



# *Blue Ridge Thunder*



## *Newsletter of the NWS Blacksburg, VA*

Welcome to the Fall 2015 edition of 'Blue Ridge Thunder' the biannual newsletter of the National Weather Service (NWS) office in Blacksburg, VA. In this issue you will find articles of interest on the weather and climate of our region and the people and technologies needed to bring accurate forecasts to the public.

### **Weather Highlight:**

#### **Late September Rain and Flooding**

**Peter Corrigan, Sr. Service Hydrologist**

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Developing drought conditions across much of the area were brought to a dramatic end in late September as persistent heavy rains began around the 24<sup>th</sup> and lasted through the first few days of October. Several stations recorded over 20 inches of rain for the month of September the vast majority of it falling in a 5 to 6-day period. The "bullseye" for rainfall was northern Patrick County, VA where Woolwine COOP picked up an amazing 21.18" for the month, most of it in that last week of September. Initially the rains were persistent but of light to moderate intensity but during the overnight hours of Sep. 28-29 several bands of much heavier rain moved across the VA Blue Ridge and into parts of the New and upper Roanoke basins producing widespread flash flooding across several counties.



**Flash flooding on Sept. 29, 2015 – Montgomery County, VA**

# Summer 2015 Climate Summary

Robert Beasley, Senior Forecaster

The meteorological summer (June through August) of 2015 was on average a warmer than normal season by about 1 to 2 degrees and nearly 2 degrees (1.8° F) warmer than summer of 2014. As was the case last summer, June was the warmest month (relative to normal) of the summer, while August ended up being the coolest. All of the official climate stations saw above normal temperatures on average for the summer season and it was among the top 10 warmest summers on record at several of the sites with shorter periods of record including Bluefield, Blacksburg and Danville (see table below). Despite the overall warm temperatures, there were no extremely hot days as the seasonal highs at both Blacksburg and Bluefield failed to reach 90°F on any day (see table below). This was the 3<sup>rd</sup> summer in a row that no 90-degree days were observed at Blacksburg and the second straight for Bluefield. The number of days reaching 90°F or above was actually slightly below average at Roanoke with 19 days versus the long-term average of 26 days. No climate site even came close to 100°F during the summer of 2015. The biggest factor contributing to the overall warm summer was high overnight temperatures with numerous daily record high minimum temperature records set. Ironically, some of the warmest temperatures of the year occurred after the end of the official summer season in the first few days of September as an extended heat wave brought widespread 90s across the piedmont into the foothills and upper 80s across the mountains.

## Climatological Statistics for Summer 2015 (Jun-Aug)

Climate Site	Average Temperature (Anomaly)	Rank (warmest =1)	Summer Maximum Temp. (°F)	No. of days $T \geq 90^\circ\text{F}$	Total Precipitation (Anomaly)	Station Period of Record
Bluefield, WV	72.9 (+1.2)	5 <sup>th</sup>	88	0	10.76 (-0.81)	1959-2015
Blacksburg, VA	71.8 (+2.1)	t-6 <sup>th</sup>	88	0	11.93 (-0.02)	1952-2015
Roanoke, VA	76.0 (+1.0)	t-17 <sup>th</sup>	94	19	16.45 (+5.02)	1912-2015
Lynchburg, VA	74.1 (+0.4)	t-78 <sup>th</sup>	92	12	11.36 (+0.12)	1893-2015
Danville, VA	77.4 (+0.7)	9 <sup>th</sup>	95	31	18.42 (+6.01)	1948-2015

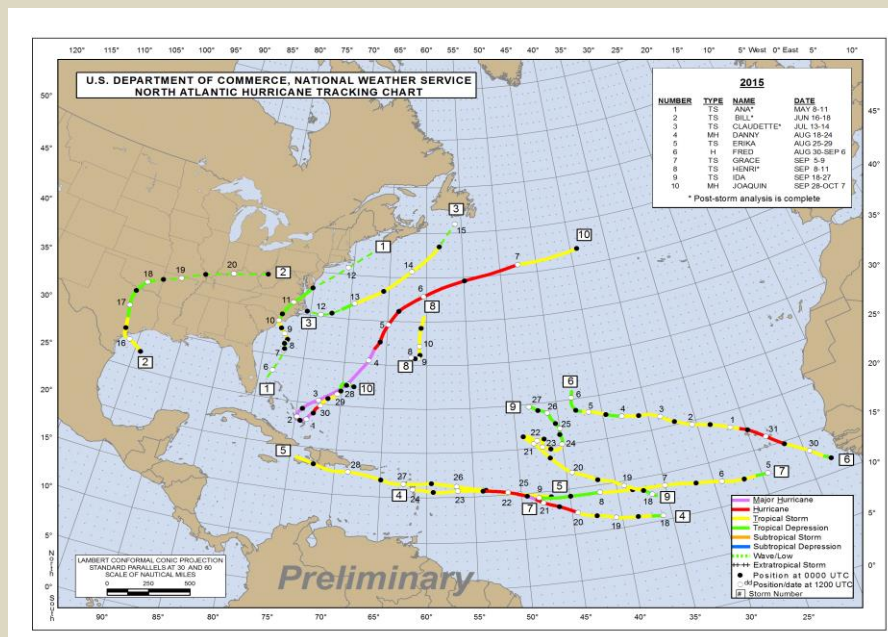
In terms of seasonal precipitation the summer of 2015 was generally close to or somewhat above average. As is typical for summertime, precipitation amounts can be highly variable because of the random and spotty nature of thunderstorms. Summer 2015 was no exception. Roanoke and Danville both saw thunderstorms with heavy rainfall in June bringing their seasonal rainfall totals to over five inches above the normal, while Blacksburg, Bluefield, and Lynchburg all finished their summer season within one inch of normal values (see table). Much of the June rainfall at Roanoke and Danville fell in just one or two days. June was by far the wettest overall summer month, with a general downward trend in precipitation from July through August. Blacksburg was the only climate site to record above normal rainfall in August due primarily to a single storm on August 10<sup>th</sup>. In fact, minor drought concerns were beginning to become apparent by late August especially east of the Blue Ridge.

# Tropical Season 2015 Wrap-up:

Jim Hudgins, Senior Forecaster

As forecast back in the spring, the 2015 Atlantic tropical season has been rather sluggish with ten named storms across the basin but with little direct impact to the mainland United States. A couple of the systems early in the season, namely Ana and Bill, made for the only landfalls, with Tropical Storm Ana being the earliest tropical cyclone to strike the country on record (May 10<sup>th</sup>), when it made landfall near Myrtle Beach, South Carolina. Tropical Storm Bill was a slightly stronger system but overall only made for minor impacts when it crossed the Texas coast on June 16<sup>th</sup>. Otherwise at the time of writing, most other named systems have stayed over the open waters of the Atlantic with several only seeing a short lifespan when attempting to cross from the deep tropics toward the Lesser Antilles. So far there have been only three Atlantic storms reaching hurricane strength, with Danny reaching Category 3 (on a scale from 1 to 5) in late August, Fred attaining Category 1 level strength in early September, and Joaquin reaching Category 4. Joaquin was especially notable for its rapid intensification, from a strong tropical storm on September 29<sup>th</sup> to reach major hurricane status on by October 1<sup>st</sup> and eventually the strongest hurricane in the Atlantic basin since Hurricane Igor in 2010 with winds up to 155 mph. Joaquin caused extensive damage in parts of the Bahamas and a U.S. cargo ship *El Faro* sank in the storm with all 33 crew lost. In spite of these impacts, Tropical Storm Erika caused the most death and destruction as it moved across Dominica leading to extensive flooding and at least 31 deaths (and 35 missing) despite being a only a weak system. Total figures for the year so far include \$591 million in damages and 92 deaths either directly or indirectly related to tropical cyclone impacts.

The below normal hurricane season is ascribed to a combination of several factors, including wind shear due to the ongoing moderate El Niño, very dry air from off the African continent being swept across the Atlantic, and below normal sea surface temperatures. The 2015 Atlantic hurricane season ends on November 30<sup>th</sup>.

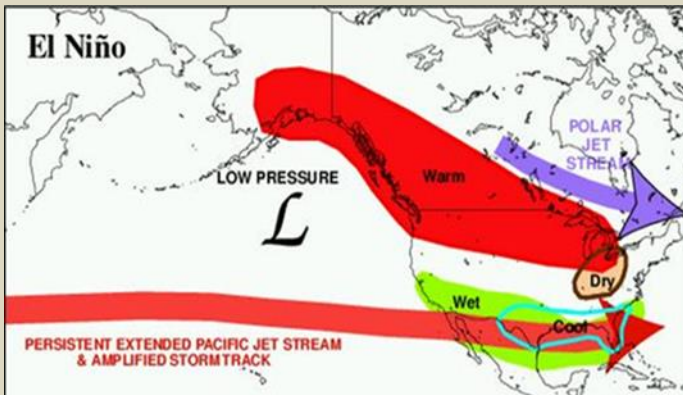


### Tracks of 2015 Atlantic Tropical Systems

# An El Niño Winter Looms: What Does that Mean for Us?

Chris Fisher, Meteorologist

As of the most recent [Climate Prediction Center](#) (CPC) update (November 2<sup>nd</sup>), we are already in one of the strongest El Niño episodes on record (since 1950). Nearly all forecasts indicate that these El Niño conditions will persist and possibly strengthen throughout the upcoming winter (2015-2016) season. The latest CPC analysis and forecast suggests that this El Niño may approach or exceed the historically strong events of 1982-83 and 1997-98. Those two events are the strongest since 1950 and quite possibly the strongest in the past century. The figure below shows the large-scale weather impacts often associated with El Niño, depicting a very active southern jet stream with more storms and precipitation across the southern U.S. and northern Mexico and warmer than normal temperatures across parts of Canada the northern U.S.



**Generalized Winter Impacts of El Niño over North America**

The expected impacts are less clear across the southern Appalachian mountains and mid-Atlantic regions, with the potential for a variety of outcomes in terms of precipitation, snowfall and temperature. A look back at data from three local climate sites (see the tables below) from these two strongest El Niño events shows a mixed picture. 1982-83 was drier than normal but with above average snowfall and near normal temperatures. 1997-98 was much wetter than normal at all three sites with snowfall well above normal at Blacksburg and Bluefield but just slightly below at Roanoke.

The bulk of this difference in snow was from a single storm on January 28<sup>th</sup>, 1998 that dropped 20.4” at Blacksburg and only 4.4” at Roanoke, a highly unusual occurrence. Temperatures in 1997-98 were uniformly above average at all three climate sites.

## 1982-83 El Nino Winter

City	Precipitation (in) (normal)	Snowfall (in) (normal)	Average Temp (F) (normal)
Roanoke VA	7.93 (8.90)	34.3 (14.3)	38.2 (38.4)
Blacksburg VA	7.45 (8.67)	29.5 (16.4)	33.6 (33.0)
Bluefield VA	5.86 (8.52)	30.7 (25.6)	35.9 (34.3)

Note: Winter months are Dec-Feb. Normals are all period of record normals.

## 1997-98 El Nino Winter

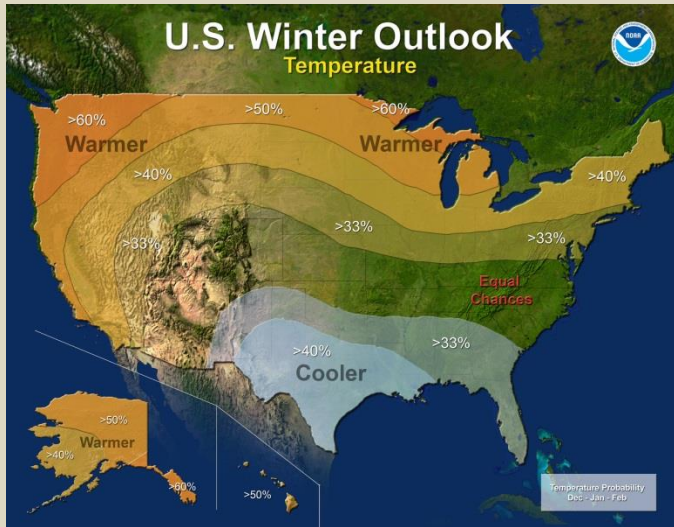
City	Precipitation (in) (normal)	Snowfall (in) (normal)	Average Temp (F) (normal)
Roanoke VA	18.34 (8.90)	10.9 (14.3)	40.5 (38.4)
Blacksburg VA	13.53 (8.67)	44.2 (16.4)	35.5 (33.0)
Bluefield WV	12.27 (8.52)	56.5 (25.6)	37.0 (34.3)

Note: Winter months are Dec-Feb. Normals are all period of record normals.

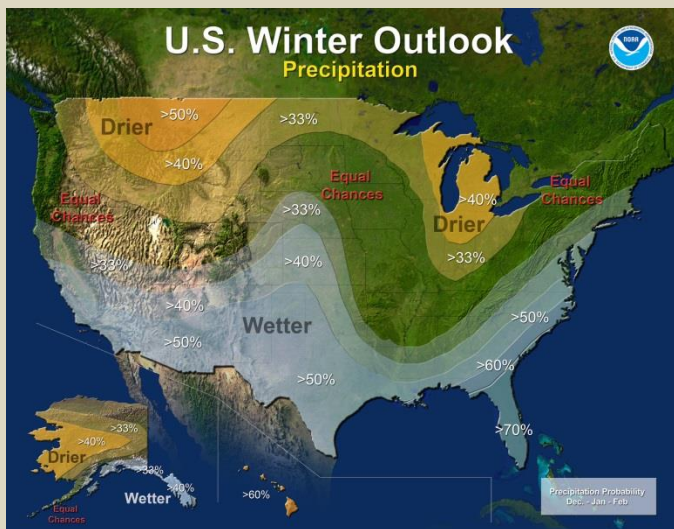
If we look a little bit closer at the temperatures, during these two strong El Niño winters, there were no below zero temperatures at any of our official climate stations in either winter. Even if you look at days with temperatures below 10 degrees, in the warm winter of 1997-98, Blacksburg had 1 day of below 10 degrees, while Roanoke and Bluefield had zero. 1982-83 which was closer to normal temperatures, Blacksburg had 8 days below 10 degrees, Bluefield had 3 and Roanoke once again had zero.

It should be emphasized that El Niño is part of El Niño-Southern Oscillation (ENSO) which is only one of several important oscillations that can exert a profound influence on weather patterns here and across the globe. For a far more detailed assessment of the possibilities for the upcoming winter with respect to ENSO [this CPC](#) link may prove useful.

So what is the 'official' forecast for the upcoming winter? The two figures below show the most recent Climate Prediction Center forecasts for temperature and precipitation across the U.S. For the local area CPC is forecasting roughly equal chances for above or below normal temperatures this winter, trending to higher odds for above normal temperature just to our north.



Looking at precipitation, the chances are very slightly in favor of a wetter than normal winter over most of our forecast area, trending toward higher chance in the southeastern portions of our forecast area where effects from coastal systems are likely to be the highest.



## NWS Provides Weather Support to Greenbrier County Emergency Management at 2015 WV State Fair

**Phil Hysell, Warning Coordination Meteorologist**

An estimated 210,000 people visited the 2015 State Fair of West Virginia during the 10-day event from August 14-23rd. To help ensure the safety of visitors and vendors, meteorologists from the National Weather Service Offices in Blacksburg, VA and Charleston, WV were embedded with the Greenbrier County Homeland Security and Emergency Management mobile command center closely monitoring weather conditions.



### Greenbrier County Mobile Command Center

Our meteorologists provided on-demand and scheduled briefings to the Incident Commander on potential impacts and timing of associated weather hazards which included thunderstorms and excessive heat. Providing this on-site decision support services (DSS) to emergency management in the interest of public safety is a component of National Weather Service's [Weather-Ready Nation Strategic Plan](#).

The Blacksburg office has recently provided remote DSS support to Emergency Management for a number of other high-profile events including events at Virginia Tech and the Franklin County Agricultural Fair.

## Focus on COOP: 45-year Award at Staffordsville, VA

**Peter Corrigan, Sr. Service Hydrologist**

The NWS COOP (Cooperative) Program is a critical component of the observational network providing daily precipitation (rain and/or snow) and temperature data for hydrological and climatological applications. The program relies on a volunteer network of citizen observers who provide daily readings (in all type of weather) to NWS offices across the U.S. The NWS Blacksburg office has over 60 of these COOP observers many of whom have served for many decades in this capacity. Observers are recognized with awards for longevity in the position and we recently honored Mr. Frank B. Strader from Staffordsville, VA in Giles County with the Dick Hagemeyer 45-year length of service award.



**Chris Fisher, NWS Blacksburg and Frank Strader,  
COOP Observer in Staffordsville, VA**

A self-described 'PHD' (Poor Hillbilly Dirt) farmer raising livestock on acreage in western Giles County, VA, Frank B. Strader has been collecting, recording and transmitting weather information officially to the NWS since 1970. We asked Mr. Strader a few questions on the occasion of his award presentation on October 13, 2015 at his farm in Staffordsville.

**Q:** Are you from Giles County?

**A:** I was born here 1935 in the midst of the depression, raised here and went to Pearisburg, VA High School (now closed). I left only to serve in the military where I was involved with military radar.

**Q:** How did you become COOP observer?

**A:** I just kind of heard about it, maybe someone knocking door-to-door? I had provided weather observation even before 1970 as an observer calling in observations to Bluestone Dam and APCO. But I became official in 1970 when this area was under the Charleston, WV forecast office area of responsibility. This continued when western Virginia came under NWS Blacksburg in about 1996.

**Q:** Is there a single most memorable weather event?

**A:** Probably 20+” of snow (which happened January 7-8, 1996)

**Q:** How many times have you missed an observation?

**A:** Only a few times

**Q:** Has the equipment always been in the same place?

**A:** Yes, at least since the house was built in 1969.

**Q:** Do you have backup observer?

**A:** My son or daughter.

**Q:** What do you like most or least about the being a COOP observer?

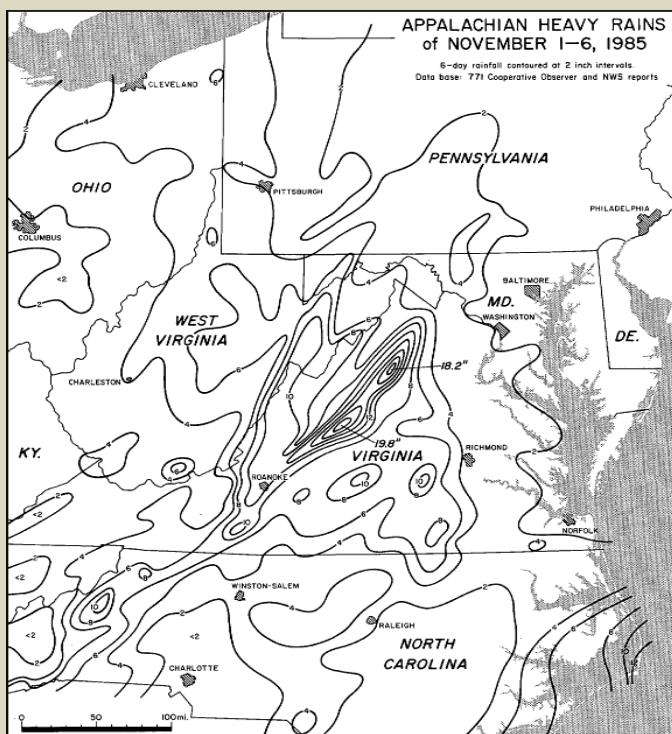
**A:** Well, it's a something worthwhile and a public service.

## The Floods of 1985 – 30 Years Ago this November

Peter Corrigan, Sr. Service Hydrologist

Thirty years ago this month the floods of 1985 devastated large parts of Virginia, in our area mainly across the Roanoke and James River valleys. The so-called Election Day Flood of November 4<sup>th</sup> caused at least ten deaths in the Roanoke Valley along with numerous scenes of dramatic rescues, flooded roads, homes and businesses. Damages in the Roanoke Valley approached \$225 million with statewide damages up to \$800 million, numbers that would likely be far higher today. The storm had its roots in the tropics as Hurricane Juan developed over the Gulf of Mexico and meandered for several days making landfall twice. There was substantial rainfall across our region each day from November 1-3 with 3-day totals up to 4 inches but the heaviest rain fell from November 4-5 with a 1-day all-time record rainfall at Roanoke of 6.61 inches on the 4<sup>th</sup>.

The resulting floods from this deluge were nearly unprecedented and have not been approached during the intervening 30 years. At over a dozen river gaging sites the flood of 1985 stands in the top 3 of all-time flood crests and is easily the highest on record at several sites including Roanoke and Holcomb Rock (just upstream from Lynchburg). What is the statistical probability of such an event occurring? Hydrologists use a measure known as the annual probability of occurrence which many people are familiar with as the recurrence interval (e.g. '100-year flood'). A 1% chance of occurrence is simply a 1 in 100 probability for the event to occur in any given year. The longer the period of record the more reliable such estimates tend to be. The Roanoke River at Roanoke gage (RONV2) had a peak discharge of 32,300 cubic feet per second (cfs) on the 4<sup>th</sup>, which is the highest on record (with data available back to 1899). This discharge equates to approximately the .005 chance of occurrence (roughly a 200-year recurrence interval; USGS, 1995). It should be stressed that the recurrence interval does not imply that such an event will occur only every 200 years! It could occur in consecutive years or much more than 200 years apart.



Rainfall Nov. 1-6, 1985: Mid-Atlantic Region



Roanoke River near Glenvar, VA in Flood, Remains of Hurricane Ida, Nov. 12, 2009.

## Recent WFO Staff Changes

### Lauren Craft (Meteorologist Intern – Pathways)

Lauren started the Pathways Program (a career development track) at NWS Blacksburg in August 2015. She received her B.S. degree at the University of Alabama in Huntsville (UAH) in Mathematics with a minor in Atmospheric Science. While at UAH Lauren spent time volunteering at the NWS office in Huntsville, AL working as a Geospatial Consultant for NASA DEVELOP, and was active in the local AMS Chapter. She then started pursuing a Master's in Geoscience with a concentration in Applied Meteorology through Mississippi State University, as well as volunteering at the NWS in Peachtree City, GA becoming upper air certified. Lauren then moved to Florida, accepting an internship with the Florida Division of Emergency Management within the State Watch Office, forecasting for the daily briefing and monitoring the weather for hazardous impacts. Additionally, Lauren interned within the Bureau of Mitigation reviewing the local county's Hazard Mitigation Plans. Lauren's initial interest in weather began in elementary school while watching the clouds with her older sister. Growing up in North Alabama, tornado sirens were common occurrences sparking an interest in atmospheric processes. Working for the NWS has been a dream of Lauren's since 7th grade and the opportunity to work in the NWS, while attending school has made a positive impact on her drive for success.

### Chris Fisher (Meteorologist Intern)

Our Spring 2015 edition of 'Blue Ridge Thunder' contained news that Chris was heading west for Glasgow, MT but life intervened shortly thereafter and he decided to remain here at NWS Blacksburg. So 'welcome back' Chris!



## UAV (Drone) Workshop to be held at Virginia Tech CRC on November 19, 2015

On November 19<sup>th</sup> the National Weather Service in Blacksburg, VA and the Mid-Atlantic Aviation Partnership will be conducting a [workshop](#) for hobbyist UAV operators.

Presentations will provide information covering FAA guidelines as well as how aerial imagery from hobbyists can help the National Weather Service assess damage following severe storms.

If you are a UAV hobbyist operator and would like to register, or for more information, please e-mail the workshop at:

[2015UAVworkshop@gmail.com](mailto:2015UAVworkshop@gmail.com)

The workshop will also be live-streamed on the internet as a webinar, so when registering please indicate if you plan to attend in person or via webinar. You must pre-register to attend the workshop!

Hope to see you there!



# *Blue Ridge Thunder*

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