Carolina SkyWatcher

National Weather Service, Newport/Morehead City, NC

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Summer 2014 Edition

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Hurricane Season 2014 Arrives

June 1 was the start of the 2014 hurricane season, which runs through November 30. This hurricane season follows on the heels of the quietest season in years. The 2013 hurricane season was the first Atlantic hurricane season since 1994 to end with no major hurricanes. It was also the first year since 1968 to record no storms of at least Category 2 intensity on the Saffir-Simpson Hurricane Scale. The first storm of the season, Andrea, formed on June 5, while the final storm, Melissa, dissipated on November 22. Only two storms, Humberto and Ingrid, reached hurricane intensity. This was the lowest number since 1982.

Hurricanes can cause catastrophic damage to coastlines and several hundred miles inland. Hurricane can produce winds exceeding 155 miles per hour as well as tornadoes and mircrobursts. Additionally, hurricanes can create storm surges along the coast and cause extensive damage from heavy rainfall. Floods and flying debris from the excessive winds are often the deadly and destructive results of these weather events. Slow moving hurricanes moving inland tend to produce especially heavy rain. Flash flooding can occur due to intense rainfall. The peak of the hurricane season is typically in late August through late September, but destructive hurricanes can form anytime during the hurricane season. Learn what you can do if a hurricane is headed your way and how to take action before, during and after the storm.

CONTENTS

Atlantic Tropical (and Subtropical) Storm Names for 2014

Arthur	Isaias	Rene
Bertha	Josephine	Sally
Cristobal	Kyle	Teddy
Dolly	Laura	Vicky
Edouard	Marco	Wilfred
Fay	Nana	
Gonzalo	Omar	
Hanna	Paulette	

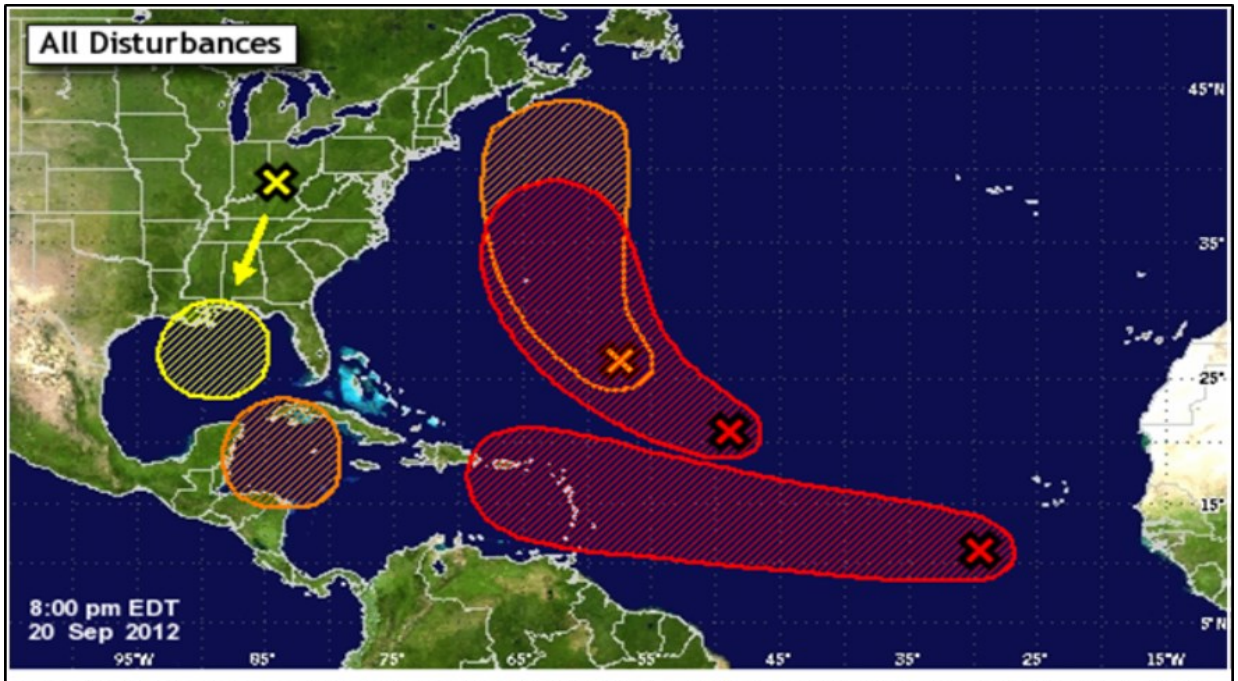
Eastern North-Pacific Tropical (and Subtropical) Storm Names for 2014

Amanda	Iselle	Rachel
Boris	Julio	Simon
Cristina	Karina	Trudy
Douglas	Lowell	Vance
Elida	Marie	Winnie
Fausto	Norbert	Xavier
Genevieve	Odile	Yolanda
Hernan	Polo	Zeke

NHC Changes for the 2014 Hurricane Season

By David Glenn, Meteorologist

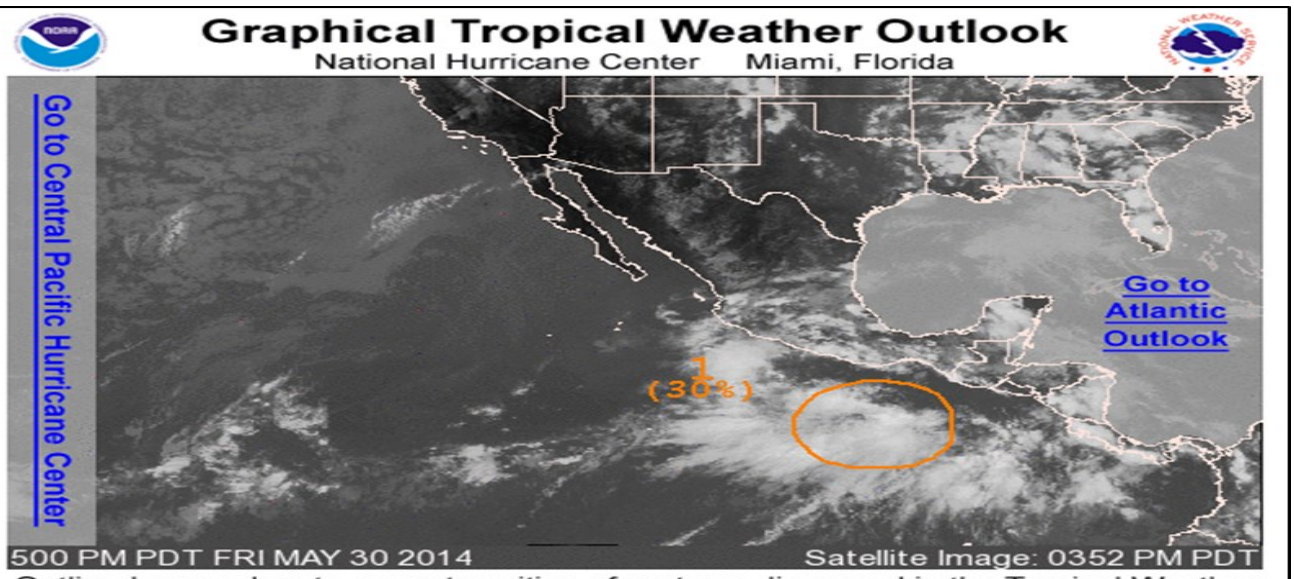
In 2014, the experimental 5-day Tropical Weather Outlook will become operational with a slight change in the appearance of the product. The new 5-day Graphical Tropical Weather Outlook will begin on July 1, 2014 and will indicate the formation potential of individual disturbances during the next 5 days. The current location of existing disturbances will be denoted by an "X", and shaded areas will represent the potential tropical cyclone formation area for each disturbance during the subsequent 5-day period. The areas will be color-coded by development likelihood, with yellow representing a low (<30%) chance, orange denoting a medium (30% to 50%) chance, and red corresponding to a high (>50%) chance of tropical cyclone formation during the next 5 days. A mouse-over feature will allow users to see the accompanying Outlook text for each disturbance. Clicking on a disturbance will display a graphic showing only that disturbance, which should improve clarity when the forecast genesis areas overlap. In 2013, Tropical Weather Outlook formation probabilities were embedded within the paragraph describing each disturbance. In 2014, the formation probabilities will appear in a tabular form beneath each paragraph. The Tropical Weather Outlook and Graphical Tropical Weather Outlook products are issued at 2 a.m., 8 a.m., 2 p.m., and 8 p.m. Eastern Daylight Time. During Eastern Standard Time, the Outlooks are issued at 1 a.m., 7 a.m., 1 p.m., and 7 p.m.



Tropical Cyclone Formation Potential for the Five-Day Period Ending at 8:00 pm EDT 25 Sep 2012
Chance of Cyclone Formation in 5 Days: Low < 30% Medium 30-50% High > 50%
X indicates current disturbance location; shading indicates potential formation area.

NHC 2014 Changes (Continued)

The National Weather Service began experimenting with the use of mixed-case (upper and lower case) text in some products a few years ago after World Meteorological Organization standards were changed. This year, NHC will issue the Tropical Weather Outlook and the Tropical Cyclone Discussion using mixed case, as well as with the full set of standard punctuation symbols. No formatting changes are planned to the other NHC tropical cyclone advisory products at this time. See below for a recent example in the Eastern Pacific Ocean.

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ZCZC MIATWOEP ALL
TTAA00 KNHC DDHHMM

TROPICAL WEATHER OUTLOOK
NWS NATIONAL HURRICANE CENTER MIAMI FL
500 PM PDT FRI MAY 30 2014

For the eastern North Pacific...east of 140 degrees west longitude:

1. A broad area of low pressure located several hundred miles south of
southeastern Mexico is gradually becoming better organized.
Environmental conditions are expected to become increasingly
conducive for continued development of this system during the next
few days as it drifts northward toward the Gulf of Tehuantepec.
* Formation chance through 48 hours...medium...30 percent
* Formation chance through 5 days...high...70 percent

Forecaster Blake
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The pronunciation guide for Atlantic tropical storms and hurricanes is available here: http://www.nhc.noaa.gov/pdf/aboutnames_pronounce_atlc.pdf

The NHC can be reached on Social Media through Facebook at http://www.facebook.com/NWSNHC and on Twitter at @NHC_Atlantic . The NHC director Dr. Richard Knabb is also on Twitter and can be followed @NHCDirector . You can receive updates from the NHC Storm Surge group by following @NHC_Surge .

Storm Surge

By David Glenn, Meteorologist

Storm surge is often the greatest threat to life and property from a hurricane. It poses a significant threat for drowning. A mere six inches of fast-moving flood water can knock over an adult. It takes only two feet of rushing water to carry away most vehicles—including pickups and SUVs. Storm surge can cause water levels to rise quickly and flood large areas—sometimes in just minutes, and you could be left with no time to take action if you haven't already evacuated as instructed. Storm surge values do not correspond well to the hurricane wind categories (of the Saffir-Simpson Hurricane Wind Scale) that range from 1 to 5. These categories are based only on winds and do not account for storm surge. Tropical storms, category 1 or 2 hurricanes, major (category 3 to 5) hurricanes, and post-tropical cyclones can all cause life-threatening storm surge. Storm surge can also occur with non-tropical storms like Nor'easters and other winter storms. Many U.S. Gulf and East Coast areas are vulnerable to storm surge, including areas up to several miles inland from the coastline. Find out today, well before a hurricane ever approaches, if you live in a storm surge evacuation zone.

The Potential Storm Surge Flooding map is an experimental National Weather Service (NWS) product that provides valuable new information on the potential storm surge flooding associated with tropical cyclones. This fact sheet can help emergency managers understand and use the new map to communicate effectively with members of their community.

Developed over several years in consultation with emergency managers and others, the map shows land areas where, based on the latest NHC forecast, storm surge could occur and how high above ground the water could reach in those areas. Major factors influence the amount of surge a storm produces at a given location, including the hurricane's landfall location; storm intensity, size, forward speed, and angle of approach to the coast; the shape of the coastline; the slope of the ocean bottom; and local features such as barrier islands, bays, and rivers.

The map will typically be issued when a hurricane or tropical storm watch is first issued for any portion of the Gulf or East Coast of the United States, or approximately 48 hours before the anticipated onset of tropical storm force winds. It is subject to change every six hours in association with every new NHC full advisory package.

Storm Surge (Continued)

Due to the processing time required to produce the map, it will not be available until about 45 to 60 minutes following advisory release. The map is based on the forecast movement and intensity of the current tropical storm or hurricane, and it takes into account likely forecast errors. It represents a reasonable estimate of worst-case scenario flooding of normally dry land at particular locations due to storm surge. There is a 1-in-10 chance that the storm surge flooding at any particular location could be higher than the values shown on the map. The map is created from multiple runs of the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model.

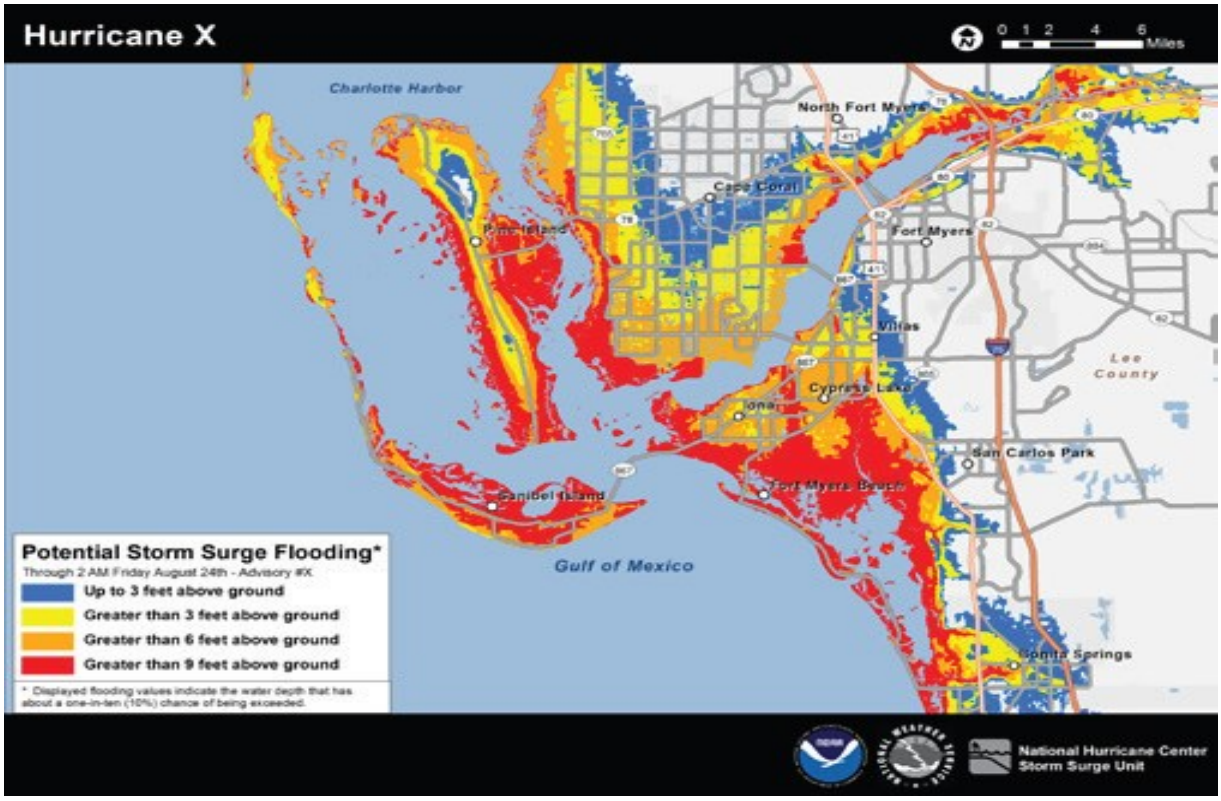
The National Hurricane Center is requesting feedback on the experimental Potential Storm Surge Flooding Map. You can provide feedback at this link:

http://www.nhc.noaa.gov/news/20140523_pns_inundation.php

Additional information can be found on the following two videos:

http://player.vimeo.com/video/13463438?title=0&byline=0&portrait=0

https://www.youtube.com/embed/84VFVZS04hM?rel=0



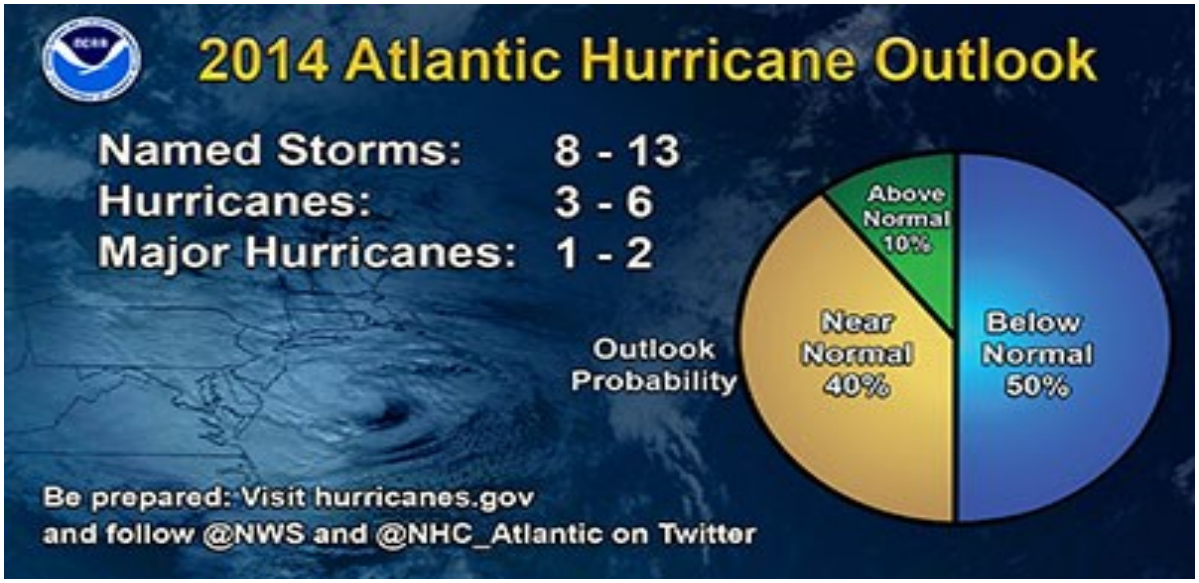
Example of a Potential Storm Surge Flooding Map

2014 Atlantic Hurricane Outlook

By Bel Melendez, Meteorologist

The 2014 hurricane season began on June 1. Most North Carolinians are well aware of tropical storms and hurricanes affecting them in one way or another, given that based on climatology, North Carolina is second in tropical cyclone landfall frequency. Recently, NOAA's Climate Prediction Center (CPC) issued their 2014 Hurricane Outlook for this season. Overall, everyone must remember that this outlook is not a seasonal hurricane landfall prediction, but the likelihood of tropical cyclones developing over the Atlantic basin. This year, experts are calling for a near to below normal season, predicting 8 to 13 named storms, of which 3 to 6 are expected to become hurricanes, and 1 to 2 are expected to become major hurricanes.

The main contributing factor in this year's forecast is the increased probability of El Nino developing this summer or early fall. Research has found, when El Nino develops, it tends to increase the strength of the of the easterly trade winds, with stronger vertical wind shear and increased atmospheric stability over the Atlantic basin and therefore reducing the ability of tropical cyclones to intensify. Experts mentioned other factors, such as model-indicated sea-surface temperatures in the main development region would be near-average to below average this summer and current weather patterns are not signaling an above average season. Just because CPC is predicting near to below average does not mean not to be prepared for this hurricane season. It only takes one storm to cause a disaster.

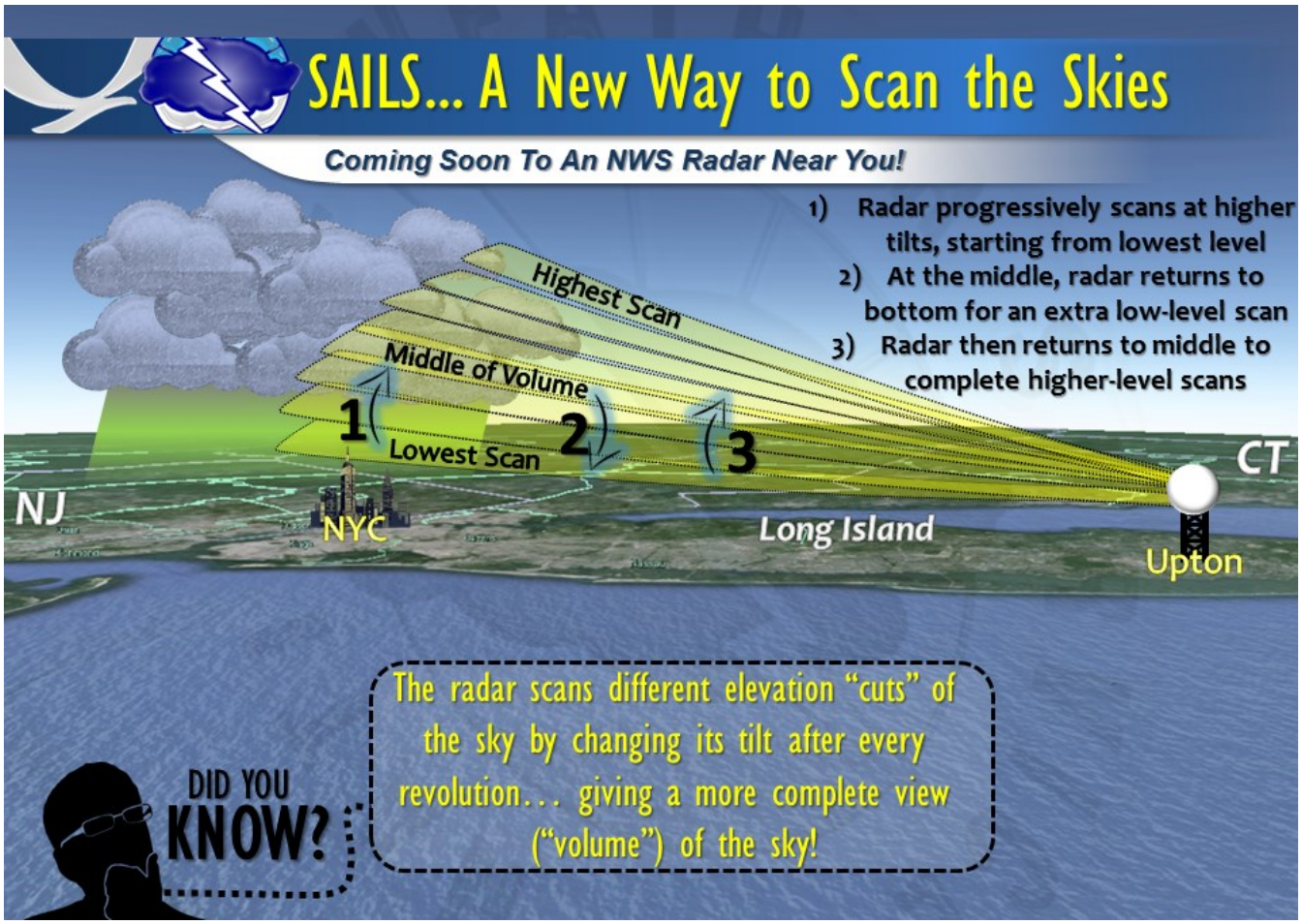


New Radar Technology Comes to NWS Newport

By Hal Austin, Meteorologist

On June 22nd, the Doppler radar at NWS Newport will be upgraded to support new technology that greatly increases resolution in the lower atmosphere. This will significantly enhance forecast and warning support.

Until now, the question was how can we increase the resolution? Rotate the antenna faster? No, that would put more stress on the hardware, plus lower the quality of the radar data. The solution was to increase the number of low level scans. The new technology that will perform this is called SAILS, which stands for Supplemental Adaptive Intra-Volume Low Level Scan. When storms are occurring, the radar scans the atmosphere at 14 different elevations every 4 minutes, beginning at 0.5° and ending at 19.5°. Now with SAILS, when the radar gets halfway up the volume scan, the radar dish will drop back down to 0.5°, perform an additional scan, then raise back up to the middle and complete the remainder of the scan. This will double the amount of scans per hour of the lower atmosphere! The increased resolution will be of tremendous value in examining thunderstorms and tropical systems.



Graphic courtesy National Weather Service, Upton, NY

NWS Represented at AMS Conference in Atlanta

By Lara Pagano, Meteorologist

The NWS Newport/Morehead City office was represented at the 94th Annual American Meteorological Society (AMS) conference in February in Atlanta. Two meteorologists went to Atlanta to attend the meeting and present local research. Tom Lonka and Lara Pagano gave two poster presentations and one oral presentation on the July 1st, 2012 Derecho that impacted much of Eastern North Carolina with damaging wind gusts, a documented gustnado and frequent lightning. They presented on two main themes: Decision Support and Local Operations. Many best practices were gleaned from this event and were thus shared among those who attended the AMS meeting.

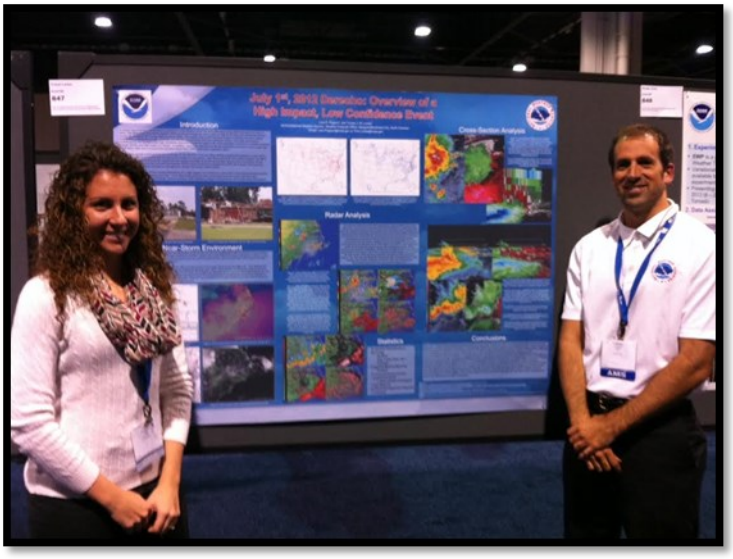
On July 1st, 2012, the NWS had issued an Excessive Heat Warning with temperatures climbing into the 100's and heat index values in the 120's. Another forecast challenge for the day was thunderstorm development. While there were boundaries across the region from prior thunderstorms, the atmosphere was "capped", and thus the severe threat was perceived as low. The previous day, the atmosphere was similar with no thunderstorm development. However, by 1pm on the 1st, thunderstorms were beginning to cultivate on a boundary across central North Carolina. The thunderstorms quickly organized into a line that bowed toward the southeast. The storms marched through the forecast area and continued offshore. It was later considered a Derecho, which by definition is a complex of thunderstorms that travels over 250 miles. This system generated very strong outflow ahead of the storm, ultimately killing 3 people. A gustnado also formed along the outflow. Extensive structural damage was made, especially across our northwest portion of the county warning area.

It became clear through our local assessment that Decision Support Services throughout the July 1st, 2012 Derecho event was vital for preparing the public of the potential for severe weather. However, the forecasted potential for a severe outbreak that day appeared limited. Therefore, Decision Support Services [and any precautionary dissemination] was confined to our routine Area Forecast Discussion and our Hazardous Weather Outlook. Looking back at this event, we categorized this as a Low Confidence, High Impact weather event. The confidence level that severe weather was going to develop July 1st was low, but if storms did develop, we knew it would quickly escalate to a severe outbreak given the amount of instability in the atmosphere. At the AMS conference, we presented on the best practices we learned mainly ahead and

NWS Represented at AMS Conference in Atlanta (Continued)

during the event. One of the best practices gained was based on briefing our Emergency Managers, Media and the public about high impact events, even if the confidence in them developing is low. The presentation was well received by the AMS community and local assessments were then highlighted by the NWS Head Quarters as a "Best Practice" for other NWS Weather Forecast Offices.

Since this event and the subsequent local assessment, the NWS Newport/Morehead City office has done a fantastic job disseminating information not only for high confidence weather events, but low confidence events that also have a high impact. This has proven to increase awareness and communication from our office to you, our public. This information can be found not only through our routine products, but most notably through our Social Media outlets (Facebook and Twitter) and Weather Briefings.



Meteorologists Lara Pagano and Tom Lonka at the AMS Conference

Destructive Tornadoes Hit The Area in April

By Chris Collins, Meteorologist

After a slow start to the severe weather season in March, April was very active. On April 7, two tornadoes affected Beaufort and Hyde Counties. The initial tornado touched down around 3:49 PM just west of Pantego Creek and Highway 264 north of Belhaven. It began as a moderate EF-1 tornado on the Enhanced Fujita scale and continued down Beech Ridge Road. Along Highway 264, there was damage to a few structures and a significant number of large oaks and pine trees were downed, twisted and snapped. One home was shifted off its foundation with partial roof destruction, a partial loss of walls and windows blown out. A car that was in that location was tossed 50 yards from the road with two injuries. The tornado strengthened to a high end EF-2 as it moved to near Pantego. Several homes, outbuildings and sheds were damaged or destroyed. Large numbers of trees were snapped, many near their base. A double wide mobile home was wiped off its foundation and destroyed despite being strapped down. Utility lines were significantly damaged as well. The tornado then continue to produce moderate EF-2 damage on Ross Farm, including roof damage, huge farm equipment moved and significant tree damage. The tornado dissipated in a field east of Belhaven. An additional EF-1 tornado caused damage in the Ponzer area of Hyde County.

On April 25, a series of at least 4 tornadoes touched down in portions of Greene, Pitt and Beaufort Counties. The first tornado touched down approximately one mile northeast of Chicod causing EF-1 damage to hard and softwood trees as it progressed eastward. The tornado then caused EF-1 to low-end EF-2 damage to several mobile homes as well as farm equipment along Blackjack-Simpson road just south of Stokestown-Saint John Road. A tractor trailer and pick-up truck were also flipped in this area. The tornado then lifted as it progressed eastward across farm fields. The second tornado touched down approximately 1.5 miles west of Chocowinity along Taylor Road causing EF-0 damage to trees, mobile homes and outbuildings. The tornado then strengthened causing strong EF-2 damage to multiple homes, businesses and trees from the intersection of U.S. Highway 17 Business and NC Highway 33 in Chocowinity eastward for approximately 1 mile. The tornado then tracked across farm and marshland before impacting multiple homes along Whichards Beach Road from near Warren's Way to Harbor Drive causing strong EF-2 to moderate EF-3 damage. The tornado then moved into the Washington Park area near Shorewood Drive and Daniels Drive after crossing the Pamlico River. Strong EF-2 damage continued for approximately 5 miles as the tornado tracked across River Road impacting several neighborhoods south of Highway 264 to just north of the intersection of NC 32 and Highway 264. Extensive damage occurred to numerous homes, mobile homes and trees along this path with several mobile homes completely destroyed. The tornado continued to track east of NC-32

Destructive Tornadoes Hit The Area in April (Continued)

and north of US Highway 264 through mainly sparsely populated farm and woodland areas for an additional 10 miles causing mainly EF-0 to low-end EF-1 damage before dissipating near Terra Ceia. In all, it is estimated that approximately 150 to 200 homes and structures sustained extensive damage with many completed destroyed.
Another brief tornado touchdown occurred approximately 3 miles north of Shine in Greene County, near the intersection of Shine Road and Kearney Cemetery Road, causing EF-0 damage to trees and approximately 6 homes. A final tornado touched down at a farm along Beaman Old Creek Road near Walstonburg in Greene County, causing strong EF-1 damage to one side of a poultry farm building and EF-0 to low-end EF-1 damage to several additional farm outbuildings, two homes and many trees. The tornado then moved through farm and woodland areas before causing EF-0 to low -end EF-1 damage to several homes and one store near the intersection of Speights Bridge Road and Walston Road.

Tornado on the Ground near Belhaven, April 7, 2014

Belhaven Damage, April 7, 2014

Damage near Chocowinity, April 25, 2014

Tornado on the ground in Greene County, April 25, 2014

The Cooperative Observer Program

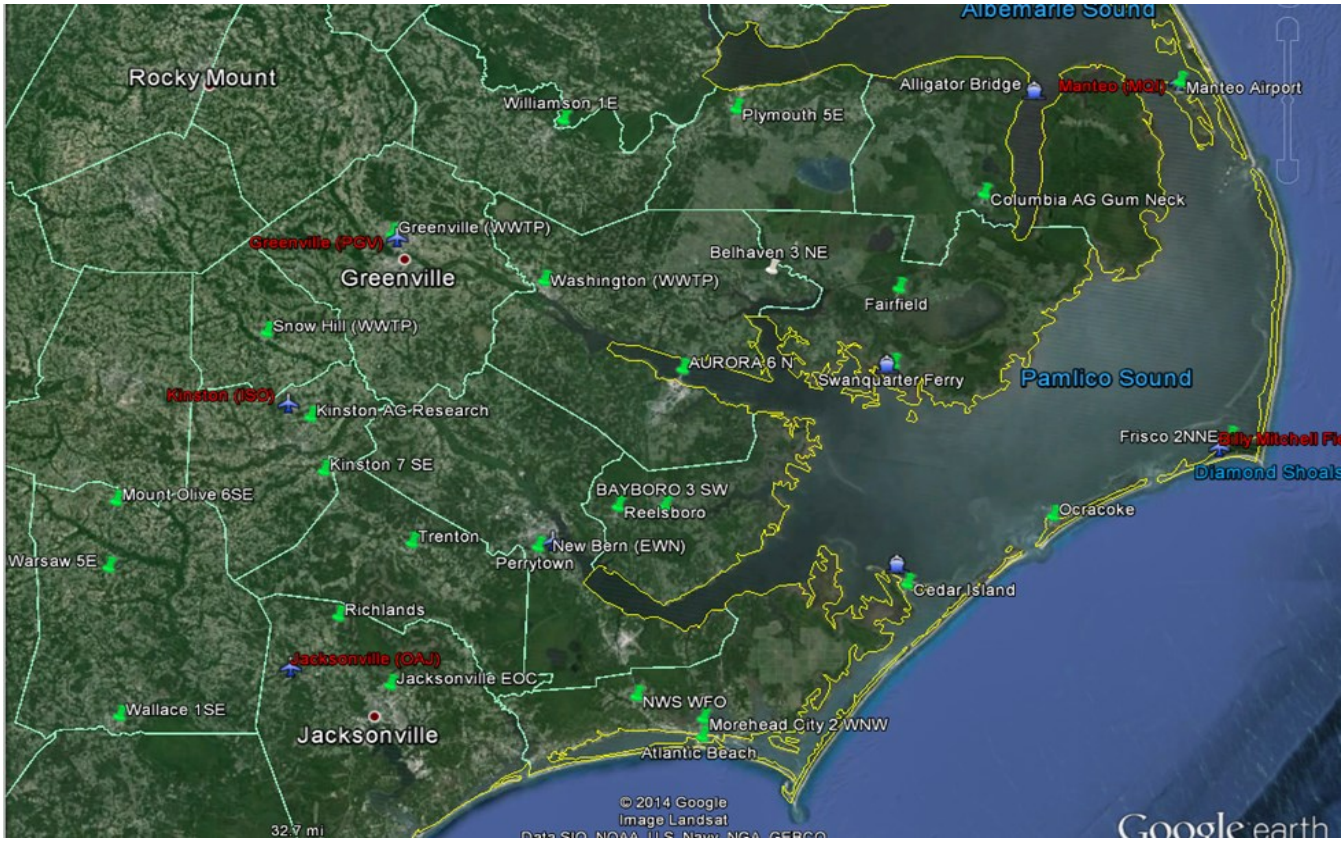
By Tony Saavedra, Observations Program Leader

The National Weather Service (NWS) Cooperative Observer Program (COOP) is a program of volunteer observers throughout the country. These observers truly are our Nation's weather and climate observing network of, by and for the people. Nearly 10,000 volunteers take observations on farms, in urban and suburban areas, National Parks, seashores, and mountaintops. The data are truly representative of where people live, work and play. Although the COOP program was formally created in 1890 under the Organic Act, the program can be tracked back to 1797 when Thomas Jefferson envisioned a network of weather observers across the nation. Its mission is two-fold:

- To provide observational meteorological data, usually consisting of daily maximum and minimum temperatures, snowfall, and 24-hour precipitation totals, required to define the climate of the United States and to help measure long-term climate changes.

- To provide observational meteorological data in near real-time to support forecast, warning and other public service programs of the NWS.

The Newport office has 33 volunteer observers throughout Eastern North Carolina.



Map of Cooperative Observer Sites in the WFO Newport/Morehead City Forecast Area.

The Cooperative Observer Program (Continued)

Approximately $4 trillion of the U.S. Gross Domestic Product is reliant on accurate weather data! Data collected by the Cooperative Observer Program is used by:

- Transportation: Used by Snow Removal crews, Route Planning for commercial goods, barge traffic across the Nations waterways and in the planning of highways to handle heavy precipitation events.

- Hydrology: Used by Water Resource Management, for development, growth and flood control. Also useful during the development of Flood Maps and Forecast Models.

- Drought: Drought losses average $6 to $8 billion a year. COOP data is used for National and North American Drought Monitoring/Mitigation and also used by the National Integrated Drought Information System throughout Western Governors Association.

- Energy: Energy demands, heating and cooling degree days to determine monthly power bills as well as for planning future energy consumption needs.

- Construction and Design: Construction materials best suited for the climate, roof planning to support heavy snow loads.

- Agriculture/Agribusiness: Develop growing seasons, plant research and adaptability, frost/freeze climatology and to study the effects of climate on crop yields.

- Disaster Mitigation: Billions of dollars of Funding for Federal Disaster Declarations, and Insurance Companies use the data to determine insurance industry payouts.

- Other Uses: NWS Warning Process, health disease Mitigation, Recreation and Tourism and to help solve legal disputes.

If you are interested in becoming a NWS Cooperative Observer, contact you nearest National Weather Service office.

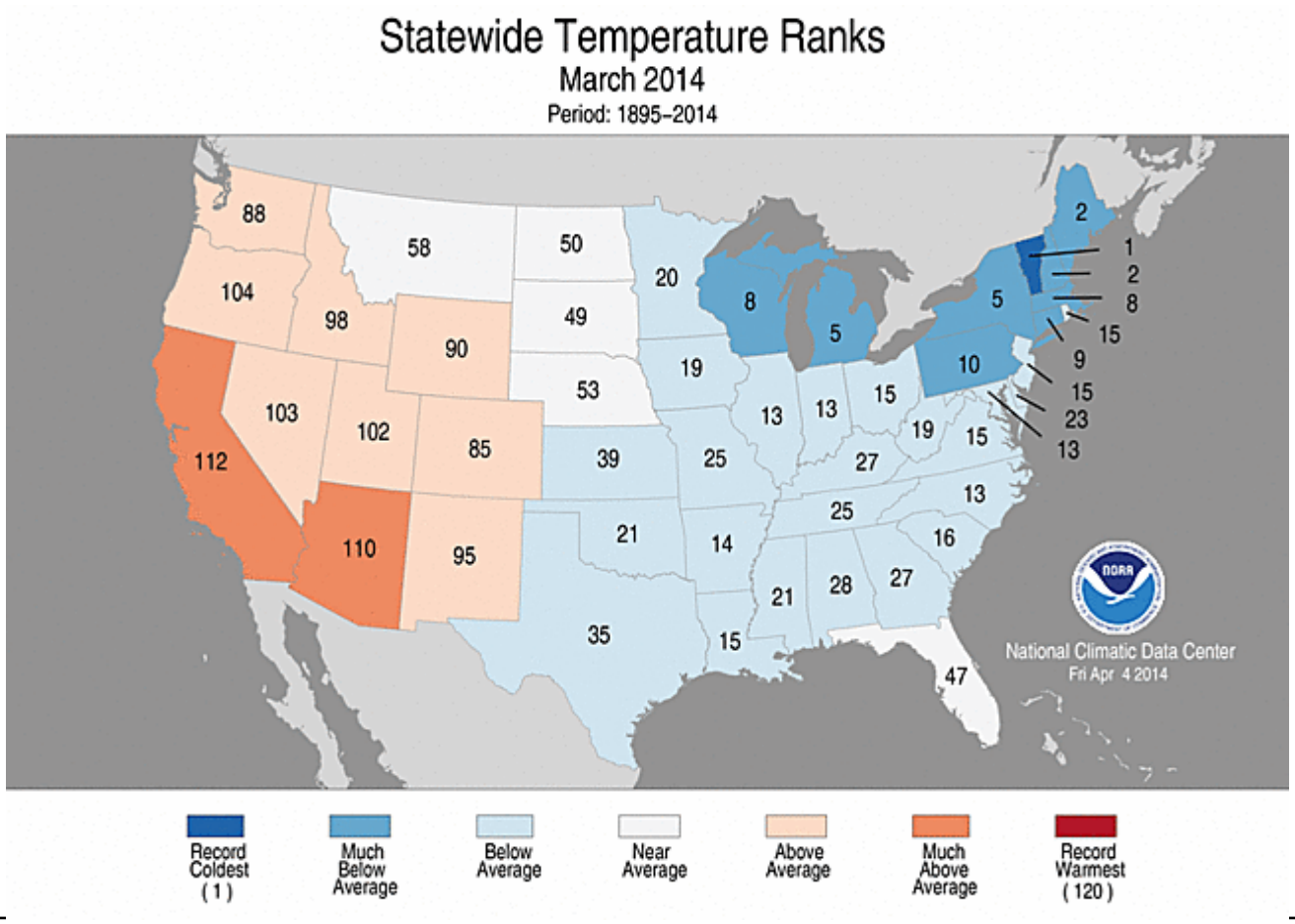
Reference http://www.nws.noaa.gov/om/coop/what-is-coop.html

March 2014 - Coldest Since 2002

By Chris Collins, Meteorologist

Below-average temperatures dominated the eastern half of the contiguous U.S. during March. The largest departures from average occurred across the Great Lakes and Northeast, where nine states had temperatures that ranked among their 10 coldest on record. The persistent cold resulted in nearly two-thirds of the Great Lakes remaining frozen into early April. Vermont had its coldest March on record, with a statewide temperature of 18.3°F, 8.9°F below average. The previous coldest March in Vermont occurred in 1916 when the monthly average temperature was 18.6°F. Maine and New Hampshire each had their second coldest March on record, while Michigan and New York had their fifth coldest. Massachusetts had its eighth coldest March, Connecticut its ninth coldest, and Pennsylvania its 10th coldest.

Here in North Carolina, it was the 13th coldest winter for the period 1895-2014. Temperatures were 3 to 4 degrees below normal at New Bern, Beaufort, Hatteras and Newport. The morning of March 14th was the coldest across much of eastern North Carolina as minimum temperatures dropped to 22 degrees at Newport, 23 at New Bern, 26 at Beaufort and 27 degrees at Cape Hatteras.



National Weather Service

530 Roberts Road
Newport, NC 28570

Phone: 252-223-5122
Fax: 252-223-3673
Website: http://weather.gov/Newport

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