NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Columbia, SC
Weather Forecast Office

FAMOUSLY HOT FORECASTS

Fall/Winter 2020

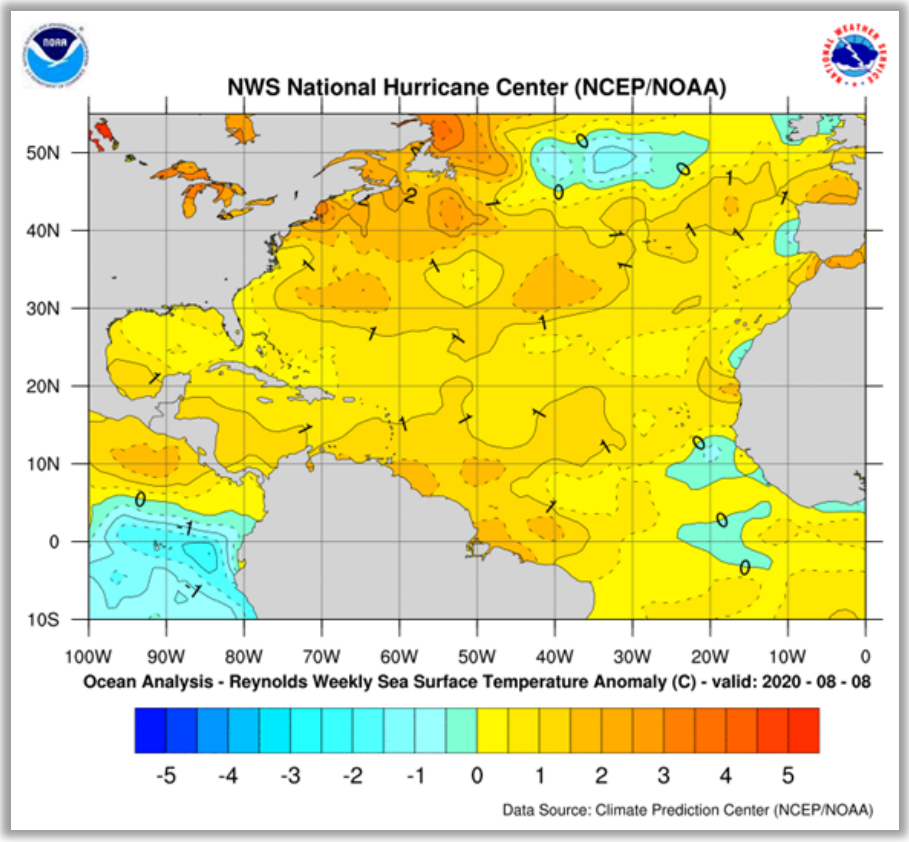
Inside this issue:

Why is the 2020 Tropical Season Setting So Many Records?

by Frank Alsheimer - Science and Operations Officer

You have probably noticed that we have set a lot of records for earliest tropical storms/hurricanes in 2020. In fact, the earliest on record third named storm (Cristobal), as well as the fifth through eighteenth named storms (Edouard through Sally), with possibly more to come before this hurricane season ends. We also set a record by having 5 named storms make landfall in the United States before August 4th. So, the obvious question is, why is this happening? Let's break it down to some favorable components.

Above Average Sea Surface Temperatures



Warm sea surface temperatures (SSTs) are the fuel for the development of tropical storms and hurricanes. It is very difficult to get tropical storms to develop when the SSTs are less than 80 degrees (they can, but are relatively uncommon). In 2020, the sea surface temperatures in the Atlantic Basin (which include the Caribbean and Gulf of Mexico), have been significantly above normal.

Here's a look at the SSTs in early August. You can see that almost the entire Atlantic Basin has SSTs above normal (warm colors). These warm SSTs have been with us since late spring, supporting the large number of early season tropical storms.

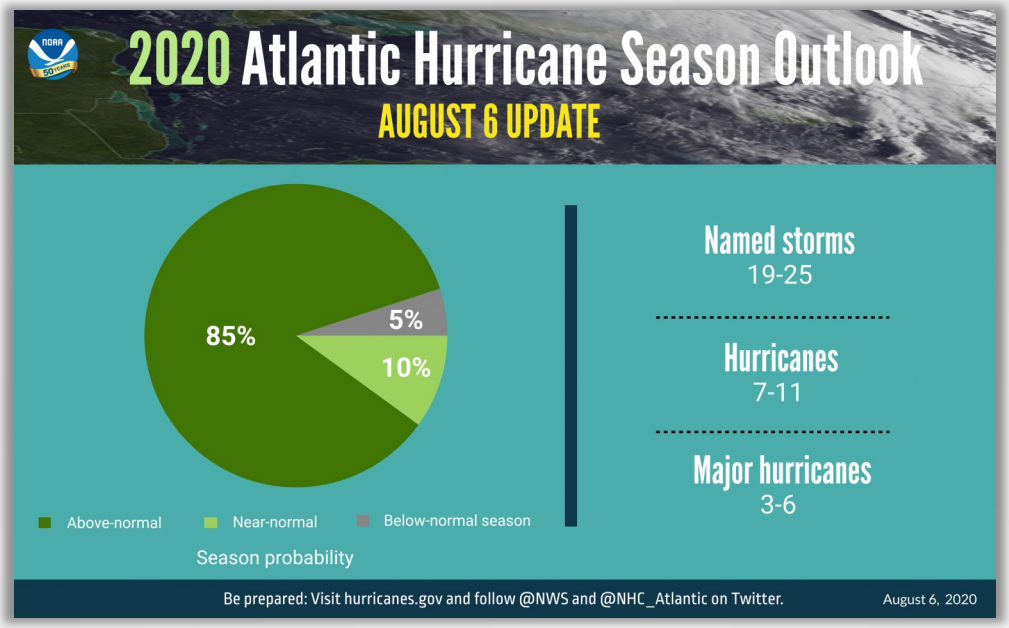
2020 Tropical Season – Continued

Below Average Vertical Wind Shear

Vertical wind shear is defined as the difference of wind with height. Unlike spring severe weather, vertical wind shear is detrimental to the development of tropical systems.

Why? Well, a hurricane is an atmospheric heat engine of sorts. It thrives on the heat generated from "hot towers", or cumulonimbus clouds. The warm ocean temps are entrained into the clouds, which eventually condense in the upper part of the atmosphere, releasing heat. This release of heat warms the surrounding atmosphere, which will cause lower air pressure at the surface beneath the heat release, and the cycle of development and intensification is underway. If, however, that distribution of heat is disrupted, the cycle stops. Strong enough wind shear will disrupt the cycle by removing some of the warm air aloft, and also tilting the cumulonimbus clouds, making it harder for the "latent heat" released into the atmosphere to remain in the correct location of the storm to develop.

So far this summer, the wind shear throughout the depth of the atmosphere over the areas of the Atlantic Basin with warm enough temperatures to support tropical development has been less than normal, meaning the systems have been able to maintain favorable structure.



Multiple Stalled Fronts over Warmer Waters

Many early season tropical cyclones form along stalled cold fronts rather than coming across as waves of low pressure from Africa. This can occur when a stalled front organizes into an area of low pressure, and if that low pressure is over warm enough SSTs, it can transition from a baroclinic system (one that feeds off of different temperatures), to a barotropic system (one that feeds on warm and moist air masses alone).

In 2020, we had several early season tropical storms that developed from old fronts. The strongest was Hurricane Hanna, which made landfall in Texas in July.

If you would like to look into the development of tropical storms/hurricanes, along with other topics in tropical meteorology, please visit the National Weather Service Jetstream School for Weather.

National Weather Service Operations During The COVID-19 Pandemic

by Richard Okulski - Meteorologist in Charge

Like most government agencies across the United States, the National Weather Service took multiple actions in March to mitigate the spread of COVID-19. Those actions at the local office level included:

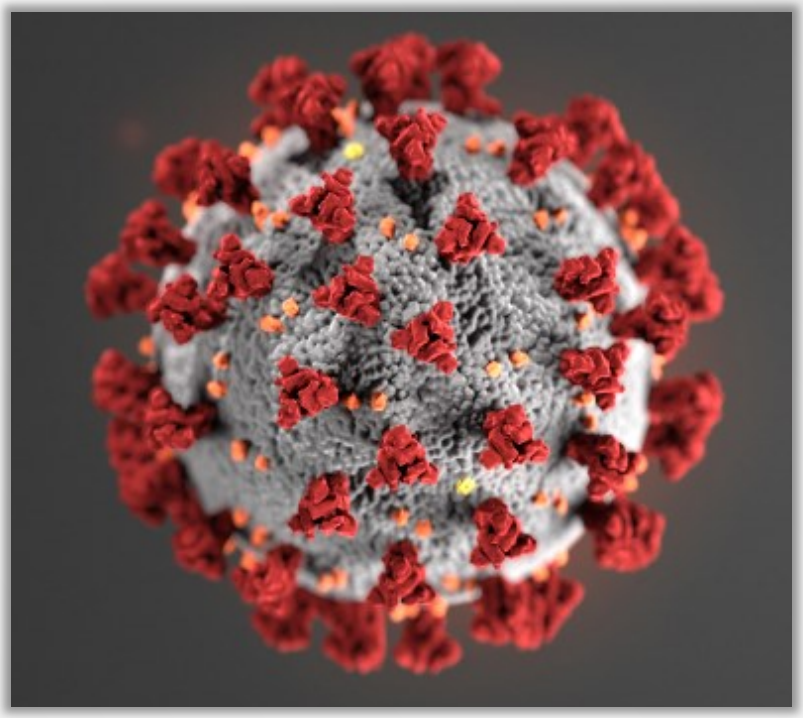
⇒ **Mandatory "telework" for all non-operational employees.**

⇒ **Limiting the number of operational shifts to six per day for routine operations.**

⇒ **Not allowing office visitors or tours.**

⇒ **Limiting travel to damage surveys and equipment maintenance and repairs.**

⇒ **Transitioning outreach to virtual platforms such as Google Meet.**



Our office did increase the number of operational shifts to seven for the summer convective and tropical season with higher headquarters approval. We are also training recent new hires in order to assist us if a tropical cyclone threatens The Midlands and CSRA and to start working shifts this fall.

We do have a "phased" return to the office plan based on federal medical data and local infection rates. Hopefully, our office can transition to more employees in the office and a gradual return to something which resembles pre-pandemic operations.

Our employees are coping as best they can in the pandemic work environment. We devised a creative solution which allows higher risk employees to work in safer office locations with converted administrative computers. Telework and in office employees communicate via Google Meet, and we have used telework employees to augment office operations during hazardous weather.

We continue to modify our standard operating procedures to meet the pandemic challenge and serve our partners at the highest level possible. We plan on incorporating a number of these creative solutions into post pandemic operations.

For more information on Coronavirus and the steps that you can take to care for yourself and help protect others in your home and community, please visit: Centers for Disease Control and Prevention.

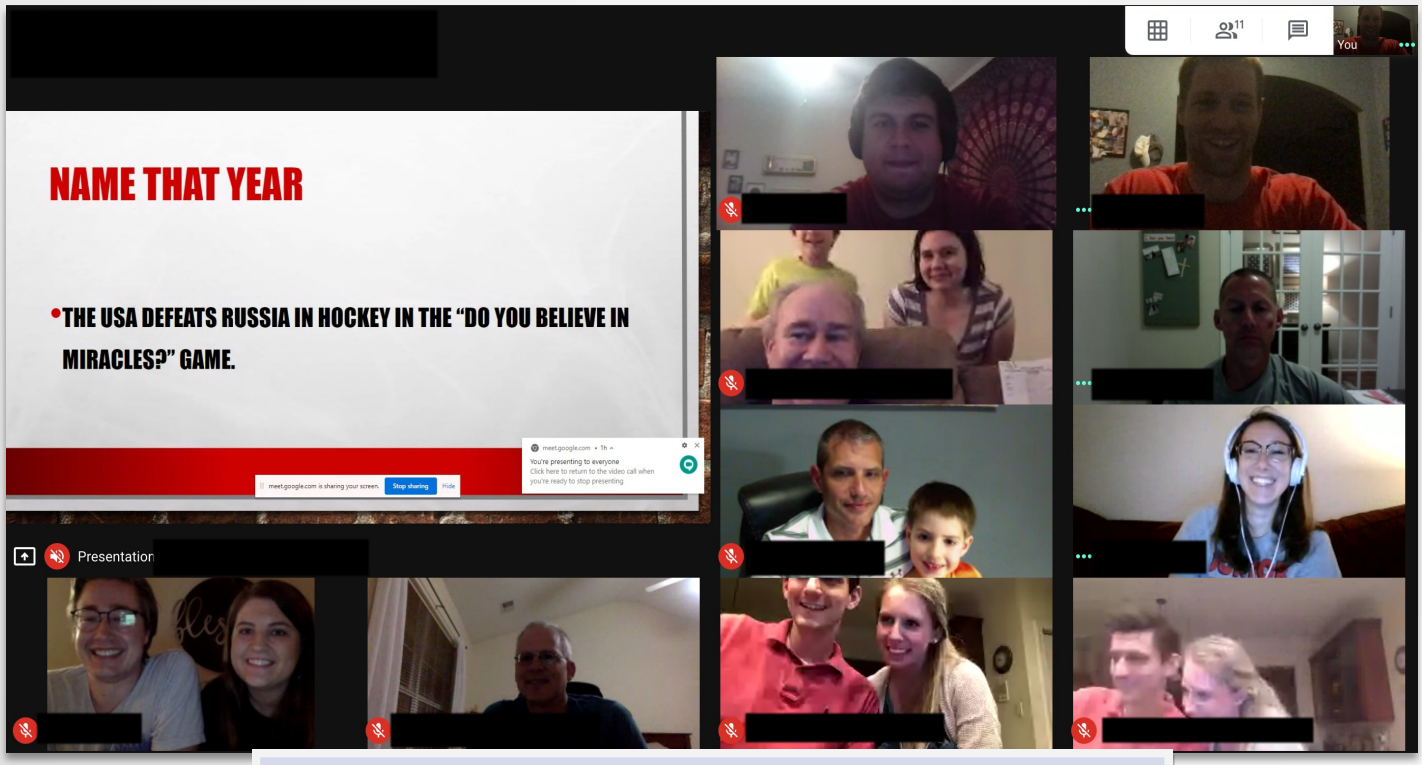
Team-Building During COVID-19

by Chris Rohrbach - Meteorologist

Limited social interactions and increased anxiety have characterized many workplaces during the COVID-19 outbreak. Team-building is more important than ever to increase morale, encourage collaboration and reconnect distanced coworkers. The Office Culture Team at WFO Columbia, SC (CAE) developed several ways to engage the office and support coworkers. Routine virtual lunches, game nights and a resource sharing document were used to help people feel less isolated.

On the evening of May 1st, 2020, CAE held its first ever virtual game night. Nine staff members and their families gathered to play trivia which included categories such as music, movies, and sports. Though the friendly competition took center stage, participants also had the opportunity to learn a little more about their coworkers and coworkers' families between rounds. The time it took to tally scores gave players time to catch up and crack jokes. The game night also gave CAE a chance to meet its two newest Meteorologist hires, Nicole Steeves and Pierce Larkin who were to join the office in the summer.

Shortages at many stores, particularly in the early months of the pandemic, made it difficult for people to find resources like toilet paper and cleaning supplies. A "Spare and Share Log" was created as a way to share resources and helpful information between coworkers. The office also participates in weekly virtual lunches to help make up for the lost face-to-face interactions. By identifying the need to reconnect on a personal level and arranging team-building activities, CAE was able to help employees dealing with anxiety and isolation.



NWS Columbia's First Virtual Game Night on May 1st, 2020.

The Dog Days of Summer: Why the Midlands and CSRA have seen less intense heat than last year

by Pierce Larkin - Meteorologist

Each summer is different across the Midlands and Central Savannah River Area (CSRA), but usually it is accompanied by oppressive heat and humidity, and several days approaching or exceeding 100°F. And while Augusta has seen that threshold this year, they have only met it twice at Augusta Bush Field and 0 times at Augusta Daniel Field. Additionally, we have barely even approached 100°F this year, with temperatures getting to 98°F or greater a handful of times in the Midlands this summer. So what gives? And why is it so different than last year?

Last summer was oppressive to start, with widespread 100°F temperatures across our forecast area to end May. Throughout the summer, the region approached (temps >= 98°F) or hit 100°F multiple times.

Number of Days Reaching 98° or Greater

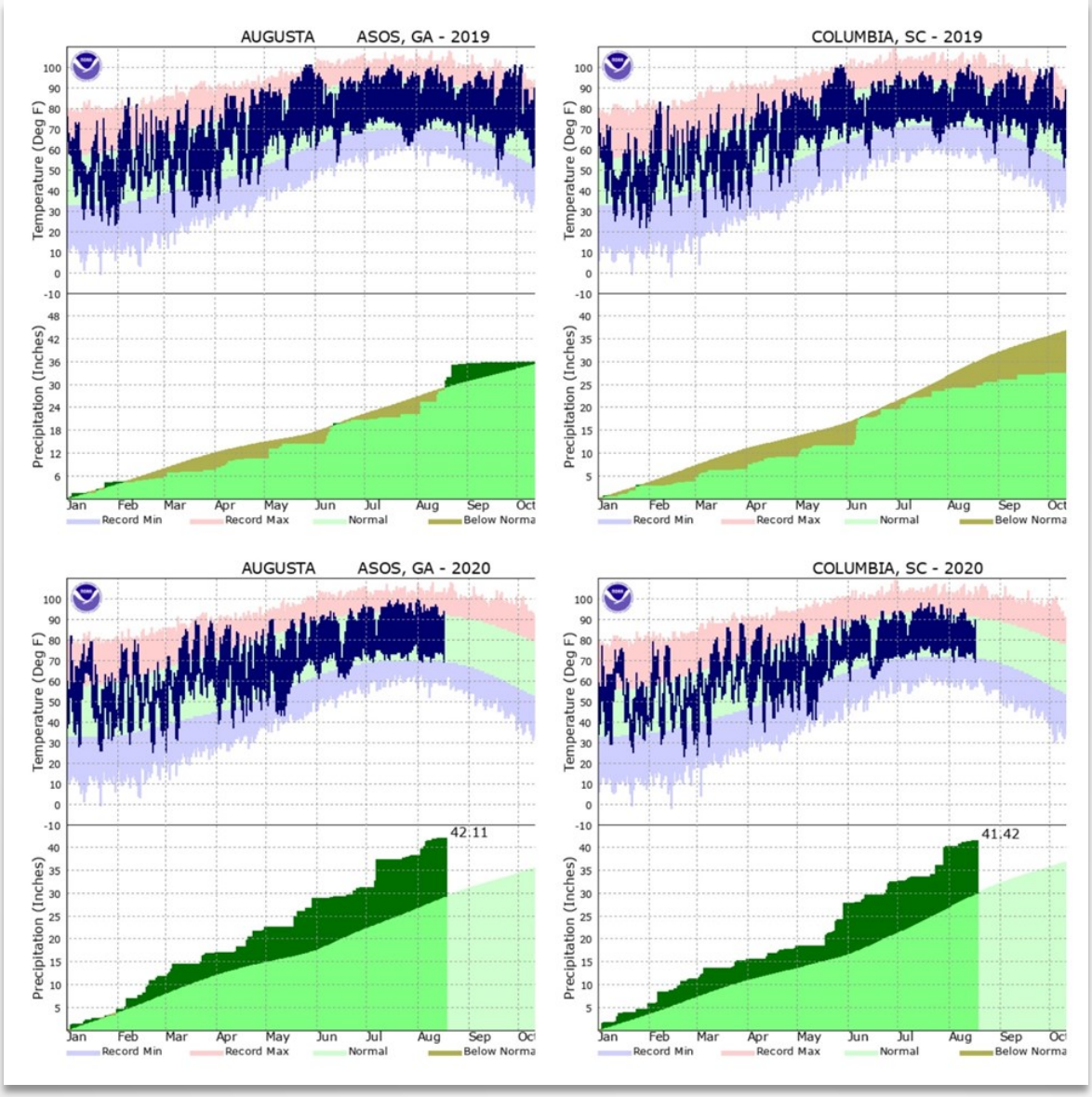
Month, Year	*Augusta (AGS)*	*Columbia (CAE)*	*Orangeburg (OGB)*
May, 2019	7	6	6
May, 2020	0	0	0
June, 2019	0	0	0
June, 2020	0	0	0
July, 2019	12	2	4
July, 2020	8	2	0
August, 2019	7	5	3
August, 2020	2	0	0
Total, 2019	**26**	**13**	**13**
Total, 2020	**10**	**2**	**0**

As you can see, the region had many more hot days approaching 100°F in 2019 than in 2020 (we needed a break somewhere, right?) The primary drivers of this are usually how much rainfall we receive throughout the spring leading up to the summer, and then how wet we can stay during the summer months. The evaporation of soil moisture near the surface can help us stay below these hot temperatures if we have enough of it, and that is dependent on overall rainfall.

That is where the two years differ significantly. Heading into last summer, Augusta and Columbia faced fairly significant rainfall deficits. By this point in the year (August 18), Augusta had seen only 28.66” of rainfall, and Columbia had seen only 24.38” of rainfall! When compared to this year, they Augusta has seen 42.11” of rainfall with

The Dog Days of Summer – Continued

Columbia picking up 41.42”!



And to top it off, summer rainfall at both sites are within 1” of their 2019 total. This is really interesting, and tells us that late winter and spring rainfall is critical to helping keep temperatures down during the summertime.

It really helps that we had a pattern that favored lots of precipitation this past spring, with flow out of the southwestern US giving us consistent rainfall opportunities. But we have also had favorable set ups for afternoon showers and thunderstorms all summer long, helping keep us relatively moist across the region. This has spared us of the normal dog days of summer heat, which in a year like 2020, is something I can be especially thankful for.

Rainfall	Augusta (AGS)	Columbia (CAE)
2019, Total (thru 8/18)	28.66"	24.38"
2020, Total (thru 8/18)	42.11"	41.42"
2019, Summer	14.18"	12.67"
2020, Summer	13.21"	13.63"

NWS Columbia Hosts Student Volunteers Virtually

by Whitney Smith - Meteorologist

Like many other things in 2020, our NWS Columbia summer student volunteer program looked much different than in years past due to the COVID-19 pandemic. Fortunately, we found two college students that were willing to be flexible and innovative in order to still get the most out of their volunteer experience this summer. Molly Cornelissen is a rising junior from Ohio State University double majoring in atmospheric sciences and earth systems science. Kennedy Tartt is a rising junior at the University of North Carolina at Charlotte majoring in meteorology with a minor in mathematics. Both ladies put in numerous hours of work to complete the first ever virtual student volunteer program at NWS Columbia, taking every challenge along the way in stride.

The students were selected for the program back in March after going through a formal application and interview process. Each was paired with a forecaster from NWS Columbia to be their mentor for the summer with whom they would complete a research project. Due to the restrictions in place from COVID-19, no visitors have been allowed to come into the office since March, so the projects were adapted to be done remotely. Molly did an apparent temperature climatology project for the state of South Carolina which will eventually be utilized by the SC emergency management community. Kennedy's work involved a dense fog climatology for the five NWS Columbia terminal aerodrome forecast (TAF) sites. Google Meet was heavily utilized for face to face interactions between forecasters and Molly and Kennedy, and Google Drive was used to store the project data.

One of the challenges that arose was that all of the communication was done either through Google Meet or email. The volunteers did not have the luxury of being able to ask a question to someone in the office, get a quick answer, and continue working. Instead, they had to email their mentors who both work rotating shifts and wait for a response. This definitely slowed down the pace of the projects, but both Molly and Kennedy still managed to push forward. Another challenge was trying to download and manipulate extremely large datasets on the ladies' personal computers. Some of the spreadsheets that were used contained over 600,000 entries.

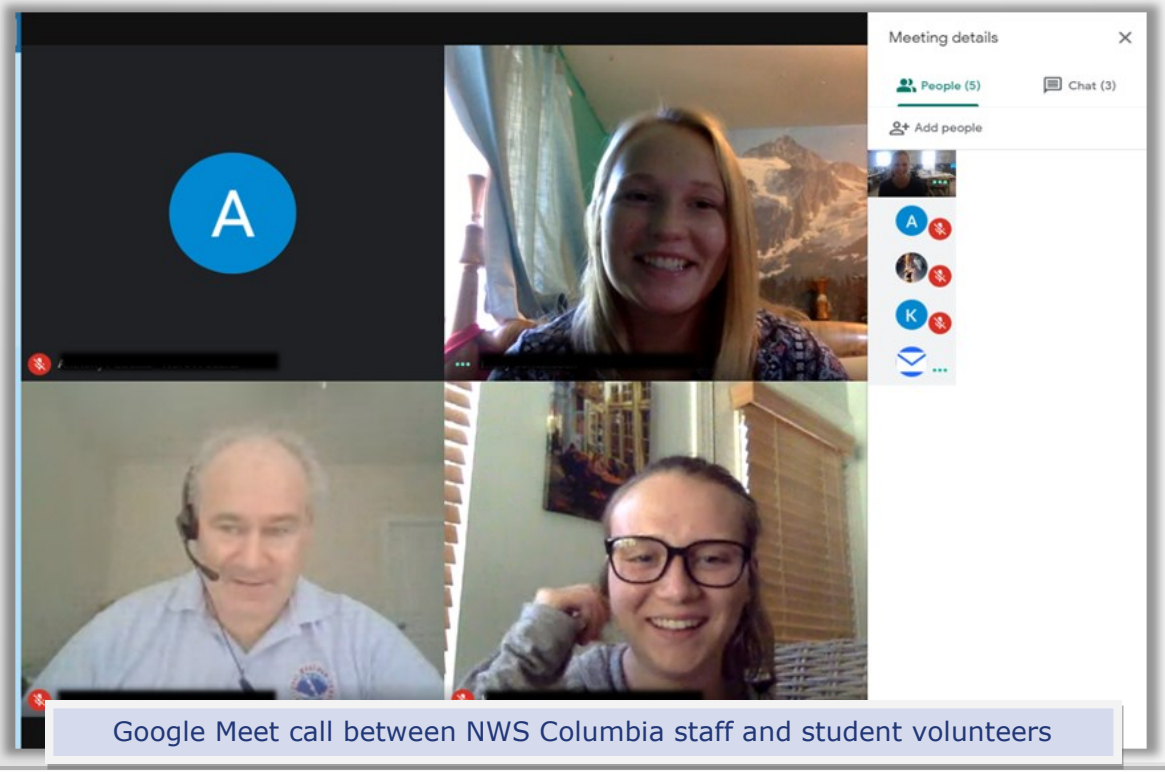
To conclude their volunteer experiences, Molly and Kennedy presented their research to the NWS Columbia staff through Google Meet on August 17th. Forecasters were extremely impressed at what all the ladies had accomplished especially considering the circumstances. Given the challenges that they experienced, both Molly and Kennedy

Virtual Student Volunteers – Continued

plan to continue their research when they head back to school in the fall so that they can completely wrap up their research projects.

Outside of the research projects, the ladies also took part in a virtual professional development day and a virtual office program exploration day. The purpose was to expose Molly and Kennedy to as much of what is like to work inside an NWS office as possible without them actually being here in person. Ultimately, our goal was for them to get a better idea of whether working at a NWS weather forecast office was the career path that they wanted to pursue. During the professional development day, NWS Columbia MIC, Rich Okulski, explained the NWS application process and best practices, Meteorologist Chris Landolfi shared his recent experience getting hired as a new NWS meteorologist, and Meteorologist Whitney Smith talked about additional opportunities for students and graduate school. The program exploration day involved Science and Operations Officer Frank Alsheimer discussing all of the positions within an NWS office, Lead Forecaster Tony Petrolito presenting his hail size research, Hydrologist Leonard Vaughan talking about the NWS Columbia hydrology program, and Meteorolgist Whitney Smith sharing the tropical program and impact based decision support services (IDSS) program.

Even though the student volunteer program did not go exactly as planned this year, both the student volunteers and NWS Columbia staff members proved that no matter the challenge, they are adaptable and can rise to the occasion. They also are skilled with technology and are able to telework successfully. We hope that Molly and Kennedy will be able to join us in the office for at least a short time when COVID-19 restrictions are finally lifted, and it is safe to do so. We wish them both the best in the upcoming school year and in their future pursuits!



Google Meet call between NWS Columbia staff and student volunteers

Hazard Services Implementation

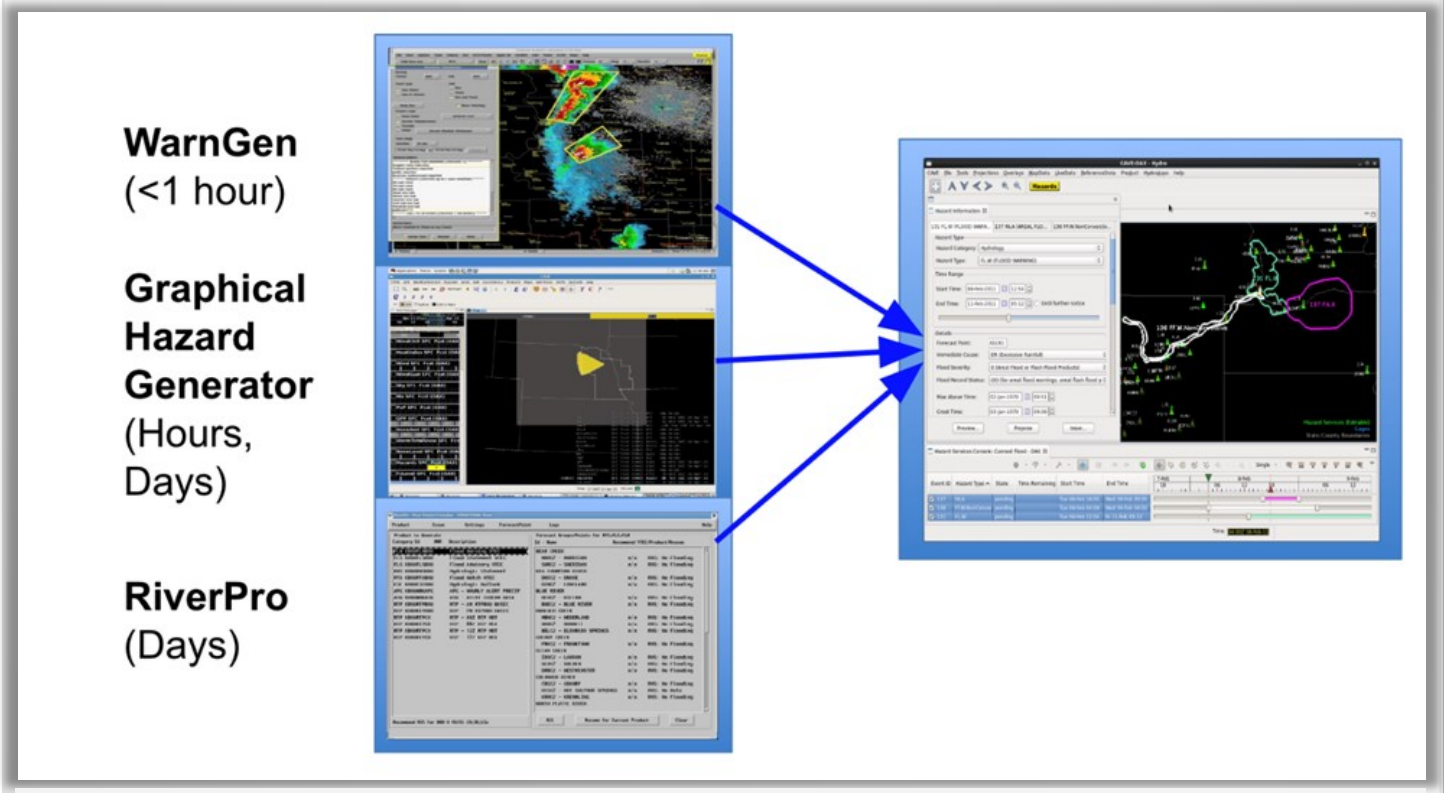
by Chris Rohrbach - Meteorologist

What is Hazard Services?

Hazard Services is an innovative and new National Weather Service software application to produce Watch, Warning, and Advisory products.

Background

Currently, forecasters must use multiple programs to issue hazardous warning products, depending on the type of event. Hazard Services is new software on the Advanced Weather Interactive Processing System (AWIPS) workstation which will replace three existing applications, each with its own interface, menu list, and process to create a forecast or weather warning. By combining these applications into one framework with a single interface, the forecasting process will be streamlined with a unified information creation workflow that is highly configurable and customizable.



New Hazard Services application (on right) upgrades and replaces three legacy AWIPS warning tools. Timeframe in parentheses indicates the timeframe in which products are created for in the legacy tools.

What are the Benefits of Hazard Services?

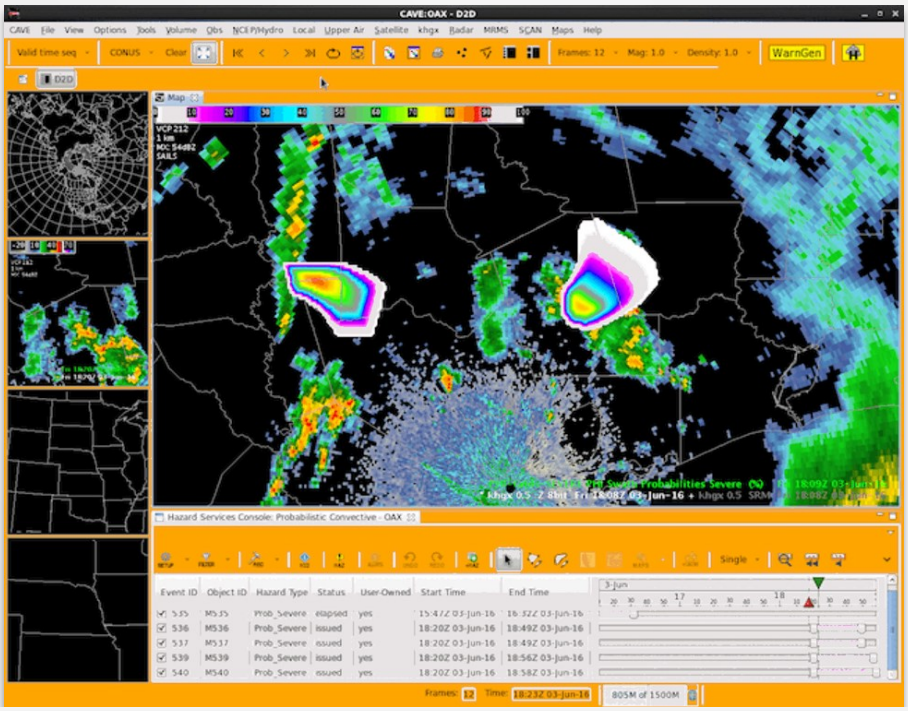
⇒ **A common interface for information creation that will minimize the amount of training needed for handling different weather phenomena**

Hazard Services – Continued

- ⇒ **The ability to produce a variety of output formats for flexible dissemination across different communication platforms**
- ⇒ **A robust Python framework that allows for the development of science-driven tools and recommenders to improve the forecast and warning-decision making process**
- ⇒ **Flexible configuration framework to meet the current and future demands of dissemination and decision support requirements**
- ⇒ **Foster improved collaboration between the NWS, NCEP National Centers, and its stakeholders**
- ⇒ **Allows for rapid adoption of social-science driven messaging improvements and consolidation, such as the efforts by the Hazard Simplification (HazSimp) program**

How will Hazard Services Impact the Future of NWS Watches, Warnings and Advisories?

As a modernized platform, HS will allow for flexible output (legacy text, xml, kml, common alerting protocol (CAP), shape files, etc.), probabilistic and deterministic information, and will lay the foundation for moving the NWS deeper into the Impact-Based Decision Support Services (IDSS) and FACETs eras.



Forecasters using Hazard Services to test probabilistic hazards in AWIPS.

You can read more about Hazard Services and its impact on the NWS at:
https://esrl.noaa.gov/gsd/eds/hazardservices/

COOP Corner

by Doug Anderson - Observations Program Leader

The Cooperative Weather Observing Program's (COOP) 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:

⇒ **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.**

⇒ **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.**

Cooperative stations are locations at which volunteers take daily weather observations using NWS-supplied equipment, filling in gaps between other types of observing networks 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 CAE team and willing to take observations over many years to come. Contact Doug Anderson, for more information.

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

Welcome to our newest observers, James and Cynthia McMillan!

Since 1951, names of the focal points (observers acting to administer a COOP station) in Bamberg have changed over the years, but one thing has remained relatively constan, daily measurements of temperature, rainfall and other weather elements. In July, Billy Thomas expressed a wish to remain active as an alternate, but have another observer act as the primary focal point. Billy began taking weather observations for us in 2008 and has done a wonderful job! We are excited and very thankful that James and Cynthia McMillan have volunteered to keep the Bamberg COOP station alive and well. Welcome to the team James and Cynthia, thanks for your service and you're doing an awesome job!

Our new Bamberg, SC observer, James McMillan

Note to our COOP observers: The McMillans are using a solar-powered MMTS system, which does not need a 110V AC outlet.

COOP Corner – Continued

COOP Awards

All NWS Cooperative Weather Observers are volunteers that perform a critical service to the NWS and our country as a whole. It is important to us that they are recognized for their role in the mission of the NWS, and provide an important baseline for the climate history of the Unites States. Some of our stations have been reporting since the late 1800s and early 1900s. For long-term climate studies and research, COOP weather data is considered by researchers to be the "gold standard" due to the diligence and accuracy of our observers along with the equipment that NWS provides to each station.

Awards are of two general types: length of service and achievement. For length of service, every observer/institution receives awards based on the length of time they have been active. They are generally first given at 10 years, and thereafter every 5 years, while institutional awards generally start and continue at multiples of 25 years. For achievement, each year the local NWS office receives a list of observers eligible for two prestigious awards – Holm and Jefferson. Each office's staff researches station and observer history, accuracy, completeness, other achievements and other factors such as community involvement. They then prepare nomination packages reviewed by NWS Headquarters who select up to 25 observers for Holm Awards, and no more than 5 for Jefferson Awards from the thousands of observers around the country.

Congratulations to our 2019 and 2020 COOP Award Winners!

One of our favorite times of the year is when we present awards to our observers. Here is a list of our 2019 and 2020 winners!

2019
Holm Award (NOAA's 2nd Highest)
Darwin Morris– Appling, GA
Tom Jones– Chesterfield, SC
30 Years Service
Tom & Frances Jones– Chesterfield, SC
10 Years Service
James Myzell– Holly Hill, SC

2020
40 Years Service
Sherry Tolson– Cheraw, SC
Jimmy Coleman– Wateree Hydro, SC
25 Years Service
Tina Jenkins– Buzzards Roost Hydro, SC
20 Years Service
Calvin Robinson– Saluda, SC
15 Years Service
Jean & Woodrow Miles– Cedar Creek, SC
10 Years Service
Hank Rutland– Orangeburg Water, SC
April Hiscox– University of SC

Due to COVID-19 restrictions, 2020 awards have not yet been presented personally. We hope to see each observer soon!

NWS Columbia Welcomes Three New Meteorologists

by Whitney Smith - Meteorologist

Within the past year, NWS Columbia has welcomed three new meteorologists to our staff. We asked them a few questions about how they got here, how they became interested in the weather, and what they like to do in their spare time. Here's what they said:

Chris Landolfi

I went to Penn State (first as a chemical engineering major) then as a met major and was convinced I was going to be a broadcast met. I spent part of my senior year freelancing for a TV Station (WBRE) in Scranton/Wilkes Barre, PA. When I graduated I got a job with a defense contractor forecasting for military bases in the Middle East before ultimately arriving at NWS Columbia in October of 2019. I've been interested in weather since I was a kid watching local news but really did not have anyone to share my passion with until I arrived at Penn State and started to meet some of the people in the meteorology department. In my spare time, I like to hike, golf, play tennis, lay out on the beach, and spend time with friends (and my dog).

Chris Landolfi

Nicole Steeves

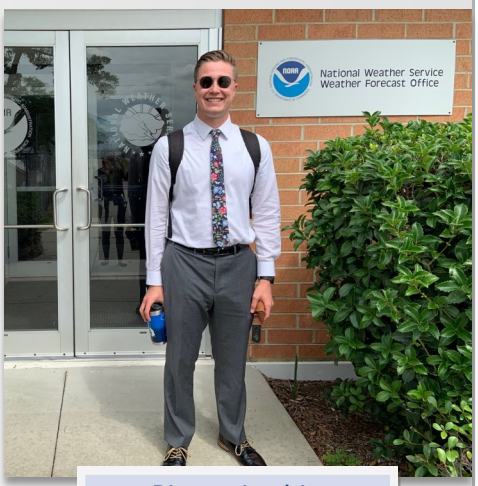
I got my meteorology degree at Florida State University and had the opportunity to volunteer at NWS Columbia shortly after I graduated. I then went on to work at News 19 WLTX as a meteorologist, but decided to focus on getting a Masters at University of South Carolina. I'm so happy I get to stay in South Carolina! I first fell in love with weather when I was around 10. The same year my family moved to Florida from Massachusetts, we had three hurricanes roll through our area in one summer. Getting to witness firsthand what nature could do made me so curious how something like a hurricane or even a simple thunderstorm can form. In my spare time, I love playing video games, reading, and listening to my record collection.

Nicole Steeves

New Meteorologists– Continued

Pierce Larkin

I went to school at Western Kentucky University, and graduated with my BS in Meteorology, and a Minor in GIS. My path into the NWS involved lots of volunteering in college, including WFO Louisville, KY, and for two entities at school (WxOrNotBG & White Squirrel Weather). After that, I worked in GIS for 1.5 years before accepting the job here in Columbia. My interest in weather began as a child, when a tornado struck Lexington, KY in May of 2004. I may have been interested before (my mom claims I have liked weather since Kindergarten), but that is the moment it really began for me. My spare time consists of spending time with my wife Chrissy, serving with a local church, fly fishing, watching basketball, and investing in my friendships!



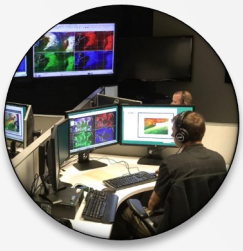
Pierce Larkin

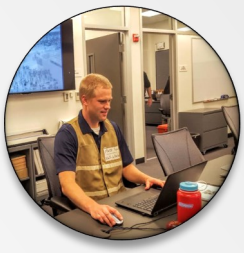
Interested in a career at the National Weather Service?

Check out the links below!


[Careers in Meteorology]


[Careers in Hydrology]


[Careers in Physical Science]


[Careers in Operational Support]


[Careers in Information Technology and Electronics Maintenance]

[Current NWS Job Openings]

[NOAA Student Opportunities]

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