

# Changing Skies Over Central North Carolina

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NOAA'S NATIONAL WEATHER SERVICE RALEIGH, NC

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## El Niño Hibernating This Winter

The western half of the continental U.S. and central and northern Alaska could be in for a warmer-than-average winter, while most of Florida might be colder-than-normal December through February, according to NOAA's annual Winter Outlook announced today from the agency's new Center for Weather and Climate Prediction in College Park, Md.

Forecasters with NOAA's Climate Prediction Center say a wavering El Niño, expected to have developed by now, makes this year's winter outlook less certain than previous years. "This is one of the most challenging outlooks we've produced in recent years because El Niño decided not to show up as expected," said Mike Halpert, deputy director of NOAA's Climate Prediction Center. "In fact, it stalled out



last month, leaving neutral conditions in place in the tropical Pacific."

When El Niño is present, warmer ocean water in the equatorial Pacific shifts the patterns of tropical rainfall

that in turn influence the strength and position of the jetstream and storms over the Pacific Ocean and United States. This climate pattern gives seasonal forecasters confidence in how the U.S. winter will unfold. An El Niño watch remains in effect because there's still a window for it to emerge.

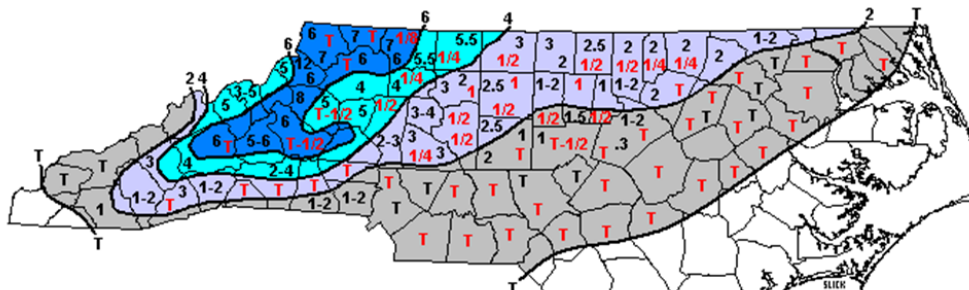
Other climate factors can influence winter weather across the country. Some of these factors, such as the North Atlantic Oscillation, a prominent climate pattern, are difficult to predict more than one to two weeks in advance. The NAO adds uncertainty to the winter outlook in the Northeast and Mid-Atlantic portions of the country.

Areas ravaged by extreme  
(continued on page 7)





## Remembering the December 2002 Winter Storm



### 04 December 2002 Event

Map shows snow accumulation in black (inches) & sleet accumulation in red (inches)

- Snow/Sleet accumulation of a trace to 2 inches
- Snow/Sleet accumulation of 2 to 4 inches
- Snow/Sleet accumulation of 4 to 6 inches
- Snow/Sleet accumulation of 6 inches or more

Data analysis - Phillip Badgett  
Graphic - Jonathan Blaes  
and Brandon Vincent  
NWS Raleigh, NC  
[www.erh.noaa.gov/rah](http://www.erh.noaa.gov/rah)

The winter storm of December 4th and 5th, 2002 was memorable for the ice and snow accumulations that lead to widespread damage and power outages

temperatures, with readings ranging from  $-2^{\circ}\text{F}$  to  $5^{\circ}\text{F}$ .

The cold front pushed south through South Carolina and eventually stalled near the Georgia/Florida border. Meanwhile, a second low pressure system formed near Louisiana and tracked east-northeast along the front. With the aid of upper level forcing to the west, precipitation broke out across the Tennessee Valley and Southeast U.S. as the low pressure system moved to the Carolina Coast on December 4th. With precipitation spreading across the dry airmass in place over the Carolinas, evaporational cooling

midday on December 5th, with 6 to 12 inches of sleet and snow ultimately reported along the Blue Ridge Mountains. Freezing rain was more prevalent over the Piedmont, where one quarter to as much as three quarters of an inch of ice accumulated. As is often the case with this magnitude of icing, there were tremendous impacts from downed trees and powerlines, along with hazardous travel conditions. In fact, Duke Power, at the time, reported the storm to be the worst in the 100-year history of the company, with over 1.5 million customers losing power. Many schools were forced to close for multiple days while power was restored and road conditions improved. While these types of events are rare in the Raleigh area, it is a good reminder of what is capable of happening during a significant winter event in Central NC.

**-Barrett Smith**



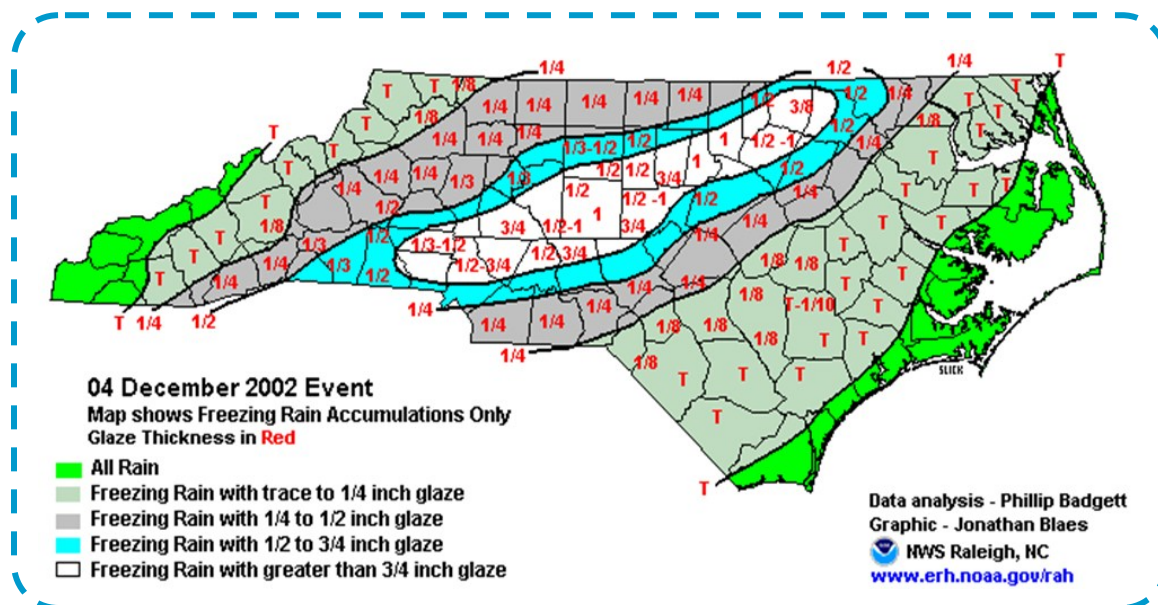
Ice in Raleigh During the December, 2002 Winter Storm

across the Carolinas. A cold front that crossed North Carolina overnight on December 2nd was followed by a very cold and dry arctic airmass moving into the area on December 3rd. While temperatures behind the front fell into the 20s, the main culprit leading to significant icing was plummeting dewpoint

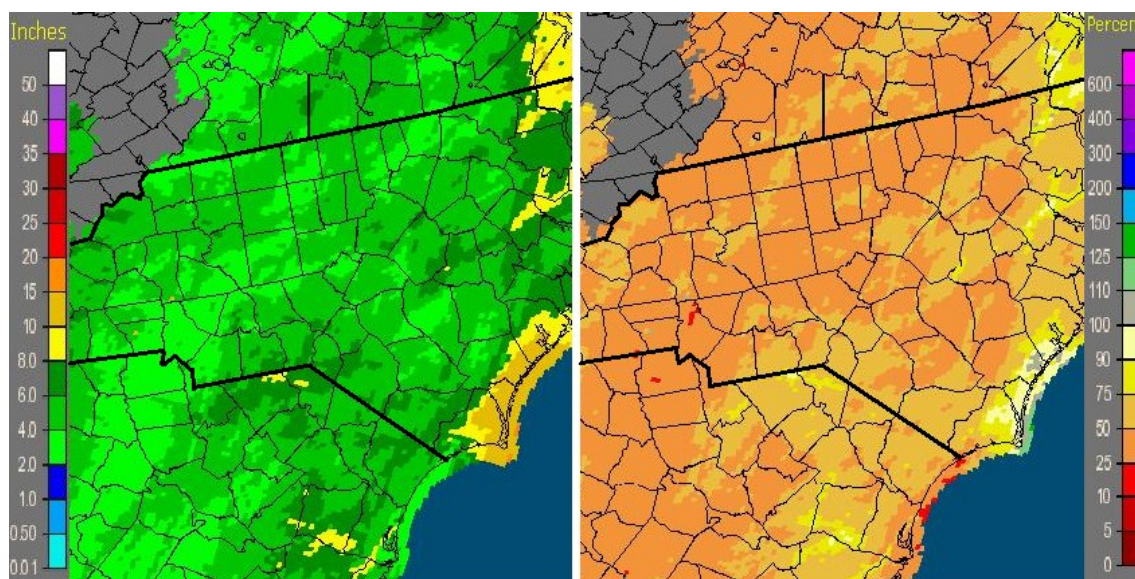
(which occurs when the evaporation of liquid precipitation falling into dry air leads to cooling of the surrounding air) locked in a shallow dome of cold air that could support a mix of snow, sleet, and freezing rain. Precipitation continued through the night and slowly came to an end by







## Drought Creeping Back Into Central North Carolina

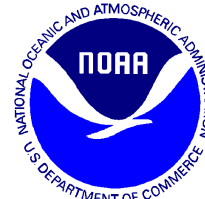


Fall Rainfall, 9/21-12/21, 2012 (left) and Percent of Normal Fall Rainfall 9/21-12/21, 2012 (right)

Rainfall was sparse across central North Carolina throughout the fall, and none of the area received as much as 75% of normal rainfall. In fact, the majority of central NC received less than half the rainfall that would normally be expected for the 3-month period.

The water level in Falls Lake, the major water supply reservoir for Raleigh, has been in a slow, but steady decline since mid-September, and was a little more than a foot below the target level on Dec 21. Inflows into the lake fell off dramatically, and inflows for November

and December (to date) with both ranking in the top 5 for lowest monthly inflows for its 85 year period of record. Lake Jordan, the water supply reservoir for much of the remainder of the Triangle, has fallen 3 feet this fall to about 2.5 feet below (Continued on Page 6)





# Winter Weather Safety Tips

Winter weather preparedness week this year was from November 25th through December 1st. We will go through a quick review of the topics discussed during that time and highlight some important winter weather safety tips and how to be prepared.

The following are a few important winter weather definitions. Winter weather advisories are issued when 1 to 3 inches of snow,

or ice accumulations of  $\frac{1}{4}$  of an inch or more, are likely within 24 hours.

Winter storm watches are issued when at least 3 inches of snow and/or ice accumulation of  $\frac{1}{4}$  inch or more in a 12-24 hour period are possible

within 24-48 hours. Winter storm warnings are issued when at least 3 inches of snow, or ice accumulations of  $\frac{1}{4}$  inch or more are likely within 12-24 hours.

Automobile Safety:

When snow falls and roadways become dangerous, you should only travel when absolutely necessary. Staying off the road during snow and ice also allows DOT crews time to clear and treat road surfaces. If you must venture out, here are some travel tips.

1. Make sure your car is in good running condition.  
2. Inform someone of where you're headed and when you plan to arrive. Take a cell phone if possible.

3. Clean snow and ice off ALL parts of your car before you drive away, including the roof.

4. Keep your gas tank as full as possible when snow and ice are forecast.

5. Keep the following basic items in your car: windshield scraper and brush, jumper cables, a tow chain or rope, a bag of sand or salt, blankets, flashlight, first aid kit, and a road map. Bringing a bottle of water and snack may also be a good idea in case you become stranded in your vehicle.

6. Drive slow.

7. Steer your car into the skid if your car begins to skid. Never hit your brakes as this will result in a more serious skid and spinning of the vehicle.

8. Keep your cool and remain calm.

If you get stranded on the road:

1. Stay in your car. Do not seek alternate shelter unless it is close by and already visible.
2. Periodically turn the car on for brief periods to warm the inside of the vehicle. To prevent a buildup of carbon monoxide gas, clear the exhaust pipe of snow and leave a downwind window slightly open for ventilation.
3. Make yourself visible by tying a colored cloth to your antenna or door, or by turning on your dome light when running the engine.

**Home/Indoor Safety:**  
Severe winter storms produce conditions which can isolate you in your home for several days, with possible loss of power and telephone services. In severe winter storms, obtaining supplies, food, and other necessities can be hampered or prevented. The following are some helpful tips to make your home a safe haven during winter weather.

1. Stock an emergency supply of food, water, necessary medicines, and baby items prior to the onset of a winter storm. Include non-perishable

## Injuries Related to Cold

- 50% happen to people over 60 years old
- More than 75% happen to males
- About 20% occur in the home



Hypothermia occurs when the extremities are excessively cold (blue)



Improperly warming the body will drive cold blood from the extremities to the heart, leading to heart failure







foods and those that do not require cooking.

2. Have the following supplies available: flashlight, battery powered radio, extra batteries, and a first aid kit.

3. Prevent water pipes from freezing by wrapping them with insulation or newspaper covered with plastic. You could also let your faucets drip slightly to help avoid freezing.

4. Keep an adequate supply of heating fuel at your home. Use the fuel properly and sparingly to avoid deadly fires.

5. Keep generators well away from the home, and never run a generator inside the house, garage, or any other enclosed area. The carbon monoxide gas that is produced is colorless and odorless, but deadly if built up inside an enclosed space.

6. Never heat your home using a charcoal grill, gas grill,

or camp stove. They are made for outdoor use and are hazardous when used indoors.

7. Be extremely careful when using candles. Be sure to inspect fireplaces and wood stoves prior to expected winter weather. Only burn wood, not paper, and do not hang anything from your fireplace while in use.

House fires can be a real danger during winter storms,

so have an evacuation plan and outdoor meeting place. Check all smoke detectors and have a fire extinguisher on hand.

Being prepared also means having the necessary information to make the right decision. You can keep up with winter forecasts, warnings, and advisories by visiting the Raleigh NWS online at <http://weather.gov/raleigh>.

**-Kathleen Carroll**

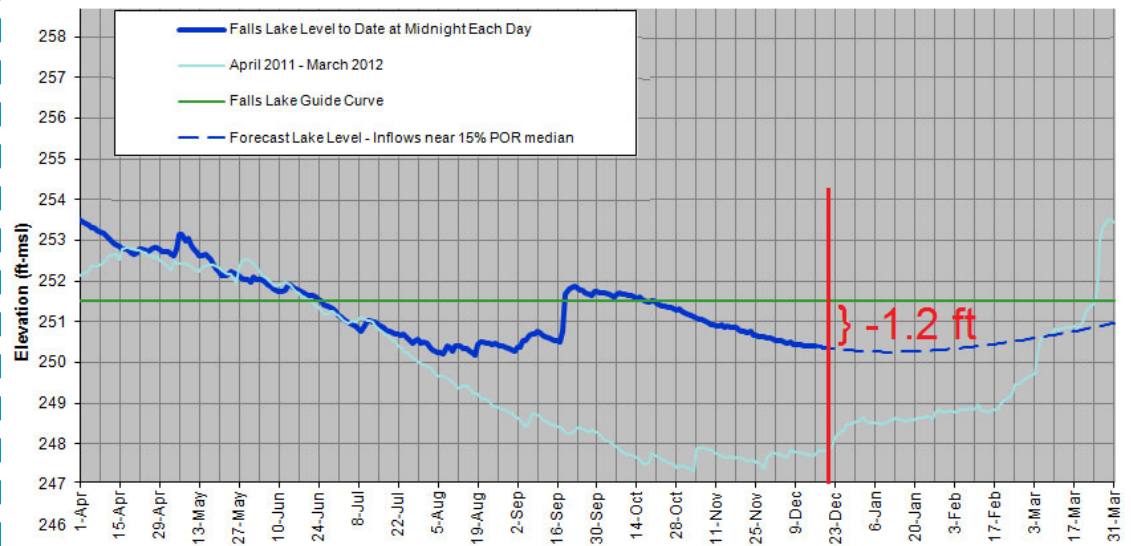


Raleigh Snow March 2009





## Drought Returns (continued from page 3)



Drought Conditions Across North Carolina for September 21 (left) and December 21 (right)

the target level. Even more ominous are the record low inflows into Jordan, with both November and December to date ranking as the lowest monthly inflows for its 83 year period of record.

Streamflows have shown steady decline this fall as well, and average flows for the month of December to date are nearly all

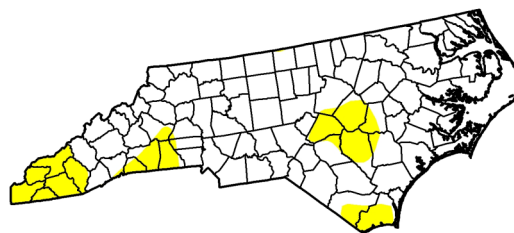
less than 25% of normal, and a number are less than 10% of normal. Drought conditions, as determined by the U.S. Drought Monitor

( <http://droughtmonitor.unl.edu> ) in conjunction with the N.C. Drought Management and Advisory Committee ( <http://www.ncdrought.org> ), have been steadily deteri-

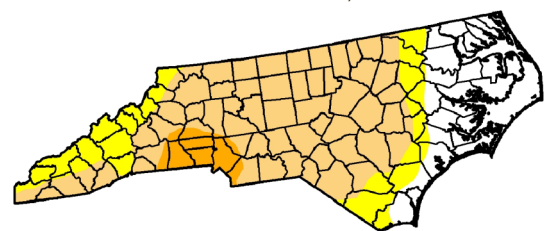
orating and expanding this fall as well. As of December 21st, severe drought conditions have been declared in the southwest (Charlotte area), while there is some level of drought over all of the state west of Interstate 95. More than half of the state now suffers from moderate drought conditions.

**-Michael Money Penny**

September 21, 2012



December 21, 2012



Drought Severity

D0 - Abnormally Dry  
D1 Drought - Moderate

D2 Drought - Severe  
D3 Drought - Extreme

D4 Drought - Exceptional

Drought Conditions Across North Carolina for September 21 (left) and December 21 (right)



## Winter Outlook (continued from Page 1)

drought over the past year **are** unlikely to see much relief from drought conditions this winter.

In the 2012 U.S. Winter Outlook (December through February) odds favor:

Warmer-than-average temperatures in much of Texas, northward through the Central and Northern Plains and westward across the Southwest, the Northern Rockies, and eastern Washington, Oregon and California, as well as the northern two-thirds of Alaska.

Cooler-than-average temperatures in Hawaii and in most of Florida, excluding the panhandle.

Drier-than-average conditions in Hawaii, the Pacific Northwest and Northern California, including Idaho, western Montana, and portions of Wyoming, Utah and most of Nevada.

Drier-than-average conditions in the upper Midwest, including Minnesota, Wisconsin, Iowa and northern Missouri and eastern parts of North and South Dakota, Nebraska, Kansas, and western Illinois.

Wetter-than-average conditions across the Gulf Coast states from the northern half of Florida to eastern Texas. The rest of the country falls into the "equal chance" category, meaning these

areas have an equal chance for above-, near-, or below-normal temperatures and/or precipitation.

This seasonal outlook does not project where and when snowstorms may hit or provide total seasonal snowfall accumulations. Snow forecasts are dependent upon the strength and track of winter storms, which are generally not predictable more than a week in advance.

**-NOAA**

## 2012 SKYWARN Recognition Day

On December 1, 2012, the National Weather Service in Raleigh participated in the 14th annual SKYWARN Recognition Day (SRD) with members of Central Carolina SKYWARN. SRD was developed in 1999 by the National Weather Service (NWS) and the American Radio Relay League (ARRL). It celebrates the contributions that volunteer SKYWARN radio operators make to the NWS. During the recognition day, SKYWARN amateur radio operators visit NWS offices and contact other radio operators across the world. While not an amateur radio contest, different certificates are awarded to radio operators depending on the number of NWS offices contacted.

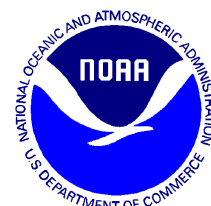
This 24 hour event, which is based on Universal Time Coordinated time, ran from 7 PM EST Friday, November 30, 2012, through 7 PM EST Saturday, December 1, 2012. Members of Central Carolina SKYWARN began preparing for the event Friday afternoon, setting up antennas and radios at the NWS Raleigh office. Numerous radio contacts were made at the start of the event Friday evening, with the bulk of the contacts made during the period starting early Saturday morning through the end of the event Saturday evening. As for the number of radio contacts made, it was the best year ever for the NWS Raleigh and the Central Carolina SKYWARN members. In all, 261 radio contacts were made, including

contacting 57 other NWS offices and 45 different states!

In addition to making radio contacts, during the day Saturday the NWS Raleigh hosted a total of 13 SKYWARN volunteers and amateur radio friends. The group enjoyed pizza and refreshments and great fellowship. The Central Carolina SKYWARN leadership, which includes Virginia Enzor, NC4VA – Emergency Coordinator, Bob Woodson, WX4MMM – Assistant (Continued on Page 10)



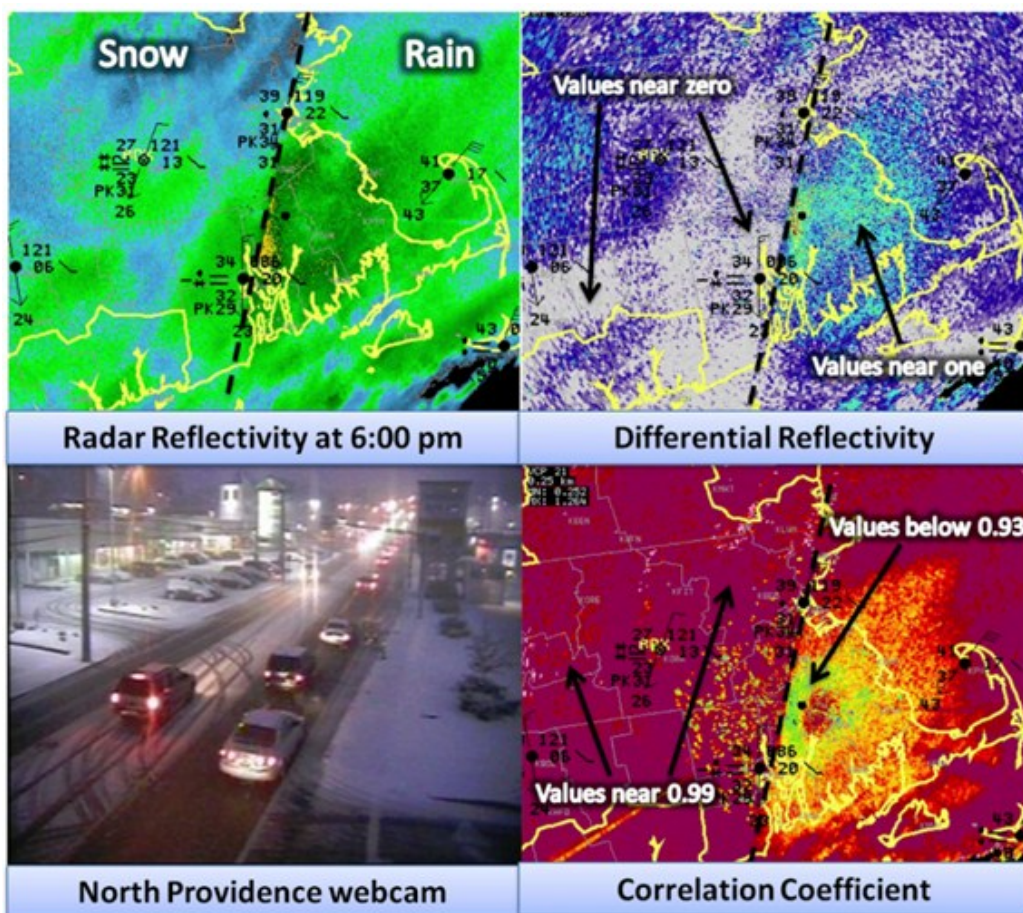
**2012 SKYWARN Recognition Day Participants**







## Dual Polarization Radar Installed at WFO Raleigh



The National Weather Service (NWS) Raleigh WSR-88D Doppler radar located in Clayton, NC was upgraded to dual-polarization (dual-pol) technology in early November 2012. This is a very exciting development which will result in improved products and services provided by the NWS.

Previously, NWS radars provided information primarily on precipitation intensity and movement. Dual-polarization technology adds the ability to sense the size and shape of objects in

the atmosphere. This will enable meteorologists to make numerous advances in forecasting and warning capabilities such as:

Improved accuracy in identifying precipitation types. This will lead to more accurate winter weather forecasts, especially during times of mixed precipitation.

Improved precipitation estimates. This will lead to more accurate flash flood warnings and river forecasts.

Improved detection of non-

precipitation targets. This will allow forecasters to focus on real precipitation radar targets.

Improved hail detection. The new radar products will lead to increased confidence in the presence and size of hail in strong to severe thunderstorms.

In some cases, the ability to help confirm that a tornado has touched down and is causing damage by detecting lofted tornado debris.

We expect that the new dual polarization technology will





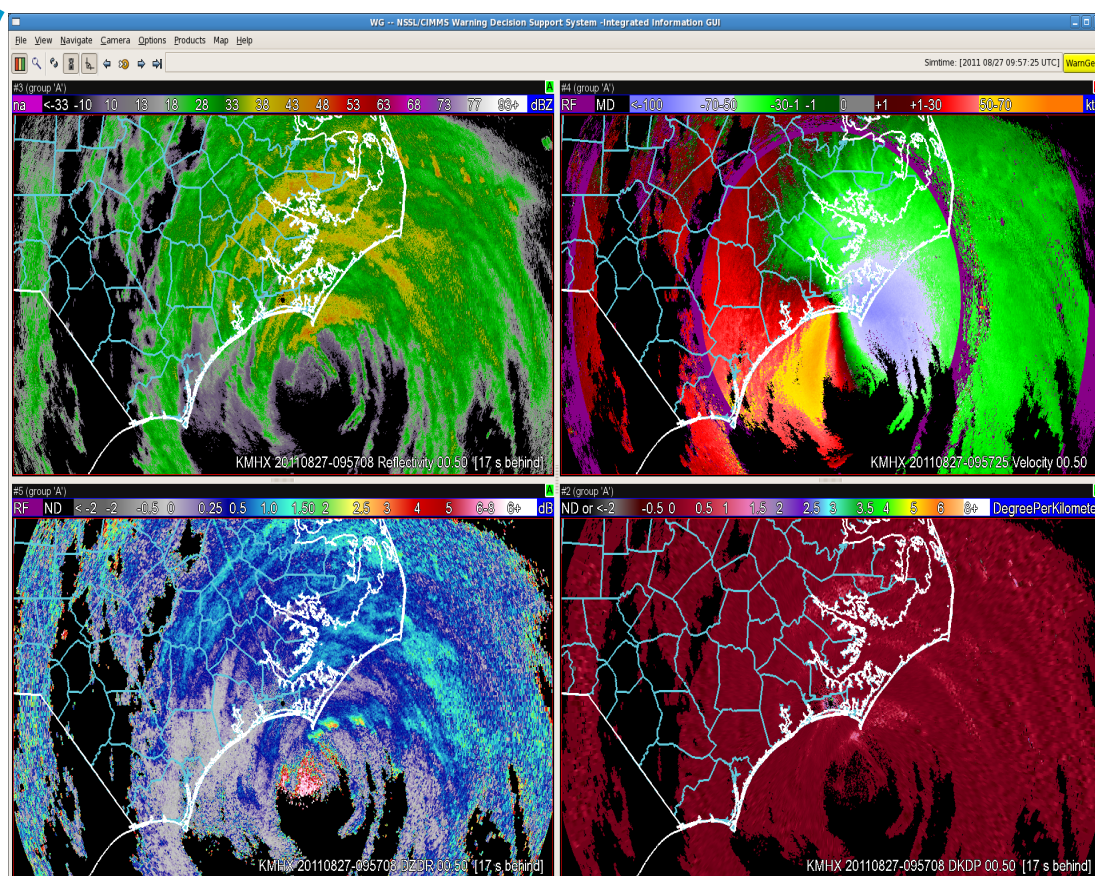
be a tremendous resource this winter to more accurately identify precipitation types such as snow, sleet, freezing rain, rain, or some sort of mixture. Forecasters will use a handful of new radar products along with an understanding of the environment and physical processes to determine the likely precipitation type.

The image below demonstrates how NWS meteorologists in Boston MA on 7 November 2012 used new dual-pol radar products to identify the rain/

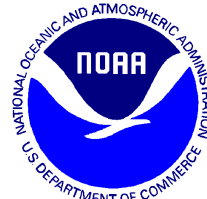
snow line. The correlation coefficient product in the lower right shows a marked discontinuity consistent with the rain/snow line. Rain or mixed rain and snow was shown in the yellow and orange shading which is indicative of mixed precipitation of varied size while all snow was shown further west in the uniform purple shading indicative of consistent precipitation type. The differential reflectivity product shown in the upper right showed a likely area of snow with a shading of gray and purple

west of the dashed line indicating a spherical hydrometeor shape typical of snow. Larger values as shown in the blue and green shading noted a shape more typical of rain drops. With this information in mind, the precipitation west of the line was identified as snow, while east of the line the precipitation was largely rain. This was consistent with the limited surface observations available and with a subsequent web cam image.

**-Jonathan Blaes**



**Dual Polarization Radar Imagery During Hurricane Irene From Morehead City, NC**





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## **SKYWARN Recognition (continued from Page 7)**

Emergency Coordinator, and Scott Lewis, KJ4BPV – Assistant Emergency Coordinator, was presented with certificates of appreciation in recognition of their valuable contributions to the NWS Raleigh SKYWARN program. Finally, all of the SKYWARN volunteers who attended and helped with the 2012 SRD event were also recognized.

Central Carolina SKYWARN, as well as the members of Triad SKYWARN, are integral parts of the SKYWARN community and

the National Weather Service's life-saving mission. Part of the severe weather warning success of the NWS Raleigh office, year after year meeting severe weather warning accuracy, false alarm and lead time goals of the Government Performance and Results Act, can be attributed to the tireless efforts of the amateur radio operators of Central Carolina SKYWARN and Triad SKYWARN.

**-Nick Petro**

<http://www.erh.noaa.gov/rah/skywarn>

## **Senior Forecaster Ron Humble Retires From**

On September 30, Senior Forecaster Ron Humble retired from the NWS. He worked for the NWS for 30 years, and for the last 18 years he worked in Raleigh. Ron began his NWS career in 1982, stationed at Reno, Nevada. Ron then became a fire weather forecaster in Sacramento, California in 1984. In 1986, he transferred to the NWS office in Tampa, Florida, where he remained until July, 1994. Then, Ron transferred to the Raleigh office and later attained the role of senior forecaster, serving until his retirement.

Ron contributed to many initiatives at NWS Raleigh. Particularly through his programming skills and script development, Ron made forecasting all types of weather much easier for

NWS Raleigh forecasters. For example, Ron developed and updated scripts to allow a variety of meteorological parameters to be available quickly and easily for forecasting maximum and minimum temperatures, as well as potentially hazardous winter weather events. His atmospheric thickness forecasting scripts and temperature verification reports were shared throughout Eastern Region and are known as best practices for more accurately forecasting maximum and minimum temperatures throughout the year.

As an important service to customers, a program Ron developed has reduced NOAA Weather Radio cycle time during high impact weather events, helping ensure that the most critical, all

-hazards information is broadcast at a high frequency. Ron has also been a major contributor to science initiatives, and the ability of the Raleigh staff to quickly and accurately share historical information with customers and partners, through scripts that gather, archive, and plot a wide variety of data. All of us at the NWS in Raleigh have been positively impacted by Ron's assistance and advice when it comes to problems with or making enhancements to office hardware and software, ultimately making the workload easier for all.

We certainly wish Ron the best as he begins the next phase of his life, and we wish his entire family well.

**-Darin Figurskey**

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