



The Wilmington Wave

National Weather Service, Wilmington, NC

Fall 2020

Volume X, Issue II

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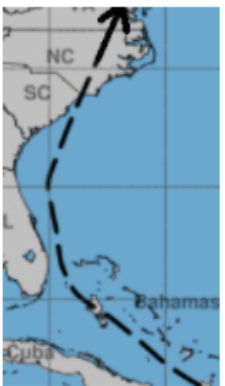
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Hurricane Isaias

By: Tim Armstrong

Hurricane Isaias (pronunciation: *ees-ah-EE-ahs*) was a category one hurricane that made landfall at Ocean Isle Beach, NC during the evening of August 3, 2020 with maximum sustained winds near 85 mph. The storm's rapid movement limited rainfall amounts, however significant storm surge flooding and multiple tornado touchdowns occurred across portions of coastal South and North Carolina.

Location	Peak Gust (mph)	Lowest Pressure (millibars)
Frying Pan Tower	103	-
Federal Point, NC	99	996.0
Oak Island, NC	87	989.0
Wrightsville Beach, NC	85	993.5
Surf City, NC	83	-
Wilmington, NC	73	992.6
North Myrtle Beach, SC	53	993.2
Georgetown, SC	49	1001.0



Track of Hurricane Isaias July 31 - Aug 4

Peak gusts reported from Isaias's landfall in southeastern NC and northeastern SC.

Hurricane Isaias struck near high tide, so the biggest impact was from storm surge flooding. Low-lying coastal streets were inundated during the evening high tide on August 3 from Garden City, SC northward through Myrtle Beach to Little River. Sea Cabin Pier at North Myrtle Beach was destroyed by crashing waves above the unusually high water levels. Where the storm's center made landfall in Brunswick County, NC, storm surge flooding was



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Damage to vehicles, homes, and a fence from storm surge flooding in Ocean Isle Beach, NC. Photo courtesy of the Brunswick County Sheriff's Office.

worse -- up to three feet of water damaged waterfront shops in Southport.

A hundred or more boats were damaged at the town marina, with twenty vessels pushed across the marsh to an adjoining neighborhood. Along the Cape Fear River at downtown Wilmington the surge broke Hurricane Florence's record for the highest river stage ever observed: 9.03 feet MLLW. Businesses along Water Street were damaged by flood waters.

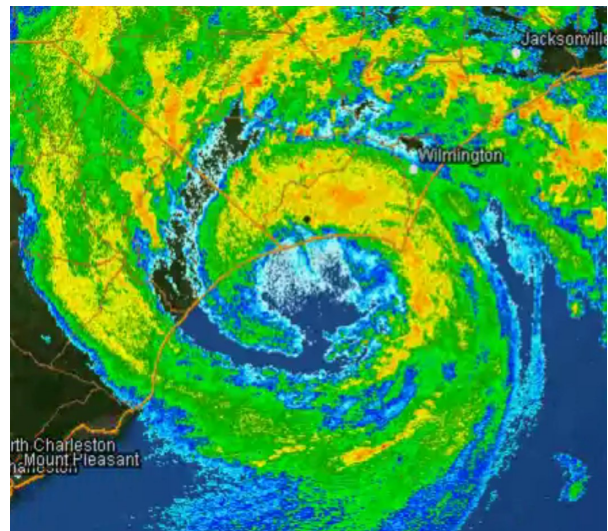
Six tornadoes touched down in the area during the hurricane: five in Brunswick County, NC and one in northern Georgetown County, SC. The strongest tornado had winds up to 115 mph and tore an eight-mile long path from Bald Head Island through Southport.

Additional Information

Hurricane Isaias webpage:

<https://www.weather.gov/ilm/HurricaneIsaias2020>

Hurricane Isaias GIS Storymap: <https://arcg.is/PPuO8>

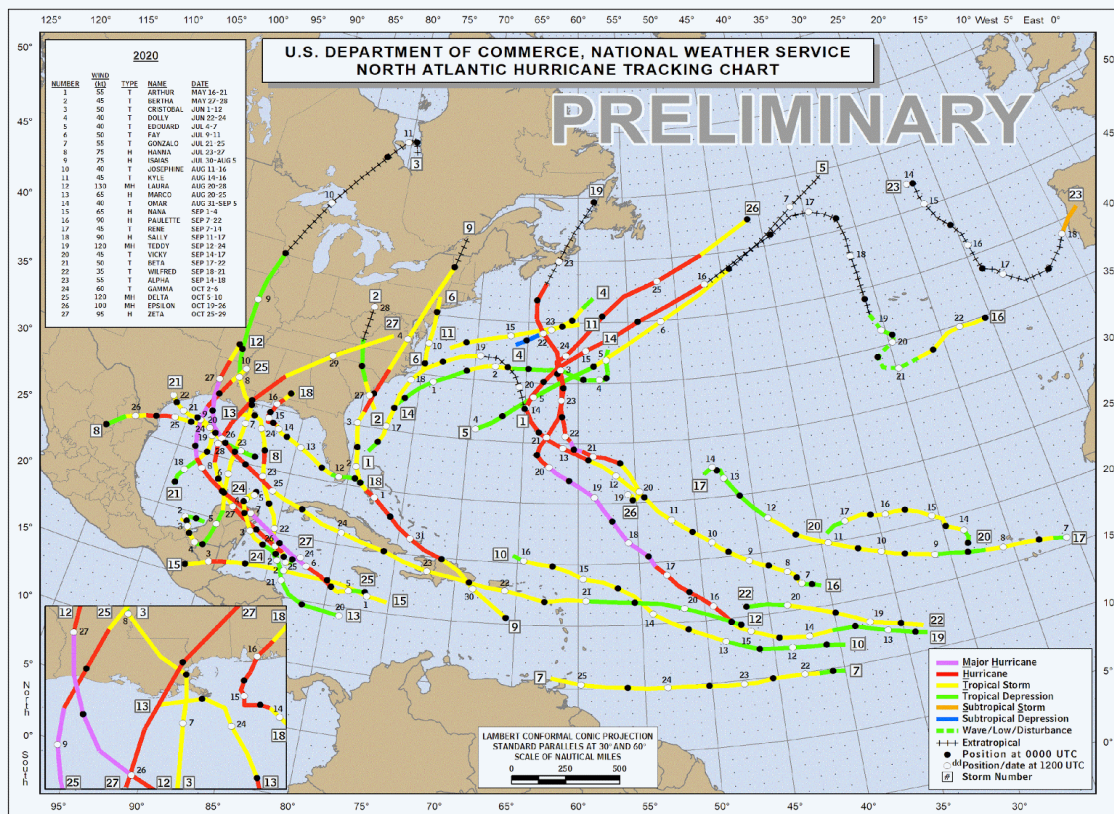


NWS radar image of the eye of Hurricane Isaias making landfall on Brunswick County, NC. August 3r, 2020 at 10:26pm

The Record 2020 Hurricane Season

By: Victoria Oliva

The 2020 Atlantic hurricane season has been extremely active, and has set many records since it began on May 16th with Tropical Storm Arthur. As of this writing, after Hurricane Iota made landfall in Nicaragua, 2020 has had **30 named storms**, which breaks the 2005 record for the most storms in a year on record, and only the second time the Greek letter naming convention has been used. Thirteen of the storms in 2020 have been hurricanes, with 6 major hurricanes. 2020 has broken the record number of named storm landfalls in the continental US in a year with **12 landfalls**, breaking the previous record of 9 storms in 1919. In addition, **27 of the 30 storms** in 2020 broke the record of earliest formation by storm number, beginning with Tropical Storm Cristobal and continuing with all storms from Tropical Storm Edouard through Iota.



Preliminary composite of all Atlantic Tropical Storms and Hurricanes during the 2020 Hurricane Season as of Oct. 25th, 2020 (does not include Eta, Theta, or Iota).

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The Gulf Coast has been hit particularly hard this hurricane season. From the Louisiana to Alabama coastline, there have been **six** tropical cyclone landfalls this year (five in LA and one in AL): two tropical storms and four hurricanes, including Major Hurricane Laura which devastated Lake Charles, LA. Five of these storms hit within a two month time span from August 27th to October 28th.

Northeast South Carolina and Southeast North Carolina have had its fair share of tropical impacts in 2020. The most impactful storm in our area was arguably Hurricane Isaias, which made landfall near Ocean Isle, NC the night of August 3rd (*see page 1-2 for article on Isaias*). Our area has also been impacted by numerous other storms this year, ranging from remnants inland bringing rain and severe weather to offshore storms enhancing rip currents and coastal flooding.

Direct impacts to our area began in late May, when Tropical Storm Bertha formed off the South Carolina coast on May 27th. Bertha made landfall near Isle of Palms, SC later that day, before quickly weakening inland and moving northwest across western NC and VA. 2-4 inches of rain fell across the area, prolonging ongoing moderate-to-major river flooding in the Waccamaw and Pee Dee basins (including Little Pee Dee). Bertha rains helped to produce a secondary high moderate crest on the Pee Dee River at Pee Dee in early June.

Southeast NC and Northeast SC were impacted by several offshore tropical cyclones late August through early September. Tropical Storm Laura in the Caribbean generated swells that enhanced rip currents across the area August 25-27. Laura would go on to make landfall in southwestern Louisiana as a major hurricane. Another round of enhanced rip currents occurred across east-facing SE NC beaches August 31 – September 1 as Tropical Depression 15 off the Carolinas coastline developed into Tropical Storm Omar east of the NC/VA border.



Flooding in Downtown Darlington, SC on Sept. 17th, 2020 (photo: Tonya Brown WPDE)

From mid to late September, tropical swells created strong rip currents along east-facing area beaches and minor coastal flooding, both along area beaches and at Downtown Wilmington. Coastal impacts first began due to swells from Hurricane Paulette, which made landfall in Bermuda September 14 (first landfall on the island since 2014). Minor coastal flooding at the beaches began on September 14th. As Paulette moved north-northeast across the western Atlantic, Hurricane Teddy was intensifying

in the Atlantic. Teddy became the season's second major hurricane (Laura was the first) on September 17th. Before Teddy made landfall in Nova Scotia on September 23rd, the storm had grown considerably in size, with tropical-storm force winds encompassing a diameter of 850 miles (4th largest on record by diameter). Swells from Teddy helped prolong the ongoing coastal flooding, increased rip current activity, and led to the issuance of a high surf advisory for SE NC beaches and a gale warning for our coastal waters. Minor coastal flooding at the beaches ended on September 22nd. Swells from Hurricane Teddy led to major coastal flooding in Charleston, SC and in the NC Outer Banks.

The first tropical remnant to affect our area was Hurricane Sally. Sally had moved across Florida as a tropical depression on September 12th, intensified into a hurricane on the 14th, and made landfall in Alabama on the 16th. Sally then rapidly weakened over land and moved across the Carolinas as a remnant low on September 17th. Remnants of Sally brought heavy rain and severe weather to NE SC and SE NC. Six tornado warnings were issued with four EF0 tornadoes confirmed: two in Florence County, SC (including a 5-mile long track south of Timmonsville), one in Hampstead, NC, and one in Wilmington, NC. 3-8" of rain fell across most of the area, leading to flash flooding in several towns in SC, including Downtown Darlington, Hartsville, and Timmonsville. Rainfall from Sally produced minor river flooding on the Black Creek near Quinby, Waccamaw at Conway, Lynches at Effingham, and Black River at Kingstree.

A week later on September 25th, remnants of Tropical Storm Beta moved across the Carolinas, after making landfall in Texas on the 22nd and slowly moving northeastward. An EF0 tornado was confirmed in Myrtle Beach, SC as multiple videos captured a waterspout moving onshore in the afternoon before quickly dissipating. 0.5-2" of rain fell across the area on average. However, locally higher amounts, particularly inland NE SC, combined with rain across western NC the previous day, led to river flooding in several locations. Rainfall from Beta resulted in moderate flooding on the Black Creek near Quinby and Lumber River at Lumberton, along with minor flooding on the Pee Dee at Pee Dee and Little Pee Dee at Galivants Ferry.



Damage in Conway, SC from a confirmed EF1 tornado on Oct. 11th, 2020.

As we headed into October, Delta was forming in the Caribbean. Delta became a hurricane as it moved into the Gulf of Mexico, before intensifying further into a major hurricane. Delta intensified from a tropical depression (October 5th)



to a category 4 major hurricane (October 6th) in just over 36 hours, the fastest rate since Hurricane Keith in 2000. Hurricane Delta made landfall in southwestern Louisiana as a major hurricane on October 9th, before weakening rapidly and moving across the Carolinas as a remnant low October 11 – 12. Eight tornado warnings were issued in our area with four confirmed tornado touchdowns: three EF1 and one EF0, including an EF1 in Conway that resulted in an injury. 2-4” of rain fell across the area, particularly along the coast, resulting in minor flooding on the Pee Dee at Pee Dee in the middle of October. View more details about the tornado event at <https://www.weather.gov/ilm/Oct2020Tornadoes>.

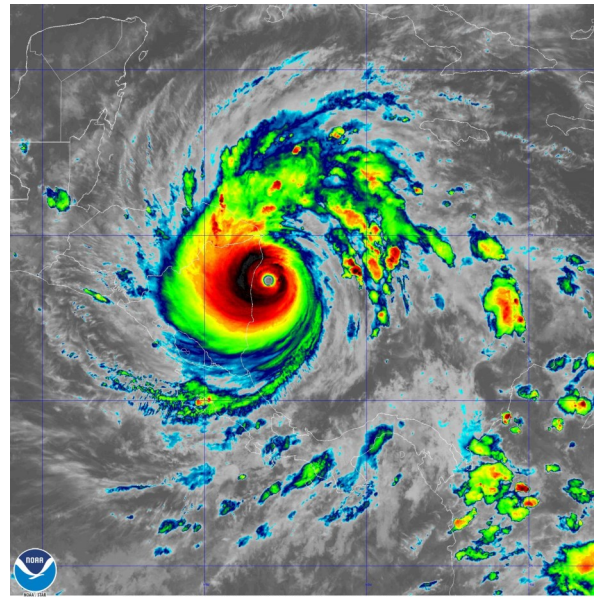
Late October, Hurricane Epsilon became the fourth major hurricane of the 2020 season, and was the farthest east any storm had rapidly intensified this late in the season. Swells from Epsilon led to enhanced rip current activity at Wrightsville Beach, NC as the storm moved north across the western Atlantic.

The latest remnant to impact our area for the 2020 season, was Hurricane Zeta. Zeta made landfall in southeastern Louisiana on the night of October 28th, before moving across Alabama and western Carolinas as a Tropical Storm the 29th. Tropical storm warnings were issued as far north as western NC. A wind advisory was issued for parts of our area for expected wind gusts over 40 mph. Multiple trees were reported down across Georgetown County, SC, as well as in Little River, SC. Johnnie Mercer Pier at Wrightsville Beach, NC reported a wind gust of 57 mph.

Hurricane Eta developed in the Caribbean Sea in late Oct., and struck Nicaragua on Nov. 3rd. Deadly storm surge and winds claimed nearly 150 lives in Guatemala, Honduras, Mexico and Nicaragua. The storm then left Central America and made landfall two more times along the Florida Keys and western Florida before transitioning into an extratropical cyclone more than 2 weeks later off of the Carolina coast.

Hurricane Iota made landfall just 15 miles south of Eta’s landfall location 2 weeks later. Iota was the first and only category 5 storm of the 2020 Atlantic Hurricane Season

with winds at peak intensity near 160 mph. Deadly storm surge, winds, and heavy rain again battered eastern Nicaragua as Iota claimed a total of 61 lives, most from flash and river flooding. As of Nov. 27th, Iota was the most intense and final storm of the 2020 record-breaking Atlantic Hurricane Season.



IR Imagery of Hurricane Iota on November 16, 2020 on its approach toward the coast of Nicaragua. Iota was the only Cat. 5 in 2020.

Staff Q&A: Keeping the NWS Running

*Interview Answers Provided by: Nancy Zerr
Article Written by: Ian Boatman*

It's probably not surprising that most of our staff is composed of meteorologists. However, there are a few folks in our office that specialize in other fields to keep us moving forward. One of those people is Nancy Zerr, our Administrative Support Assistant (ASA). Nancy works tirelessly to make sure all of our administrative duties are up to par, and she is an absolute necessity on our team. Recently, we sat down with Nancy so she could share more about her background, and the type of work she does each day.

1. Where did you go to school, and how has your career path led you to NWS Wilmington, NC?

I began my college education at a business college in western New York, where I earned a degree in Travel/Tourism Business Management and Restaurant/Hotel Management. After graduating, I was asked to return as a faculty member and continued teaching there for several years before leaving to help open "Fiesta Travel" for two sisters that had no travel training at all. I ended up leaving western NY in 1997 and headed to Spartanburg, SC, where I pursued my high school dream of earning a degree in Horticulture Technology. I became adjunct faculty there during my training and after graduating. My love for interior plants led me to move to South Florida, where all the interiorscape plant growing actually took place. My husband worked for the Veterans Administration at the Key Largo Vet Center and I became Operations Manager for Sunshine Tropical Foliage in Homestead, where I soon became acutely aware of hurricane season and what that meant to people living in that area. My husband and I lived in Key Largo, and during our five years in South Florida, we evacuated many times due to incoming hurricanes. My husband became glued to The Weather Channel and our interest in weather grew during our time in Key Largo. After five years of evacuations, we decided to move to Maine, where my husband was able to transfer to the Vet Center in the Portland area and I started my government career at the Portsmouth Naval Shipyard as Administrative Support for the Public Works Department. Some



Nancy Zerr works tirelessly to ensure that the NWS Wilmington can serve the public 24/7

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of my responsibilities included making all the travel arrangements for over 180 staff members, as well as scheduling all the required medical appointments with the onsite medical facility and assisted the safety manager with monthly training. When my husband retired, we decided that we wanted to move further south to get out of the snowy cold Maine winters. We landed in North Carolina, where my daughter was already living. For us, it was a win-win.

2. Why did you decide to pursue this career?

My first response would be to get to a warmer climate, and still work for the federal government, but I really knew that with the attention to detail that this position required, I knew it would challenge me and be ever changing. I knew my organizational skills would be needed.

3. What do you do in your spare time?

These days, due to COVID-19, my spare time is spent either working out in the yard, crocheting, or reading. I am an avid reader, and enjoy most topics. Since March, I have also started my own “cottage industry” business. I am making face masks in all sizes and patterns and they have been a huge success.

4. Your role in our office seems to involve a lot of “behind the scenes” type of work. What kinds of things do you do to help keep us moving forward?

Some of my responsibilities include processing payments for all the telephone (eight monthly items), electric, and water for our office, ASOS weather stations, and Doppler radar locations (five monthly items). I am also responsible for initiating and maintaining/monitoring contracts for of-



Automated Surface Observing Systems (ASOS) are part of the equipment maintained by NWS

ice grounds maintenance, office janitorial, and office and Doppler radar HVAC maintenance. I am also responsible for the use of a government credit card and utilize that to pay invoices which include office and Doppler radar fuel, copy machine maintenance, pest control, fire extinguisher inspections, trash/recycling, and more.

Creating travel authorizations and vouchers also falls to me as well, for a staff of 21, including all Incident Meteorologist (IMET) travel, international (i.e., Australia) and domestic. Our IMET just flew back from a 50-day deployment, which crossed two fiscal years, so the process was a bit more complicated than usual.



Nancy has assisted with IMET deployments to locations all over the world. This photo was taken by our local IMET during a deployment to the 2018 Ferguson Fire near Yosemite National Park in California. Nancy handles various budgetary and logistical aspects of the deployment as equipment and personnel are often transported to rural and remote areas.

One of my most important and time consuming responsibilities is budget tracking. I am tasked with completing a monthly Excel spreadsheet for NWS Eastern Region that tracks every penny our office receives and spends, including overtime and comp time earned and used. It also tracks accounting codes (which change every fiscal year) and need to be updated accordingly. I work closely with the NWS Eastern Region Budget Team to accurately forecast expenses throughout the current and next fiscal year so they can request the necessary funding from Congress to support the NWS Mission.

Finally, I also make sure that everyone is getting paid accurately and that we have correct supporting documentation verifying labor costs.

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NWS Wilmington's New Wave Detail

By: Mark Willis



Long period swell from Hurricane Laura reaches Wrightsville Beach on Aug. 25, 2020. The details of these hazardous wave events are now being made available by NWS Wilmington.

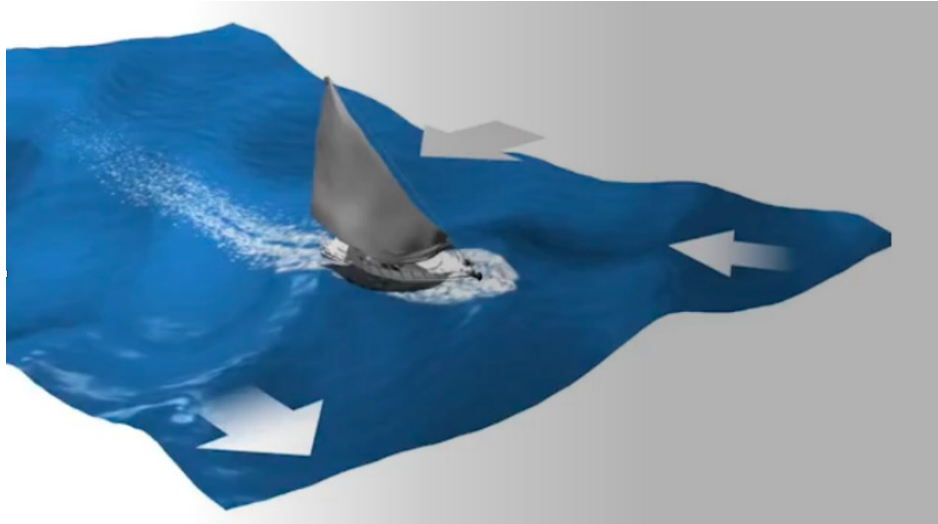
During the 2020 boating season, NWS Wilmington led an effort to add wave detail to our marine forecasts. Our office was one of many along the East Coast to begin including wave height, period, and direction information to an experimental version of the popular “Coastal Waters Forecast (CWF)”. Currently, our marine forecasts only include [Significant Wave Height](#). This parameter is important as it represents an average of the highest one third of wave heights that

you may observe on the water, and is a common variable reported from buoys. However, it is limiting in that it does not tell you if there are multiple, coexisting wave systems occurring along with their individual heights, periods, and directions. Here is a little “Waveology 101” that helps us understand the importance of this project:

There are three fundamental properties of ocean waves: height, period, and direction. Wave height generally refers to how tall a wave is from trough to crest, wave direction is the direction the wave is coming from, and wave period is the time it takes for successive waves to pass a fixed point, such as a buoy. The period is also directly related to how fast waves move, how deep they extend into the ocean, how much energy they contain, which, in turn, influences the size of breaking waves at the coast, and more.

In addition, it is common for there to be multiple, coexisting wave groups that coincide at any given point in the ocean. For example, during the fall, we often see short period waves from the NE that develop behind cold fronts, which simultaneously exist with longer period waves from the SE from tropical systems. In the summer we often see short period waves from the SSW associated with the local winds, along with small SE swell associated with the offshore Bermuda High Pressure area. Some users may only be interested in short period waves because they present hazardous, choppy waves for smaller boats, others may take

particular interest in the long period waves given the shoaling hazards they create near shore, while others may be interested in both. The point is, no two wave systems are created equal, any wave system present may be hazardous or of interest to different marine groups, and therefore we feel we should not ignore them.



Schematic of a sailboat being impacted by three simultaneous wave systems from different directions (arrows). This is a common occurrence, and the new experimental CWF will help mariners become aware of the associated hazards.

The experimental version of our CWF, available at <https://www.weather.gov/ilm/proposedcwf>, provides height, period, and direction information for up to two wave systems at a time, in addition to the Significant Wave Height. Below is an example of the legacy vs. experimental version of the CWF:

Legacy CWF: NE winds 20 to 30 kt. Seas 5 to 7 ft.



Experimental CWF: NE Winds 20 to 30 kt. Seas 5 to 7 ft. Wave Detail: NE 6 ft at 6 seconds and SE 4 ft at 15 seconds.

We would love to hear your feedback on this project, as we are going to be working with NWS Headquarters in the months to come to determine if the new wave detail should be included in our official, operational versions of our marine forecast products. Drop us a line with your thoughts at ILMWaves@noaa.gov.



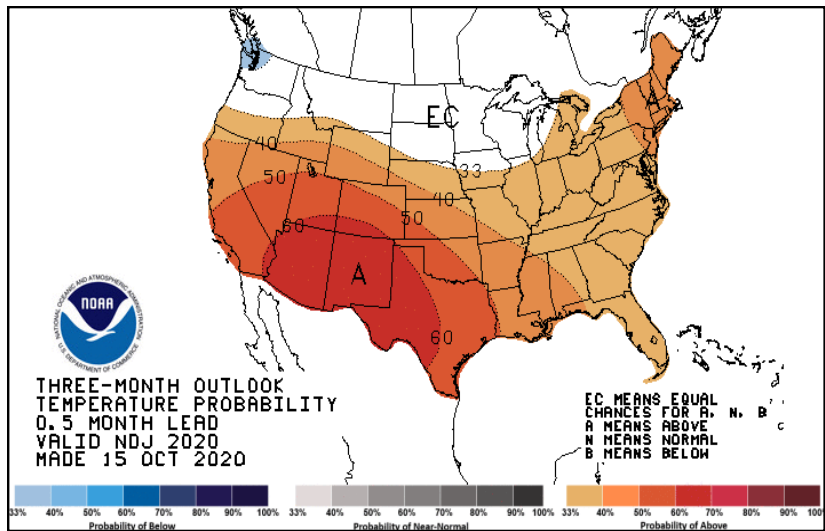
2020-2021 Winter Outlook

By: Timothy Armstrong

The official NOAA outlook for the upcoming winter season is for increased chances of above-normal temperatures and below-normal rainfall. This is mainly due to a moderate to strong La Niña that should continue through winter and into at least the first part of the spring of 2021.

During La Niña, cool water in the tropical east Pacific Ocean causes fewer thunderstorms to form there, leading to a weaker subtropical jet stream that brings less moisture and less rainfall to the southern United States during the winter. The position of the polar jet stream also lifts farther north during La Niña. This tends to focus storminess across the Ohio Valley and Great Lakes, leaving the Carolinas high and dry with warmer than normal temperatures.

This should save money since less electricity, natural gas, or wood will be needed for heating homes and businesses. Solar energy generation potential could be higher than normal given an expected large number of dry, sunny days. Outdoor recreational activities could also benefit this winter with less cloudy, cold, or wet weather expected.

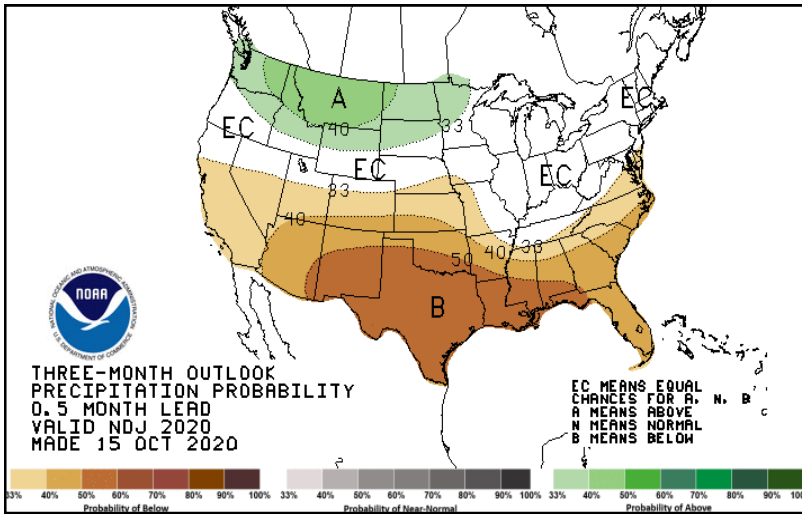


Temperature outlook for this coming winter. Slightly higher chances of above-normal temperatures are forecast across the Carolinas

Since soil moisture is currently above normal across the Southeast and evaporation is typically low during the winter, it's unlikely that below normal rainfall would have a significant impact on the area. In fact, some dry weather could be beneficial as it favors a lower flood risk along the Waccamaw, Cape Fear, Pee Dee, and Lumber Rivers. If below normal rainfall were to continue into the Spring of 2021, however, it could lead to issues with enhanced fire risk or drought developing by March or April.

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Precipitation outlook for this upcoming winter. Higher chances of below-normal precipitation are forecast across the Carolinas.

Even if average temperatures this winter are above normal, there will undoubtedly be occasional arctic outbreaks that bring below normal temperatures to the Carolinas for at least a few days at a time. On average, our local cities dip into the teens at least once during the winter, even at Myrtle Beach!

Measurable snowfall is rare across eastern North and South Carolina, historically only occurring in about half of our winter seasons. Cold air moving south from Canada has to intercept a storm system moving northeastward across Florida to bring us snow. Bringing moisture overhead without bringing in warm temperatures from the Atlantic Ocean is a very difficult balancing act.

During previous winters with similar climate conditions to what we expect this winter, measurable snowfall has occurred about half the time -- very close to long-term climate averages. It's not possible to say with any certainty whether measurable snow will fall this winter -- but La Niña doesn't rule it out.



Photo from College Road during the January 28-29, 2014 ice and snow storm in Wilmington, NC.

More details about the winter weather outlook are available at <https://www.weather.gov/ilm/WinterOutlook2020-2021>
Video: <https://www.youtube.com/watch?v=HpVfWObpKI4>

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Winter Safety

By: Jordan Baker

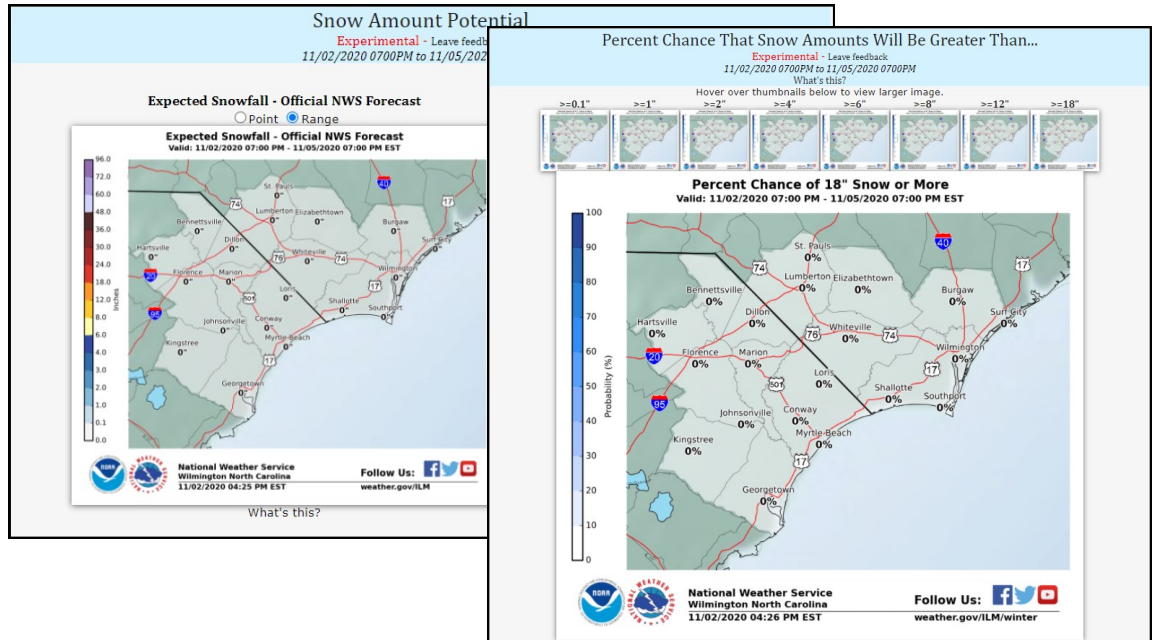
✿ While southeast NC and northeast SC have relatively mild winters, we still have extreme weather events that may affect our area such as ice storms, long-duration cold snaps, and nor'easters that bring snow, rain, and wind. It is important to be ready for these events because it only takes one to cause loss of life and property.

✿ In preparation for a winter weather event, keep in mind that the primary concern will be the loss of heat, power outages, and shortage of supplies if storm or proceeding conditions persist for more than a couple of days.

✿ Before winter weather strikes, be sure to take necessary precautions such as maintaining, cleaning, and annually inspecting chimneys and other heating equipment, and making sure your vehicle is prepared by having a full gas tank and inspecting the antifreeze levels, brakes, battery, and more!

✿ If a snow or ice storm is approaching our area, make sure to check out our Probabilistic Snowfall Forecasts at www.weather.gov/ilm/winter to get an up-to-date forecast showing Expected Snowfall totals (current forecast), High-End Snowfall totals (don't expect more than this much), and Low-End Snowfall totals (expect at least this much). You can also view the percent chance of seeing more than a given amount (e.g. % chance of seeing more than 1 inch, 2 inches, 4 inches, etc.).

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Disaster Kit Preparation

For Home/Work

- Flashlight and extra batteries
- Battery-powered NOAA Weather Radio
- Extra food and water (one gallon of water per person, per day)
- Prescription medicines
- Cash and a credit card, emergency phone numbers
- Important documents
- Blankets and change of clothing per person
- First aid supplies
- Fire extinguisher/smoke alarm/carbon monoxide detector
- Heating fuel
- Emergency heat source

For Vehicle

- Mobile phone, charger, batteries
- Windshield scraper or de-icing spray
- Flashlight with extra batteries
- Battery powered radio
- Compass and road maps
- Water and snack food
- Matches
- Extra hats, socks, mittens, and clothing
- First aid kit with pocket knife
- Necessary medications
- Blanket(s) & sleeping bags
- Tow chain and/or rope
- Jumper cables
- Emergency flares or Fluorescent distress flag

For additional information, visit www.ready.gov/winter-weather

70% of snow and ice-related injuries occur in automobiles

Leave extra space between you and the vehicle in front of you

Ice and Snow, Take it Slow.



 weather.gov/winter

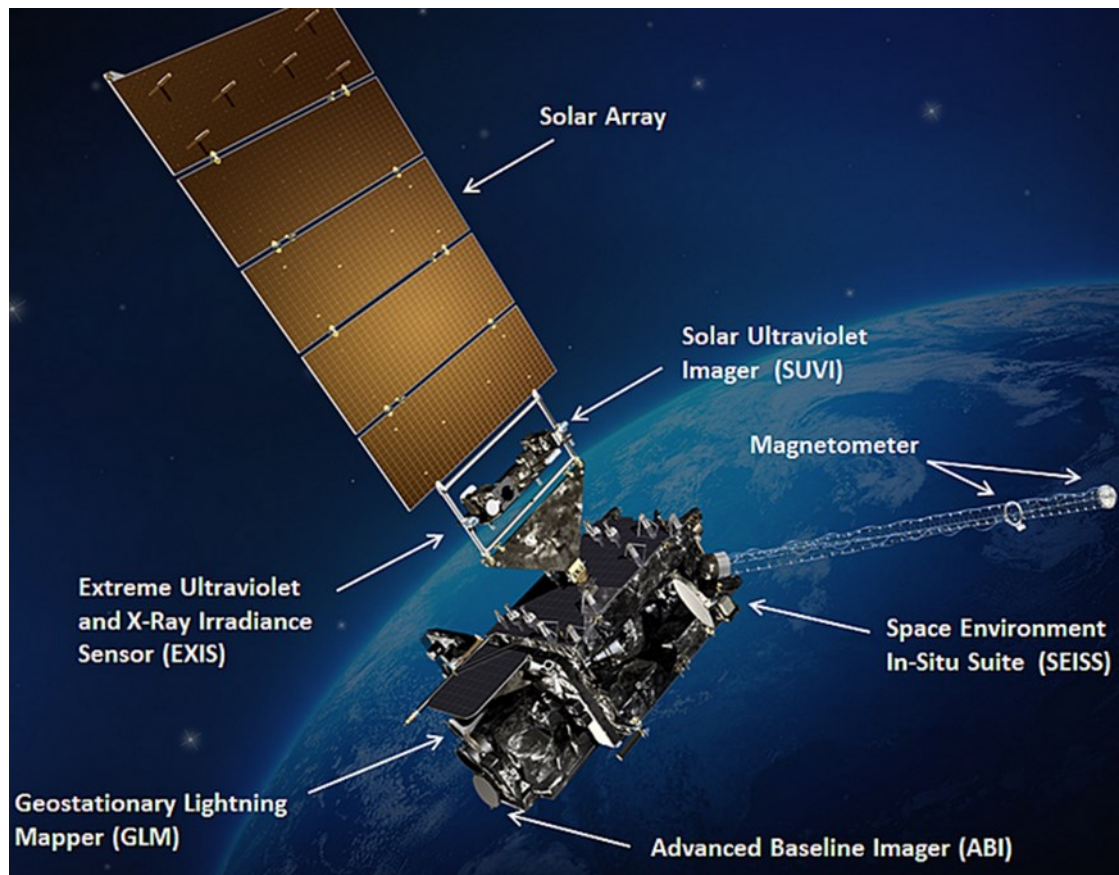
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Who is Watching the Sun?

By: Michael Colby

Solar emissions can affect technological systems on which society depends. Radioactive waves and particles from a solar storm for example, can disrupt communications, navigation, power grids, space-craft systems, and even put astronauts and airline passengers at risk to a higher level of radiation exposure. Impacts to the Earth and Earth's atmosphere caused by the Sun, are called Space Weather. Four sensors onboard the GOES satellite continually monitor the health of the Sun. These include a Solar Ultraviolet Imager, a Magnetometer, the Space Environment In-Situ Suite, and Extreme Ultraviolet and X-ray Irradiance Sensors.



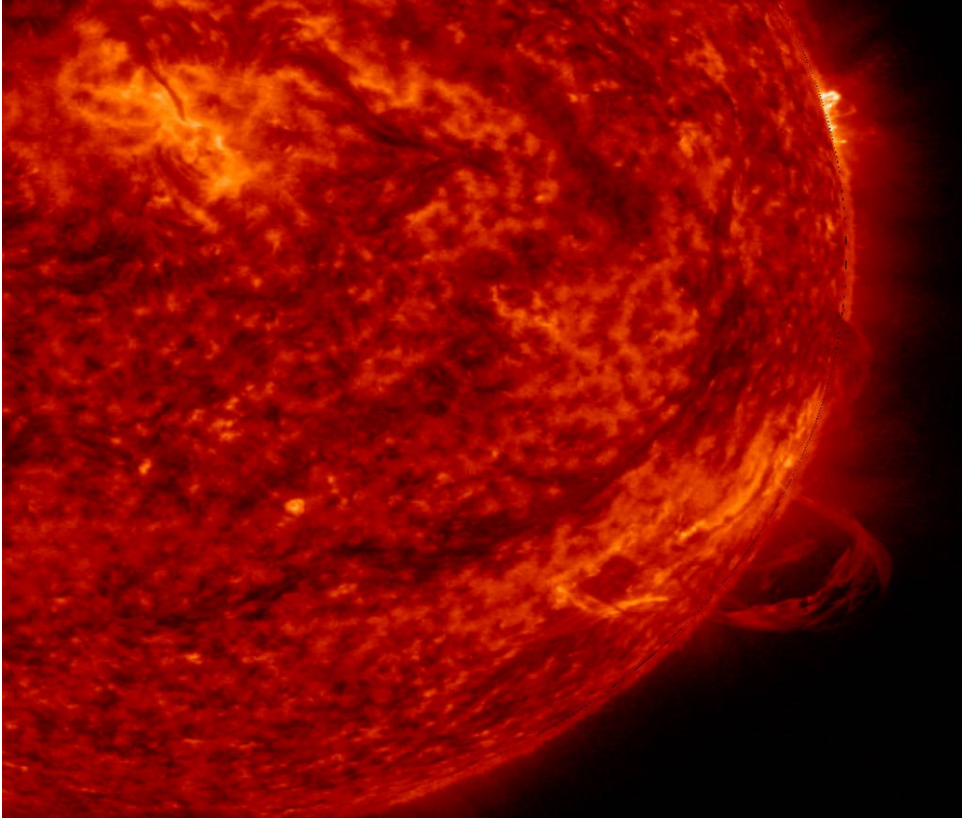
Instruments onboard GOES Satellite. Courtesy: NASA and NOAA

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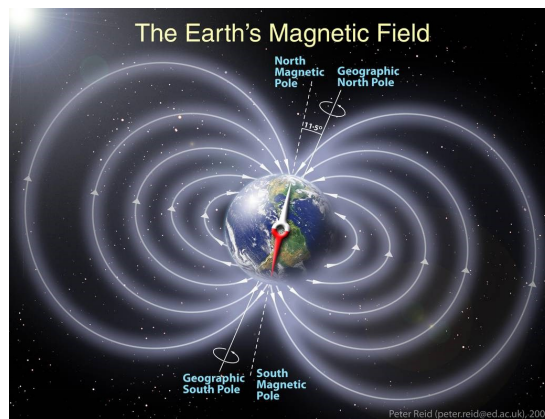


The Solar Ultraviolet Imager is a telescope that watches for changes in extreme ultraviolet light, an early detection of solar flares and coronal mass ejections. Scientists at the Space Weather Prediction Center can more closely examine solar prominences and filaments, and coronal holes from which solar winds emanate.



Two long threads of solar material called filaments break free from the sun, erupting into space. Filament eruptions always precede a corona mass ejection (CME) which lead to solar flares and can cause geomagnetic storms on Earth. Courtesy: NASA

The Magnetometer measures the strength and polarity of the Earth's magnetic field in space. Abrupt changes in the magnetosphere can signal the onset of a geomagnetic storm. Strong solar wind perturbations from coronal mass ejections, can push the magnetosphere inside satellite orbit, causing harsh conditions for electronic systems onboard satellites and space craft.



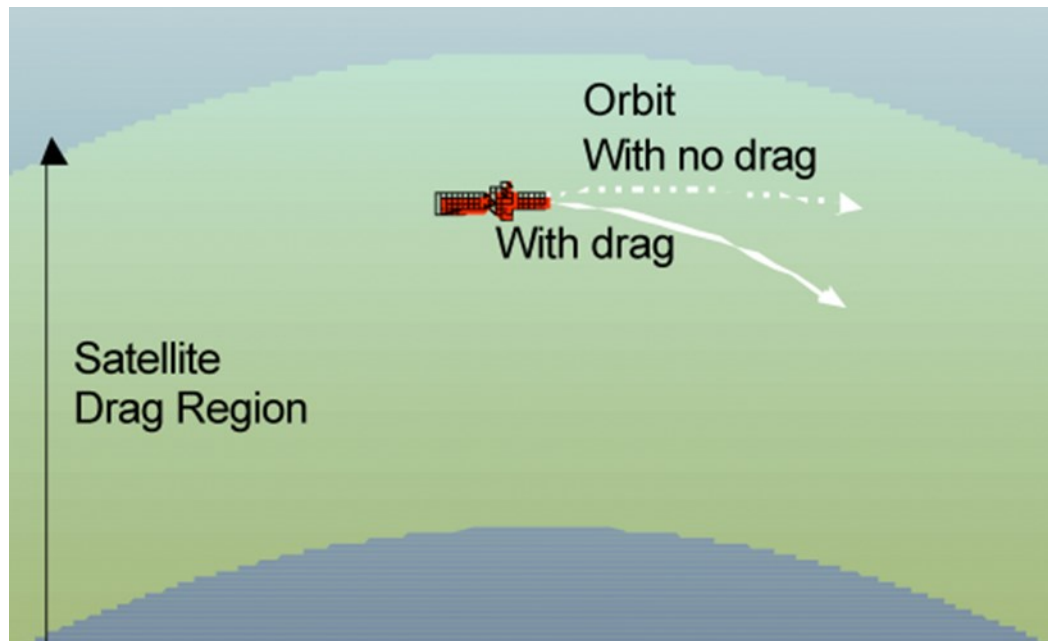
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The Space Environment In-Situ is comprised of four sensors that monitor proton, electron, and heavy ion fluxes in the magnetosphere. This information is critical in determining the risk level of radiation exposure to astronauts and satellites.

The Extreme Ultraviolet and X-ray Irradiance Sensors monitor solar variations that directly affect satellite drag and tracking, and ionospheric changes that impact navigation and communication operations.



Satellites must be launched above the Satellite Drag Region of the atmosphere so that the friction caused by molecules in the atmosphere don't allow the satellite to come back to Earth too quickly.

The answer to the question, 'who is watching the sun?' is NOAA, and the Space Weather Prediction Center, diligently monitoring our nearest star for changes.



Learn more at swpc.noaa.gov



NOAA's 2020 Milestones

By: Ian Boatman

NOAA's 50th Anniversary

On October 3, 1970, our parent organization, the National Oceanic and Atmospheric Administration (NOAA) was officially born. In 2020, we celebrate 50 years of science, service, and stewardship. NOAA has become one of the world's most renowned science agencies that protects life and property of the United States and its territories. Through this time, we have helped build a Weather-Ready Nation, with the innovation of weather satellites, a revolutionary Doppler weather radar, and world-class computing in numerical weather prediction. We keep an eye on our oceans, using sonar technology to map coastal waters to better understand marine habitats and better the economy through shipping.



National Weather Service's 150th Anniversary

On February 9, 1870, President Ulysses S. Grant signed a Joint Congressional Resolution into law. This resolution was “to provide for taking meteorological observations at the military stations in the interior of the continent, and at other points in the States and Territories...and for giving notice on the northern lakes and on the seacoast, by magnetic telegraph and marine signals, of the approach and force of storms.” In 2020, 150 years later, we hope that President Grant would be proud of who we are as the National Weather Service today. We stay committed to our mission of providing weather, water, and climate data, forecast and warnings for the protection of life and property, and enhancement of the national economy. Wilmington has a special claim to this history.



National Weather Service operations in the 19th century (left) and today (right).
Photo courtesy: NOAA's NWS Insider (Aug. 2020 Issue)

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National Weather Service, Wilmington, NC



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The Wilmington Wave

National Weather Service, Wilmington, NC



Left: An NWS weather balloon is launched from Bismark, North Dakota on June 24, 2017. Credit: NOAA.

Right: Early testing of hydrogen filled balloons for upper air measurements. Theodolites - a surveying tool that measures horizontal and vertical angles - were used to track balloons to the limit of visibility. Credit: NOAA Photo Library. (NOAA)

National Weather Service in Wilmington, NC

As if there isn't already enough to celebrate at the national level, we also have some personal milestones to acknowledge at our office! Coming New Year's Day 2021, we will be celebrating 150 years of taking precipitation observations at the Wilmington International Airport (KILM)! We started taking these observations on January 1, 1871, making our site the longest continuous weather observation site in North Carolina. Not to be outdone, we will be celebrating another major anniversary in just a few years. Our first temperature observations started on April 1, 1874. So come April Fool's Day 2024, we will be adding 150 years of continuous temperature observations to our list of accomplishments. Here's to another 150 years and more of weather observations in the Port City!



Get Involved with the National Weather Service!

By: Jordan Baker

Along with the thousands of National Weather Service (NWS) employees, volunteers from all over the country contribute to help the NWS's mission of protecting life and property. Wondering how you can help us and your community prepare and learn from weather-related events? Check out all of these unique ways to get involved!

Skywarn Training

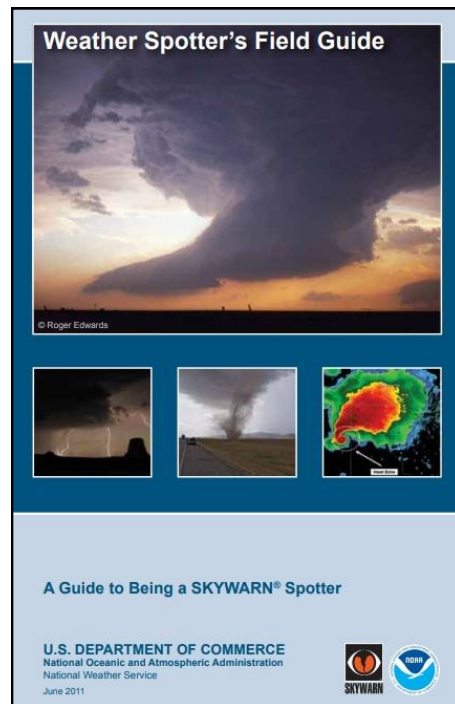
In most years, thunderstorms, tornadoes and lightning cause hundreds of injuries and deaths and billions in property and crop damages. To obtain critical weather information, the National Weather Service (NWS) established SKYWARN® with the general public and partner organizations. SKYWARN® is a volunteer program with between 350,000 and 400,000 trained severe weather spotters. NWS encourages anyone with an interest in helping to provide storm reports to the National Weather Service to please join the SKYWARN® program. These reports assist our forecasters in critical warning decisions that could save the lives of those in your community or in communities far away. Your information is as valuable as radar, satellite, and our other forms of weather data. This information can make the difference when severe weather threatens our area, and it only takes 30 seconds

to submit a storm report by phone! Volunteers can be anyone in the community from the general public to police and fire personnel, dispatchers, EMS workers, public utility workers and other concerned private citizens. Individuals affiliated with hospitals, schools, churches and nursing homes or who have a responsibility for protecting others are encouraged to become a spotter.



SKYWARN
WEATHER.GOV®

Ready to become a spotter? Visit www.weather.gov/ilm/skywarn to learn more and find an upcoming class. Training is free, usually virtual, and typically lasts only 2 hours.



The Wilmington Wave
National Weather Service, Wilmington, NC



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Co-Op Observers

The [NWS Cooperative Observer Program](#) is truly the national weather observing network of, by, and for the people. Established in 1890 and now with more than 8,700 volunteers, the NWS depends on these dedicated observers. Our Co-Op observers are committed to taking observations and report daily weather and climate information using the phone or internet. NWS provides the training, equipment, and maintenance — you provide daily data! Your observations support warnings, forecasts, and help build a long-term weather history for an area. The data are also used in agricultural planning and assessment, engineering, environmental-impact assessment, utilities planning, and litigation. Coop data plays a critical role in efforts to recognize and evaluate the extent of human impacts on climate from local to global scales.



Richard Hendrickson records a snowfall measurement from a 2014 snowstorm in Bridgehampton, NY. Mr. Hendrickson submitted his first co-op report in 1930 and continued daily reporting until his passing in 2016. Mr. Hendrickson's 86 years of service are the longest tenure of any Co-Op observer.

WeatherReady Nation Ambassador

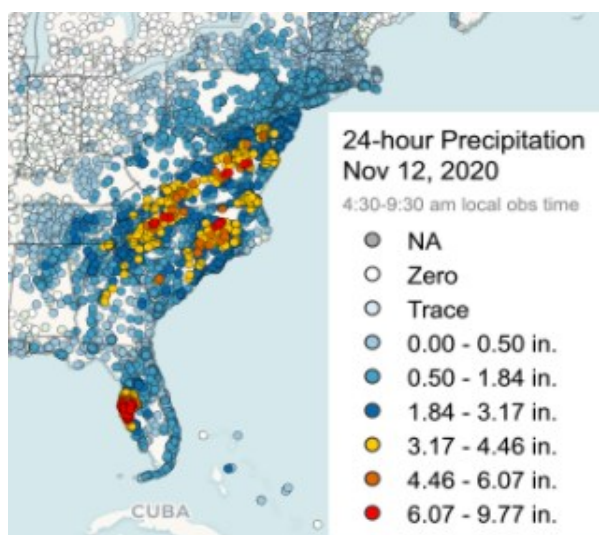
The Weather-Ready Nation Ambassador™ initiative is the National Oceanic and Atmospheric Administration's (NOAA) effort to formally recognize our partners who are improving the nation's



readiness, responsiveness, and overall resilience against extreme weather, water, and climate events. As a WRN Ambassador, partners commit to working with NOAA and other Ambassadors to achieve this goal by creating a plan for your organization in a time of weather emergency. For organizations looking to become a Weather-Ready Nation Ambassador, find more information at www.wrn.gov, read these [FAQs](#), or [contact us](#) to sign up today!

CoCoRAHs

The Community Collaborative Rain, Hail, and Snow Network (www.cocorahs.org) is a non-profit, community-based network of volunteer observers who measure precipitation from their backyard. Participants can volunteer at any age. CoCoRaHS sells low cost equipment to help volunteers get started and all observations are entered into an online database. This data is used by a wide variety of users, ranging from meteorologists and hydrologists to insurance adjusters and engineers.



CoCoRAHs reporting stations in the Carolinas and Virginia after the Nov. 12th heavy rain event.

Survivor Stories & mPing

Have you been a victim of dangerous weather hazards? NWS encourages you to tell us your story by emailing melody.magnus@noaa.gov. These stories are used to spread education and awareness of hazardous events. Here in North and South Carolina, these stories are especially important in warning our summer-time visitors of the dangers of rip currents and lightning.



mPING (Meteorological Phenomena Identification Near the Ground project) is a mobile app designed so that users can report the type of precipitation they are experiencing. No need to measure! Use the free mobile app to send reports anonymously. Reports are automatically recorded into a database to improve weather computer models. The information is even used by road maintenance operations and the aviation industry to identify icy areas.

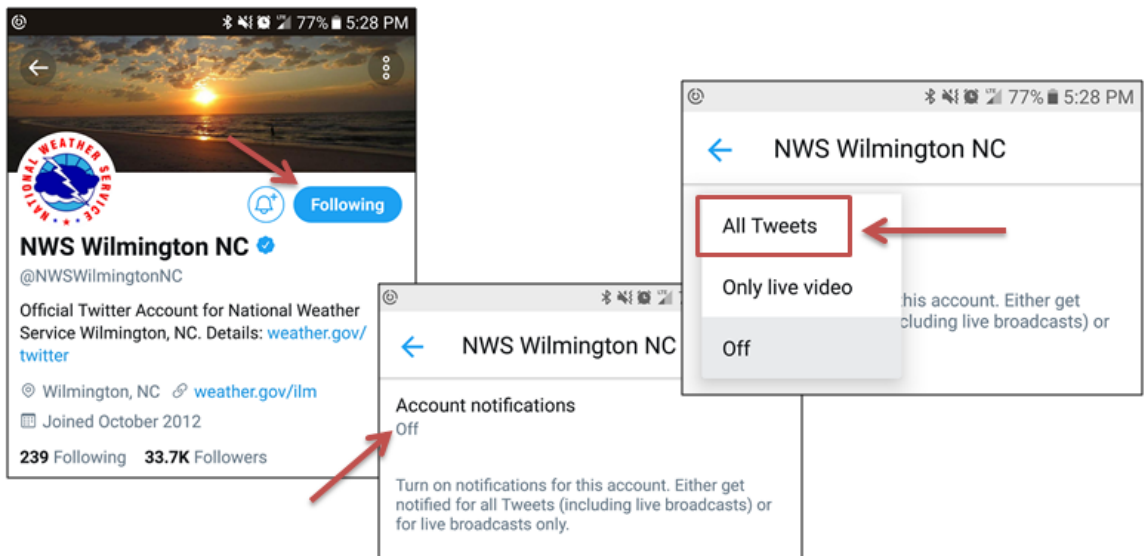
Social Media Notifications

Whether it's during active weather, storms in your area, or you are just interested in information from the National Weather Service, you can turn on social media notifications from your local NWS office to stay notified of ongoing weather in your area. For Twitter, you can turn on mobile notifications alerting you of new tweets from your NWS office. For Facebook, you can choose to turn on Notifications for the NWS page that will send you a notification within Facebook for new posts, up to 5 a day.

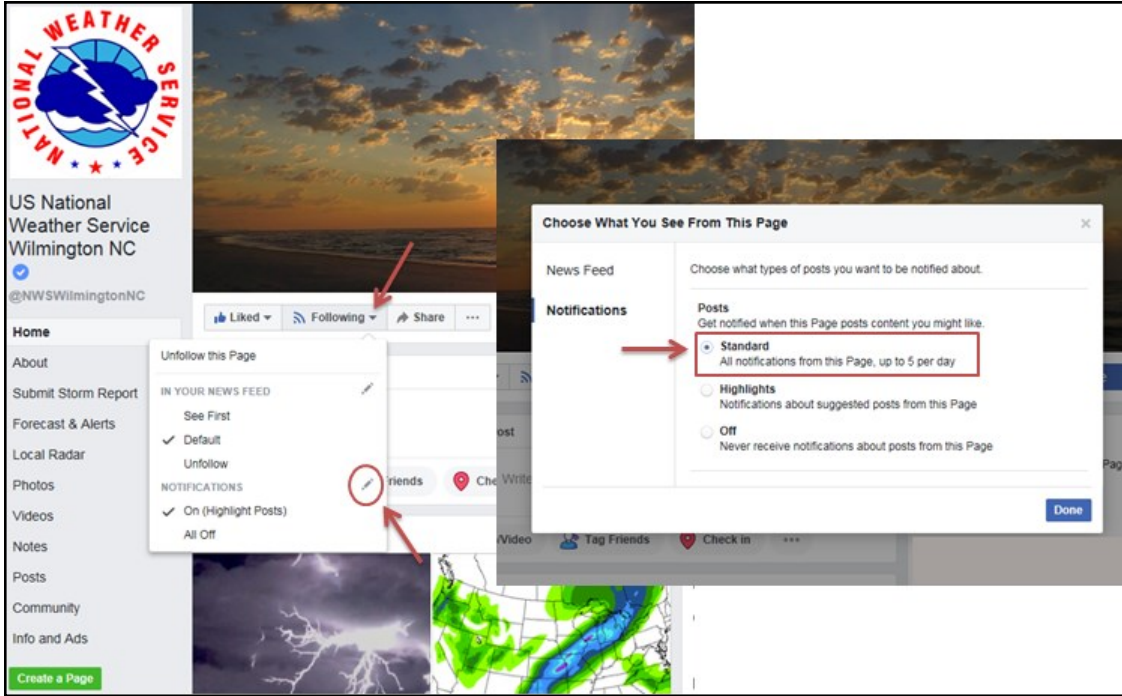
Twitter via Desktop



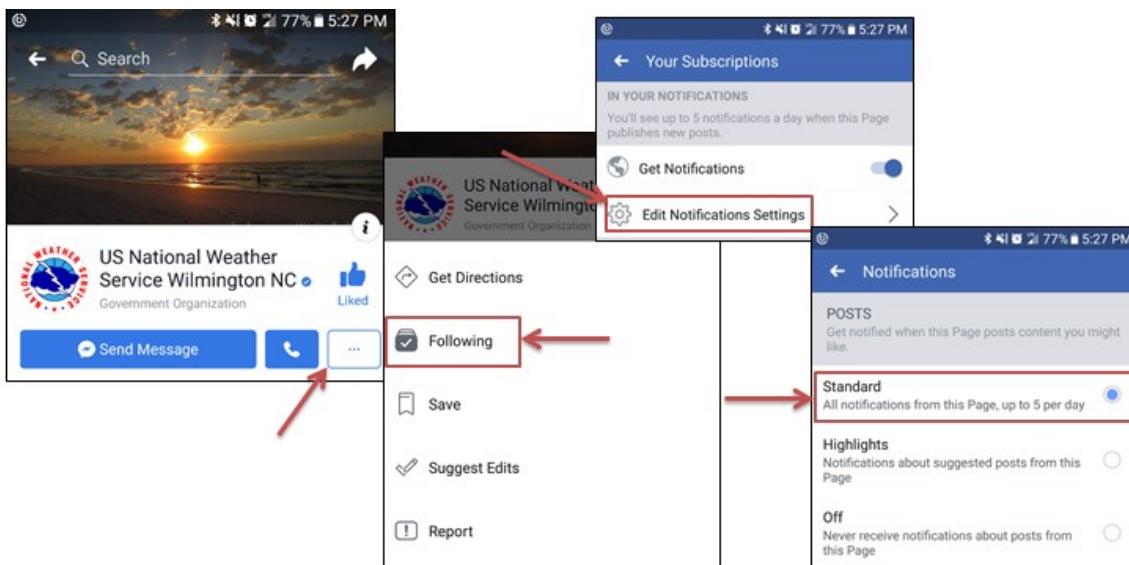
Twitter via Mobile



Facebook via Desktop



Facebook via Mobile



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The Wilmington Wave

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