THE WEDGE FRONT

NATIONAL WEATHER SERVICE GREENVILLE-SPARTANBURG SC

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NWS GSP Provides Decision Support Services for the 2018 FEI World Equestrian Games

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The Tryon International Equestrian Center (TIEC, Figure 1) in Mill Spring, North Carolina, was the site of the 2018 FEI [Fédération Équestre Internationale] World Equestrian Games (WEG). The WEG serves as the international championship for eight of the ten equestrian events recognized by the FEI. The games began in 1990 and are held every four years, opposite the Summer Olympic cycle. This year is only the second time the WEG has been held outside Europe; Lexington, KY hosted the games in 2010.

North Carolina Emergency Management (NCEM) asked NWS GSP to use principles of Decision Support Services (DSS) during the 13-day event to help them protect as many as 50,000 daily visitors from weather hazards, many of those visitors coming from overseas. DSS is an important role for the NWS to play in promoting public safety, and our agency has invited other government agencies to request DSS for events and incidents of all types: planned and unplanned, large and small. Thus, NWS GSP staff recognized NCEM's request as an opportunity to serve, and to gain experience for use in responding to future large events. Beginning in July 2017, NWS GSP management met monthly with NCEM officials, in addition to local law enforcement, fire, and medical personnel, to plan the emergency response for the WEG. An excellent working relationship developed over the year of these meetings.

Scheduled for September 11 to September 23, the late-summer setting for the WEG suggested a relatively low likelihood of severe weather near the event site. Climatology of the area indicates severe weather tends to be more likely in late spring and early summer. However, occasional "garden variety" thunderstorms still can be expected near Mill Spring any day in September, given its location in the North Carolina foothills, close to the Blue Ridge Escarpment--which focuses development of convective updrafts. Thus, early on, NWS GSP meteorologists recognized that lightning was a possible threat to the athletes, horses, and spectators, since several of the individual events are held outdoors at various locations across the TIEC. Plans for evacuating the arenas and stands during lightning were finalized well ahead of time.

Senior Meteorologist, Trisha Palmer, briefs Incident Command staff on September 18, 2018.

As high-profile members of the international equestrian community planned to attend the WEG, and due to the large number of attendees expected, an Incident Command Structure (ICS) was set up so government agencies could work efficiently to ensure public safety in and around the TIEC. NWS GSP was invited to "embed" in the Incident Command Post, located on the TIEC grounds, in order to provide any needed weather support to the ICS. The plan called for one or two GSP meteorologists to be embedded at a time, in shifts beginning at 7 a.m. and 2 p.m. each day of the Games. In order to accommodate this need, three additional meteorologists from other East Coast NWS sites came to GSP on a temporary basis to help with the routine duties of the office. This helped free up local forecasters to deploy to the TIEC.

With September being the peak of the Atlantic hurricane season, at the very first meeting with the WEG team in July 2017, GSP staff discussed possible impacts from a tropical cyclone moving inland near or over the TIEC. An action plan was developed with all involved knowing this was a low-probability scenario, but also a worst-case scenario.

On August 28, 2018, a tropical wave of low pressure developed near the Cape Verde Islands of the eastern Atlantic Ocean. This feature continued to organize, and on September 1, the NWS National Hurricane Center (NHC) named it Tropical Storm Florence.

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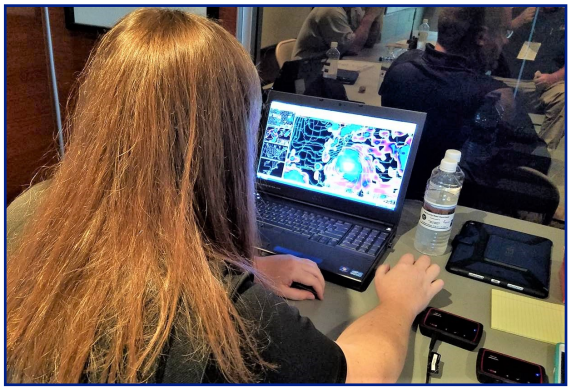
Atmospheric models such as the NWS's own GFS (and similarly capable models run by weather agencies in Canada and Europe) soon depicted Florence strengthening and eventually making landfall somewhere on the East Coast. Such depictions initially varied widely, giving NWS forecasters little confidence as to which part of the country would be affected, if at all: some model runs showed Florence staying over the open sea. However, model guidance gradually trended toward a Southeast landfall. With forecast confidence rising, one week prior to the first WEG events, NWS GSP meteorologists advised Incident Command that a tropical cyclone indeed could impact the Games. A region-wide emergency response could no longer be dismissed as theoretical.

A row of pop-up tents used by vendors just outside the US Trust Arena, on the TIEC grounds. These tents were used for sales and demonstrations of equine products.

As the WEG got underway, the official NHC forecasts continued to show Florence, by then upgraded to a hurricane, as being likely to move through the Carolinas. In response, NWS GSP doubled the frequency of its briefing packages to the TIEC community, including increasingly specific information as confidence in impacts increased.

Leaders of each branch of the ICS met for an Operational Briefing twice daily to review the day's emergency preparedness activities. An embedded GSP meteorologist spoke first in these briefings, providing updates on any relevant weather information. Though Florence remained on the horizon, other short-term weather impacts still were possible and potentially dangerous. The first few days of the WEG were sunny, with afternoon temperatures running in the mid to upper 80s, at least 10 degrees above normal for mid-September. Combined with unusually high humidity, afternoon heat indices generally rose into the lower 90s, which posed some danger especially for sensitive populations such as the elderly and for anyone who is not accustomed to such conditions. The safety of the horses is also an important consideration, since they respond to heat and humidity in a manner similar to humans. Many attendees and their animals were visiting from central and northern cities of Europe, where high temperatures are typically in the 70s on summer days. The GSP meteorologists provided forecast temperatures and heat indices so medical personnel could anticipate the impact to visitors. Daily briefings also covered the expectations for thunderstorms, given the aforementioned plans to evacuate outdoor areas in the event of lightning, and the possibility of strong winds toppling tents and other temporary structures. If winds became strong enough, evacuations could be completed.



Forecaster Sandy LaCorte analyzes atmospheric model data in the Emergency Operations Center, prior to the landfall of Hurricane Florence.

30 miles away in Greer, at the NWS office, forecasters supported the GSP staff member(s) embedded at the TIEC. During the daytime hours, a shift at the office was dedicated primarily to DSS. The forecaster manning that shift used the full office resources to provide any needed weather data to the embedded personnel. This included preparation of weather charts and graphics and details on rapidly changing events (such as growing thunderstorms). While the embedded personnel did have access to the Internet and its wealth of weather resources, the staff in the office had full use of AWIPS, the operational forecasting system used by the NWS. On the other hand, those embedded were able to provide "ground truth" and communicate face-to-face with ICS personnel. These are not possible when meteorologists are not on site. When not preparing or giving briefings, the embedded staff monitored radar and satellite imagery, nearby surface observations, plus readings from a portable Davis weather station set up by the WEG management. If any critical weather thresholds were reached, the Incident Commander was notified immediately. They also kept abreast of the latest forecast information to be able to discuss the weather during the remaining days of the WEG operations, whenever asked.

The GSP forecasters embedded on-site at the TIEC used the office's briefing packages to brief Incident Command in person, which allowed the forecasters to underscore the most important messages from the office. This would have been difficult to convey over the telephone or teleconference. Members of the Incident Command also asked questions, received answers, and provided valuable feedback in real time. The embedded forecasters relayed these comments back to the office to help tailor later briefings. Furthermore, once Florence made landfall on Friday, September 14, and conditions worsened, the on-site forecasters provided *constant* weather updates in the Emergency Operations Center (Figure 5). This helped members of the Incident Command make decisions critical to the safety of those on-site as well as to the general population--with resources from across the state deployed to the TIEC, some personnel did double duty, leading response in their hometowns as well as cooperating to protect those involved in the WEG.

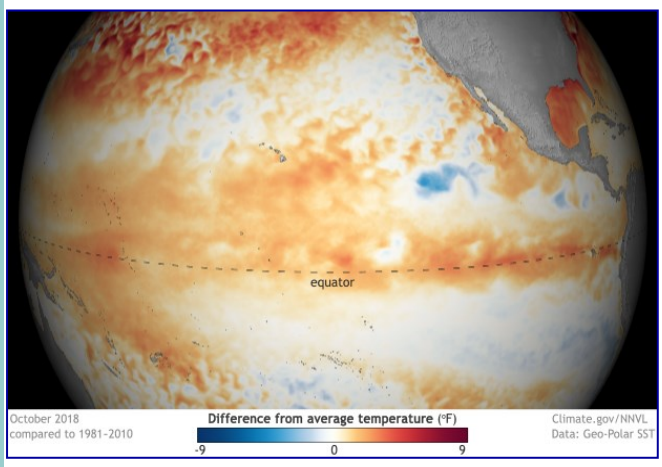
This portable facility is owned by North Carolina Emergency Management. It served as the Emergency Operations Center for the WEG.

All of these emergency operations transpired behind the scenes, largely out of sight of the thousands of athletes and spectators. The first week of WEG competition was occasionally disrupted by weather, but nearly all events proceeded despite some delays. The biggest direct weather impact on the competition was the cancellation of the endurance race on the first day of the Games, Tuesday, September 11. Some viewed this event as the most important of the WEG as a whole, and weather was cited as the main reason for its cancellation. An afternoon shower passed over the endurance course. After the shower ended and the sun returned, the heat and humidity rose to a level that the FEI considers dangerous for horses undergoing an endurance challenge. The course also became too muddy to safely be used after dark. As a result, the endurance event was cancelled before it could be completed.

- Jake Wimberley, Meteorologist

The El Niño Southern Oscillation

The El Niño Southern Oscillation (also known as ENSO) refers to periodic changes (generally a 2 to 5 year cycle) in ocean temperatures compared to normal across the central to eastern equatorial Pacific Ocean. The latest sea surface temperatures across the central Pacific show above normal temperatures which is an indicator for a potential El Niño this winter.



What causes it?

ENSO is believed to be related to the relationship between atmospheric pressure systems across the west and central or east Pacific which is described by the Walker Circulation.

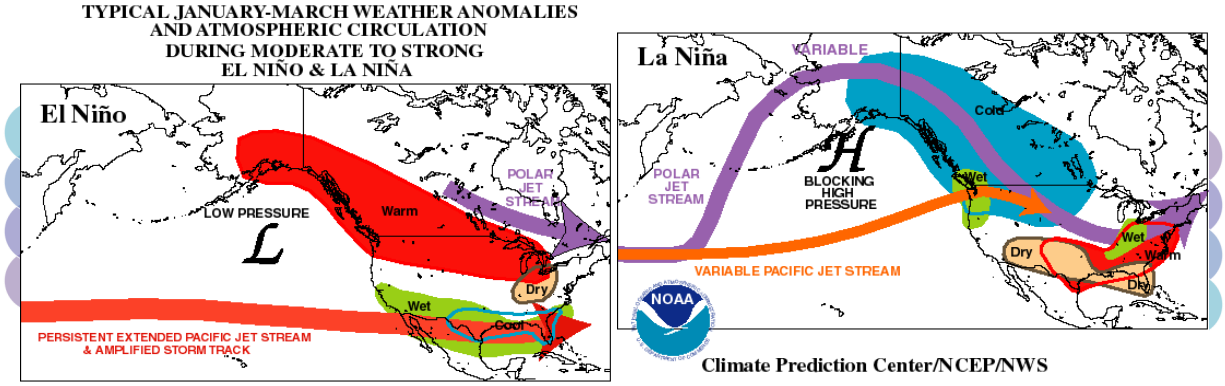
El Niño vs La Niña

La Niña is marked by below normal temperatures across the central to eastern equatorial Pacific Ocean is caused by a stronger than normal Walker Circulation. The stronger circulation increases easterly winds across the equatorial Pacific, which cools the sea surface temperatures across the central and east Pacific through two mechanisms. Stronger upwelling or pulling up cooler water from below the surface and pushing warmer water westward, away from the region.

El Niño is marked by above normal temperatures across the same region and is caused by a weaker than normal Walker Circulation. The weaker circulation allows easterly winds to significantly weaken and in some causes even reverse and become westerly. This allows warmer water to push eastward into the central to eastern Pacific Ocean while significantly limited cooling due to upwelling.

Why should we care?

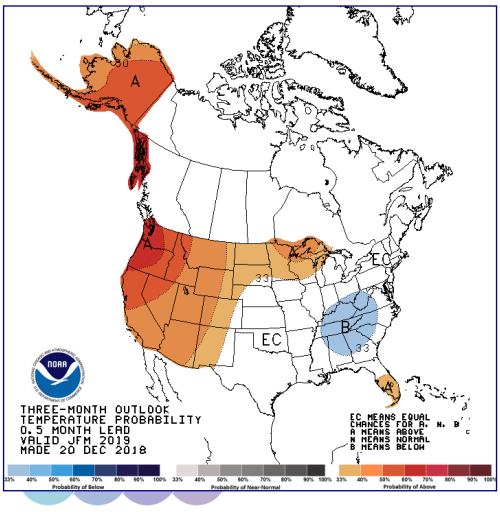
The amount of energy (think heat and moisture) available in the equatorial Pacific Ocean (as described by ENSO) drives changes in the weather downstream including our neck of the woods, which is known as a teleconnection. Changes in our weather is ultimately linked to the central Pacific Ocean through changes in the jet stream. La Niña favors a jet stream pushed to the north through the Pacific Northwest, which generally leads to near to below normal precipitation and above normal temperatures with near normal snowfall across the western Carolinas and northeast Georgia. While El Niño favors a more active southern subtropical jet stream, which favors a stormier weather pattern with above normal precipitation including above normal snowfall with near normal temperatures.

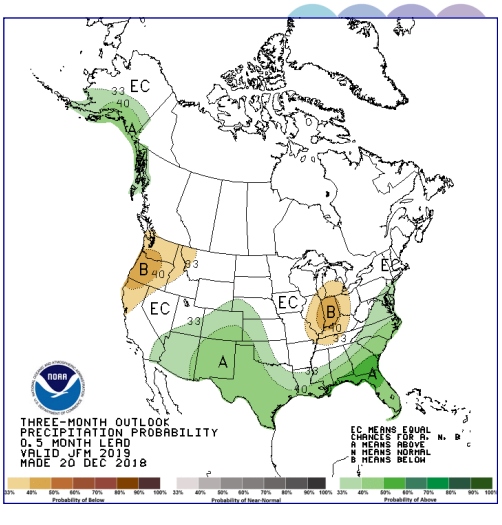


What does this all mean for this winter?

The latest from the Climate Prediction Center (CPC) says there is an 80 percent chance of El Nino developing this winter with a 55-60 percent chance of it continuing into the spring. This would increase our odds for above normal precipitation, including potentially snowfall, with near normal temperatures as currently predicted by the CPC for the December through February period.

For further reading including ENSO updates:
https://www.climate.gov/enso





- Robbie Munroe, Meteorologist

Our Newest Staff

Position: *Meteorologist*
Start Date: *September 2018*

Robbie Munroe became strongly passionate about weather as a young child. The weather bug, and in particular a passion for winter weather and snow was passed onto him from his father. Fast forward many years and Robbie took this passion to the University of North Carolina at Asheville (UNCA) where he studied atmospheric science. During his time at UNCA he became particularly passionate about forecasting weather across the mountains of the western Carolinas. He took on multiple projects including a climate work while volunteering here at the Greenville-Spartanburg National Weather Service (NWS) office in 2008. He continued on to East Carolina University in 2008 where he continued to grow personally and professionally through earning a Master's degree in geography which including subjects such as climate and coastal storms, other geosciences such as hydrometeorology, and social science. He is now pursuing his PhD at ECU, focusing on storm surge. While pursuing this degree Robbie also worked full time as an entry meteorologist in the Los Angeles/Oxnard NWS office where he honed his forecasting skills from 2015-2018. Robbie is very excited join the GSP staff in serving and forecasting for the western Carolinas and northeast Georgia.

Position: *Electronics Technician (ET)*
Start Date: *October 2018*

Brian Harris recently joined the GSP Staff from Italy, where he served for 3 1/2 years as a Satellite Communications Field Technician for DOD/NAVY'S Forward Deployed Regional Maintenance Center Command. Prior to his assignment in Italy, Brian was serving in the same capacity at Forward Deployed Regional Maintenance center in Bahrain. Brian began his career as a federal employee in 2011 at Mid Atlantic Regional Maintenance Center in Norfolk, VA. Prior to becoming a federal employee, Brian was an Electronics Technician in the US Navy and served aboard the USS Winston S. Churchill. He and his wife, Kristyn, are from Saratoga Springs, New York.

Position: *Meteorologist*
Start Date: *October 2017*

Unlike most meteorologists, Sandy's passion for weather did not start at an early age. In fact, she was terrified of severe weather as a young child, a fear known as astraphobia. It was not until high school that she realized her fear had become her passion. Though her main interests focus on severe weather, working at a coastal National Weather Service office (Wilmington NC) for nearly 7 years expanded her interests to tropical weather as well. Knowing what an important role weather education plays in the safety of the public during potentially hazardous weather events, Sandy enjoys being involved in educational and outreach events within the community.

Sandy earned her B.S. degree in Atmospheric Science from University of North Carolina-Asheville in 2008, and her M.S. degree in Atmospheric Sciences from University of Alabama in Huntsville in 2011. Both with Virginia Tech and University of Alabama – Huntsville, Sandy has been storm chasing for educational and research purposes. Her career with the National Weather Service began as a summer volunteer at the Greenville-Spartanburg, SC WFO in 2007, followed by a student intern position at NWS WFO Huntsville, AL (2009-2011), and a meteorologist position at NWS Wilmington NC (2011-2018).

Winter Hazards: Are You Prepared?

Building a Weather-Ready Nation

Know your Risk, Take Action, Be a Force of Nature!

While dangerous road conditions are one of the most deadly hazards during winter, it's not the only threat you may encounter. Other winter hazards include brutal cold, heavy snow and ice, dangerous flooding, extreme wind, and treacherous fog.

To learn more about winter safety, visit
https://www.weather.gov/wrn/winter_safety

- Sandy LaCorte, Meteorologist

NWS Greenville-Spartanburg SC - Out in the Field

Meteorologist Lauren Carroll and Sandy LaCorte attended the first annual Weather Proof event at the Schiele Museum located in Gastonia, NC on August 25th. Open to the public, this event featured local meteorologists, climatologists, emergency managers, and more, answering weather questions and teaching weather safety.

Pictured: Lauren Carroll

What's the best way to teach weather safety? Start them young! Service Hydrologist, Josh Palmer, and lead meteorologist Trisha Palmer, spent time at Inman Intermediate School, Campobello Gramling School, and Inman First Baptist Church Child Development center. Kids had the chance to learn about weather safety, take part in hands-on activities, and see neat weather experiments!

Pictured: Trisha Palmer

On September 8th, meteorologists Andrew Kimball and Sandy LaCorte joined Greenville County (SC) Emergency Management for their first annual Get Ready Greenville Preparedness Day. This event included agencies and organizations from around the area who prepare for, respond to, recover from, and mitigate disasters and emergencies.

Pictured: Andrew Kimball

After Hurricane Florence, NWS GSP Service Hydrologist, Josh Palmer, traveled to the Carolina coast to assist NWS Wilmington NC with their post-storm flood surveys.

NWS GSP Observing Program Leader, Chris Horne, recently presented an Honored Institution Award to Elberton Utilities, Water Division, for 50 years of weather observations and to SC DNR's Walhalla State Fish Hatchery for 75 years of official weather observations. We thank you and congratulations!

NWS Cooperative Observing Program

The National Weather Service (NWS) Cooperative Observer Program (COOP) is the nation's weather and climate observing network. The COOP network is made up of more than 7,000 volunteers that take weather observations on farms, in the suburbs, in the city, and on the shores. The data is truly a climatological snapshot of where the citizens of the country work live and play.

The COOP program was officially created in 1890 as part of the Organic Act. The first network of cooperative stations was set up as a result of this act of Congress that was also the act which established the weather bureau. However, cooperative stations began long before this event. John Campanius Holm's weather records, that were taken without the benefit of instruments in 1644-1645, were the earliest known observations in the United States. Subsequently, individuals, including George Washington, Thomas Jefferson, and Benjamin Franklin, maintained weather records. In fact, Thomas Jefferson maintained an almost unbroken record of weather observations between 1776 and 1816. Also, George Washington took his last observation just days before his death.

The mission of the COOP program is to provide observational meteorological data, which usually consists of daily maximum and minimum temperatures, 24-hour precipitation totals, snowfall and snow depth readings. Some stations also report river levels, and agricultural information that includes soil temperatures, and evaporation readings. Observers may also provide data in near real-time to help support and enhance forecast, warning and other public service programs of the NWS.

COOP Observer standard rain gage at Black Rock Mountain State Park

Cooperative weather observers range from private citizens or institutions, to local, state and federal government agencies. Observers are not required to take tests. Also, automated observing sites can be considered at a cooperative weather site, if the data it provides is used for services that otherwise could be collected by an observer. The equipment that observers use to gather weather information is provided and maintained by the NWS. Once the data is gathered, the observer has the option to record the data on a form and at the beginning of each month, mail the form to the supervising NWS Office. Or, the observer has the option to input the data through the internet using a program called WXCODER and then print out the monthly data for their records while the NWS Office can go to the WXCODER website and download and print the monthly data. Once the data has been quality controlled at the NWS Office, it is then sent along to the National Centers for Environmental Data in Asheville where it is entered into the national climatological database.

Within NWS GSP's county warning and forecast area (CWFA), there are currently 113 COOP sites, whose observers are either individuals or institutions, with a few automated sites as well. 3 of these institutions have taken observations for over 100 years!

Left: COOP Site at Caesars Head

Right: Weather equipment at Grandfather Mountain

For more information about the COOP Program, visit https://www.weather.gov/coop/

- Chris Horne, Observing Program Leader

Did You Know?

Carbon monoxide can accumulate from:

Furnaces

Water heaters

Boilers

Wood stoves

Fireplaces

Charcoal grills

Gas cooking stoves

Clothes dryers

Gas or kerosene space heaters

Automobile exhaust

Carbon Monoxide: The Invisible Killer

Carbon monoxide (CO) is a deadly odorless, colorless, and poisonous gas that is the cause of fatalities each year, especially during the winter weather season. It is a result of the incomplete burning of various fuels (ie coal, wood, kerosene, propane) from equipment such as generators and cars.

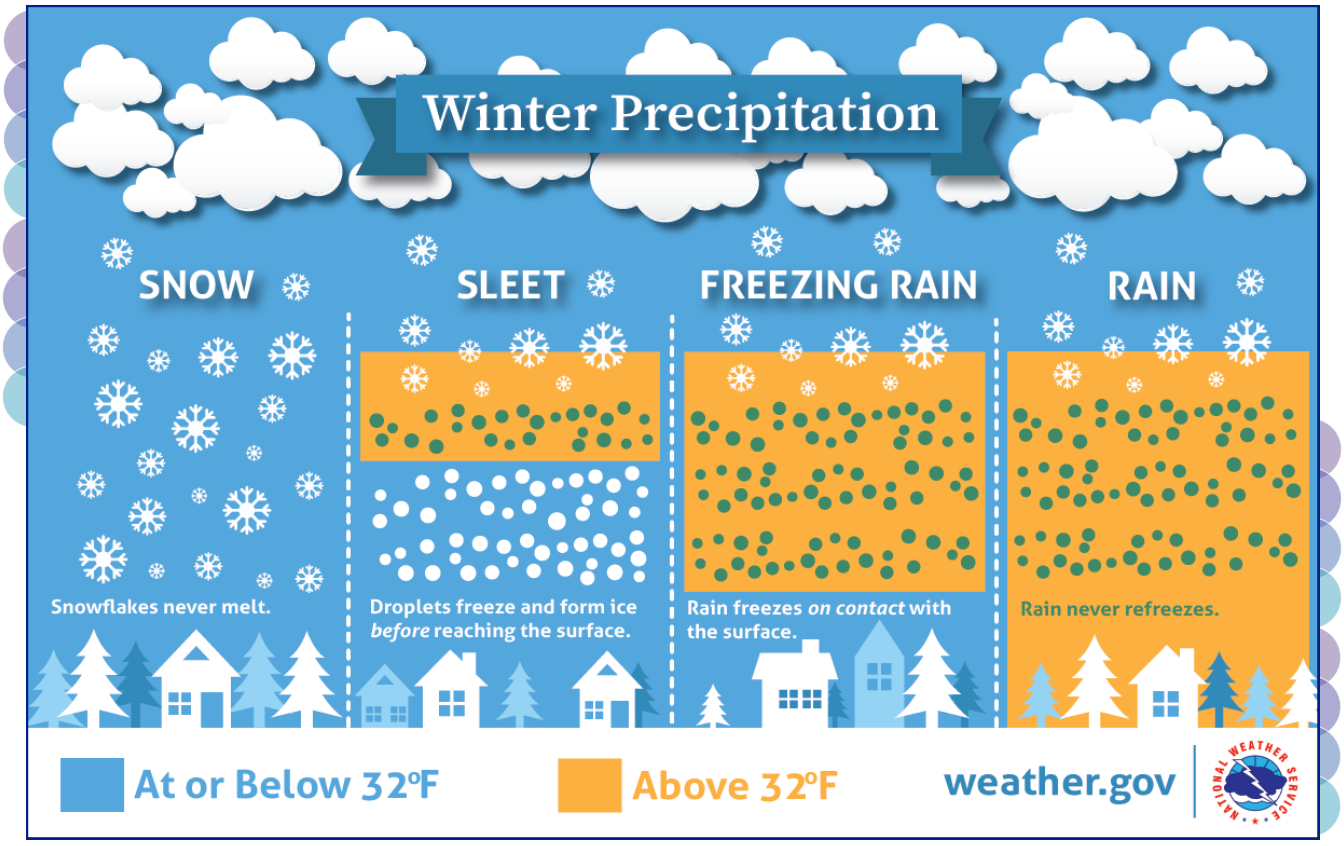
Ways to Prevent CO Poisoning

- Never operate equipment in enclosed spaces (garage or locations in a home)
- Never leave car running in an attached garage (even with garage door open)
- Never burn charcoal inside home, vehicle, garage
- Never use gas appliances to heat your home (ovens, clothes dryers, etc.)
- Never operate equipment where people are sleeping
- Install carbon monoxide alarms in central locations on every level of your home
- If carbon monoxide alarm sounds, move quickly to fresh air

SYMPTOMS OF CO POISONING

- Dizziness
- Nausea
- Fatigue
- Headache
- Shortness of breath
- Vomiting*
- Mental confusion*
- Loss of consciousness*

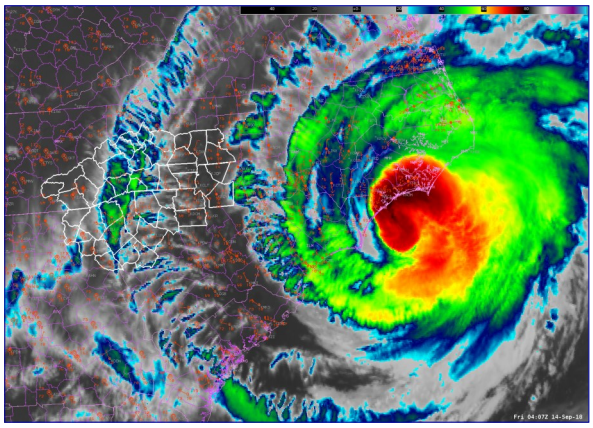
**High level of CO Poisoning*



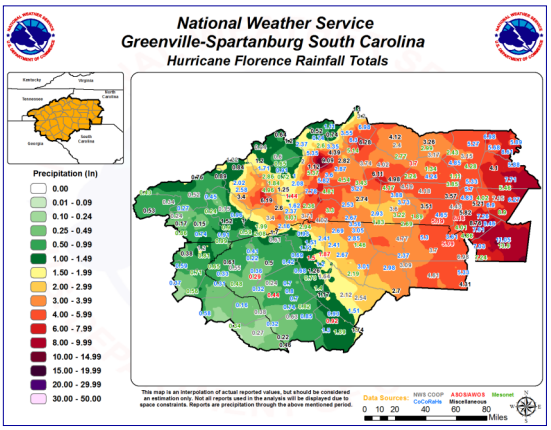
Will there be rain, ice or snow? This graphic explains how having different layers of warm and cold air between the clouds and the ground determines the type of precipitation that hits the ground. To learn more, visit **http://www.nssl.noaa.gov/education/svrwx101/winter/types/**

Hurricane Florence and Hurricane Michael Impact the Western Carolinas and Northeast Georgia

The Greenville-Spartanburg (GSP) County Warning Area (CWA) had direct impacts from both Florence and Michael earlier this fall. Hurricane Florence started as a typical "Cape Verde" system off the west coast of Africa on August 31, gradually developing into a Category 4 hurricane over the central Atlantic, before being shunted southwest and weakened to a tropical storm by September 7. The storm then strengthened again to a Category 4 hurricane as it turned toward the northwest and threatened the Carolina coasts over the next several days. By September 12, a strong ridge of high pressure built into the eastern U.S., causing the storm to slow down and begin weakening. The storm turned left, making landfall at Wrightsville Beach, NC, on the morning of September 14. Fortunately, the storm weakened to a Category 1 hurricane before landfall, but the slow storm motion caused catastrophic inland flooding across eastern NC and SC. During the day on September 14 and into the 15th Florence slowly weakened to a tropical storm as it drifted west-southwest across eastern SC. At that point, the moisture and circulation of Florence entered the GSP CWA and produced very heavy rainfall across the Charlotte metro area. Union County, NC was hardest hit with up to 11" of rain, causing a Flash Flood Emergency, with over 70 roads closed due to streams and creeks out of their banks. . The combination of gusty winds and saturated soils caused numerous trees to be blown down across much of the forecast area. On September 16, the storm weakened to a tropical depression then turned toward the north and sped up as it became absorbed into an upper level trough over the Appalachians by the 17th.

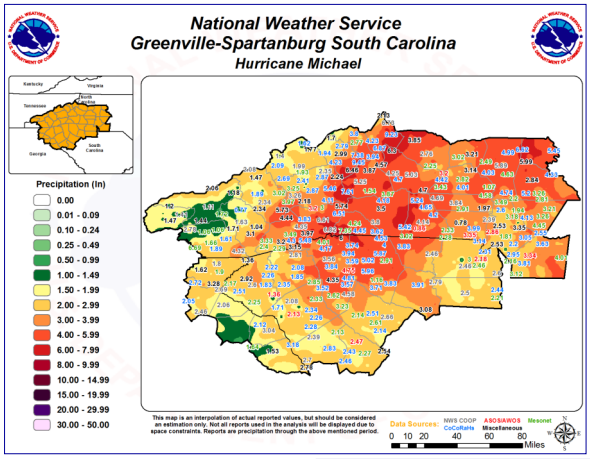


Left: A GOES-16 infrared satellite image of Florence as it approached the North Carolina coast just after midnight on September 14, 2018.

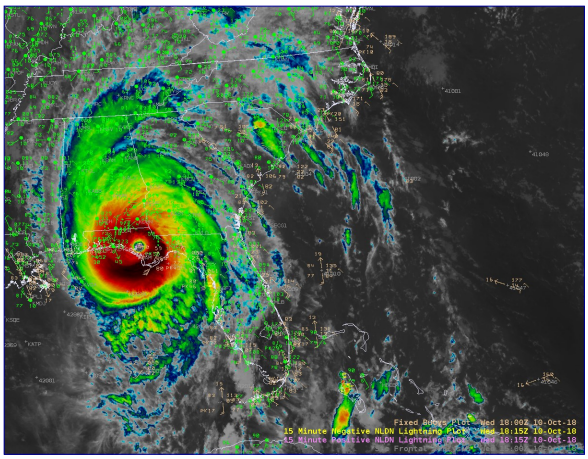


Right: Storm Total Precipitation from Hurricane Florence, September 14 - 17, 2018.

Hurricane Michael developed from a broad area of low pressure in the southwestern Caribbean Sea. It became a tropical depression on October 7, then gradually intensified as it tracked north across the Gulf of Mexico to a Category 4 hurricane by October 10. Michael made landfall as the strongest hurricane to hit the Florida Panhandle in recorded history near Mexico Beach, FL, with peak wind speeds of 155 mph. The storm then rapidly weakened as it moved inland and turned to the northeast over central Georgia. By late October 11, Michael had weakened to a tropical storm. As it moved into eastern Georgia, the outer rain bands entered the forecast area, producing heavy rain that tracked across the area overnight and into the morning of October 12. This resulted in more widespread flooding across the GSP CWA than with Florence, but not as severe. Like with Florence, the storm also produced gusty winds that combined with wet soils resulting in numerous trees and limbs being knocked down, especially across the North Carolina Piedmont and eastern Upstate. Due to Michael's close approach to the CWA, an Inland Tropical Storm Warning was issued for most of the area (Issued when winds associated with a tropical system are sustained of 39 to 73 mph). This was the first season in which inland tropical warnings were issued at the GSP CWA. In western NC, three deaths were reported in each storm directly as a result of either trees falling or people driving on flooded roads. There were no reports of tornadoes in the GSP CWA with either storm.



Left: Storm Total Precipitation from Michael October 9-12, 2018..



Right: A GOES-16 infrared satellite image of Michael after it made landfall on the afternoon of October 10, 2018. .

Right: Part of road washed out in Iredell County, NC during Hurricane Michael.

Photo courtesy of Iredell Firewire.

Left: Large tree fallen on a house in Iredell County, NC during Hurricane Michael.

Photo courtesy of Iredell Firewire.

- Andrew Kimball, Meteorologist

Be Prepared for Winter Weather

Exposure to extreme cold, fires and poisoning due to the improper use of heaters, and vehicle accidents are just a few reasons as to why dozens of fatalities are reported each year due to winter weather, an overlooked significant threat. Now you may be thinking that the winter season across the Coastal Carolinas is nothing compared to, for example, the New England region. Well, we have our share of winter weather across the Carolinas, thus you should always be prepared.

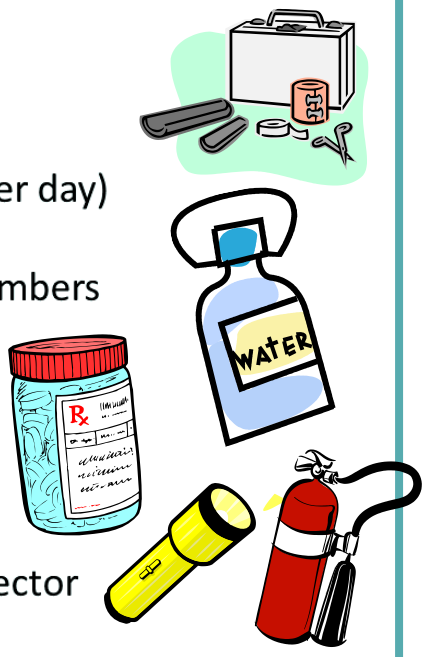
In preparation for a winter weather event, keep in mind that the primary concern will be the loss of heat, power outages, and shortage of supplies if storm or proceeding conditions persist for more than one day.

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!

For additional information, visit www.ready.gov

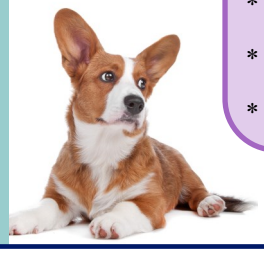
Safety Kit Checklist: Home & Work

- ❑ Flashlight and extra batteries
- ❑ Battery-powered NOAA Weather Radio
- ❑ Extra food and water (1 gallon of water per person, per day)
- ❑ Prescription medicines
- ❑ Special items for infant, elderly or disabled family members
- ❑ Cash
- ❑ Emergency phone numbers
- ❑ Important documents
- ❑ Blankets and extra clothing
- ❑ First aid supplies
- ❑ Fire extinguisher/smoke alarm/carbon monoxide detector
- ❑ Emergency heat source (fireplace, space heater, etc)



Safety Tips: Outdoor Animals & Pets

- Move animals to sheltered locations
- Have extra feed on hand or near feeding areas
- Have water available (animals may die from dehydration)
- Make sure pets have plenty of food, water and shelter



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Winter Weather Safety Tips: In a Vehicle

* Drive only if it is absolutely necessary. If you must drive: travel during the day; don't travel alone; keep others informed of your schedule; stay on main roads and avoid back road shortcuts.

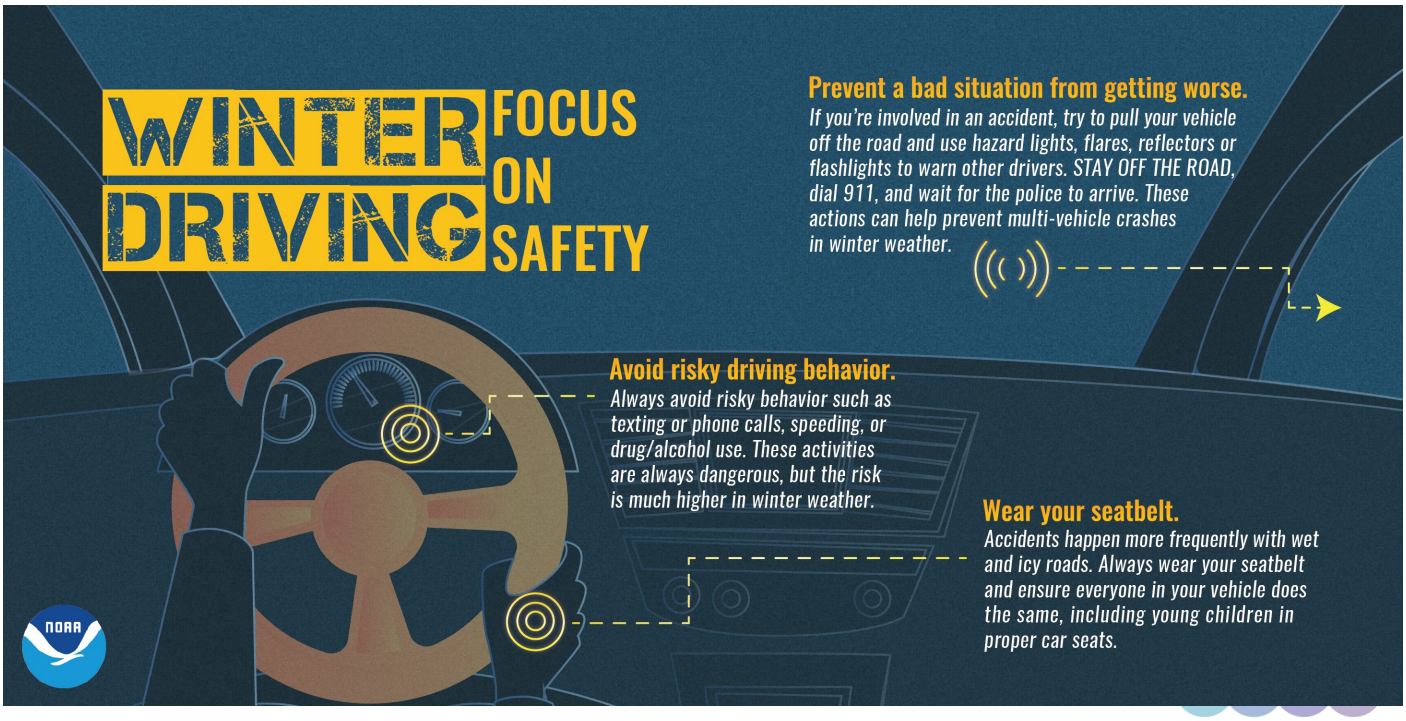
* If driving on snow or ice-covered roadways, reduce your speed. Driving at the regular speed limit will reduce your ability to control the car if you begin to slide. Leave plenty of room between you and other vehicles.

* If conditions worsen and you can no longer drive safely, pull off the highway. Stay calm and remain in your vehicle. Do not set out on foot unless you can see a building close by where you know you can take shelter.

* Let someone know your destination, your route, and when you expect to arrive. If your car gets stuck along the way, help can be sent along your predetermined route.

Vehicle Safety Kit Checklist

- ❑ Mobile phone, charger, batteries
- ❑ Windshield scraper and small broom
- ❑ 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
- ❑ Road salt and sand, booster cables
- ❑ Emergency flares/fluorescent distress flag



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WINTER DRIVING KNOW BEFORE YOU GO

Get the weather forecast.
Change your travel plans if hazardous weather is expected.

Check road conditions.
Call 511 or visit your state's DOT webpage to check on road conditions. Choose a different route or adjust your travel plans if road conditions are poor.

Pack an emergency supply kit.
Stock your vehicle with a mobile phone, charger, batteries, blankets, flashlight, first-aid kit, high-calorie, non-perishable food, candle to melt snow for drinking water, sack of sand or cat litter for traction, shovel, scraper, and battery booster cables.

Ready your vehicle.
Check your battery, wipers, coolant, and other systems affected by cold temperature. Make sure your tires have good tread. Clear snow, ice or dirt from your windows, lights and camera.

WINTER DRIVING FOCUS ON SAFETY

Prevent a bad situation from getting worse.
If you're involved in an accident, try to pull your vehicle off the road and use hazard lights, flares, reflectors or flashlights to warn other drivers. STAY OFF THE ROAD, dial 911, and wait for the police to arrive. These actions can help prevent multi-vehicle crashes in winter weather.

Avoid risky driving behavior.
Always avoid risky behavior such as texting or phone calls, speeding, or drug/alcohol use. These activities are always dangerous, but the risk is much higher in winter weather.

Wear your seatbelt.
Accidents happen more frequently with wet and icy roads. Always wear your seatbelt and ensure everyone in your vehicle does the same, including young children in proper car seats.