NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Columbia, SC
Weather Forecast Office

FAMOUSLY HOT

FORECASTS

Spring/Summer 2021

Inside this issue:

10th Anniversary of the 2011 "Super Outbreak"

by Rich Okulski - Meteorologist in Charge

On April 28, 2011 then WFO Memphis Warning Coordination Meteorologist Rich Okulski departed his office with fellow manager, Data Acquisition Program Manager Zwemer Ingram to survey severe tornado damage in Smithville, Mississippi. Rich received a call from Mississippi Emergency Management Agency coordinator Tracy Pharr while driving across Northern Mississippi. She urgently asked how long it would take them to reach the town. Rich heard the anxiety in her voice and asked whether the damage was "not as bad or worse" than the EF-4 damage tornado in Yazoo City in 2010. She said "worse" without hesitation. Rich called his regional headquarters, informed them that Smithville could be a rare EF-5 damage tornado, and asked whether he could make the call at the site. Regional headquarters gave Rich permission to make the call.

Rich and Zwemer reacted with both awe and horror as they drove through Smithville on their way to the Incident Command Post. Zwemer immediately thought back to the 1974 Super Outbreak which he lived through as a teenager. Rich thought back to his memories of the bombing damage inflicted on Safwan, Iraq by the U.S. Air Force during the First Gulf War. They spent most of the day surveying incredible tornado damage which both of them hope to never witness again.

EF-5 damage to a well-built, anchored home in Smithville, MS.

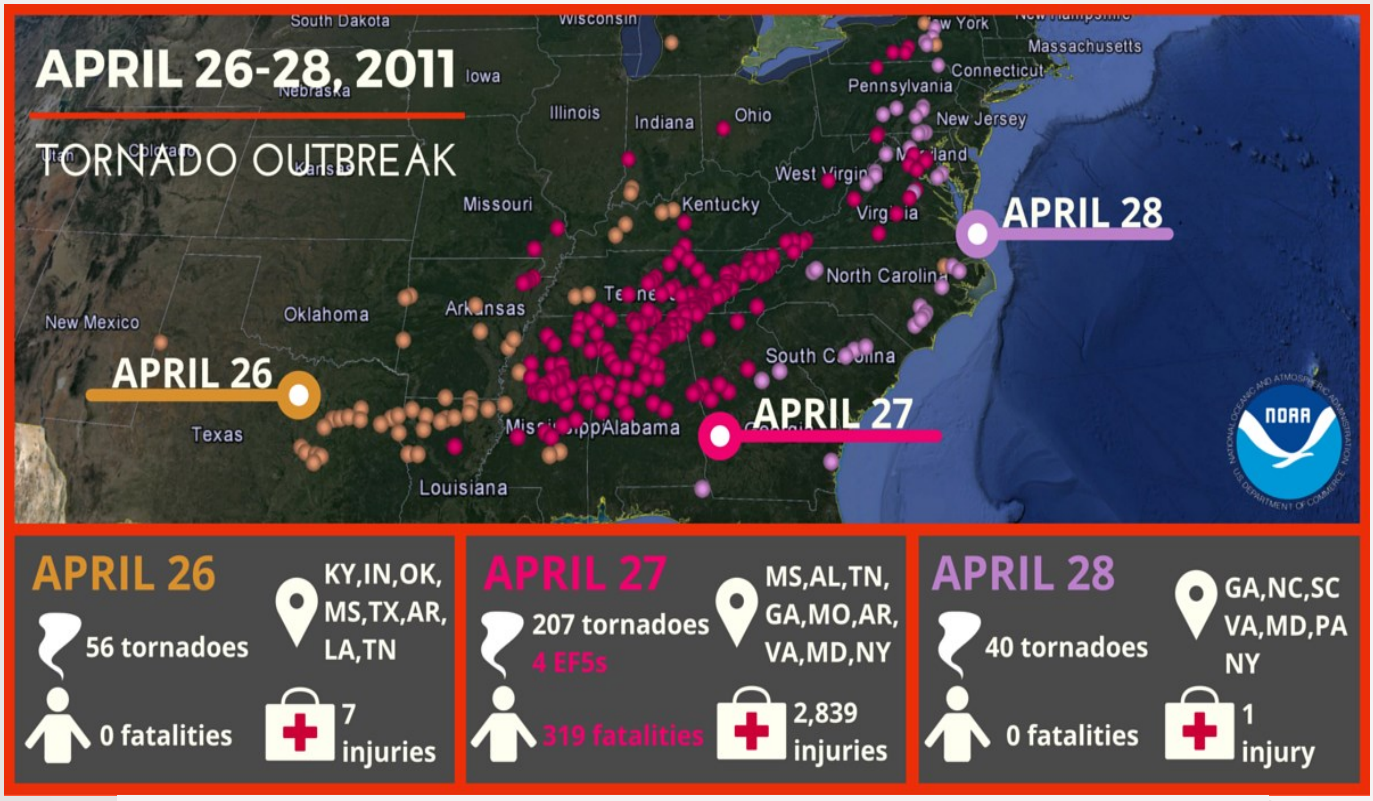
Ford Explorer that was thrown into a water tower

Super Outbreak – Continued

The most notable damage included the complete destruction of the police station and post office, a Ford Explorer hurled ½ mile into one of the town's water towers which then caromed another ¼ mile prior to ground impact, a 1965 Chevy pickup which could not be found in town, a house which had two ends still standing but the middle gone, and mangled home appliances. Rich rated the first EF-5 damage tornado in Mississippi since 1966 and the first EF-5 for the 2011 Super Outbreak.

Sixteen people lost their lives and another forty were injured. Rich remembered an emergency responder who smoked as she recounted one of Smithville's tragic stories despite the smell of propane in the air from broken pipes. A babysitter in a well constructed home died when the violent tornado demolished the structure. She saved the two children in her care by covering them with her body. Emergency responders evacuated those children by air to Memphis, because they had been impaled by debris. The situation could have been far worse, however the county emergency manager in coordination with the NWS Memphis office kept students from departing the town's schools which were not in the tornado's path.

The 2011 Super Outbreak was a once in a generation severe weather event. We must be prepared for the next outbreak of this magnitude through awareness, preparedness, and skilled execution. Our nation's citizens depend on it.



A look at the number of tornadoes from the April 2011 "Super Outbreak"
Graphic courtesy of NWS Mobile/Pensacola

Advancing Impact-Based Warnings

by Chris Landolfi - Meteorologist

National Weather Service offices across the country have been working to develop better impact-based warnings for emergency managers and the general public for almost ten years, ever since the 2011 tornado season which saw over 550 tornado fatalities. The idea is that not every warning is created equal. Minor roadway flooding does not necessitate a flash flood warning that activates wireless emergency alerts, which are alerts sent directly to mobile phones. Tornadoes and severe thunderstorms also do various degrees of damage. There needs to be a way to distinguish between particularly damaging and dangerous storms from ones that may just barely reach severe limits.

Minor Street Flooding (Left) versus 2015 Historic October Flood (Right)

Technology has advanced significantly in the past ten years with implementation of dual-polarization radar and so must our warnings. Some degree of impact-based wording has been applied to each severe thunderstorm, tornado, and flash flood warnings. Tornado and flash flood warnings are "tagged" based on their severity: "Base (no tag), Considerable, or Catastrophic (Emergency)." With each higher tag, the wording will become more urgent. For example, the words: "You are in a life-threatening situation" and "This is a Particularly Dangerous Situation" will be in the warning text.

Beginning this year (expected to be implemented July), severe thunderstorm warnings will also feature a tag: "Base (no tag), Considerable, and Destructive" based on both wind speeds and/or hail size. Storms that are expected to produce 80 mph winds or 2.75 inch hail will activate wireless emergency alerts.

	Base	Considerable	Catastrophic (Destructive)
Severe	58 mph wind 1" hail (quarter)	70 mph wind 1.75" hail (golf ball)	80 mph wind 2.75" hail (baseball)*
Flash Flood	Flash Flood Damage Possible	Unusually Severe Damage*	Major damage with water rising to levels rarely seen*
Tornado	Tornado Indicated or Observed*	High confidence in damaging tornado*	Observed damaging tornado near population center.*

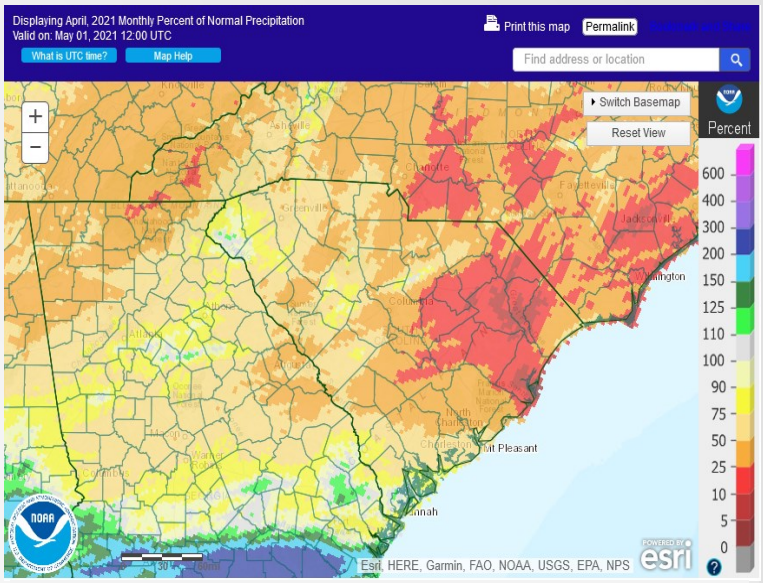
* indicates that Wireless Emergency Alerts are activated.

Ensure that you enable wireless emergency alerts on your mobile device and tell your friends and family to do the same! For more info, visit: weather.gov/wrn/wea

Missing Out on April Showers

by Chris Rohrbach - Meteorologist

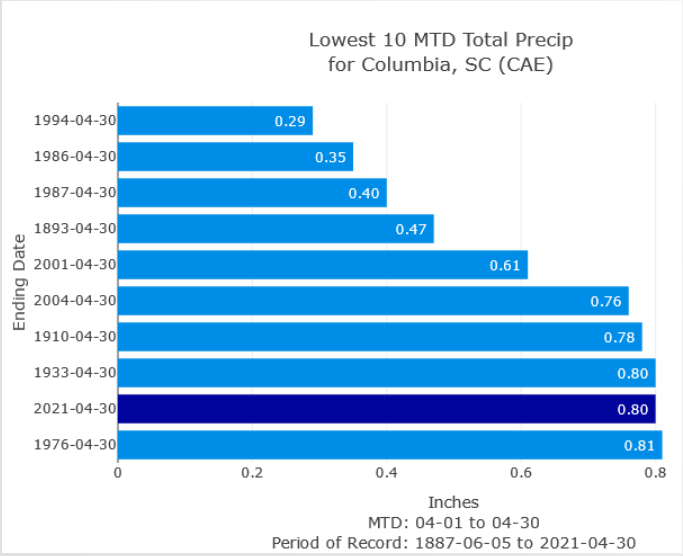
If the old adage holds true, anyone looking forward to flowers this May was surely disappointed. The past April was one of the driest on record for the Midlands of South Carolina. At the Columbia Metropolitan Airport the monthly rainfall total was 0.80 inches, about 30% of normal amounts. Perhaps worse off were the eastern Midlands and the Pee Dee. The figure on the right shows the percent of normal rainfall across the region for April 2021. Virtually all of central SC experienced below normal amounts. But Sumter, SC fared worse than most areas. The Cooperative Observer (COOP) station measured only 0.30 inches of rain for the month which is less than 10% of the station's normal amount. This is the lowest monthly rainfall total for any month since November of 2007 at the Sumter station.

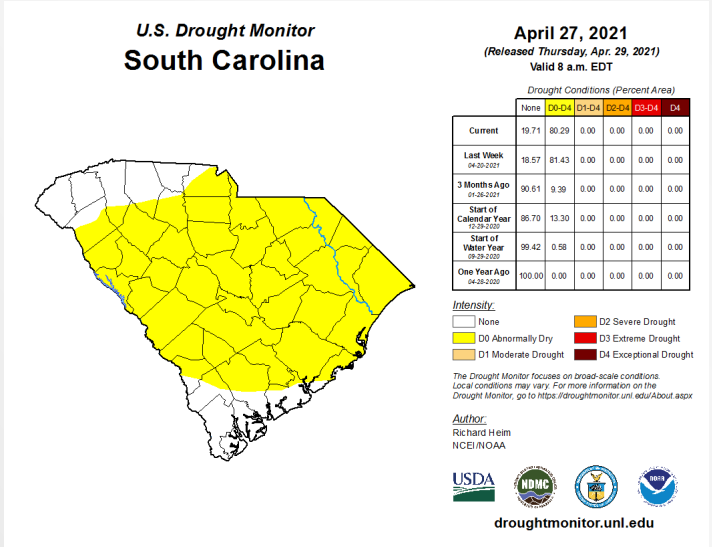


Percent Normal Precipitation during April 2021. Rainfall Data is Estimated.

The lack of rain brought South Carolina into the D0, or abnormally dry, category on the US Drought Monitor which is a group of agencies and organizations which map areas of drought in the United States. The group says that historically the D0 category can cause stunted crop growth, early irrigation and an increase in brush fires. In fact, on April 21st in Aiken county a wildfire began during the afternoon and burned about 90 acres and forced evacuations in a nearby subdivision.

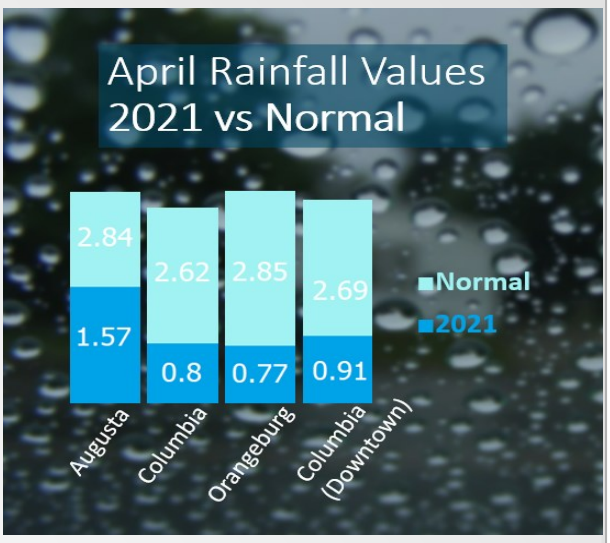
Two days in April carried the vast majority of the rainfall for the month. April 10th and 24th recorded 0.10 inches and 0.67 inches respectively at the Columbia Metro Airport. This accounted for a little over 96% of the monthly total. April 2021 was tied for the 8th driest April since precipitation records began for CAE.





Updated Climate "Normals"

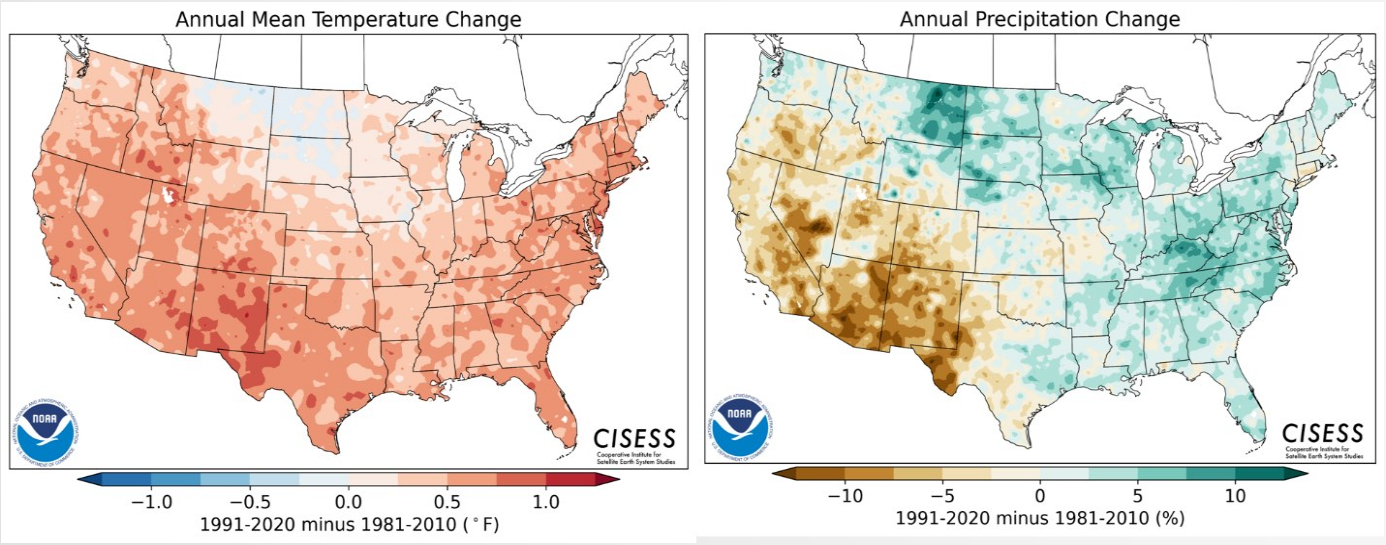
by Nicole Steeves and Dan Miller - Meteorologists



The sprinklers trying to revive the brown lawn that was perfectly green just last year. The seemingly endless pollen season. It doesn't take much to realize we got a below average amount of rain this April. To see just how dry it was, we turn to the records. There, we can get a numerical measurement of exactly how far off from average we were. But how is that average calculated?

A climate "normal" is a 30 year average of meteorological variables like precipitation and temperature at a given location. 30 years of data generally offsets the extremes and variations, such as ENSO (El Nino-Southern Oscillation), that we might see from one year to the next. Every ten years, these normals are updated to include data from the previous ten years.

The National Center for Environmental Information (NCEI) released the new set of 30-year climatological normals for the US in May, using weather observations taken during the 30 year period from 1991 through 2020. This includes new normal daily high and low temperatures and precipitation amounts, along with monthly and annual normals of temperature and precipitation. The previous dataset we were using covered the period 1981-2010. The next set of 30-year normals will cover the period 2001-2030, and will be updated and released in 2031. The 30-year time period standard for climatological normals was established by the World Meteorological Organization (WMO) early in the 20th century. The reason that a 30-year period was used was due to the fact that, at that time, many locations around the world only had around 30 years of continuous meteorological observations. The normals are used to compare climate from location to location, and also to compare changes in time at any given location. Note that daily/monthly record highs/lows and precipitation amounts still use the full dataset for the period of record of continuous observations. For Columbia, SC and Augusta, GA, we have continuous temperature and precipitation records dating back to the late 1800's.



Updated Climate "Normals" - Continued

How have the new climate normals changed in South Carolina and the Central Savannah River Area? In general, average temperatures are somewhat warmer than those from 1981-2010. Precipitation is somewhat higher as well. The increase in normal temperatures was greater at Augusta than Columbia. It is important to remember that normals characterize today's climate and do not track or define long-term trends or changes in climate. Changes vary from season to season and month to month. The new normals reflect average values during the most recent 30-year period of record. Any trends or comparisons between this dataset and the previous 30-year dataset do not necessarily predict a continued similar trend in the future!

Below are some tables showing how normal changed with the new 30 year dataset:

Columbia SC
Monthly/Annual Normal Average Temperature Comparison

Month	1981-2010 Normal	1991-2020 Normal	Difference
January	44.8	45.7	+ 0.9
February	48.5	49.1	+ 0.6
March	55.6	55.9	+ 0.3
April	63.4	64.1	+ 0.7
May	71.7	72.2	+ 0.5
June	79.1	79.1	0
July	82.2	82.4	+ 0.2
August	80.8	81.0	+ 0.2
September	74.7	75.5	+ 0.8
October	64.1	64.6	+ 0.5
November	54.8	54.0	- 0.8
December	46.7	47.7	+ 1.0
Annual	63.9	64.3	+ 0.4

Augusta GA
Monthly/Annual Normal Average Temperature Comparison

Month	1981-2010 Normal	1991-2020 Normal	Difference
January	45.4	47.4	+ 2.0
February	49.1	50.8	+ 1.7
March	55.9	57.5	+ 1.6
April	62.7	64.6	+ 1.9
May	71.1	72.7	+ 1.6
June	78.6	79.7	+ 0.9
July	81.6	82.8	+ 1.2
August	80.5	81.8	+ 1.3
September	74.6	76.4	+ 1.8
October	64.4	66.0	+ 1.6
November	55.2	55.6	+ 0.3
December	47.2	49.4	+ 1.8
Annual	63.9	65.4	+ 1.5

Columbia SC
Monthly/Annual Normal Precipitation Amount Comparison

Month	1981-2010 Normal	1991-2020 Normal	Difference
January	3.58"	3.49"	- 0.09"
February	3.61"	3.39"	- 0.22"
March	3.73"	3.57"	- 0.16"
April	2.62"	2.83"	+ 0.21"
May	2.97"	3.49"	+ 0.52"
June	4.69"	4.97"	+ 0.28"
July	5.46"	5.35"	- 0.11"
August	5.26"	4.65"	- 0.61"
September	3.54"	3.91"	+ 0.37
October	3.17"	3.13"	- 0.04"
November	2.74"	2.76"	+ 0.02"
December	3.22"	3.70"	+ 0.48"
Annual	44.59"	45.24"	+ 0.65"

Augusta GA
Monthly/Annual Normal Precipitation Amount Comparison

Month	1981-2010 Normal	1991-2020 Normal	Difference
January	3.91"	3.84"	- 0.07"
February	3.92"	3.67"	- 0.25"
March	4.18"	4.08"	- 0.10"
April	2.84"	2.92"	+ 0.08"
May	2.65"	3.05"	+ 0.40"
June	4.72"	4.75"	+ 0.03"
July	4.33"	4.48"	+ 0.15"
August	4.32"	4.61"	+ 0.29"
September	3.22"	3.60"	+ 0.38
October	3.27"	2.56"	- 0.71"
November	2.82"	2.66"	- 0.16"
December	3.39"	3.87"	+ 0.48"
Annual	43.57"	44.09"	+ 0.52"

Annual Number of Days ≥ 90F Comparison

Location	1981-2010 Normal	1991-2020 Normal	Difference
Columbia, SC	71.6	80.9	+ 9.3
Augusta, GA	82.0	86.3	+ 4.3

Average Date of the First Fall Freeze Comparison

Location	1981-2010 Normal	1991-2020 Normal	Difference
Columbia, SC	November 3rd	November 7th	4 days later
Augusta, GA	November 5th	November 9th	4 days later

Annual Number of Days ≤ 32F Comparison

Location	1981-2010 Normal	1991-2020 Normal	Difference
Columbia, SC	47.3	46.5	- 0.8
Augusta, GA	51.3	51.0	- 0.3

Average Date of the Last Spring Freeze Comparison

Location	1981-2010 Normal	1991-2020 Normal	Difference
Columbia, SC	March 30th	March 25th	5 days earlier
Augusta, GA	March 29th	March 23rd	6 days earlier

Virtual Partner and Community Outreach

by Chris Landolfi - Meteorologist

Every year, our office works to maintain relationships with the local community and our partners in central SC and east central GA. This past year, however, has been difficult with the COVID-19 pandemic preventing us from attending local community events, school talks, and spotter talks in person. Our office had to get creative to ensure that the partnerships we worked so hard to create did not dissolve. Using a variety of virtual platforms, we have been able to attend virtual career fairs, school talks, and storm spotter training.

Meteorologist Chris Landolfi leads a virtual Storm Spotter Training

One of the biggest events that we host is our annual Integrated Warning Team Meeting where we invite our core partners which consist of public safety officials, government partners, and members of the media, to discuss best practices and challenges in best serving the public. This helps us to better understand how our products are used and what ways we can improve in service to our partners. It also gives our partners insight as to how we operate in our office. While this event is usually held in person, this year we were able to successfully host it virtually with 71 attendees.

While we hope to be able to attend more events in person soon, utilizing virtual platforms will still help us. In the past, it has been difficult to reach some of the more remote communities that we serve, especially outside of central SC, where our office is located. Now with the virtual option always available to us, this will help us to reach out to even more schools, local communities, and potential storm spotters in the future as we share our passion for meteorology and introduce people throughout the area to their local National Weather Service Forecast Office.

MIC Rich Okulski and WCM John Quagliariello kick off our IWT

If you are an educator, local community leader, or just want to get a group together to have a meteorologist from our office give a presentation, please reach out by filling out this form on our website:

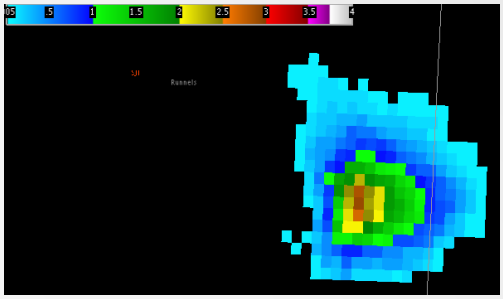
weather.gov/cae/outreach.html

Multi-Radar/Multi-Sensor: An Advanced Severe Weather Tool

by Frank Alsheimer - Science and Operations Officer

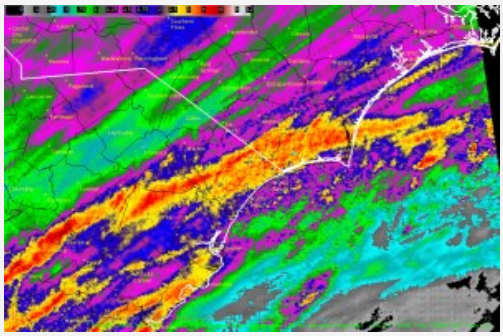
Meteorologists have a number of tools available to help with forecast and detection of severe convective weather, including large hail, damaging wind gusts, tornadoes, and flash floods. Doppler radar is probably the best known and most used tool, but satellite, lightning detection networks, surface observations, and forecast models all have a role. Looking at all the sources that are involved in the severe weather decision-making process can be a difficult task given the firehose of data meteorologists are bombarded with in a severe weather situation. However, there is a tool that can help with some of that data management. It is called the Multi-Radar/Multi-Sensor system. Designed by NOAA's National Severe Storms Lab (NSSL), the MRMS is "… a system with fully-automated algorithms that quickly and intelligently integrate data streams from multiple radars, surface and upper air observations, lightning detection systems, satellite observations, and forecast models. Numerous two-dimensional multiple-sensor products offer assistance for hail, wind, tornado, quantitative precipitation estimations, convection, icing, and turbulence diagnosis."
That's a mouthful for sure, so let's break it down into the categories of products the MRMS system produces.

1) Hail Detection
MRMS has products that estimate the probability hail in a given storm is reaching 1 inch in diameter or larger, as well as the expected size of the maximum hail stone within a given storm. It also creates a swath going back anywhere from 30 minutes to 24 hours, so a forecaster can see the hail trends for a given thunderstorm.



2) Rotation
MRMS has products that calculate the shear in low levels and mid levels of the atmosphere based on doppler radar radial velocity data. Increasing values of shear in the mid levels can indicate the development of a supercell, while increasing values of shear in the low levels can be an indicator a tornado is forming.

3) Precipitation Estimates
MRMS has a series of algorithms that determine how much rain is accumulating under a storm based on the intensity of radar echoes, as well as the environment near the storm. This is especially critical in areas where ground truth rain gauges do not report rainfall accumulation in real time. High rain rates in a short period of time are one of the key ingredients for flash flooding.



4) FLASH products
The MRMS FLASH products take the next step in aiding forecasters issue flash flood warning. They use the rainfall estimates from the precipitation products, as well as the antecedent soil conditions, to estimate the maximum streamflow in creeks and rivers over thousands of locations. This allows forecasters to target flash flood warnings to the most vulnerable areas.

To see more MRMS products, go to: https://mrms.nssl.noaa.gov/qvs/product_viewer/

Spring/Summer Weather Hazards

by Pierce Larkin - Meteorologist

Usually, the months of May through July feature our most interesting and brutal weather of the year. Temperatures warm to uncomfortable levels, thunderstorms are a daily threat, and our severe weather chances begin ramping up. There are many threats to be prepared for during the hottest portion of the year, and this article seeks to provide some tips to help be prepared!

Threats from thunderstorms usually are the first to ramp up during the summer time. Our severe weather reports typically begin to increase in frequency during the first week of May and continue to increase through early June, peaking, and then falling through mid-August. This owes to the gradual increase in daily thunderstorm coverage, and the occasional cold front that can still pass through or get hung up around our area in June. Usually, these are driven by wind and hail threats, as our tornado threat usually peaks in late winter and early spring.

As with any severe thunderstorm, you want to be sure you seek shelter inside your home and away from windows. This protects you in the case of a tree falling and hitting said window, or lightning striking a tree and causing damage that way! Lightning is another hazard we deal with in the summertime. Protecting yourself from it is similar to the steps you'd take during a severe thunderstorm. As long as it has been 30 minutes since the last time you heard thunder, you should be safe to return back to outdoor activities. Remember - When Thunder Roars, Go Indoors! As with any severe weather, feel free to send us hail or wind damage reports @NWSColumbia on Twitter or Facebook, but only after it is safe to do so!

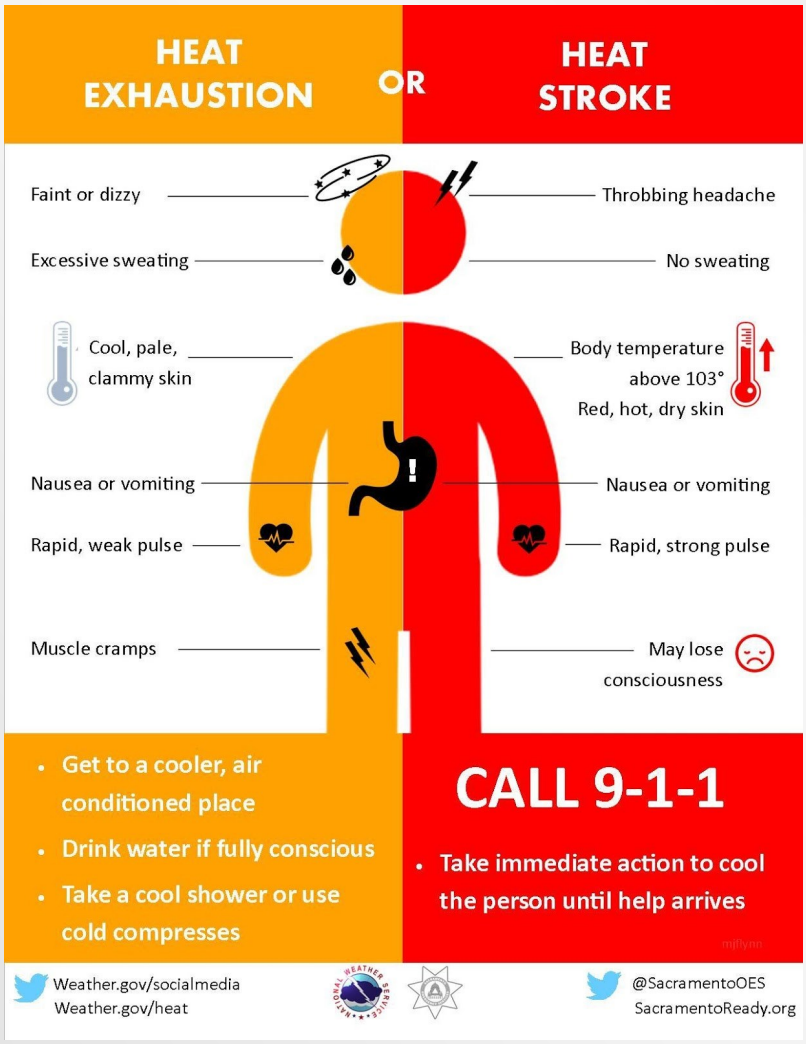
Another threat that we face with summer time thunderstorms is flash flooding. It occurs when rain or thunderstorms pour a high amount of rain (usually 2-3" or more) over a short amount of time (such as 1-3 hours). Flash flooding is the second leading cause of weather-related deaths in the US, and is almost always preventable! Flash flooding will cause creeks or streams to rise well above their normal pool and flood over roads. This includes regularly flood prone locations, exacerbating issues in those locations. The easiest way to protect yourself: TURN AROUND DON'T DROWN! Over half of flash flooding deaths are vehicle-related. It only takes 18-24" of water to sweep a vehicle away. If you come across a flooded roadway, always remember to Turn Around Don't Drown, and you will ensure your safety.

Weather Hazards—Continued

Heat is the other significant weather threat we face during the summer time. Central South Carolina and east-central Georgia regularly see temperatures in the upper 90s during the summer months, with oppressive humidity to boot. It can feel unbearable at times! To ensure you are as safe as possible in the heat, follow these tips:

- Take frequent breaks if you have outdoor activities
- Stay hydrated! Dehydration can lead to heat exhaustion or heat stroke.
- Pay attention to the signs of Heat exhaustion/stroke.
- Always check the backseat for children or pets before you exit your car. A car can become too hot for a child in as little as 10 minutes!
- Wear sunscreen or protective clothing on days with high Ultraviolet (UV) exposure to protect against skin damage.

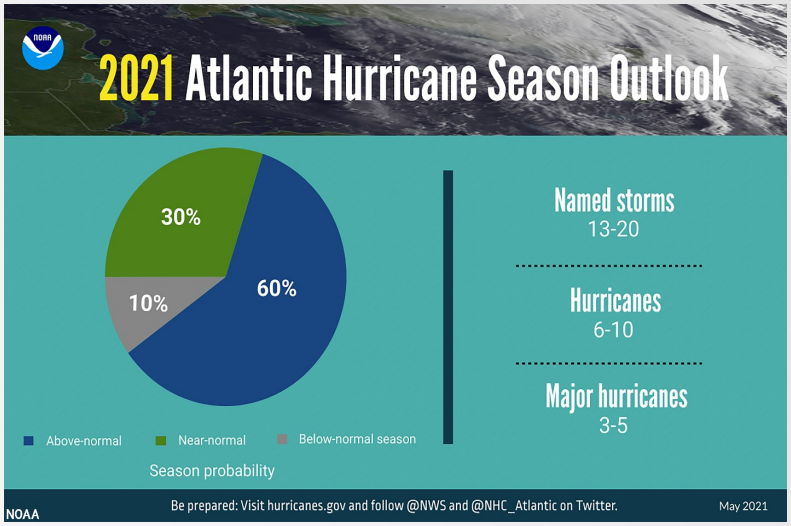
Heat is the leading cause of weather-related fatalities in the United States, and many can be prevented by following these steps and paying attention to warning signs.

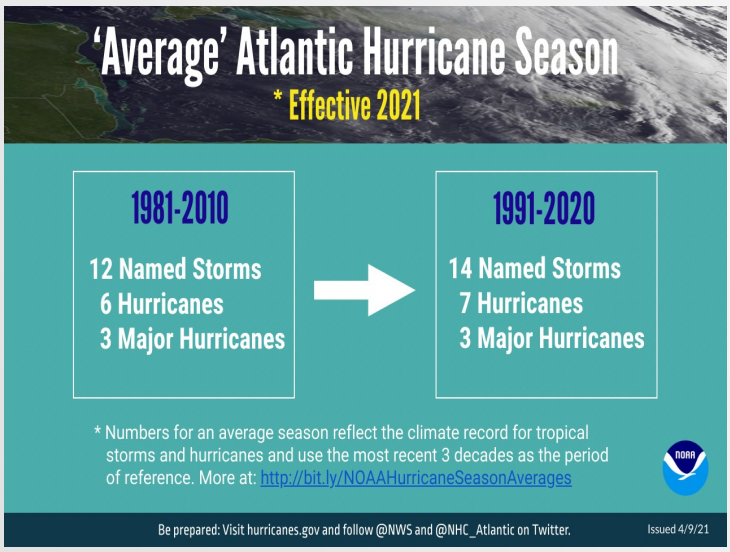


Tropical Outlook for 2021

by Dan Miller - Meteorologist

On May 20, NOAA's Climate Prediction Center released its Hurricane Outlook for the 2021 season. Forecasters predict a 60% chance of an above-normal season, a 30% chance of a near-normal season, and a 10% chance of a below-normal season. Factors supporting the above-normal season forecast include the fact that El Nino Southern Oscillation conditions are currently neutral and a weak La Nina condition may develop later this year. El Nino conditions typically reduce the number of tropical cyclones because it causes upper level wind shear which works against tropical cyclone development. A lack of El Nino conditions would provide a more favorable environment for tropical cyclone development. Other factors include the expectation of warmer than average sea surface temperatures, which provides more moisture and instability for cyclones to work with. Also, an enhanced West African monsoon season is expected. Clusters of thunderstorms moving west into the Atlantic from Sub-Saharan Africa, north of the Equator, can act as "seedlings", or "breeding grounds" from which tropical cyclones can develop. All official tropical cyclone forecasts are made by the National Hurricane Center in Miami, FL (hurricanes.gov). There is a wealth of information on their website, including tropical weather outlooks, forecasts, any watches/warnings, etc. NOAA will update the 2021 Hurricane Outlook in early August.





Updated Atlantic Hurricane "Normals"

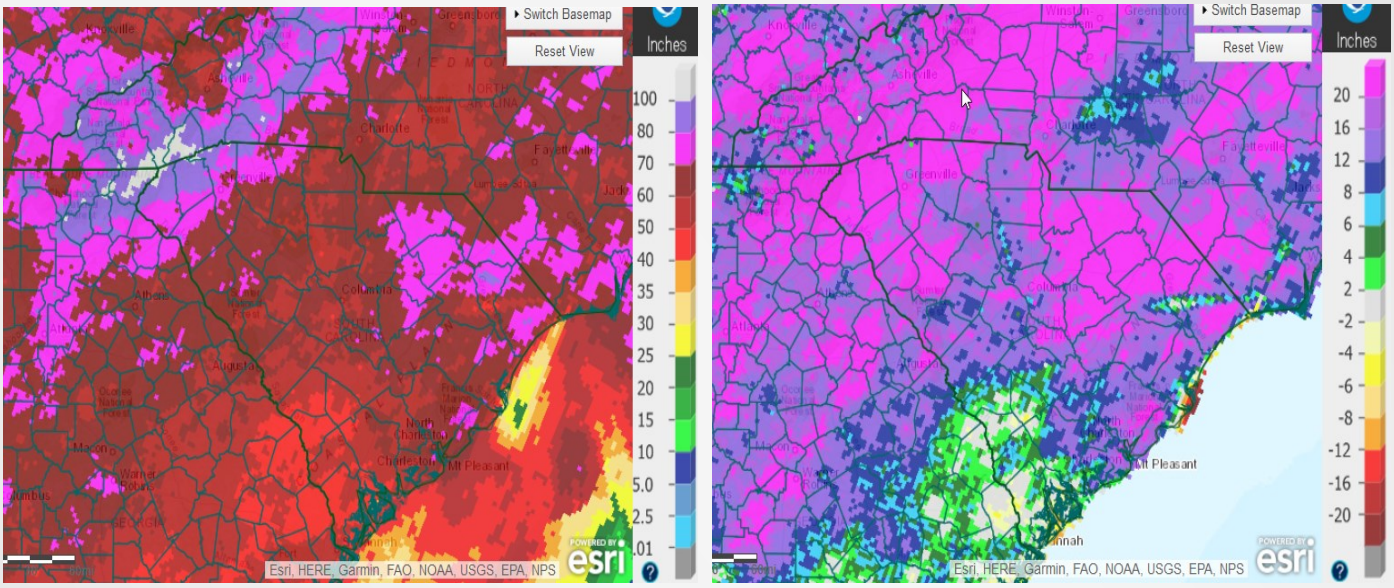
Similarly to our updated temperature and precipitation normals that were released this year, new 30-year averages were recently released by NOAA regarding the average number of named tropical cyclones, hurricanes, and "major" hurricanes (Category 3 or higher on the Saffir-Simpson Hurricane Intensity Scale) per year for the Atlantic, Caribbean Sea and Gulf of Mexico. The new averages, compared to the previous 1981-2010 dataset, reflect an increase in the average number of named storms from 12 to 14, a slight increase in the average number of hurricanes from 6 to 7, and no change in the average number of "major" hurricanes, per year. Despite an expectation of an above normal season, it is not likely that 2021 will feature as many storms as the record-breaking 2020 season. In 2020, there were 30 named storms, 12 of which made landfall in the continental US! This broke the previous record for the number of named storms in a season in the Atlantic Basin of 28 set in 2005.

Frequent River Flooding During 2020

by Leonard Vaughan - Senior Service Hydrologist

For those that live, work or drive near a major river, you may have noticed that the flows were high for much of 2020. Over the past 10 years, 2020 was the most active year for river flooding across South Carolina and east-central Georgia. The main contributor to river flooding is the frequency and occurrence of widespread heavy rainfall events.

For an idea of how abnormally high rainfall was for the year, here is some perspective by showing how much rain fell across the area compared to the departure from normal for the region. From the foothills of the Carolinas to the Midlands and CSRA the average precipitation for a year is around 46 inches. The table below also shows how the year ranked since records began for Columbia and Augusta as well as locations upstream.



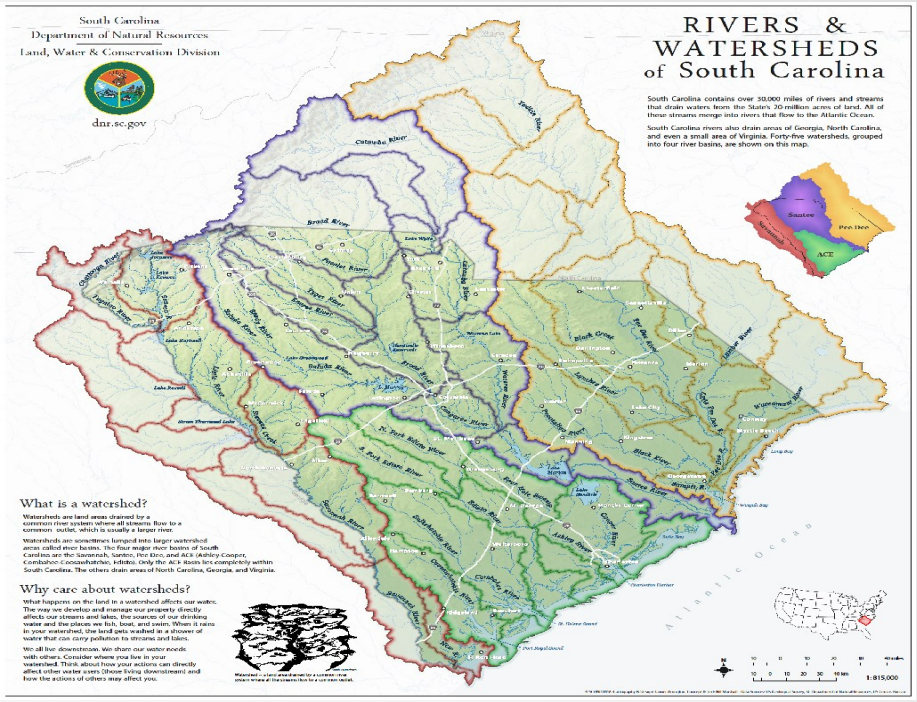
Precipitation estimate in 2020 (left) and departure from normal (right)

	2020 Precip (in.)	Rank
Greenville, SC	68.22	2nd wettest
Asheville, NC	64.71	4th wettest
Augusta, GA	56.25	8th wettest
Charlotte, NC	58.80	10th wettest
Columbia, SC	56.33	13th wettest

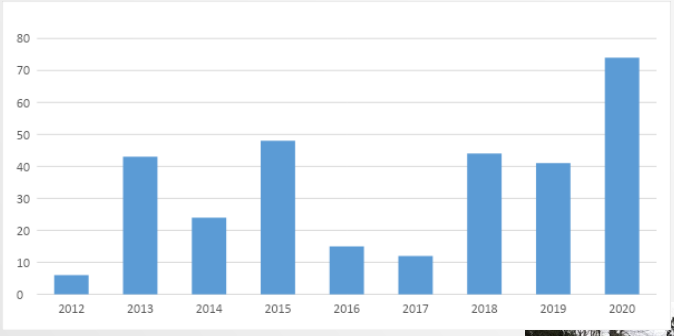
The NWS at Columbia has 11 river forecast points that we issue "River Flood Warnings." During 2020, we issued 74 River Flood Warnings for those locations. Additionally, many of our rivers are affected by reservoir operations especially during heavy rainfall events. The number of events for each month, closely followed the river flood climatology for the southeastern U.S. The most active period typically is during the Winter and early Spring.

2020 River Flooding – Continued

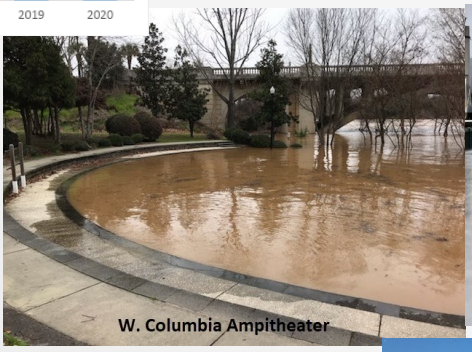
Where does all of the rainfall go, once it hits the ground? To understand this better, to the right is a map of the major river basins that cover South Carolina. They extend into North Carolina and Georgia, flowing generally from the higher terrain of the southern Appalachians to the southeast, towards the Atlantic Ocean. This is why we monitor both precipitation amounts in our forecast area but also in the Carolina foothills.



For those affected by area rivers, it was quite the year. The table below shows the number of river flood events each year from 2012-2020.



You can see by this table that since 2012, no year came all that close to the number of river flood events experienced in 2020. Below are some pictures from the flooding that occurred in West Columbia (top left), Augusta (top right), Saluda (bottom left) and along Lake Wateree (bottom right).


W. Columbia Ampitheater


Courtesy Augusta Chronicle


Saluda River Resort


Lake Wateree Dam

COOP Corner

by Doug Anderson - Observation Program Leader

The Cooperative Weather Observing Program's roots can be traced back to 1797 when Thomas Jefferson envisioned a nationwide network of weather observers. The program itself was created in 1890 under the Organic Act passed by Congress. Its mission is two-fold:

1. To provide climatological records, usually consisting of daily high and low temperatures, snowfall and precipitation totals. This data is essential to defining U.S. Climate and measure long-term climate trends.

2. To supply observational meteorological data in near real-time to support forecast, warning and other public service programs (drought, agricultural, fire weather, etc.) programs of the NWS.

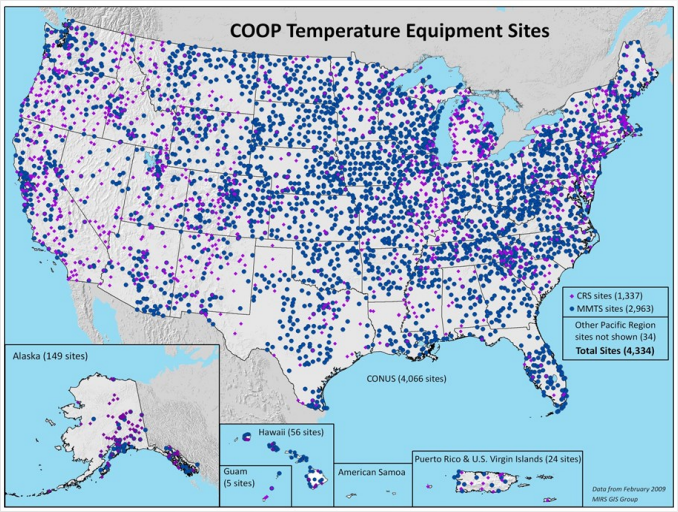
Volunteers are Needed!

We are looking for volunteers in or near the following communities: **(SC) Bishopville, Camden, Euataville, Kershaw, Lancaster, Pageland, Patrick, McBee, Rimini/Santee, Jackson, Springfield and St. Matthews. (GA), Hepzibah.**

Cooperative stations (COOP) are locations at which volunteers take daily weather observations using NWS-supplied equipment, filling in gaps between other types of observing stations such as airports, mesonets, etc. The equipment meets NWS standards and is installed in accordance with strict guidelines to ensure accuracy and uniformity. About 10,000 volunteers around the country from all walks of life provide this valuable service. We are always looking for new observers to join the NWS Columbia team and are willing to take observations over many years to come.

Contact Doug Anderson, douglas.anderson@noaa.gov for more information.

On the web: https://www.weather.gov/coop/



What Does a COOP Station Look Like?

Many people are surprised that NWS-issued COOP equipment isn't wireless, high-tech or super fancy. The basic requirements of temperature, rain and snow measurements involved proven, accurate equipment, although they are old-school and involve some human interaction. That makes them special!

First, where are COOP stations? Just about everywhere that Americans live, work and play. Our region has stations installed not only at our observers' homes, but also at water plants, fire stations and many other locations.

COOP Corner - Continued

Regardless of what equipment is used, it has to be installed and sited correctly for measurements to be accurate. That's why NWS prefers to use the same type of equipment all across the country. That way, the equipment is calibrated and maintained at every station as much as possible. Putting the equipment in the right spot is also very important. Let's say…if a temperature sensor is installed next to a heat pump, building, on a roof, on or near a concrete or asphalt parking lot, the temperature readings would-n't be right, would they? To the right is an example of where NOT to put a temperature sensor.

Temp Sensor right next to HVAC unit which would give a bad reading!

Rain gauge under a tree (bad)

Rain gauge placement is also very important. They should be placed in an open area with no obstructions like trees, bushes and buildings that may interfere with the gauge "catching" all the rain that falls. Many people ask why we don't use fancy electronic systems. The biggest reason is that in heavy rain, the mechanical and electronic "tipping bucket" inside can't keep up to count the number of "tips" that the little cup inside makes to count each increment of 0.01 inches. Our 8-inch and 4-inch rain gauges trap and keep everything that falls into them. Unfortunately, that sometimes includes bird poop! As a general rule, if there is a tree or something else near the gauge, the gauge should be placed at least twice as far from it than the obstruction's height. It's best to shoot for at least 4 times as far away than its height (e.g. 20-foot tree, rain gauge placed 80 feet away). To the left is an example of what not to do.

Basically, if you are measuring rain (and snow), you want to put your rain gauge and snowboard in the most open area you have available for the best and most accurate measurements. So, being a COOP observer does require some manual reading and re-setting of the equipment we provide. There are newer systems being tested that will hopefully make the job easier…but even now, each weather observation only takes a few minutes each day. Here are some examples of what our equipment looks like:

As you can see, our equipment is old school…designed and installed to make sure each COOP station measures weather elements as consistently and accurate as possible across the country. Want to learn more? Contact Doug at douglas.anderson@noaa.gov. He's also happy to help you with advice on installing any of your personal home weather stations.

COOP Corner - Continued

Celebrating the Life and Legacy of Mrs. Margaret Jayroe

The greatest part of the Cooperative Observing Program is its people. Over 10,000 volunteers make the program alive and vibrant, some for many, many years. We'd like to celebrate the life of, and mourn the passing of Mrs. Margaret Sease-Jayroe of Little Mountain, SC.

7/18/78

Tribute Paid To 'Old Queen'

By MARILYN THOMPSON
Record Staff Writer

They could have laid "Old Queen" to rest among the family mementos, packing it away with the other relics that have played a part in the Sease family's history for almost a century.

But instead, Margaret Sease Jayroe today brought "Old Queen" to its fitting resting place in Columbia, where even the governor took time to pay tribute to the weathered veteran before it went on display in the Columbia Science Museum.

Since 1893, "Old Queen" has recorded the ups and downs of temperature in the rural town of Little Mountain. And since 1893, the Sease family has been recording, with "Old Queen's" dependable assistance, the town's weather conditions for use by the National Weather Service.

The thermometer, which acquired its nickname from the name of its manufacturer, The Queen Company, has the longest record of service of any thermometer used by the weather service in its rural weather stations, according to a statemen from the weather service.

It was placed under the watchful care of the town's first volunteer weather observer, Dr. J.M. Sease, 85 years ago. The rural physician established what became a family tradition of daily checks of the town's temperature extremes.

Over the years, the townsfolk of Little Mountain began to depend on "Old Queen" and the Sease family to warn them of impending frost that might damage delicate flowers and vegetable gardens.

"Everybody called us to find out if they should bring their plants in or pull their green tomatoes off the vine," Mrs. Jayroe remembers.

Even with age, "Old Queen" never lost its dependability.

A few years ago, weather service officials said they wanted to replace the thermometer since any instrument that old couldn't be accurate, Mrs. Jayroe recalls.

But the weathermen were in for a surprise when their calibrators revealed that "Old Queen" was still just as accurate as any new equipment they could install.

Though the thermometer has been in the family for decades, Mrs. Jayroe believes it will be put to better use as part of a weather display in the science museum.

"People can look at it and see that even after this many years, it still works," she said.

Record photo by Johnny Drummings

Mrs. Jayroe And 'Old Queen'

The Little Mountain Cooperative (COOP) Weather Station has a rich legacy. Established by Margaret's Grandfather, Dr. J.M. Sease on Oct 1, 1893 the family has kept virtually unbroken weather records. The Sease-Jayroe family has the distinction of being the 5th-longest reporting station in the COOP network. Currently, there are over 8,100 stations and over 10,000 volunteer observers. Little Mountain is one of only 2,000 stations that have been in operation for over 100 years. As such, it is included in the prestigious US & Global Climate Historical Network, and the family's weather data is considered the "gold standard" for scientific research.

Margaret assumed the family legacy of outstanding service as the third observer in her family on October 1st, 1962. Over the years of her service, her detailed daily observations have included highs of 107F, lows of 2 below zero, a September severe weather outbreak with 3 tornadoes near her station, 7.35 inches of rainfall and 8.3 inches of snowfall in different 24-hour periods. A retired schoolteacher and author of local history and genealogy publications, she touched and had a positive, lasting influence over thousands of people. We warmly remember Margaret as an outstanding example of wisdom and service before self among the Little Mountain community and to all the employees in our office.

Mrs. Jayroe's cheerful voice was a daily highlight to us. She cared deeply about her daily observations, and when asked how she felt about winning the Jefferson Award, the highest NOAA can bestow, she said "I am deeply honored. I will miss being able to report the weather when I'm no longer able to do so." When asked how she has stayed so faithful to the Cooperative Program over all these years, she summed it up nicely: "It becomes a part of your life, just as brushing your teeth does".

Margaret receives NOAA's Highest Volunteer Award

Art Jayroe and the rest of the family continue to carry on her legacy today. We can't say thank you enough, and are deeply honored to have them on our team. Miss Margaret, thank you and you are deeply missed!

Thank you Weather-Ready Nation Ambassadors!

- 28th Operational Weather Squadron Shaw AFB
- Aiken County Emergency Management Division
- Aiken Regional Medical Centers
- Augusta-Richmond County EMA
- Augusta University
- Bamberg County Emergency Services
- Barnwell County Emergency Management
- Buford Fire & Rescue
- Burke County EMA
- Calhoun County Emergency Management Agency
- Carolinas Integrated Sciences & Assessments (CISA)
- Challenger Learning Center of Richland District One
- Chris Wolfe SC Weather
- City of Columbia Police Department
- City of Sumter
- Columbia County Emergency Management Agency
- Columbia Metropolitan Airport
- CSRA East Central District Amateur Radio Emergency Service
- CSRA Weather
- District Five of Lexington and Richland Counties
- Dominion Energy SC
- Edgefield County EMA
- Fairfield County Emergency Management
- GA Dept. of Public Health - East Central Health District
- Gold Cross EMS
- Kershaw County Amateur Radio Club, Inc.
- Kershaw County Emergency Management
- Lady Starr Radio
- Lancaster County Emergency Management
- Lee County Emergency Management
- Lexington County EM Division
- Livingston Insurance
- McCormick County Emergency Services
- McDuffie County Fire Rescue Service
- Michelin Tire North America - Lexington, SC
- @Midlands_Wx
- Montmorenci Volunteer FD
- Newberry County Emergency Services Alliance
- Orangeburg County Emergency Services
- Orangeburg County Fire District
- Palmetto Chapter - American Meteorological Society
- Pantagraph.online
- Pee Dee Ice & Fuel, Inc.
- Richland County Emergency Services
- Richland Library
- Robert Bryant & Son, Inc.
- SC Department of Transportation - Traffic Management
- SC State Fire
- Simply Flood LLC
- South Carolina Emergency Management Division
- South Carolina Farm Bureau Insurance
- South Carolina State Climatology Office
- The Times and Democrat
- University of South Carolina Emergency Management
- USGS South Atlantic Water Science Center
- US Postal Service (National Preparedness)
- Wagener Fire Department
- WAGT (Augusta, GA)
- Wilbur's Last Ride
- WFXG FOX 54 NEWS NOW (Augusta, GA)
- WIS-TV (Columbia, SC)
- WJBF-TV (Augusta, GA)
- WLTX-TV (Columbia, SC)

For more info on the Weather-Ready Nation ambassadors and how to apply, go to: weather.gov/cae/wrn

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Columbia Weather Forecast Office
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(803) 822-8135

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