NATIONAL WEATHER SERVICE, NEWPORT/MOREHEAD CITY, NC

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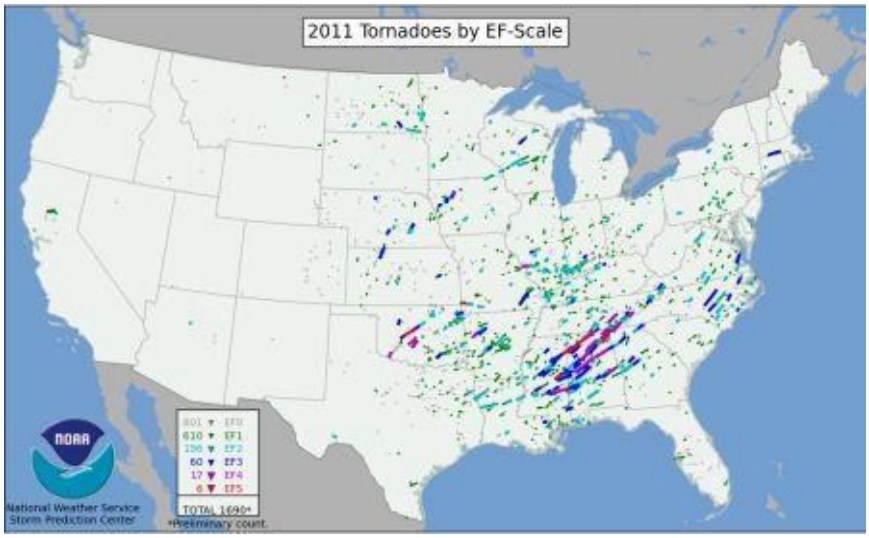
CAROLINA SKY WATCHER

SPRING 2012 EDITION

SEVERE WEATHER SEASON IS HERE

By Chris Collins, Meteorologist

While spring brings warmer weather and thoughts of outdoor fun, it is also the most active time of the year for severe weather in Eastern North Carolina. Threats such as tornadoes, severe thunderstorms producing damaging winds, hail, and lightning, along with flooding rainfall all occur during the peak severe weather season in March through early June. The 2011 severe weather season was very active across the United States (see graphic to the right) as well as over Eastern North Carolina, highlighted by a major tornado outbreak on April 16 (see next article), which included two EF-3 tornadoes on the Enhanced Fujita scale (see graphic next page) that produced widespread damage. There was also a smaller tornado outbreak on April 28. A record number of tornadoes were observed across the United States during the Spring of 2011. Historically, more tornadoes occur in Eastern North Carolina than any other part of the state.



2011 Tornadoes across the United States by EF-Scale

Most tornado deaths and injuries occur outdoors, in automobiles, and in mobile homes. Nearly two thirds of all tornado fatalities occur in mobile homes and many of these at night. When a tornado warning is issued for your area or if you spot a tornado, remember to "get in, get down and cover up". Seek shelter in a substantial building, in an interior bathroom or closet on the lowest floor.

In addition to tornadoes, severe gusts of wind from a thunderstorm called downbursts or straight line winds are a serious danger. Nationally, over the last 30 years, nearly as many people have been killed by straight line winds as from tornadoes. Thunderstorm wind gusts rush down from the storm sometimes reaching speeds in excess of 100 mph. Thunderstorm winds of this magnitude effect large areas creating widespread damage and injuries from flying debris. Straight line winds can cause damage equivalent to that of a tornado. Dangerous lines of well organized thunderstorms, called squall lines, occasionally move across eastern North Carolina in the spring and early summer. These dangerous storm systems can be very explosive racing across the state at over 50 mph creating widespread wind damage over large areas.

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SEVERE WEATHER SEASON IS HERE *(continued from page 1)*

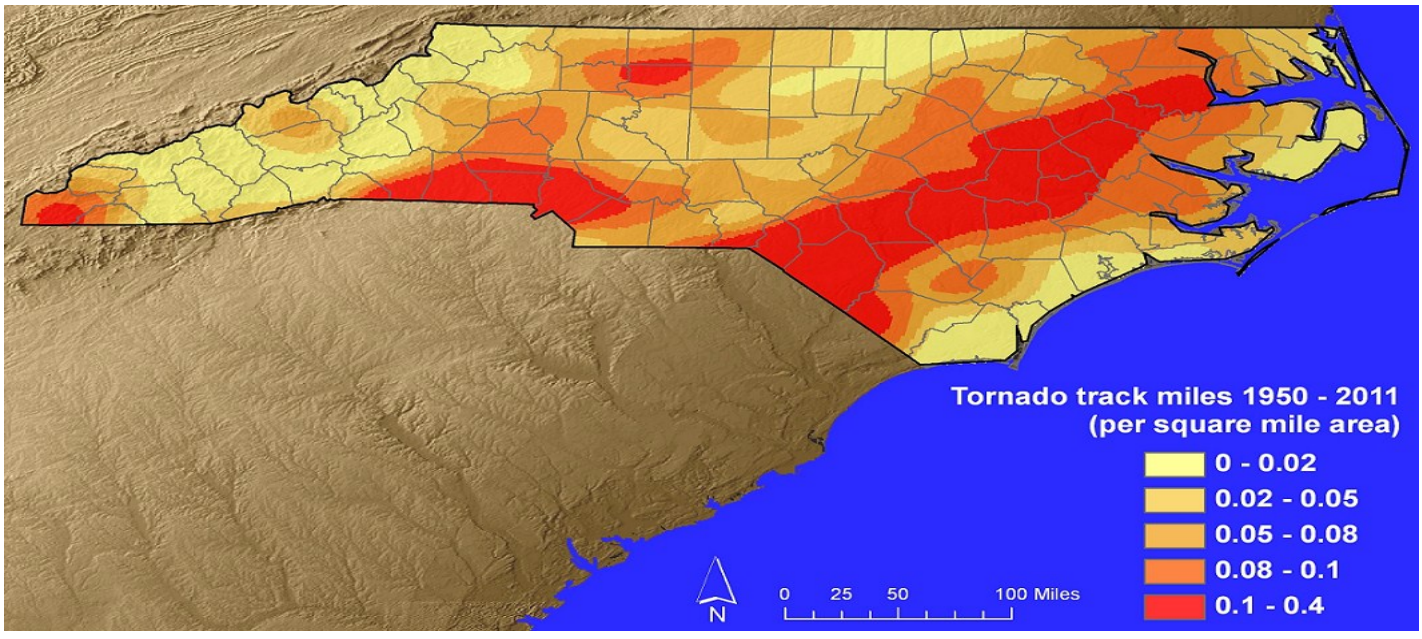
EF 0	65-85 mph
EF 1	86-110 mph
EF 2	111-135 mph
EF 3	136-165 mph
EF 4	166-200 mph
EF 5	Over 200 mph

Enhanced Fujita Tornado Scale

The staff here at the National Weather Service office in Newport monitors severe weather over Eastern North Carolina 24 hours a day, seven days a week. Our job is to issue life-saving severe thunderstorm and tornado warnings for 15 counties in Eastern North Carolina. The National Weather Service will issue a Tornado Warning when a tornado has been observed, or is indicated by Doppler radar. Severe Thunderstorm Warnings are issued for damaging wind gusts in excess of 58 mph, or hail in excess of 1 inch in diameter.

NOAA Weather Radio broadcasts official National Weather Service warnings, watches, forecasts and other hazard information 24 hours a day, 7 days a week. In North Carolina, nearly 30 NOAA Weather Radio broadcast stations provide weather forecasts and warnings for all 100 counties. No matter where you live, there is a NOAA Weather Radio station nearby. NOAA Weather Radio receivers range in price from $20 to $65, though most radios cost less than $40. The weather radio's round-the-clock protection can be a lifesaving investment and they can be purchased with the S.A.M.E. (Specific Area Message Encoded) technology. The S.A.M.E. technology allows the user to program specific counties into the radio such that it only receives alerts for the desired areas.

Another good source of preparedness for severe weather is the **Storm Prediction Center** (SPC), located in Norman, Oklahoma. The SPC is tasked with forecasting the risk of severe thunderstorms and tornadoes in the contiguous United States. The agency issues convective outlooks, mesoscale discussions, and watches as a part of this process. Convective outlooks detail the risk of severe thunderstorms and tornadoes during the given forecast period. Mesoscale discussions are issued to give information on a region that has a developing severe weather threat and states whether a watch is likely and details thereof, as well as situations of isolated severe weather when watches are not necessary. Watches are issued when forecasters are confident that severe weather will occur, and usually precede the onset of severe weather by one to three hours. The SPC webpage is located at http://www.spc.noaa.gov.



North Carolina Tornado Track Density (1950-2011), Courtesy Tom Allen, East Carolina University and Michael Frates, University of Akron

REVIEW OF APRIL 16, 2011 TORNADO EVENT

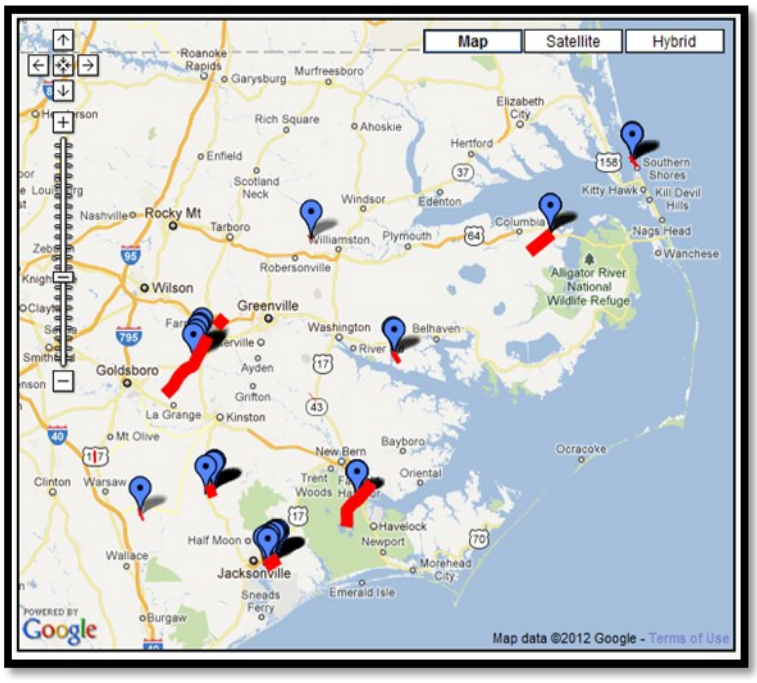
by Chris Collins, Meteorologist

Multiple long track, tornadoes developed over eastern North Carolina during the late afternoon and evening of Saturday April 16th, 2011. Twelve tornadoes were confirmed over the area, several of which caused major damage. Hundreds of homes were damaged or completely destroyed across the region. Many businesses and several schools received structural damage with some buildings totally destroyed. Thousands of residents were either temporarily or permanently displaced from their homes. Scores of injuries also occurred with several injuries being categorized as critical. Greene, Craven, Jones and Onslow Counties were particularly hard hit.

The atmospheric set up was conducive for supercell thunderstorms to form on this day. A jet stream structure enhanced lift over the area, while strong vertical wind shear developed across Eastern North Carolina. This setup provided the ability for storms to violently rotate while surface heating during the afternoon increased surface based instability.

At the surface, a cold front was poised to the west over the North Carolina mountains at 7 am Saturday morning as a warm front moved north to the near the North Carolina/Virginia border. Thunderstorms would break out ahead of the cold front, first over central North Carolina during the early afternoon hours and move into Eastern North Carolina by late afternoon and early evening. Strong surface based instability and low-level wind shear led to the thunderstorms very quickly becoming tornadic.

All these factors were contributors to the intensity of the thunderstorms that developed, producing violent tornadoes that caused damage of up to EF3 intensity on the Enhanced Fujita Scale for rating tornadoes. This outbreak was the largest over Eastern North Carolina since an outbreak on March 28, 1984 produced two EF-4 tornadoes over Eastern North Carolina along with 16 deaths.



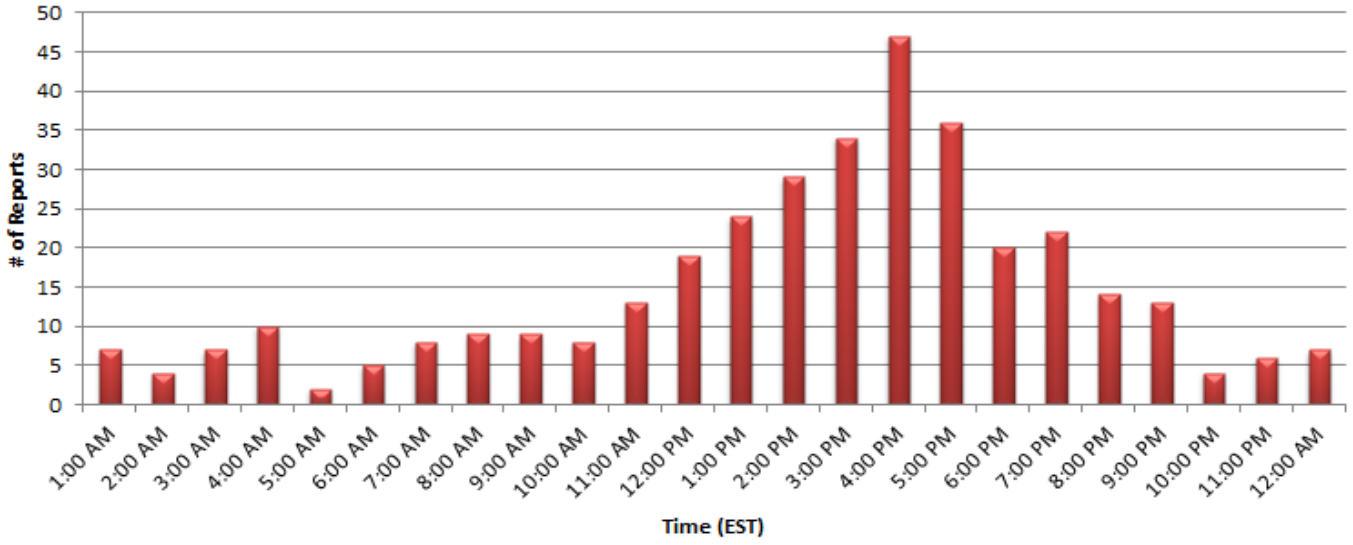
Tornado Touchdowns in Eastern North Carolina, April 16, 2011

Tornado Damage from Onslow County, April 16, 2011

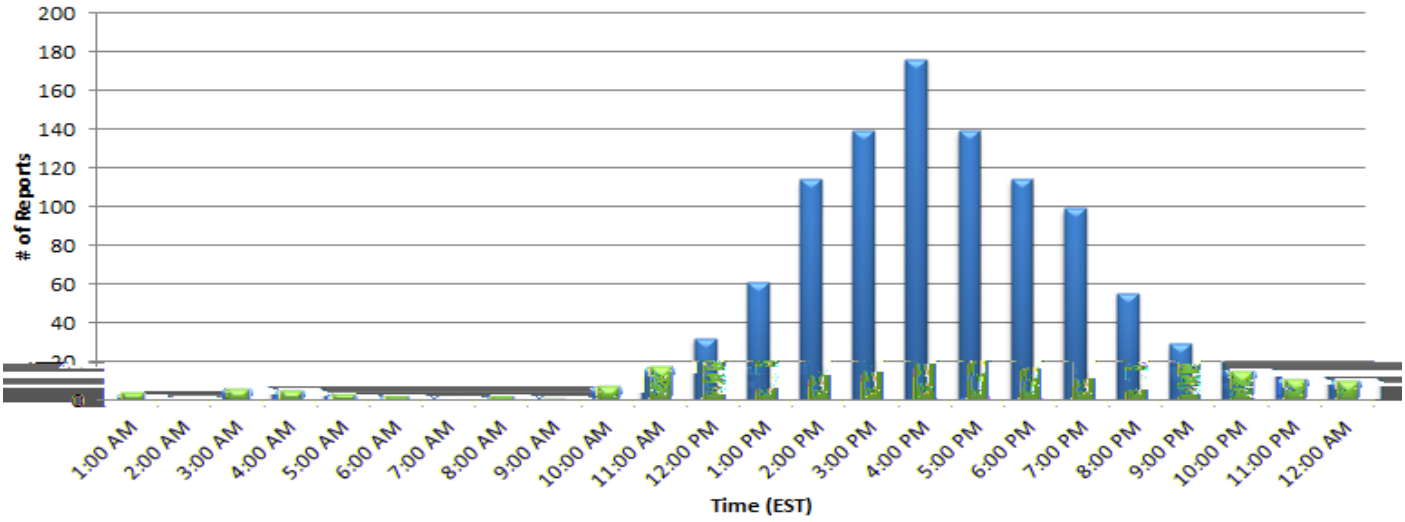
SEVERE WEATHER CLIMATOLOGY

by Belkys Melendez, Meteorologist

Spring is a time when birds are chirping, trees are blooming, and temperatures are getting warmer. With the start of nicer weather, Spring is also a time for Severe weather. La Nina is on the way out, as ocean temperatures in the Pacific return back to normal sometime in the middle of Spring. However, La Nina's atmospheric pattern will still linger and continue to increase the chances of severe weather during the months of April through June. This information is based on a local study conducted last year at the National Weather Service Newport/Morehead City office. This study consists of damaging winds, hail and tornadoes from 1950 through June 2011 classified by time of day. For 2012 Severe Weather Season, there is no way of knowing exactly how much severe weather we will get. Will it be strong winds and/or hail or will it be tornadoes? It's hard to say, but odds are high for severe weather during the months of April through June.

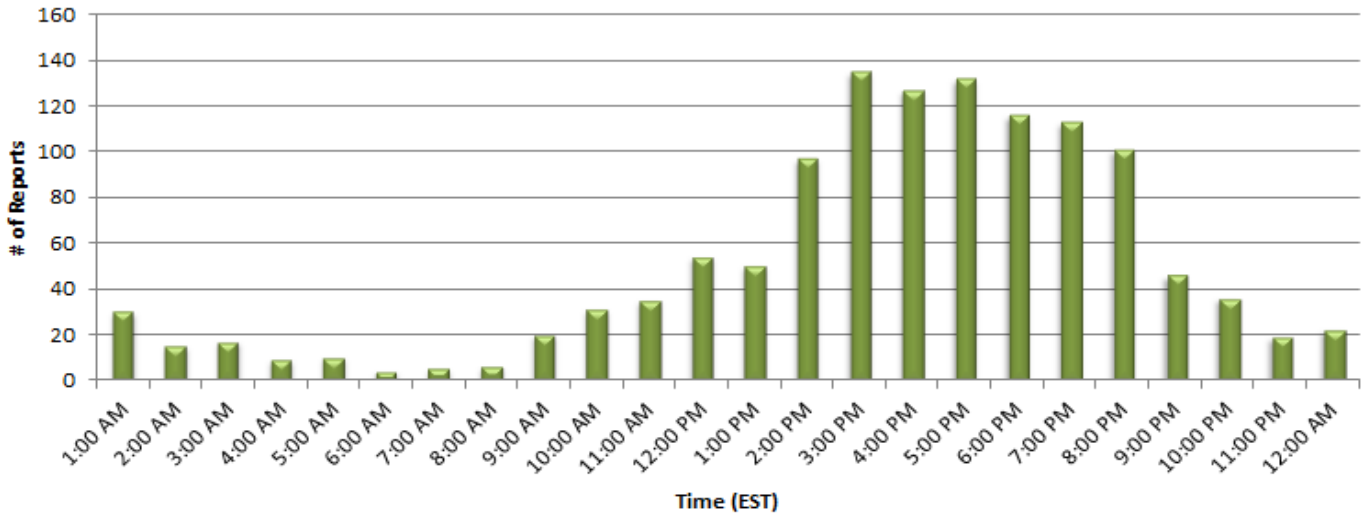


Tornado Reports classified by Time of Day (EST)



Damaging Wind Reports classified by Time of Day (EST)

SEVERE WEATHER CLIMATOLOGY (CONTINUED)



Hail Reports classified by Time of Day (EST)

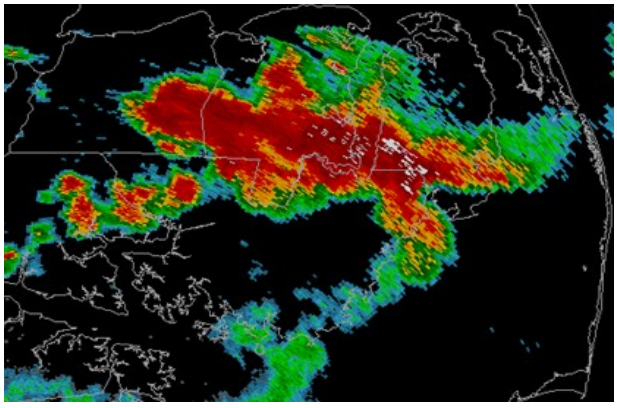
Annual Average Number of Tornadoes per State (1953-2004)

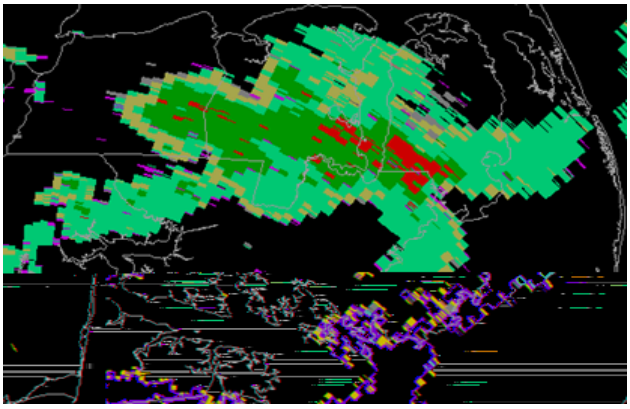
DUAL POL RADAR

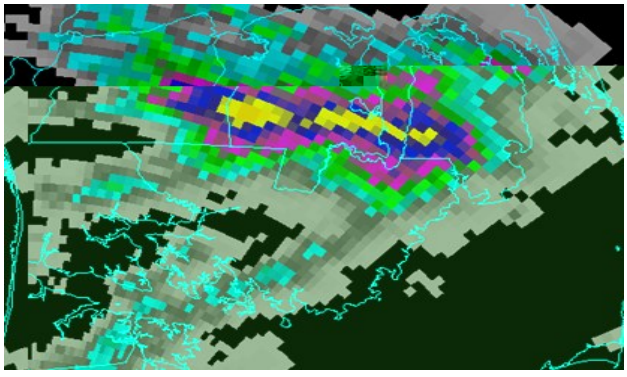
by Carin Goodall, Meteorologist

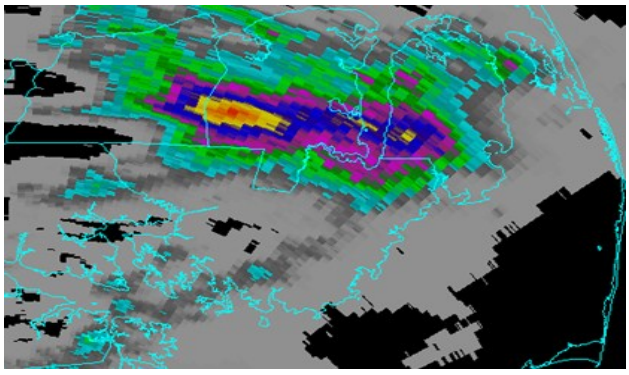
On June 23, 2011, the National Weather Service Office in Newport/Morehead City turned on the upgrade to Dual Polarization capabilities, also known as Dual Pol, to our Doppler Radar. This will greatly enhance our ability to determine, among other things, what type of precipitation is falling, and how fast it is falling. It will also help us better determine if hail in present in a thunderstorm, and possibility improve our ability to decide how big that hail is. Fourteen new radar products are available, helping us to continue to provide our suite of high quality products and services to the people of east central North Carolina.

Our office was a test site for Dual Pol, and we were the second operational site to receive the upgrade, and the first coastal site. The Dual Pol installation is the biggest upgrade to our radar since it was installed in 1994. It took almost two weeks to install the hardware necessary for the upgrade. Between now and the end of this year, all National Weather Service offices across the country will receive this upgrade. Eventually, some of the new products will be available to the public on the National Weather Service web sites. Conventional radars detect data in only one dimension, giving meteorologists an idea of the size of the targets. Dual Pol technology measures the size and shape of the target, eliminating some, but not all, of the uncertainty about the target by sampling it in both the horizontal and vertical dimensions. Here is a brief example of how Dual Pol provided better rainfall estimates in an area where hail was suspected.









The top left picture shows a large cluster of storms. The top right picture is a Dual Pol product known as Hydrometeor Classification; the red is indicating where Dual Pol suspects hail is present. The bottom left picture is a rainfall estimate from conventional Doppler radar. The bottom right frame shows rainfall estimation from the Dual Pol algorithm. Dual Pol has recognized that hail is present in the eastern area of storms, and has taken that into account when estimating how much rain has fallen. Observations in the area indicated that the Dual Pol rainfall estimates was more accurate than the conventional estimate. This is an example of only one benefit we expect to receive from this exciting upgrade to our radar.

NATIONAL WEATHER SERVICE ON FACEBOOK

by Lara Pagano, Meteorologist

Over the last several years, the way the National Weather Service communicates information and alerts to the general public has dramatically changed. While the once pioneered Weather Radio is still in use and continues to play a large role in the dissemination of information, especially for watches and warnings, it is the newly developed outlets such as Facebook and Twitter that have rapidly gained mass attention. Therefore, in an effort to utilize all communication outlets, the Morehead City office will now also communicate to our community through Facebook. Facebook is a social networking website, which began as a tool for users to connect with schoolmates. However, over the years Facebook has developed into a hub of breaking and sharing news and alerts. National Weather Service offices across the country now have a public Facebook page which allows viewers to receive up-to-date information on the past, present and future state of the weather. In addition, our viewers can aid in forecast accuracy and verification by submitting observations in the form of photos and measurements while also interacting directly with Meteorologists on station. Through a survey conducted after a recent Severe Weather outbreak, we have gained evidence that notification through Facebook increases public awareness. As Facebook grows, the office too hopes to reach more individuals within the County Warning Area to promote public preparedness and awareness. Find us today on Facebook!!

The Newport / Morehead City National Weather Service Facebook Page

LIGHTNING SAFETY

By Chris Collins, Meteorologist

Of all the weather types associated with thunderstorms – hail, tornadoes, floods, etc – lightning is the most dangerous. In the United States there are an estimated 25 million cloud to ground lightning flashes each year and each one is a potential threat to life and property. During the past 10 years there has been an annual average of 44 lightning fatalities in the United States. As thunderstorm season approaches, it is time to educate ourselves on the dangers of lightning.

Lightning Fast Facts:

- If you can see it or hear it, lightning can hit you. Find shelter now.
- The primary rule for lightning safety: **When Thunder Roars, Go Indoors!**
- Lightning is the number two weather killer in the United States (behind floods), killing more than hurricanes and tornadoes combined.
- Lightning kills 44 people in the U.S. each year and inflicts severe life-long debilitating injuries on at least a 1000 people annual.
- Every 5 seconds between flash and boom is a mile's distance from you.
- Under ideal conditions, lightning's thunder can be heard 12 miles away.
- Lightning is really no wider than a few inches.
- "Bolts from the Blue" – These lightning flashes have been documented to travel more than 25 miles away from the thunderstorm cloud. Clear skies above you are no indication of how dangerous a nearby storm is!
- The air within a lightning strike can reach 50,000 degrees Fahrenheit.
- Lightning can heat its path five times hotter than the surface of the sun.
- One ground lightning stroke can generate between 100 million and 1 billion volts of electricity.

Lightning Safety Facts

- The "30-30 Rule" offers easy to follow lightning safety guidance. When you see lightning, count the time until you hear thunder. If that time is 30 seconds or less, the thunderstorm is close enough to be dangerous. Seek shelter. If you can't see the lightning, just hearing the thunder is a good back-up rule. Wait at least 30 minutes after the lightning flash before leaving shelter.
- No place outside is safe during a thunderstorm!
- A house, or other fully enclosed building with wiring and plumbing offers your best protection against lightning. Once inside stay off of corded telephones, computers and other electrical appliances and stay away from sinks, showers, indoor pools and other plumbing. Don't watch lightning from windows or doorways. Inner rooms are safer.
- A car with a metal roof and sides is your second best protection against lightning. As in a house, don't touch any conducting paths leading outside. It is the metal shell that protects you, not the rubber tires. Lightning causes about $5 billion of economic impact in the U.S. each year!

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COCORAHS IN NORTH CAROLINA

Residents of North Carolina are encouraged to participate as volunteer weather observers by measuring rain, snow and hail through the CoCoRaHS Program. So, what is CoCoRaHS? CoCoRaHS began at the Colorado Climate Center at Colorado State University in 1998 in response to the damaging Fort Collins flood in 1997. North Carolina became the 21st state to join the CoCoRaHS network in September 2007. Roughly 400 volunteer observers consistently report their daily precipitation across North Carolina. CoCoRaHS stands for Community Collaborative Rain, Hail and Snow Network.

The CoCoRaHS network is looking for enthusiastic volunteers to report rainfall, snowfall and hail information. You can let the National Weather Service, media, researchers, farmers, emergency managers and a wide range of other users know how much rain, hail, or snow was observed in your backyard or schoolyard by joining the program. If you would like to contribute valuable precipitation information unique to your location, then this program is for you!

Observers record precipitation information using the recommended 4 inch rain gauge and enter their observations onto the CoCoRaHS webpage. This program will help a variety of users view and study the variability of precipitation across North Carolina. The accumulated precipitation data will be available to anyone using the web. Become a piece of the meteorological puzzle and join the other 10,000 plus volunteers from across the nation by becoming a CoCoRaHS observer. Please visit the CoCoRaHS website at http://www.cocorahs.org to learn more about the program or become an observer.

To report adverse weather conditions 24/7, please call us at:

1-800-889-6889