



# Changing Skies

## Over Central North Carolina

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NOAA'S NATIONAL WEATHER SERVICE RALEIGH, NC

### INSIDE THIS ISSUE:

Katie Dedeaux 2  
NER Employee of the Month

Day After 3  
Christmas Storm Remembered

Ready NC 4

Staff Changes 6

CSTAR 8  
Research



# GOES-R: The Birth of a Satellite



The GOES-R spacecraft "body" (lower portion) is mated with the "brain" of the satellite in the clean room of Lockheed Martin near Denver, Colorado, on Sept. 6. Photo Credit: Lockheed Martin

The two main components of NOAA's GOES-R Satellite have recently come together. The System Module and Core Module subassemblies were successfully joined and now form the GOES-R spacecraft. This is an important milestone in the development of the satellite, as it merges together the elements that form both the 'brain' and the 'body' of the satellite that will be launched in early 2016. The Geostationary Operational Environmental Satellites – R Series (GOES-R) is the next generation of geostationary Earth-observing systems.

This process brings together these two primary subassemblies of the satellite before the GOES-R spacecraft begins

environmental testing later this year. More than 70 electronics boxes mounted within the System Module provide the functionality to operate the spacecraft and its six instruments. The Core Module forms the main central structure of the satellite and carries the propellant needed to maneuver the spacecraft after it is separated from the launch vehicle and operational in geostationary orbit.

"The successful completion of the System and Core Module mate is a key benchmark for GOES-R as we press forward in the development of the spacecraft for launch," according to Greg Mandt, NOAA system program director for the GOES-R Se-

ries Program. "So many members of our team have worked hard to make this milestone possible."

With the instruments successfully joined, the GOES-R Series Program team will move forward with the integration of the Earth Pointing Platform (EPP) onto the spacecraft. The EPP will support the Advanced Baseline Imager (ABI) and Geostationary Lightning Mapper (GLM) instruments, as well as the star trackers and inertial measurement units used to precisely measure the attitude and location of the satellite in space.

The GOES-R Series will be more advanced than NOAA's current GOES fleet. The satellites are expected to more than double the clarity of today's GOES imagery and provide more atmospheric observations than current capabilities with more frequent images.

The advanced spacecraft and instrument technology on the GOES-R Series satellites will result in more timely and accurate weather forecasts for NOAA's National Weather Service. It will improve support for the detection and observations of meteorological phenomena, including (continued on page 7)



## Dedeaux Awarded with Eastern Region Employee of the Month

Raleigh forecaster Katie Dedeaux was honored as the National Weather Service's (NWS) Eastern Region Employee of the Month for September. As the NWS Raleigh aviation focal point, Katie has conducted excellent aviation outreach. Following successful aviation focus group meetings held at NWS Raleigh in

to the discussion because they help pilots better interpret the meaning and any uncertainties of the aviation forecasts.

From contacts made at the focus group meetings, considerable aviation outreach occurred during August and

bers were able to interact with FAA personnel, better understand the needs of air traffic controllers regarding aviation forecasts and basic aviation coordination, and see the actual information available to tower personnel in advance of hazardous weather. Our forecasters were also reminded of the value of notifying tower personnel of strong and severe thunderstorms in the area. Even though tower personnel have the capability to recognize most hazardous weather in the area, the notifications by our forecasters help the tower personnel's situational awareness.



**Katie Dedeaux, Journeyman Forecaster at NWS Raleigh**

The overall aviation outreach program has been very good at NWS Raleigh, expanding from annual visits to towers and TRACONs, to focus group meetings where pilots learn directly from NWS forecasters and where forecasters gain valuable feedback from pilots, and including innovative opportunities to show forecasters how weather affects pilots. The interactions help in aviation forecasting for central North Carolina. Statistics show that NWS Raleigh again exceeded aviation forecasting goals in fiscal year 2014, with some of the statistics being the best in recent memory. For her aviation outreach leadership, Katie was worthy of the honor of being Eastern Region Employee of the Month for September.

**-Darin Figsrkey**

the fall, 2013, and coordinated through the North Carolina representative of the Federal Aviation Administration's (FAA) Flight Standards District Office (FSDO), Katie helped host another successful aviation focus group meeting at the Raleigh office on May 31. Among the combined notes from the workshops, customers expressed praise for the accuracy of the NWS Raleigh aviation forecasts. There was a good following among general aviation pilots of the aviation part of the NWS Raleigh forecast discussion, with pilots liking confidence factors added

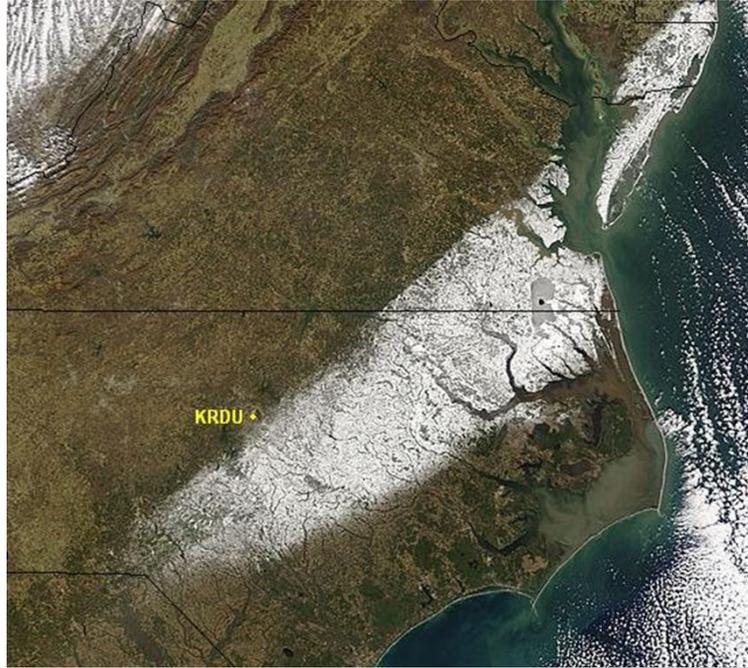
September. Tours at a local flight simulator school were scheduled by Katie to allow NWS Raleigh forecasters the opportunity to see just how weather affects pilots, especially during takeoff and landings, but also while in the air where thick cloud cover can be very disorienting. Raleigh forecasters gained a new appreciation for just what it means when adverse aviation conditions occur. In addition, Katie led tours of the air traffic control tower and terminal radar control (TRACON) at Raleigh-Durham International Airport, in which staff mem-



# Remembering the “Day After Christmas” Winter Storm

Ten years ago, a quick hitting winter storm in late December, 2004 left a mix of freezing rain, sleet and snow across portions of central and eastern North Carolina. The storm missed Christmas Day by just one day, which would have been a rare treat for residents of the area. Instead, it was labeled by some as the “Day After Christmas” storm, with the heaviest wintry precipitation falling on December 26th. Forecasters saw signs of the impending winter storm upstream on Christmas Eve when an unprecedented snow fell across parts of southern Texas. The storm system would then cross Florida and move northeast along the East Coast over the next two days. The eventual track of the low pressure center stayed well offshore, which kept precipitation from reaching many areas across western North Carolina that typically get winter weath-

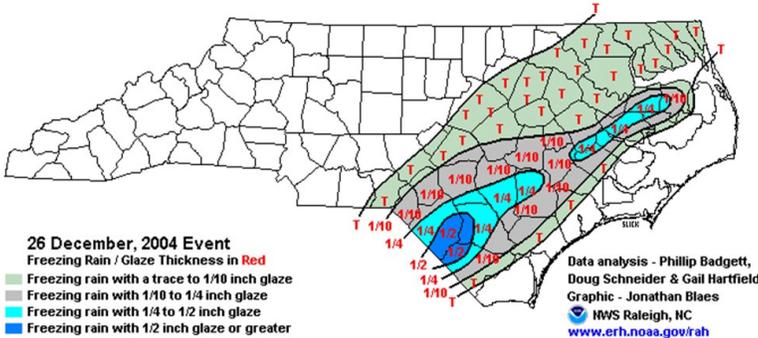
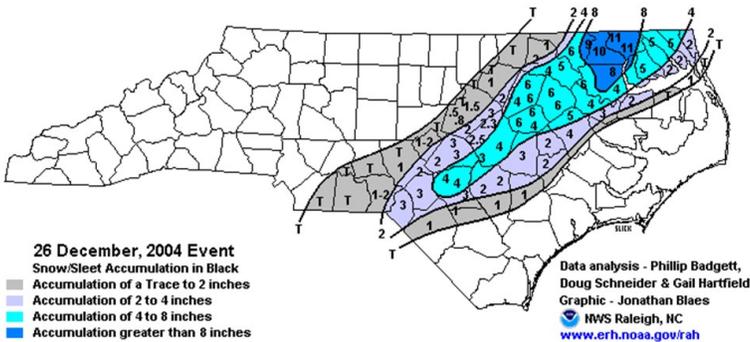
er. However, where precipitation did fall, temperature profiles were still supportive of frozen precipitation. The type of precipitation (freezing rain, sleet or snow) was largely dictated by the rate at which it fell, a common occurrence when there is no continuous supply of cold air into the region. The heavier the precipitation rate, the more likely it is to overcome any warm air above the surface, and the better the chance of snow. Across the southern Coastal Plain,



MODIS satellite image showing snow cover on Dec. 26th, 2004

where there was more warm air aloft, freezing rain was dominant and up to a quarter of an inch was observed. As precipitation spread further north, increasing intensity and more favorable temperatures allowed snow to be dominant. In total, four to eight inches of snow fell from the Raleigh area northeast toward Roanoke rapids, with some areas getting nearly a foot of accumulation! The resulting narrow band of snow accumulation made for a remarkable visible satellite image (MODIS) with snow cover stretching from Fayetteville to the Virginia Tidewater region. No doubt many around the state will be crossing their fingers, hoping to see a similar image this holiday season.

-Barrett Smith





*“The first step is to write a plan, which should be a thought-out list of whom to call, where to meet and any special considerations that may need to be addressed.”*



## ReadyNC helps to Battle the Winter Weather Blues



North Carolina encounters unpredictable weather during the winter months. In early 2014 there were four winter storms within weeks of each other that dumped inches of snow, sleet or freezing rain, causing an unprecedented number of accidents and school cancellations. Single digit temperatures were also reported in many areas of the state.

Due to the proximity to the Appalachian Mountains, Atlantic Ocean, Gulf Stream and Gulf of Mexico, North Carolina can experience a variety of winter weather patterns that provide a mixed bag of precipitation. Climatology suggests that each year 6 to 12 winter weather events, defined by the occurrence of measurable snow, sleet, freezing rain, and/or cold rain, occur across the Piedmont of North Carolina. Coastal regions typically experience fewer than four events per year.

“Winter storms are known as deceptive killers because they cause power outages, downed trees, traffic jams and accidents that leave lasting impacts on the state,” said

North Carolina Emergency Management Director Mike Sprayberry. “Most deaths are not directly related to the storm; instead, people die in traffic accidents on icy roads or of hypothermia from lengthy



exposure to cold. Three easy steps will help anyone get ready for an emergency. You need to create a plan, make a kit and stay informed. Following these simple actions will help you be ready before an emergency occurs and help keep you safe.”



Photo credit: NC Division of Parks and Recreation by M. Windsor

The first step is to write a plan, which should be a thought-out list of whom to call, where to meet and any special considerations that may need to be addressed. Once you have a plan in place, build an emergency supplies kit for your home and your car. Besides the standard items – non-perishable food and water for each person for four to seven days, medications, and important papers – you should also include rock salt, sand, snow shovels, extra warm clothes and blankets. Ensure a flash light, battery operated radio, extra batteries, and a first-aid kit are on hand. Finally, pay attention to the weather forecast and stay informed about potential storms.

During the cold winter months, be aware that carbon monoxide poisoning can occur from improper heating. The colorless, odorless carbon monoxide gas can be deadly and is produced from fuel-burning appliances, generators and

heaters. Without proper ventilation, carbon monoxide fumes can accumulate causing headaches, fatigue, shortness of breath, nausea and dizziness. While preparing for winter weather, remember to keep charcoal grills and portable camping equipment outdoors.

Preparations for winter weather are different than those required for hurricanes and floods. To prepare your home for winter weather, add insulation to walls and attics, and keep an adequate supply of heating fuel on hand. Caulk and weather-strip doors and windows and insulate water pipes to keep them from freezing. Remember to keep generators away from the home and have a trained professional ensure proper wiring. Never run a generator in the garage or other enclosed area.

Snow and ice can cause hazardous driving conditions which lead to massive traffic delays. Keep in mind that road conditions can quickly change. When driving in winter weather, remember to:

- Reduce your speed.
- Leave plenty of room between you and other vehicles.



- Approach bridges and overpasses with caution since they often become icy prior to roadways. Do not push your breaks while on a bridge.
- If you begin to slide, take your foot off the gas and turn the steering wheel in the direction of the slide. Do not push the brakes.
- If you need to pull off the highway, set your directional lights to “flashing.”
- Do not go out on foot unless you see a building nearby to take shelter.
- If running the engine to keep warm, crack the window open to prevent carbon monoxide poisoning. Never let everyone in the

car sleep at once. One person should stay awake to watch for rescue crews. Tie a colored cloth to the antenna or door to make yourself visible.

“North Carolinians need to know what to do during a winter weather emergency as weather conditions can rapidly deteriorate,” said Sprayberry. “The ReadyNC mobile application provides the most current traffic and weather information so you can be safe.”

The free ReadyNC mobile app also provides real-time information about opened shelters and riverine flood levels. It also lists phone number for North Carolina power companies to report outages, and provides basic instructions on how to develop an emergency preparedness plan. It is available for both iPhone and Droid devices.

The [ReadyNC.org](http://ReadyNC.org) website also provides information to help you prepare for winter storms, including how to make an emergency supplies kit and what to do during and after winter storms.

**-Laura Leonard**  
**NC Emergency Management**





## Staff Changes at NWS Raleigh



**Ryan Ellis**

Ryan Ellis was promoted to the position of general forecaster at the Raleigh office. Ryan has been at the NWS in Raleigh since January, 2009. In addition to high proficiency in operations, Ryan has led several initiatives at Raleigh, including redesigns of both the office's intranet page and this office newsletter, and conducting research on orographic cirrus outbreaks that has been presented at workshops and shared with other NWS offices. A manuscript on the research is in the final stages of the editing process for publication. In addition, Ryan created a new system for handling tours at the office which has been very successful, and he has been an integral part of aviation outreach as well as Integrated Warning Team workshops in the Triad and Triangle. As satellite focal point, Ryan has been a part of testing and evaluation of

satellite products. Ryan is also a graduate of the Eastern Region Leadership Development Program. The effective date of Ryan's promotion was September 7.

JL Winger, the former Electronics Systems Analyst (ESA) in Caribou,

Maine, transferred to Raleigh as the ESA of our office. JL had been the ESA at Caribou since May, 2009. Prior to going to Caribou, JL was an electronics technician in Jackson, Mississippi for 8 years. JL joined the NWS in Jackson following his work as an electronics technician for a federal contractor in an Air

Force contract in southeast Alabama. In that role, JL worked on the Next-Generation radars (NEXRAD), the Automated Surface Observing Systems (ASOS), and other meteorological equipment.

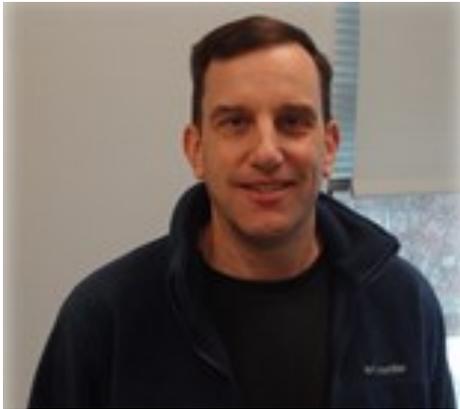
JL also worked as a Production Shift Supervisor and Electromechanical Technician at Sony for 8 years, and he spent 8 years in the U.S. Air Force as an Assistant Non-Commissioned Officer in Charge (ANCOIC) as well as a radar electronics technician. JL has been married for almost 29 years to his wife, Peni, and they have one adult daughter, Kayla, who is recently married and is an Environmental Microbiologist. JL's officially became a part of the Raleigh office October 5.

Finally, electronics technician Todd Billups transferred from our office October 19, taking a position in North Carolina with the Federal Aviation Admin-



**JL Winger**





**Todd Billups**

in Arizona, where he worked as an Airway Transportation Systems Specialist. In that position, he maintained, repaired, and modified radar, communications, weather and automation equipment for the FAA in support of the National Air-space System. Todd was previously in the

specialist and supervisor, and lastly as Quality Assurance Program Chief at Luke Air Force Base in Arizona. Todd was a three-time recipient of the local NWS Isaac Cline Award for Electronics, Engineering, and Facilities, recognizing his constant dedication to service, great communication with the NWS Raleigh staff, and overcoming whatever challenge was placed before him. We'll miss Todd at the Raleigh office, but we certainly wish him and his family well.

**-Darin Figurskey**

istration (FAA). Todd originally came to the Raleigh office in August, 2011 from the FAA

Air Force in various capacities from 1980 through 2001, performing as a radar

## GOES-R: The Birth of a Satellite (from page 1)

severe storms and hurricanes. The enhanced data from GOES-R will directly affect public safety, protection of property, and ultimately, our nation's economic health and development.

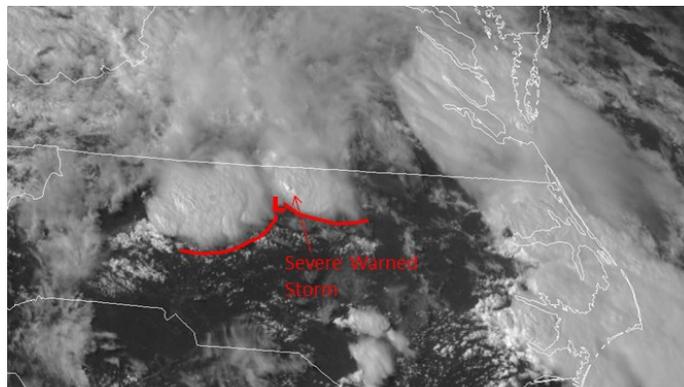
NOAA manages the GOES-R Series Program through an integrated NOAA-NASA program office, located at NASA's Goddard Space Flight Center in Greenbelt, Maryland.

NOAA's mission is to understand and predict changes in Earth's environment, from the depths of the ocean to the surface of the sun, and to conserve and manage our coastal and marine resources.

For more information about GOES-R, visit: [www.goes-r.gov](http://www.goes-r.gov).

### How is NWS Raleigh helping?

The GOES-14 Super Rapid Scan Operations for GOES-R (SRSOR) experiment successfully conducted phase two of its 2014 campaign August 14–28. During this time, special one-minute data sets were collected



**GOES-14 visible image from August 18, showing progression of a boundary along with a surface meso-low near Greensboro, North Carolina.**

for GOES-R algorithm developers, research partners, forecasters and GOES-R Proving Ground participants to assess the utility of the one-minute imagery that will routinely be available from the GOES-R series ABI. An example highlighting the utility of the SRSOR imagery to forecasters was posted to the [Collaboration for Improved Meteorology in the Mid-Atlantic and Southeast blog](#). GOES-14 SRSOR one-minute imagery aided forecasters at the NWS Weather

Forecast Office (WFO) in Raleigh, North Carolina, during severe weather warning operations on August 18. From this example it was noted that the SRSOR imagery increased confidence in warning decisions and ultimately made the process more efficient because evidence was coming in faster than ever before. A GOES-14 SRSOR experiment is planned for May and August 2015 in partnership with the NOAA Testbeds.

**-NASA and GOES-R**





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## New Research Project Starting up at NWS Raleigh

### **N.C. State – NWS Research Project Examining High-Shear Low-CAPE Storms Begins**

Severe weather in environments with large vertical wind shear and marginal instability (so-called “high-shear low-CAPE”, or “HSLC” events) represent a significant high-impact forecasting and warning challenge for the NWS. Most of the severe weather events we experience in central NC during the November through February months qualify as HSLC and many other events that occur in October and March can be considered HSLC as well. A good example of this type of event is described in the [event summary of the March 27, 2009 tornado event](#) available on the NWS Raleigh web site. These types of

environments account for a substantial fraction of severe wind and tornado reports in our region. The long-range goal of the research is to improve predictions and warnings for hazardous weather in HSLC environments.

The project entitled “Improving Understanding and Prediction of High Impact Weather Associated with Low-Topped Severe Convection in the Southeastern U.S.” will be collaboration between principal investigators and students at N.C. State University and a dozen NWS Weather Forecast Offices in the Southeast along with the Storm Prediction Center and the HMT group at the Earth System Research Lab. The three-year project is being funded as a part of the NOAA/NWS Collaborative Science, Technology, and Applied Re-

search (CSTAR) Program. This project will build on previous collaborative research between N.C. State and the NWS which has had very successful research to operation results along with the integration of students into NOAA and the NWS. A workshop in November in Raleigh kicked off the project. The research will be conducted through a set of collaborative research studies including an idealized modeling and emulated radar sampling study, a model resolution and sensitivity study, a predictability study using ensembles and dynamical-statistical downscaling, and an assessment of HSLC forecasting composite parameters.

**-Jonathan Blaes**