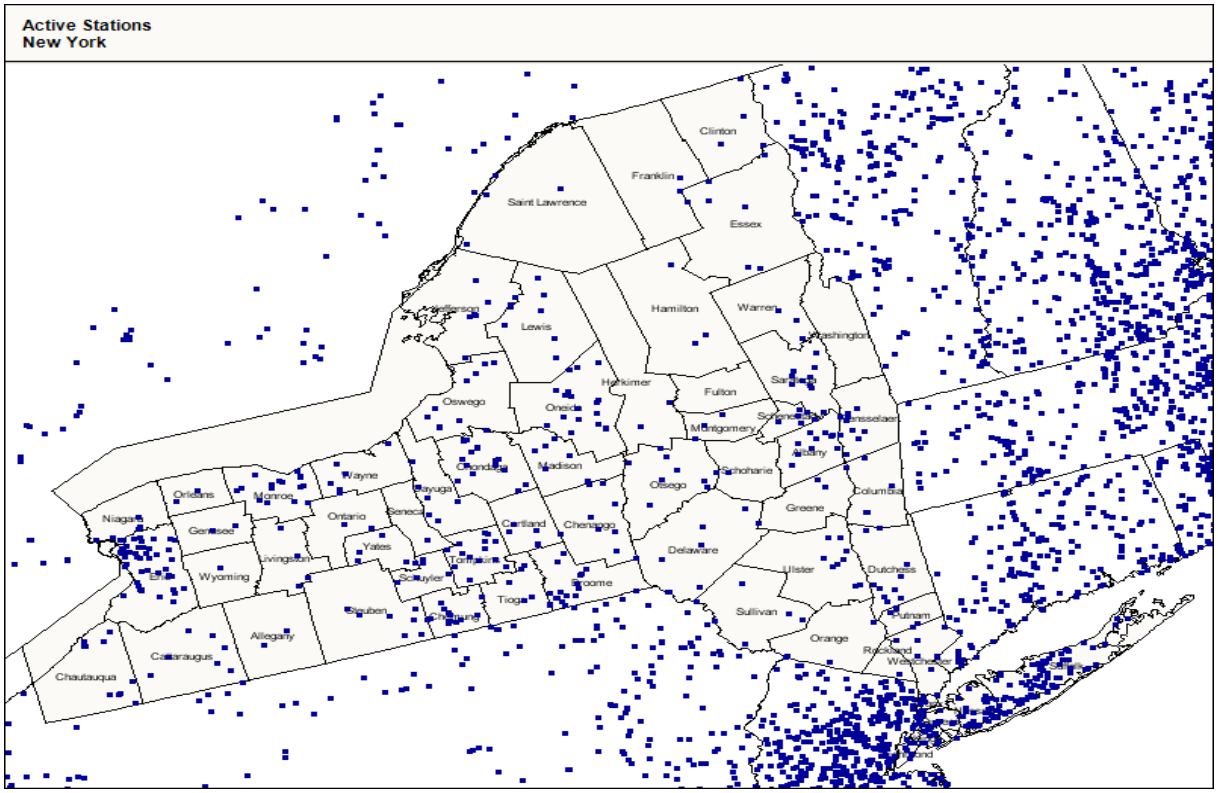
New York's Volunteer Network

The CoCoRaHS network of volunteer observers is essential for gathering representative data of precipitation in the state of New York, as well as across the country. New York's network consists of approximately 550 active observers, with 77 active observers in Eastern New York. Below is a map of all the CoCoRaHS observers across New York, which also displays the CocoRaHS sights in our surrounding areas, including an additional 33 observers in our office's four western New England counties.

You're just a couple of pages away from…

SPRING 2017 SKYWARN SPOTTER TRAINING SESSIONS

SIGN UP TODAY!



Locations of the CoCoRaHS observers across New York. Some of the counties in Eastern New York have only 2 or fewer CoCoRaHS observers.

When an observation is taken, the information can be submitted directly to the CoCoRaHS website or through the CoCoRaHS app. The information is then readily available for mapping, and if intense precipitation is reported, the information can be sent directly to the National Weather Service Office for meteorologists to use in conjunction with warnings or watches.

How to Join CoCoRaHS

Simply visit www.cocorahs.org and click "Join" in the upper right-hand side of the page, and fill in your information. Soon after submitting your application, you will receive an automatic email from CoCoRaHS containing your login and password information along with a station ID. You will also receive a welcome email from your local coordinator which should include a CoCoRaHS observer's guide and other training materials. The last step in becoming an observer is to purchase a rain gauge ($30) by visiting: http://www.weatheryourway.com/cocorahs/store.html.

SPRING 2017 SKYWARN SPOTTER TRAINING SESSIONS

Courtesy of John Quinlan, Senior Forecaster, NWS Albany

4/3/17 **700PM - 900 PM** **GO-TO-MEETING** **ALBANY, NY**
Mon. Go To Meeting Online Webinar
Sign up and instructions will be sent to the email address you provide.

4/12/17 **630PM -830 PM** **HERKIMER COUNTY** **GERMAN FLATTS, NY**
Wed. TOWN BUILDING
555 SR 5S

4/17/17 **700PM - 900 PM** **COLUMBIA COUNTY** **CHURCHTOWN, NY**
Mon. FIRE HOUSE
2219 COUNTY ROAD 27

4/24/17 **700PM - 900 PM** **WARREN COUNTY** **QUEENSBURY, NY**
Mon. UNO PIZZA
900 SR 9

4/25/17 **700PM - 900 PM** **ULSTER COUNTY** **KINGSTON, NY**
Tues. HOSE #5 FIRE HOUSE
830 ULSTER AVE.

5/1/17 **630PM -830 PM** **LITCHFIELD COUNTY** **WINSTED, CT**
Mon. SECOND FLOOR BLUE ROOM
338 MAIN ST.
ENTER THROUGH POLICE DEPARTMENT MAIN ENTRANCE

5/2/17 **700PM - 900 PM** **BENNINGTON COUNTY** **MANCHESTER CENTER, VT**
Tues. EMERGENCY OPERATIONS CENTER UPSTAIRS
6041 MAIN ST.

5/3/17 **700PM - 900 PM** **BERKSHIRE COUNTY** **PITTSFIELD, MA**
Wed. BERKSHIRE MEDICAL CENTER AUDITORIUM
725 NORTH STREET

5/4/17 **600PM -800 PM** **GREENE COUNTY** **CAIRO, NY**
Thu. COMMUNITY ROOM
CAIRO PUBLIC LIBRARY
15 RAILROAD AVE.

5/8/17 **700PM - 900 PM** **SARATOGA COUNTY** **WILTON, NY**
Mon. WILTON EMS STATION
1 HARRAN LANE

5/9/17 **630PM - 830 PM** **WINDHAM COUNTY** **TOWNSHEND, VT**
Tues. GRACE COTTAGE HOSPITAL HEINS BUILDING
133 GRAFTON RD ON ROUTE 35

5/10/17 **700PM - 900 PM** **WASHINGTON COUNTY** **FORT EDWARD, NY**
Wed. MUNICIPAL CENTER BUILDING B
TRAINING ROOM 1 IN THE BASEMENT
383 BROADWAY

5/11/17 **700PM - 900 PM** **DUTCHESS COUNTY** **POUGHKEEPSIE, NY**
Thu. EMERGENCY MANAGEMENT OFFICE
TRAINING ROOM 113
392 CREEK RD.

5/12/17 **730PM - 930 PM** **ALBANY COUNTY** **BETHLEHEM, NY**
Fri. BETHLEHEM TOWN HALL
445 DELAWARE AVE.

5/15/17 **700PM - 900 PM** **HAMILTON COUNTY** **LAKE PLEASANT, NY**
Mon. LAKE PLEASANT FIRE DEPARTMENT
CR11/SOUTH SHORE RD.

5/16/17 **700PM - 900 PM** **RENSSELAER COUNTY** **HOOSICK FALLS, NY**
Tues. NORTH HOOSICK FIRE DEPARTMENT
22106 SR 22

5/17/17 **700PM - 900 PM** **FULTON COUNTY** **JOHNSTOWN, NY**
Wed. FULTON COUNTY OFFICE COMPLEX
EMERGENCY OPERATIONS CENTER IN THE BACK
2712 SR 29

5/18/17 **700PM - 900 PM** **MONTGOMERY COUNTY** **FULTONVILLE, NY**
Thu. MONTGOMERY COUNTY EMO
PUBLIC SAFETY FACILITY
200 CLARK DRIVE

5/22/17 **700PM - 900 PM** **SCHOHARIE COUNTY** **COBLESKILL, NY**
Mon. MOSA ADMINISTRATIVE BUILDING
2783 SR 7

6/9/17 **700PM - 900 PM** **ADVANCED SESSION** **GO-TO-MEETING**
Fri. Go To Meeting Online Webinar
Sign up and instructions will be sent to the email address you provide.

6/12/17 **700PM - 900 PM** **ADVANCED SESSION** **GO-TO-MEETING**
Mon. Go To Meeting Online Webinar
Sign up and instructions will be sent to the email address you provide.

ALBANY SEASONAL CLIMATE SUMMARY

Evan L. Heller, Climatologist

Records or values of note highlighted in yellow.

STATS

	DEC	JAN	FEB	SEASON
Average High Temperature/Departure from Normal	37.7°/+1.9°	37.1°/+6.5°	42.7°/+8.1°	39.2°/+5.6°
Average Low Temperature/Departure from Normal	23.0°/+1.8°	24.0°/+9.5°	23.9°/+6.6°	23.6°/+5.9°
Mean Temperature/ Departure From Normal	30.3°/+1.8°	30.6°/+8.0°	33.3°/+7.4°	31.4°/+5.8°
High Daily Mean Temperature/Date	43.5°/1st	49.0°/12th	57.5°/24th	
Low Daily Mean Temperature /Date	11.0°/16th	12.5°/9th	13.0°/10th	
Highest Temperature reading/Date	50°/1st	54°/12th	74°/24th	
Lowest Temperature reading/Date	1°/16th	4°/9th	3°/10th	
Lowest Maximum Temperature reading/Date	21°/16th	21°/7th & 9th	23°/10th	
Highest Minimum Temperature reading/Date	37°/1st	44°/12th	41°/23rd & 24th	
Total Precipitation/Departure from Normal	1.75"/-1.18"	3.13"/+0.54"	2.85"/+0.65"	7.73"/+1.26"
Total Snowfall/Departure from Normal	12.1"/-1.6"	4.6"/-13.0"	22.2"/+9.8"	38.9"/-4.8"
Maximum Precipitation/Date	0.29"/18th	1.08"/24th	0.71"/25th	
Maximum Snowfall/Date	2.4"/12th & 17th	1.7"/31st	11.2"/9th	

Table 1

NORMALS, OBSERVED DAYS & DATES

NORMALS & OBS. DAYS	DEC	JAN	FEB	SEASON
NORMALS				
High	35.8°	30.6°	34.6°	33.6°
Low	21.2°	14.5°	17.3°	17.7°
Mean	28.5°	22.6°	25.9°	25.6°
Precipitation	2.93"	2.59"	2.20"	7.72"
Snow	13.7"	17.6"	12.4"	43.7"
OBS TEMP. DAYS				
High 90° or above	0	0	0	0/90
Low 70° or above	0	0	0	0/90
High 32° or below	6	8	5	19/90
Low 32° or below	26	22	24	72/90
Low 0° or below	0	0	3	3/90
OBS. PRECIP DAYS				
Days T+	25	26	22	73/90/81%
Days 0.01"+	14	13	9	30/90/40%
Days 0.10"+	7	6	4	17/90/19%
Days 0.25"+	3	5	4	12/90/13%
Days 0.50"+	0	2	4	4/90/7%
Days 1.00"+	0	1	0	1/90/1%

Table 2a

NOTABLE TEMP, PRECIP & SNOW DATES	DEC	JAN	FEB
Major Snow Event	-	-	12.2" (9th-10th)

Table 2b

RECORDS

ELEMENT	DECEMBER	
None	-	-

Table 3a

ELEMENT	JANUARY	
Daily High Mean Temperature | Previous Record/Year	49.0°/12th	45.0°/1885
Daily High Minimum Temperature | Previous Record/Year	44°/12th	36°/2013
Top 10 Warmest Mean Maximum Januaries Value/Rank | Remarks	24.0°/#10	tie
Daily Maximum Precipitation Value/Date | Previous Record/Year	1.08"/24th	0.94"/1923
Daily Maximum Wind Speed Value/Direction/Date | Previous Record/Direction/Year	50 mph/S/11th	49 mph/W/1990

Table 3b

ELEMENT	FEBRUARY	
Daily Maximum Temperature Value/Date | Previous Record/Year	69°/23rd	62°/1984
Daily Maximum Temperature Value/Date | Previous Record/Year	74°/24th	65°/1985
Daily Maximum Temperature Value/Date | Previous Record/Year	70°25th	67°/1976
Daily High Mean Temperature | Previous Record/Year	55.0°/23rd	48.0°/1981
Daily High Mean Temperature | Previous Record/Year	57.5°24th	53.5°/1985
Daily High Mean Temperature | Previous Record/Year	53.5°/25th	47.5°/1891
Top 10 Warmest Februaries Value/Rank | Remarks	33.3°/#3	-
Top 10 Warmest Mean Maximum Februaries Value/Rank | Remarks	42.7°/#2	-
Top 10 Warmest Mean Minimum Februaries Value/Rank | Remarks	23.9°/#3	-
Daily Maximum Wind Speed Value/Direction/Date | Previous Record/Direction/Year	43 mph/W/6th	41 mph/W/2011
Top 100 All-Time Snowiest Months Value/Rank | Remarks	22.2"/#79	tie

Table 3c

ELEMENT	WINTER	
None	-	-

Table 3d

MISCELLANEOUS
DECEMBER

Average Wind Speed/Departure from Normal	8.8 mph/+0.3 mph
Peak Wind/Direction/Date	43 mph/WNW/30th
Windiest Day Average Value/Date	17.1 mph/18th
Calmest Day Average Value/Date	2.8 mph/7th
# Clear Days	0
# Partly Cloudy Days	20
# Cloudy Days	11
Dense Fog Dates (code 2)	17th & 29th
Thunder Dates (code 3)	none
Sleet Dates (code 4)	none
Hail Dates (code 5)	none
Freezing Rain Dates (code 6)	none

Table 4a

JANUARY

Average Wind Speed/Departure from Normal	8.1 mph/-0.6 mph
Peak Wind/Direction/Date	50 mph/S/11th
Windiest Day Average Value/Date	16.4 mph/11th
Calmest Day Average Value/Date	1.6 mph/2nd
# Clear Days	0
# Partly Cloudy Days	18
# Cloudy Days	13
Dense Fog Dates (code 2)	4th, 19th, 21st & 22nd
Thunder Dates (code 3)	none
Sleet Dates (code 4)	none
Hail Dates (code 5)	none
Freezing Rain Dates (code 6)	24th

Table 4b

FEBRUARY

Average Wind Speed/Departure from Normal	9.4 mph/+0.3 mph
Peak Wind/Direction/Date	45 mph/W/25th
Windiest Day Average Value/Date	20.0 mph/16th
Calmest Day Average Value/Date	3.3 mph/12th
# Clear Days	1
# Partly Cloudy Days	19
# Cloudy Days	8
Dense Fog Dates (code 2)	9th & 12th
Thunder Dates (code 3)	25th
Sleet Dates (code 4)	7th & 15th
Hail Dates (code 5)	none
Freezing Rain Dates (code 6)	7th

Table 4c

WEATHER WORD FIND

by Tom Wasula

Each word will be found in any one of 8 directions (vertical, horizontal or diagonals/forwards or backwards)

The solution to this puzzle will be provided in the fall issue.

Severe Weather

E A X B T D E H G Z K C Z U X S H Q D B
L N P P F U T C G O M U Q G D U K G J A
H E X R V O I T S T D M W V R P D B X L
Q H N B R L Y A G Z G U O V T E P E X N
M W V N Y C I W W N D L A H W R M M U X
Q P A A R F E V I R Z O U T N C H G P F
R D Z B V L W N N J Z N O A V E H A U F
O H V F T E T U M A D I C L R L M D E Q
E T L N P H N Q Y E Q M X E F L N V Q B
V D I M G S I R R U C B Q D H H E C D H
H M Z I I B Z S L D B U J P H V S L N L
D U L Y T O T Q E A O S G N I N R A W A
K S G B N O Y X L R T W T E Z S U O L M
G U S T R D U O L C L E N N U F E L Q F
I X B M T J T N M Z U H W B E M N P V E
Q W N Z X D W T L H G G L C U M T Q U Z
U X X C G I O R L J R T W H V R L Y S V
Y K D I N S H S A O B B N T P I S H P S
O B J Y F E C Y A S Q C L Z A K G T W K
N D W R W A L L C L O U D H E F V G G V

ANVIL
CUMULONIMBUS
DOWNBURST
FLASHFLOOD
FUNNELCLOUD
GUST
HAIL
LIGHTNING
SHELFCLOUD
SUPERCELL
THUNDERSTORM
TORNADO
WALLCLOUD
WARNING
WATCH

Winter '16-'17 Issue

Solution

```
Y T + + + + C + R L + + + + + + + + S L
D + E + R L + E F A M R O T S W O N S L
N + + E I + T + L K + + I C E + O + + I
I + L P L S + + U E D + + + + W + + + H
W U P + A S + + R E + R + + F + + + + C
R E + E + + + + R F + + A L + + + + + D
R + R M A J E C I F + + A O + + + + + N
+ O + + + + + + E E B K + + B + + + + I
N + + + + + + + S C E L + + + W + + + W
B L I Z Z A R D + T + + A + + + O + + +
+ + + + + + + + + + + + + C + + + N + +
+ + + + + + + + + + + + + + K + + + S +
+ + + + + + + + + + + + + + + I + + + +
+ + + + + + + + + + + + + + + C + + +
+ + + + + + + + + + + + + + + + E + +
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(Over,Down,Direction)
BLACKICE(11,8,SE)
BLIZZARD(1,10,E)
CLIPPER(7,1,SW)
FLURRIES(9,2,S)
ICE(13,3,E)
ICEJAM(9,7,W)
LAKEEFFECT(10,1,S)
NOREASTER(1,9,NE)
RULER(1,6,NE)
SLEET(6,5,NW)
SNOWBOARD(19,12,NW)
SNOWFLAKE(19,1,SW)
SNOWSTORM(19,2,W)
WINDCHILL(20,9,N)
WINDY(1,5,N)

From the Editor's Desk

This is the first semiannual issue of Northeastern StormBuster, now a publication issued in spring and fall only. There are some changes; my climate summary has become part of the *Departments* section, as it has been a regular part of StormBuster for many years. Also, because we offer spotter training sessions in spring and fall, we are attempting to make the SKYWARN sessions a regular part of each issue; so it, too, has been added to the *Departments* section.

In this issue, we open with a look at 10 very interesting clouds, one of which was classified just one day after I thought I was finished writing the article. Then, we provide you with an opportunity to become both a Weather-Ready Nation Ambassador, and a member of the CoCoRaHS community of observers, with feature articles contributed by two of our new staff members here at the Albany National Weather Service. We hope you will

enjoy our slightly revised format as much as you will the warmer weather ahead. See you in fall!

WCM Words

Steve DiRienzo
Warning Coordination Meteorologist, NWS Albany

The National Weather Service (NWS) has a long history of partnerships with citizens who provide environmental data important to observing and forecasting weather and river conditions. The NWS Cooperative Observing Program dates back to 1890 and is one of the original "Citizen Science" programs.

The NWS continues to depend on support from the general public in two key programs: SKYWARN Spotters and Cooperative Observers. In both these programs, volunteers provide vital, real-time observational data. We are always looking for additional storm spotters and observers of the weather. With today's technology, it is super easy to report your observations.

SKYWARN storm spotters form the Nation's first line of defense against severe weather. The efforts of these volunteers have given communities the precious gift of time--seconds and minutes that can help save lives. They do this by providing ground truth information that helps confirm what NWS meteorologists see on WSR 88-D Radar scans and satellite imagery.

CoCoRaHS observers generally record precipitation daily, and electronically send those reports daily to the NWS and the National Climatic Data Center (NCDC). CoCoRaHS observers are not required to take any tests, but there is free online training available.

Hopefully we'll see you at one of our spring SKYWARN training classes. A list of dates and times is above. If you can't make it to one, that's OK because we are offering a couple of them online in real time. If you want to get involved in citizen science, join CoCoRaHS. More information on CoCoraHS can be found at: https://www.cocorahs.org/.

Here at the National Weather Service, we strive to be the source of unbiased, reliable and consistent weather information. We're here to answer your weather and water questions 24 hours a day, 7 days a week. If you have concerns, please call us. If you have comments on Northeastern StormBuster, or any of the operations of the National Weather Service, please let me know at Stephen.Dirienzo@noaa.gov.