NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

STORM COURIER

Charleston, SC
Weather Forecast Office

Fall/Winter 2015

Highlights...A One-Two Weather Punch

Tornado & Historic Flood Within One Week!

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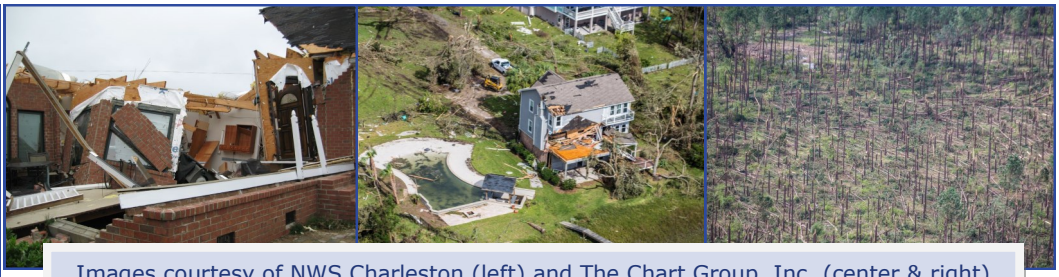
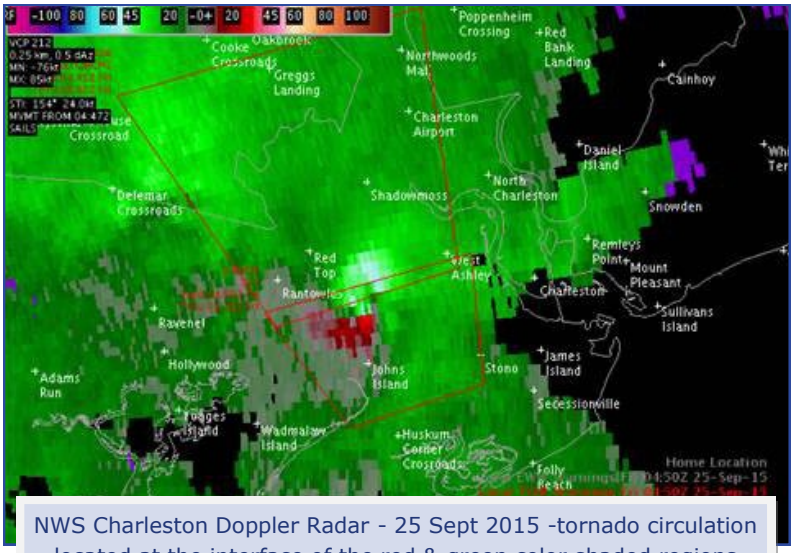


Images courtesy of NWS Charleston (left) and The Chart Group, Inc. (center & right)

The Johns Island Tornado (September 25, 2015)

by Ron Morales - Warning Coordination Meteorologist

The National Weather Service Forecast Office was extremely busy during the last week of September and the first week of October. The hyperactive stretch of weather began during the early morning hours of September 25, 2015. The environment was primed for the potential for severe weather, particularly tornadoes, as a small area of low pressure over the Atlantic tracked northwest across Beaufort County, SC. As this system moved ashore, it not only pulled in more unstable air off of the Atlantic waters, from Beaufort northward to the Charleston area, but also created a wind field that became conducive for tornado development. One storm of particular interest on our Doppler radar that night was the one that moved over Kiawah Island. This storm strengthened quickly, evident by the development of a very strong low-level rotation (see image to the right). This strong low-level rotation became an EF-2 strength tornado just minutes later over Johns Island, with maximum wind speeds of 130 mph.



NWS Charleston Doppler Radar - 25 Sept 2015 -tornado circulation located at the interface of the red & green color shaded regions

This event posed some significant challenges for the warning forecasters. One of the biggest challenges was that the tornado developed very quickly and occurred very late at night (between midnight and 1 am) when people are typically sleeping. Second, it was an unusually strong tornado for the time of day and part of the coastline. In fact, it was only the 3rd EF-2 strength tornado recorded for Charleston County, and the only one to ever occur at such an early hour!

More information on this event: http://www.weather.gov/chs/JohnsIslandTornado-Sep2015

Highlights...A 1-2 Weather Punch - Continued

Tornado & Historic Flood within One Week!

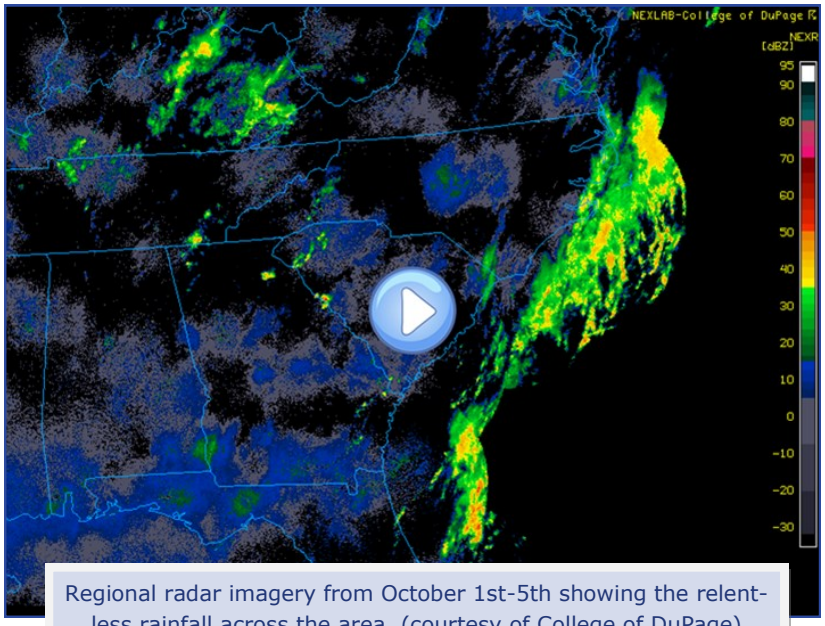
Flooding and damage across Berkeley County, South Carolina. (courtesy of NWS Charleston)

The Historic South Carolina Flood of October, 2015

by Ron Morales - Warning Coordination Meteorologist

No one would have imagined that just a week after the Johns Island Tornado, much of South Carolina would experience a flood of historic proportions. The heavy rainfall began over coastal portions of South Carolina on October 1st, with the heaviest occurring on October 3rd and 4th. Widespread amounts of 15 to 25 inches were reported, with nearly 27 inches reported around Mount Pleasant, SC. All of the meteorological pieces of the puzzle were arranged perfectly to produce a record breaking rainfall event. These pieces included a slow-moving low pressure system over the southeast U.S., which not only pulled in deep tropical moisture from the Atlantic as well as from the outer fringes of Hurricane Joaquin, but also provided the lift to produce flooding rainfall across a large portion of South Carolina. In addition to the heavy rainfall, northeast winds combined with astronomically high tides to produce major coastal flooding through much of the same time period!

Although our forecasts were calling for very heavy rainfall and the potential for flooding at least 2 to 4 days before the event, no meteorologist would believe days in advance that as much as 2 feet of rain would fall over a period of just a few days! Unfortunately, with such heavy rainfall comes catastrophic flooding. Not only did all of the Charleston Tricounty rivers experience major flooding, but so did all of the creeks and streams that feed those rivers. In fact, some creeks flooded that many people probably never knew could flood. Many homes and business, especially those near rivers, creeks and streams, experienced moderate to major flood damage. In addition, several major roads and bridges were either flooded or washed out completely, which made travel in some areas very difficult, if not impossible for a time. It will likely take weeks to months to repair the structures and roadways that were damaged by the flood waters.



Regional radar imagery from October 1st-5th showing the relentless rainfall across the area. (courtesy of College of DuPage)

There were many challenges for our forecasters during this event. One of the biggest was producing the actual forecast of a potentially record-breaking rainfall and flood. Next was how to convey a clear and consistent message of such a high impact forecast to our core partners and the public. Thankfully, many did hear and understand how to prepare. However, there were also many that did not fully envision the magnitude of flooding that eventually resulted, likely due to the fact that this level of flooding had not been witnessed in their lifetimes.

More information on this flooding event, including a detailed map showing local impacts, can be found at: http://www.weather.gov/chs/HistoricFlooding-Oct2015

Highlights...Forecasts & Outlooks

Southeast U.S. Winter Weather: A Retrospective

by Steve Rowley - Meteorologist

During most winters, snow, sleet, freezing rain and extreme cold bypass southeast sections of South Carolina and Georgia. We normally enjoy ample sunshine and mild temperatures common to our region during the winter months, and these climate traits entice people from colder locales to visit or relocate to the Southeast. During most years, our winter weather experience is limited to viewing or reading about winter storms that occur elsewhere. This sparsity of local snow, ice and frigid temperatures can lull us into a false sense of security.

Given our latitude and proximity to the Atlantic Ocean, a meeting of cold air and moisture – the necessary ingredients for any winter storm – seldom occurs here. However, on rare occasions cold air and precipitation have converged to produce significant winter storms in our region. Snow and ice have accumulated on our highways, bridges, driveways, sidewalks, motor vehicles, trees and power lines, greatly disrupting the normal rhythm of daily life and commerce. Indeed, the infrequent occurrence of winter storms magnifies the impact of these events in the Southeast.

During the modern era, heavy snow blanketed parts of the region in February 1973, December 1989 – only 3 months after Hurricane Hugo - and most recently in February 2010. In January 2011, a morning ice storm closed roads and damaged trees and power lines across much of the area. During an incredible 2 week period in January and February 2014, 2 major ice storms blasted the region, closing bridges and roads, disrupting travel for several days and damaging or destroying many trees. So extensive was the tree damage that debris collection and disposal continued through the summer of 2014.

Feb 2010 - Walterboro, SC

Jan 2014 - Hanahan, SC

Feb 2014 - Berkeley County

Very cold air also infrequently invades our region. On January 21, 1985, airport temperatures bottomed out at 3F° above zero in Savannah and 6F° above zero in Charleston – the coldest temperatures ever recorded at these locations. The snow storm of December 1989 was accompanied by some of the coldest daytime temperatures in modern history. On December 23, 1989, the temperature only managed to recover to 20F° at Charleston, and the high temperature was only 23F° at Savannah. In February 1899, a historic, frigid arctic air mass plunged into the Southeast. Amplifying the impact of cold temperatures, arctic outbreaks are sometimes accompanied by strong winds which produce dangerous wind chills.

Prior to the holiday season is a great time of year to plan ahead for the potential impacts of winter storms and extreme cold, as we are most vulnerable to dangerous winter weather from late December through February. Preparation is the key to tempering the impacts of uncommon yet dangerous winter weather. For more details regarding winter weather preparation, please refer to these outstanding web sites: www.FEMA.gov and www.redcross.org.

The rarity of winter weather in our region imposes unique and demanding forecast challenges on our meteorologists. At the National Weather Service office in Charleston, forecasters participate in annual, specialized winter weather training to prepare for the upcoming season. When necessary, our staff will address the impacts of winter storms within Hazardous Weather Outlooks, Winter Storm Watches, Winter Storm Warnings and Winter Weather Advisories. Warnings convey threats to life and property, while advisories imply significant inconvenience.

By passing along timely and accurate reports, you can help your National Weather Service to deliver the best possible service during winter storms and cold weather outbreaks. In the meantime, enjoy our usually benign winter season, but always be prepared for brief bouts of snow, ice and cold weather.

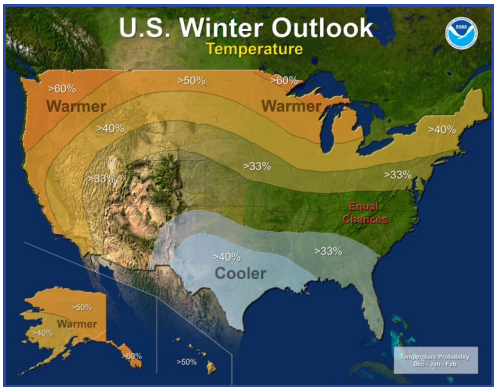
Highlights…Forecasts & Outlooks

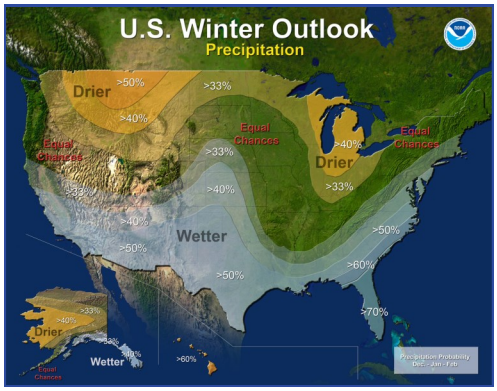
Southeast U.S. Winter Weather: Winter 2015-16 Outlook

by Steve Rowley - Meteorologist

Due in large measure to strong El Nino conditions – warmer than normal sea surface temperatures in the eastern Pacific Ocean - the outlook for the winter of 2015-2016 (specifically for the months of December, January and February) calls for a high probability for wetter than normal conditions across our region, accompanied by a slightly higher probability for cooler than normal conditions across southeast Georgia and an equal chance for above and below normal temperatures across most of southeast South Carolina.

Remember that these seasonal outlooks are presented as long term *probabilities*, not as definite forecasts. Short term systems often produce conditions which differ greatly from longer term outlooks. For most of the winter, the influence of El Nino will likely translate to extended cloudy periods and frequent and sometimes significant rain events. However, we will remain vigilant for intrusions of chilly air from the north supplied by "wedges" of high pressure which should periodically develop east of the Appalachian Mountains. Given the proper conditions, this cold air could interact with moisture to produce one or more episodes of freezing and/or frozen precipitation in our region.





A More In-Depth Look at El Niño

by James Carpenter - Meteorologist

The El Niño Southern Oscillation (ENSO) is a naturally occurring phenomenon in the equatorial region of the Pacific Ocean. Crudely, you can imagine this region of the Pacific as a bathtub, with very warm water near the surface sloshing between the eastern and western "walls" of the Pacific "tub." When warmer-than-normal sea surface temperatures exist over the central and eastern Pacific basins, this is known as the El Niño. In contrast, when the warmest sea surface temperatures are over the western equatorial Pacific, and cooler-than-normal surface temperatures are over the eastern Pacific, this is referred to as La Niña. When sea surface temperatures across the Pacific basin are near long-term normal values, this pattern is referred to as ENSO-neutral, and this frequently occurs during the transition between an El Niño and La Niña, as the sloshing from one side to the other takes place. These varying states of the Pacific Ocean have large scale impacts on weather patterns, resulting in far-reaching implications for sea life, regional economies, and many other aspects of living on Earth.

The ENSO is associated with major shifts in precipitation, pressure, and wind patterns. During an El Niño, warmer than normal sea surface temperatures create instability within the maritime atmosphere, pumping more moisture than usual into the atmosphere near the western coast of the U.S. Additionally, jet streams have a tendency to undergo changes in intensity and position during an El Niño. In conjunction, these effects encourage large-scale winter storm systems to traverse the southern portions of the United States more frequently, which can lead to cloudier, colder, wetter winters on average for the southernmost states.

The current El Niño already ranks among the strongest events, continues to strengthen, and is on track to become the most intense El Niño on record, eclipsing the El Niño of 1997-98. It is important to remember that each El Niño is its own animal, and predicting long-term impacts to our region based on El Niño alone is ill-advised. Additional atmospheric patterns that influence our winter weather are considerably more variable than the ENSO, and thus more challenging to monitor and predict in the short-term.

In Touch, In Tune…Together Everyone Achieves More

NWS Charleston Hosted T.E.A.M. Leadership Workshop

by Julie Packett - Administrative Support Assistant

The most effective field leaders reinforce the importance of teamwork. In a National Weather Service (NWS) Forecast Office setting, teamwork plays a critical role in achieving the NWS mission of protecting life and property. In fact, collaboration needs to extend past the brick walls of a NWS building.

T.E.A.M. workshop participates from NWS Charleston, Columbia, Jacksonville, & Wilmington

In an effort to bring forth the importance of teamwork and unity within our office and across forecast area borders, NWS Charleston hosted a sub-regional leadership workshop in early November. With three additional NWS Offices in attendance, Wilmington, NC; Columbia, SC; and Jacksonville, FL, the passion and enthusiasm for achieving organizational goals were contagious.

NWS Wilmington's Warning Coordination Meteorologist Steve Pfaff

Over the course of the day, eight different speakers presented and/or led activities on a wide range of topics, including crisis management, personal accountability, problem solving, and team building. The comradery allowed for open discussion on various issues and successes within each office.

As an extra bonus, Toby Housey, a former NWS Charleston employee and current member of the 628th Air Base Wing Equal Opportunity Office, graciously agreed to participate in the workshop. Partnered with TSgt Smith, Mr. Housey led a team-building activity that focused on time management, problem solving and trust between team members.

Meteorologists Bob Bright & Carl Barnes participating in a team-building exercise

As a result, this workshop strengthened relationships and helped develop personal leadership skills. Those in attendance commented that the workshop was a "success" and included "a nice diverse group of talks and good discussion points."

Supporting Our Partners - 2015 SKYWARN Recognition Day

SKYWARN Recognition Day was developed in 1999 by the National Weather Service and the American Relay League to celebrate the contributions that volunteer SKYWARN radio operators make to the NWS. During tropical, winter weather, and other major weather events, real-time reports gathered by radio operators are extremely useful to forecasters.

On December 5th, 2015, NWS Charleston provided a venue for SKYWARN radio operators to exchange weather reports with others across the nation. They made over 150 contacts in a 24 hour time period, including one in Austria.

NWS Charleston wants to extend a special thank you to all the SKYWARN radio operations. Thank you!

In Touch, In Tune…Together Everyone Achieves More

NWS Charleston Employees Visit Regional & National Centers

by Carl Barnes, Emily Timte, & Frank Alsheimer

The National Weather Service (NWS) consists of more than just local forecast offices; it is a collective effort between numerous local, regional, and national offices. Some NWS Charleston employees were given the opportunity to visit regional and national centers with the goal of strengthening relationships, improving coordination, and enhancing services.

National Hurricane Center in Miami, FL

In August, a member of the Tropical Weather Program team traveled to Miami, Florida to shadow forecasters and learn about daily operations at the National Hurricane Center (NHC). NHC consists of three primary divisions: the Hurricane Specialists Unit, which creates the hurricane track and intensity forecasts; the Tropical Analysis & Forecast Branch, which creates the wind and seas forecast for much of the North Atlantic Basin and Caribbean Sea; and the Storm Surge Unit, which is working on developing and improving the new NWS Storm Surge Watch and Warning products and forecasts. This trip resulted in enhanced collaboration practices between the NHC, which has a very large area of responsibility, and NWS Charleston, which is focused on developing the details of the forecast and performing decision support for the people of southeast South Carolina and southeast Georgia.

In September, our climate focal point went on a familiarization trip to the National Center for Environmental Information (NCEI) Weather and Climate branch in Asheville, North Carolina. NCEI was formerly known as the National Climatic Data Center but has since merged with several other centers that deal with environmental data. NCEI is the main hub for all things climate – they even house some of the oldest climate records to date. National Weather Service offices around the country routinely work with NCEI to ensure data quality is top notch. Not only do they deal with data quality control, they also deal with public requests, monitoring, extreme events, and data access tools. There is a wealth of climate information free to the public available in the Climate Data Online tool.

National Weather Service Forecast Office in Peachtree City and River Forecast Center

Finally, the Science and Operations Officer and Hydrology Focal Point traveled to the Atlanta Metro Area in late September to meet with our regional partners in the area. They began by visiting the FEMA Region 4 office in Atlanta where they focused on ensuring that the Southeastern United States is prepared for a major hurricane landfall, or high impact winter storm. They then traveled south to Peachtree City, GA where they visited the Peachtree City/Atlanta, GA Forecast Office and the Southeast River Forecast Center (SERFC). The team from NWS Charleston met with leadership from the NWS Peachtree City Forecast Office in order to develop and improve coordination methods amongst the offices that cover Georgia, and with the SERFC to discuss various hydrologic forecast topics, including the placement of additional river gages.

Overall, these site visits proved beneficial in ensuring that NWS Charleston is able to best use the tools and assets available to develop the best forecasts possible. The relationships created on these visits will bridge the gap between various local, regional, and national offices and pave the way for future collaboration efforts.

In Touch, In Tune...Together Everyone Achieves More

2015 Week of Service - Ronald McDonald House of Charleston

by Emily Timte - Meteorologist

Every year in the fall, the National Weather Service holds the National Week of Community Service. During this week, offices around the country make an effort to reach out to help those who are in need in our communities. All of these events occur outside of our normal working hours.

For the 5th Annual NWS National Week of Service, NWS Charleston brought in food donations to make "On-the-go Meal Kits" for the Ronald McDonald House (RMH) of Charleston. At the end of the donation period, several staff members worked together to assemble the kits. We were able to make 50 kits! Each kit contained a microwaveable entree, side, drink, and plastic utensils. The RMH of Charleston houses 27 families while children undergo extensive medical treatment. It allows parents & children to lead a life as normal as possible without having to pay for hotel/travel expenses.

Want NWS Charleston at Your Next Event?

The National Weather Service in Charleston maintains a very active educational outreach program. Whether it's a Storm Spotter Training seminar, school talk/career fair, or community event/festival, you can request to have a NWS meteorologist at your event. From elementary level to college and beyond, presentations and talks can be customized toward a specific topic, such as weather safety, tornadoes, hurricanes, and more.

Not planning an event? You can request a tour at the NWS Charleston Office. Our facility can comfortably accommodate tour groups of approximately 20 people; although, larger groups can be divided. For office tours, all attendees must be U.S. citizens, and adults must sign in and show a photo ID. Please note, office tours may be subject to last minute cancellations due to hazardous weather; however, we will gladly reschedule any cancelled tours.

Submit all requests via our Outreach Request Form.

Middle School Office Tour

Classroom Talk

Earth Day Festival

Although NWS meteorologists would love to visit every classroom, this is just not feasible. Still, teachers and educators can incorporate meteorological elements into their lessons plans and use our educational webpage as a reference.

Tech Talk…Research & Technology

NWS Incident Meteorologist's Significant Role During Fire Season

by John Quagliariello - Meteorologist

Severe to exceptional drought conditions across most of Washington, Oregon, California, Nevada, western and northern Idaho, and northwestern Montana led to a very active wildfire season in 2015. According to the National Interagency Fire Center, there were over 51,000 fires consuming more than 11 million acres through early October 2015, nearly doubling the 10-year average for acres burned.

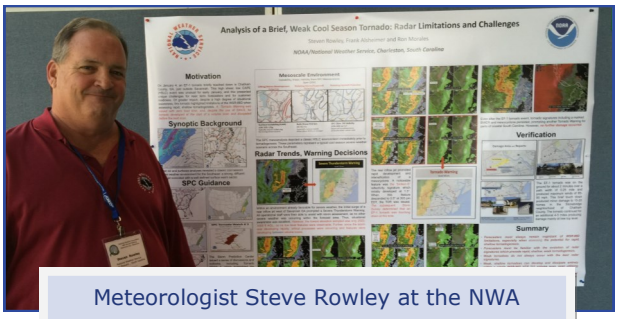
In an effort to support the incident management teams managing these wildfires, the National Weather Service deployed a record number of specially trained Incident Meteorologists (IMETs) during the peak of fire activity. On August 25th, there were 44 certified IMETs deployed, breaking the record of 34 certified IMETs deployed back in 2000. During this time, IMETs provided accurate, on-site weather forecast, warning, and consultation services to help firefighters, incident responders, and command staff manage wildfires safely and effectively.

So, you may be wondering what tools an IMET has at their disposal, often out in remote locations of the country. Each IMET, including ours here in Charleston, has an Advanced Meteorological Response System (AMRS). The AMRS consists of a high-powered laptop with a thin client of the AWIPS II meteorological processing and display system used at the local office for interpreting weather data. Each AMRS also has a mobile hotspot for communications/ receiving data, a Kestrel handheld weather and wind speed meter and weather balloons and radiosondes for taking measurements of weather conditions at various levels of the atmosphere. All of these tools enable IMETs to observe the environment, monitor weather conditions, and interpret weather models and other data to provide the best possible service to protect wildland firefighters and aid decision-makers in developing the best strategy to succeed in managing wildfires.

Chatham County Tornado of January 4, 2015

Several forecasters undertook a study to more closely examine the tornado which touched down in the Savannah area this past January. The event was particularly difficult for warning decision makers with the tornado setting down and then lifting in only about 3 minutes. This very brief EF-0/EF-1 (85-95 mph) tornado initially touched down near the intersection of Berwick Boulevard and Stonebridge Circle before moving quickly northeast through the Stonebridge neighborhood. The tornado ripped numerous shingles and vinyl siding panels off a number of houses and damaged several large wooden fences.

The results of the study were presented at the National Weather Association Conference in Oklahoma City this past October.



Meteorologist Steve Rowley at the NWA Conference in Oklahoma City, OK

Tech Talk...Research & Technology

Fall Coastal Flooding Due to Abnormally High Tides

by Pete Mohlin - Meteorologist

Our area experienced an incredible stretch of abnormally high tides for almost 2 weeks in late September into early October.

These unusually high tides were first caused by an increased gravitational pull from the perigean moon in late September (or the perigean spring tides that occur when the perigee, or moon's closest approach to earth occurs near the time of a full or new moon). Combine that with several days of persistent onshore winds and large seas due to areas of low pressure in the Atlantic, plus a slower than normal Gulf Stream, that caused even more water to pull up against the coast, and the situation becomes even further aggravated.

We can compare the Gulf Stream to the Amazon River, which is the world's largest river in terms of water discharge. But the Gulf Stream has about 600 times the flow of the South American river. So when you back up that much water, it doesn't have much room to go anywhere except toward the coast with the persistent onshore winds.

Finally, with such high tides that are further exacerbated by the freshwater flooding from the historic rainfall led to significant flooding of properties and roads, especially in downtown Charleston. Also, the main access road from Tybee Island to Wilmington Island in Georgia was cut off due to the flooding.

There were 13 straight days (September 25 through October 7) of tides reaching at least 7.0 ft Mean Lower Low Water (MLLW) in Charleston Harbor, or the level at which at least shallow coastal flooding begins. It also resulted in tides reaching at least 7.0 ft MLLW in Charleston for 10 straight tide cycles from September 25-30 and another 9 straight high tides reaching at least 7.0 ft MLLW from October 3-7.

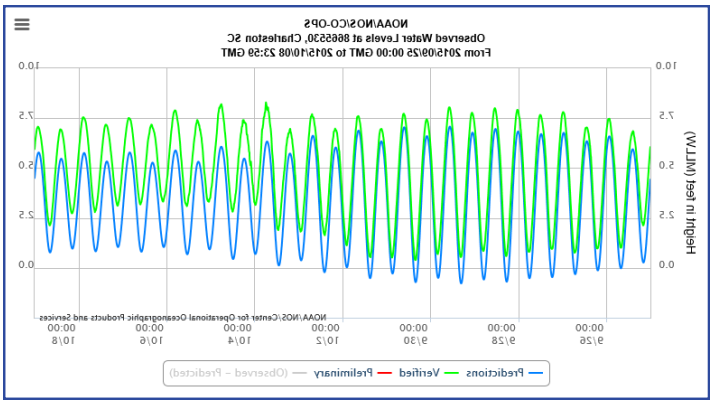
At Fort Pulaski there were 9 straight days (September 26 through October 4) of tides reaching at least 9.2 ft MLLW, or the level where typically at least shallow coastal flooding begins. They also had 8 straight high tide cycles reaching at least 9.2 ft MLLW from September 26-30.

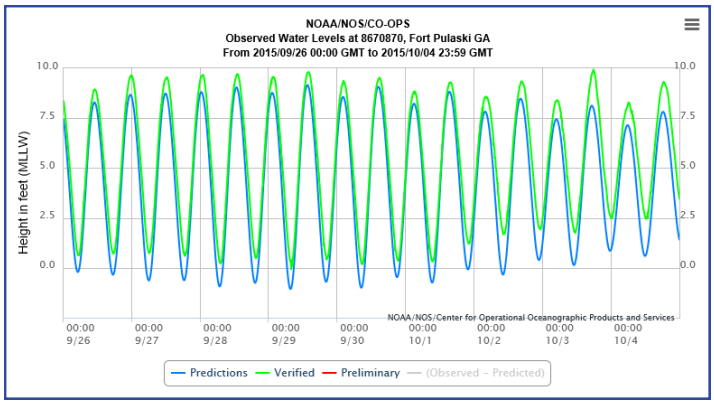
In fact, tide levels during this prolonged stretch peaked at 8.29 ft MLLW in Charleston Harbor at 142 PM EDT on October 3 and surprisingly on the same date and at the same time at Fort Pulaski, where tides peaked at 9.94 ft MLLW.

As impressive as these levels were, they were actually surpassed by another abnormally high perigean spring tide later in the month, which combined with a slowing down of the Gulf Stream and persistent onshore winds and elevated surf. Tide levels from October 25-31 produced coastal flooding yet again, as tides peaked on the 27th at 8.69 ft MLLW in Charleston Harbor at 836 am, and at 10.43 ft MLLW at Fort Pulaski at 842 am. For Charleston this is the 4th highest tide level on record, while it is the 3rd highest at Fort Pulaski.

The first chart shows the observed water levels (green) compared to astronomical (or predicted) tide levels (blue) at the Charleston Harbor tide gauge from September 25 through October 8. Note the significant tidal departures through the entire period.

For additional information please visit the following websites:
[Tides & Currents]
[Advanced Hydrologic Prediction Service]

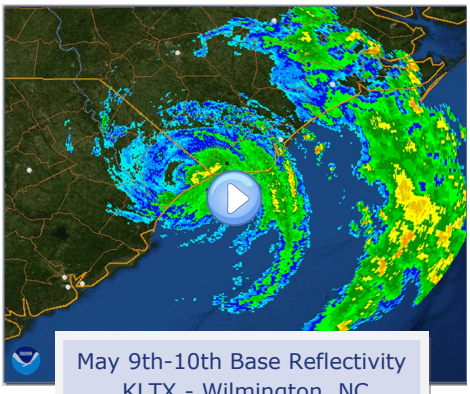




Tech Talk…Research & Technology

2015 Tropical Season Wrap-up

by Carl Barnes - Meteorologist



May 9th-10th Base Reflectivity
KLTX - Wilmington, NC

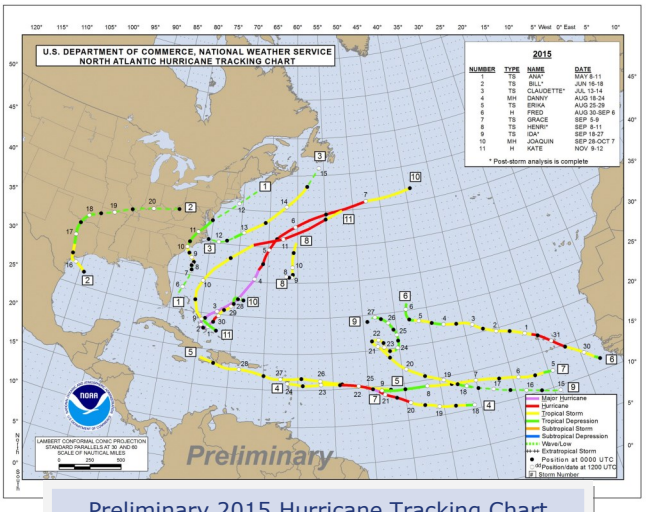
The 2015 hurricane season started early, when Tropical Storm Ana developed off the South Carolina coast on May 9th -well before the official start of hurricane season on June 1st. It is very unusual to have tropical activity this early in the season, and Ana became one of the earliest tropical cyclone landfall on record when it came onshore near Myrtle Beach on May 10th. Though the impacts from Ana were minimal, it did serve as an early reminder of our vulnerability to hurricanes along the Southeast Coast.

On May 27th, NOAA released its first outlook for the 2015 Atlantic hurricane season. The expectation was that the strengthening El Niño would suppress hurricane activity by increasing the amount of vertical wind shear and subsidence aloft, two variables which favor hurricane formation when they are low. The outlook noted that the most likely scenario would be: 6-11 named storms, 3-6 hurricanes, and 0-2 major hurricanes. The primary uncertainty was the strength of the El Niño.

The first two and a half months of the 2015 Atlantic Season were fairly slow, with just 2 tropical cyclone formations during this time. Of these two storms, Bill and Claudette, Bill had significantly more impact on the Continental United States, making landfall on Matagorda Island, Texas on June 16th, with heavy rainfall/flooding and tornadoes. Tropical Storm Claudette formed off the Mid-Atlantic Coast on July 13th before moving harmlessly out to sea.

On August 6th, NOAA released their second and final 2015 Atlantic hurricane outlook, suggesting that the most likely scenario was 6-10 named storms, 1-4 hurricanes, and 0-1 major hurricanes. Overall this was not a major change from the first outlook, with only minor reductions in each category.

Activity in the Atlantic Basin began to increase come the middle of August, and Danny became the first major hurricane well east of the Lesser Antilles on August 21st. In total, three tropical cyclones would form during the second half of August, and four in September, with none having major direct impacts on the Continental United States. Major Hurricane Joaquin, which developed near the Bahamas before moving northeastward well off the East Coast, did not have significant direct impacts on our area, but it likely contributed indirectly to the flooding across the Carolinas in early October by enhancing moisture transport into the region. Hurricane Kate was the final storm of the 2015 season, and remained well off the East Coast during the second week of November.



Preliminary 2015 Hurricane Tracking Chart

All told, the 2015 Atlantic hurricane season saw 11 named storms, including 4 hurricanes, and two major hurricanes. This is below the 1981 to 2010 normal of 12 names storms, 6 hurricanes, and 3 major hurricanes. Additionally, this is the tenth consecutive year that no major hurricane has made landfall in the U.S. – the previous longest recorded drought was 8 years. As always, preparedness is the most important factor in mitigating the impact of a hurricane, and as we start turning our eyes toward the 2016 season, remember that no matter what the outlook for the season is, it only takes one!

Tech Talk...Research & Technology

Additional Local Studies

by Frank Alsheimer - Science and Operations Officer

The National Weather Service Forecast Office in Charleston, SC continues to pursue advances in science and technology to constantly improve our forecasts and services. 2015 was no exception, with several research efforts either begun or continued. Here is a brief summary of a few of those efforts.

Dual-Pol Severe Thunderstorm Indicators Research

Currently, two meteorologists on staff are looking into ways that dual-pol moments from the WSR-88D Doppler Radar can be used to aid forecasters in determining the threat for downburst winds from thunderstorms that meet or exceed 50 knots. While previous dual-pol studies have looked at precipitation estimates, hail production, and tornado formation and strength, not much has been done to date looking at the problem of severe straight-line winds. A NOAA Hollings Scholarship student will be co-located with the office in the summer of 2016 to help with this research effort.

Storm Surge Visualization

A long term project with the College of Charleston on a new methodology for storm surge visualization was completed this year. The purpose of the project was to determine if visualizing potential storm surge from a hurricane in a vertical plane using known landmarks was more effective than traditional plan view maps. While we are plowing through the results and working on a manuscript now, a preliminary review of the survey results indicate the method used in the study (or similar methods) has some promise in helping people understand the true threat from storm surge for their location.

Coastal Flood Climatology

As part of a grant from the COMET program, NWS Charleston and the College of Charleston will be creating a coastal flood climatology for the Charleston area. It is well known that the frequency of coastal flood events in Charleston harbor has risen significantly over the past 60 years, with tidal levels reaching 7 feet Mean Lower Low Water or higher (the level at which at least nuisance coastal flooding beings) increasing by an order of magnitude since the 1950s. The purpose of the study is to look at the type of weather events that contribute to coastal flooding and determine if there have been changes in the weather patterns that could have played a role in the increase of flood events. Additionally, the study will look at outlier events and examine the weather patterns associated specifically which each of those.

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