Blue Ridge Thunder
Newsletter of the NWS Blacksburg, VA

Welcome to the Fall 2018 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:
Hurricanes Florence and Michael Impact the Region

Jim Hudgins, Senior Meteorologist and Peter Corrigan, Senior Service Hydrologist

After about 15 years without major tropical impacts in the Blacksburg County Warning Area (CWA), 2018 saw two systems, Florence and Michael, directly impact the area. Widespread flooding and some wind damage occurred with both storms, in mid-September and again in October. Hurricane Florence made landfall along the North Carolina Coast September 14th and brought devastating rainfall to much of NC as it meandered for several days before finally dissipating in South Carolina. The remnants of Florence tracked across the southern Appalachians bringing several days of heavy rain with the highest amounts of 7 to 10 inches (dark red on the map) falling across the southern Blue Ridge and parts of the NC Piedmont.

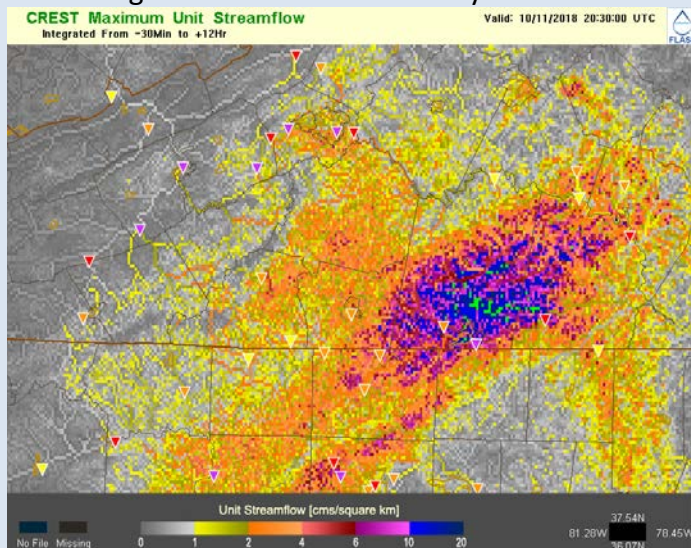**72-hour rainfall from Florence, 800 AM, Sepetmber 18, 2018**

Blue Ridge Thunder
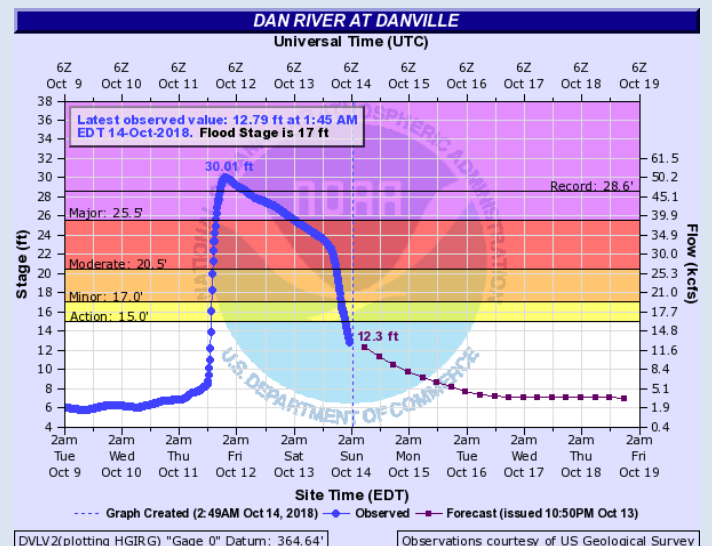## *Newsletter of the NWS Blacksburg, VA*

Damaging flash flooding and river flooding occurred with Florence as the Dan, Roanoke and New Rivers saw moderate stage flooding, with about 5- to 10-year annual recurrence intervals. Florence, however, turned out to be just a warmup as Hurricane Michael roared ashore as Category 4 storm in the Florida panhandle on October 10th and tracked rapidly north. A so-called PRE or predecessor rainfall event ahead of the actual circulation of Michael dropped heavy rain of 4-7 inches in 24 hours across several basins. Thus, some flooding was already ongoing when the rainfall from Michael proper arrived in the early morning hours of the 11th. Numerous flash flood warnings were issued from early to mid-morning counties. The extreme rainfall (4-9 inches in a few hours) and reports of widespread water rescues prompted the issuance of two rare Flash Flood Emergencies: one for the Roanoke area at 243 PM and another for Danville and Pittsylvania County at 414 PM. The figure below shows the modeled runoff from the Coupled Routing and Excess STorage (CREST) hydrologic model at 430 PM EDT. The dark blue pixels are the highest on the scale and the light blue values are actually 'off-scale'.

**CREST Maximum Unit Streamflow
430 PM EDT, Oct. 11, 2018**

Sadly, five flooding fatalities were attributed to Michael in the CWA; two in Danville City, two in Charlotte County and one in Pittsylvania County. Local officials in Halifax County described it as the 'worst, most devastating storm we've ever seen in the county'. Flood damages will run well into the millions with the worst verified losses according to the VA Department of Emergency Management in Danville City ($2.7 million), Pittsylvania ($1.5m), Halifax ($1.6m) and Charlotte counties ($1.1m). The majority of the damage was due to roads and bridges. River flooding in many areas was the worst since the remains of Hurricane Jeanne in September, 2004 or Hurricane Fran in September, 1996. The New, Roanoke and Dan rivers all saw moderate to major flooding with approximate recurrence intervals of 10 to 25 years. The Dan River at Danville (DVLV2) crested at 30.01 feet, above the record from Fran of 28.65 feet. It was only the 6th highest discharge on the Dan River however since the gage was moved by the USGS in 1996.
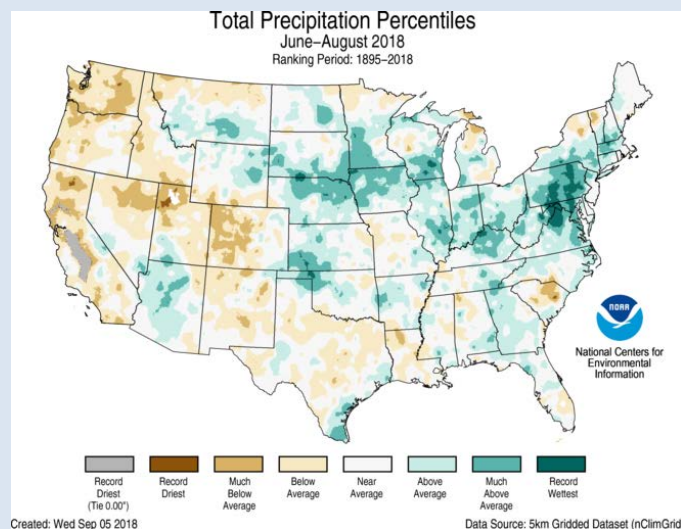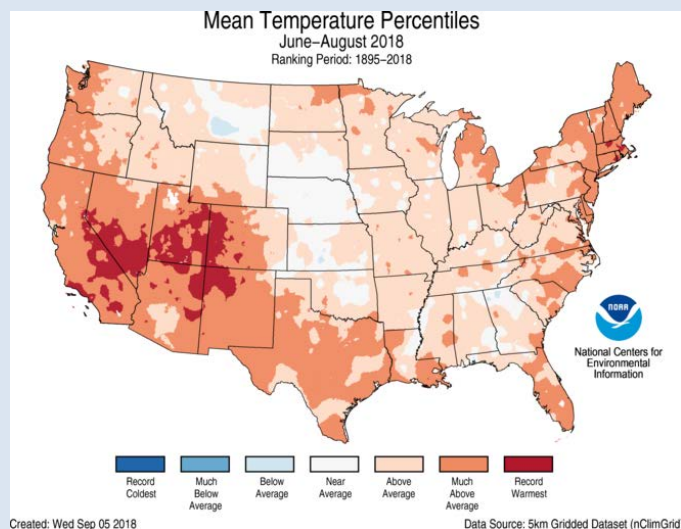

AHPS Hydrograph for Dan River at Danville

Summer 2018 Climate Summary

Peter Corrigan, Sr. Service Hydrologist

Summer 2018 saw temperatures (June through August) that were generally near to slightly above average across the Blacksburg CWA and nationwide. Precipitation was slightly above normal across much of the CWA (figure below, right), and much wetter over the northern Mid-Atlantic. For parts of the Mid-Atlantic (northern Virginia, Maryland and Pennsylvania) it was the wettest summer on record (see map below and right) per data from the National Center for Environmental Information (NCEI). Temperatures were slightly above normal (map at lower left), although not by a large amount.

The table below shows temperature and precipitation rankings and anomalies (departures from normal) for the five official climate sites in the CWA. No climate site reached 100°F during the summer of 2018 and the number of 90°F days was fairly close to normal. Rainfall was variable due mainly to local thunderstorms. Note that the period of record for both Danville and Bluefield has been considerably extended back in time through a process called ThreadEx (explained here). Previously, Danville climate records dated back to 1948 and have now been extended back to 1916. At Bluefield the period of record has been pushed back from 1959 to 1909.
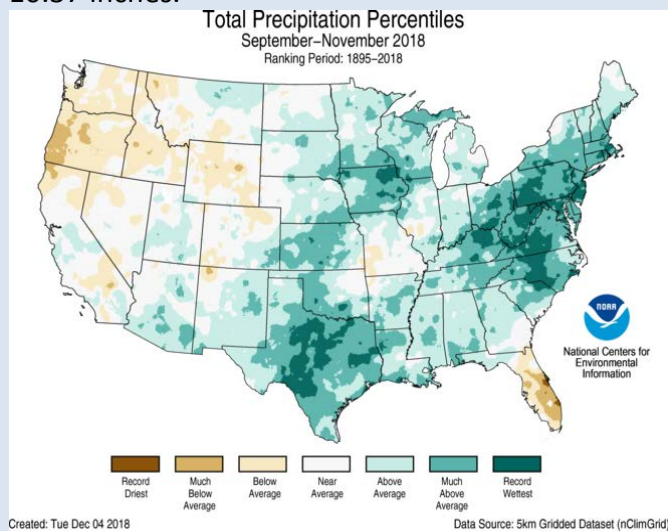
Local climatological statistics for summer 2018 (Jun-Aug)

Climate Site	Average Temperature (Anomaly)	Rank (Warmest =1)	Summer Maximum Temp. (°F)	No. of days T≥ 90°F	Total Precipitation (Anomaly)	Station Period of Record
Blacksburg, VA	71.0 (+1.3)	t-16th	90	1	9.30 (-2.55)	1952-2018
Roanoke, VA	76.3 (+1.3)	t-13th	96	26	13.27 (+1.84)	1912-2018
Lynchburg, VA	75.4 (+1.7)	t-43rd	95	28	15.09 (+3.85)	1893-2018
Danville, VA	76.5 (-0.2)	t-62nd	94	26	15.48 (+3.07)	1916-2018
Bluefield, WV	69.8 (-1.9)	t-80th	86	0	8.63 (-2.94)	1909-2018

Fall 2018 was the wettest on record

Peter Corrigan, Sr. Service Hydrologist

If you thought is has been a wetter than normal fall you are correct and that goes for all of 2018 as well. The period from September through November was the wettest on record according to data from the NOAA NCEI site. The map below show precipitation percentiles at record wet levels across most of the Blacksburg CWA in the September-November period. Across the local cooperative network the 3-month average was 21.73 inches versus the 1981-2010 normal mean of 10.37 inches.
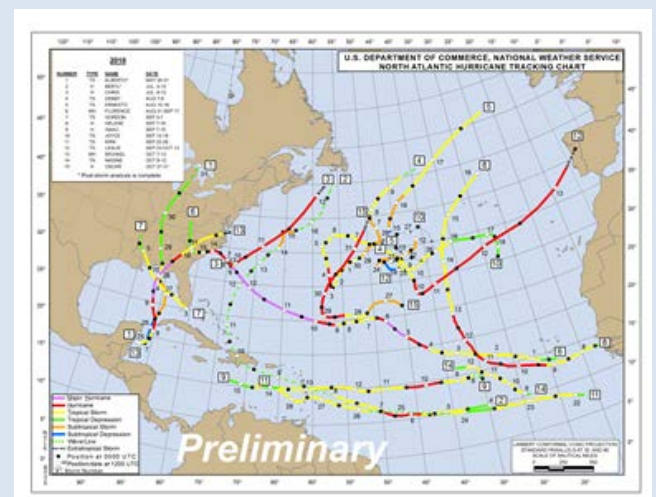

Meanwhile, several COOP sites have already set all-time annual rainfall records with still a month to go in 2018. As of November 30th, 2018 that list includes several long-term COOP stations such as Rocky Mount, VA at 67.26 inches (old record 64.28 inches in 2003) with rainfall records dating back to 1984, Martinsville, VA at 65.22 inches (old record 64.25 in 1937) with records back to 1930 and North Wilkesboro, NC at 67.45 inches (old record 66.53 inches in 1994) with records dating back to 1921. Up until now 2003 was the wettest year in CWA-wide averages but it remains to be seen if 2003 will be eclipsed by 2018. But the wet start to December promises to give 2003 a run for the money.

Active 2018 Atlantic Hurricane Season

Jim Hudgins, Senior Forecaster

As noted in the '**Weather Highlight**' section above, the 2018 tropical season had major impacts in the local area. But how did the 2018 season stack up as a whole? Hurricane Oscar in late October brought the total of named cyclones for the season to 15 with one additional tropical depression. The 1981-2010 average is 12.1 named storms. Of the 15 storms, 8 reached hurricane status (6.4 average) with 2 becoming majors (2.7 average) including both Florence and Michael with winds reaching Category 3 levels (111-129 mph) or stronger. The Accumulated Cyclone Energy (ACE) for the 2018 season compiled by Colorado State University shows that the season was just slightly above average. The season started with the formation of Tropical Storm Alberto in late May making for the 4th year in a row in seeing a named storm before the official start of the season on June 1st. An interesting aspect of the 2018 season was that there were no hurricanes in August, normally a very active time. Meanwhile, there were four simultaneous named systems in September, the first time that has occurred since the 2008 season.
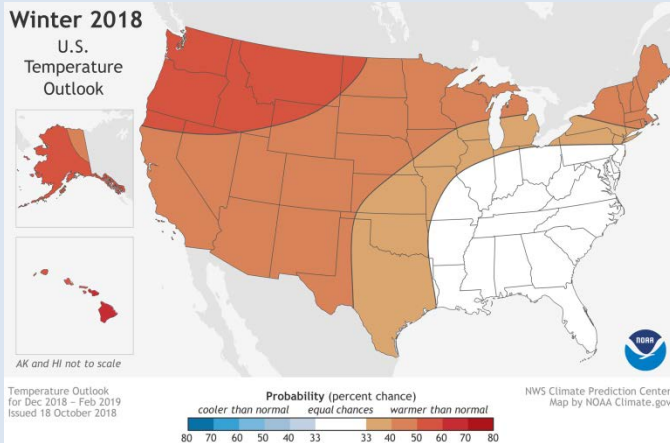

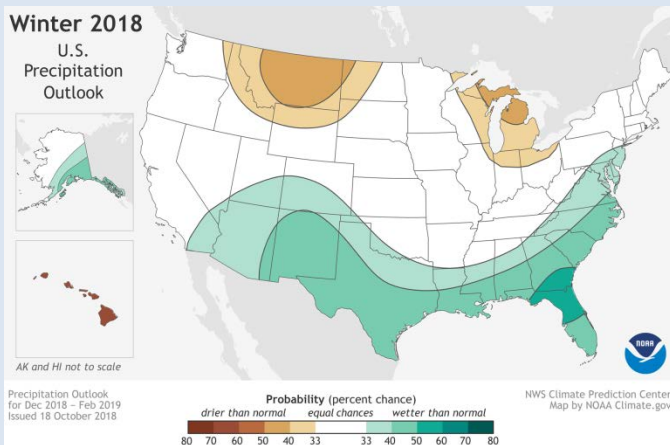
Tracks of 2018 Tropical Cyclones

Winter 2018-2019 Outlook:
A weak El Niño to Develop?

Andrew Loconto, General Forecaster

The NWS Climate Prediction Center (CPC) recently released its outlook for the upcoming 2018-2019 winter shown in the two figures below:

Winter (Dec-Feb) Temperature Outlook

Winter (Dec-Feb) Precipitation Outlook

In a probabilistic sense, there's a slight tilt in the odds toward a wetter-than-median winter, with equal chances of above- or below-normal, (meaning no strong signals or consensus in climate tools to indicate a tendency toward colder or warmer than normal).

The wnter forecast is weighted toward the likelihood of an El Niño event. An an El Niño Watch was issued by the Climate Prediction Center (CPC) back in June with an 65% chance (raised to 80% by November) for El Niño criteria to occur this winter. In the most recent ENSO Diagnostic Discsusion, CPC continues to project a weak El Niño (as defined by an Oceanic Nino Index (ONI) of +0.5°C or greater). The El Niño is not termed as such until there are at least 5 consecutive 3-month periods with ONI values verifying above the +0.5 threshold. That forecast is reflected in most available ONI forecasts from both IRI ENSO forecasts and the Climate Forecast System (CFS v2.0). Published research suggests a tendency for an increased number of severe weather episodes across the Deep South/Gulf Coast in El Niño years, due to the enhanced subtropical jet stream that skirts across the southern tier of states. The most recent winter El Niño event was in 2015-2016, which was one of the strongest ever recorded. Much of the U.S. experienced well above normal temperatures that winter, especially December, 2015 which shattered warmth records in nearly every eastern U.S. state including all three states in our CWA (VA, NC, WV).

It should be stated that weak El Niños tend to produce more variation in winter weather than strong ones. This is discussed in the most recent NOAA Climate Blog by Mike Halpert, which provides an interesting discussion on the outlook. He points out that only four of the twelve weak El Niño events observed since 1950 featured above normal temperatures. Precipitation anomalies associated with the same 12 weak El Niños are the actually opposite of the wet tendency seen in strong events. The big takeaways are that not all El Niño events are the same in terms of impact, particularly weak ones - and that CPC's outlooks really are probabilistic versus guarantees.

A New Storm Reports Submission Form

Will Perry, Senior Meteorologist

A new form for submitting your storm reports is available on the NWS Blacksburg web site. You can access it here: https://inws.ncep.noaa.gov/report/. The form is fairly straight-forward. The first page is where you select what type of weather you are reporting (rain, snow, severe, etc.):
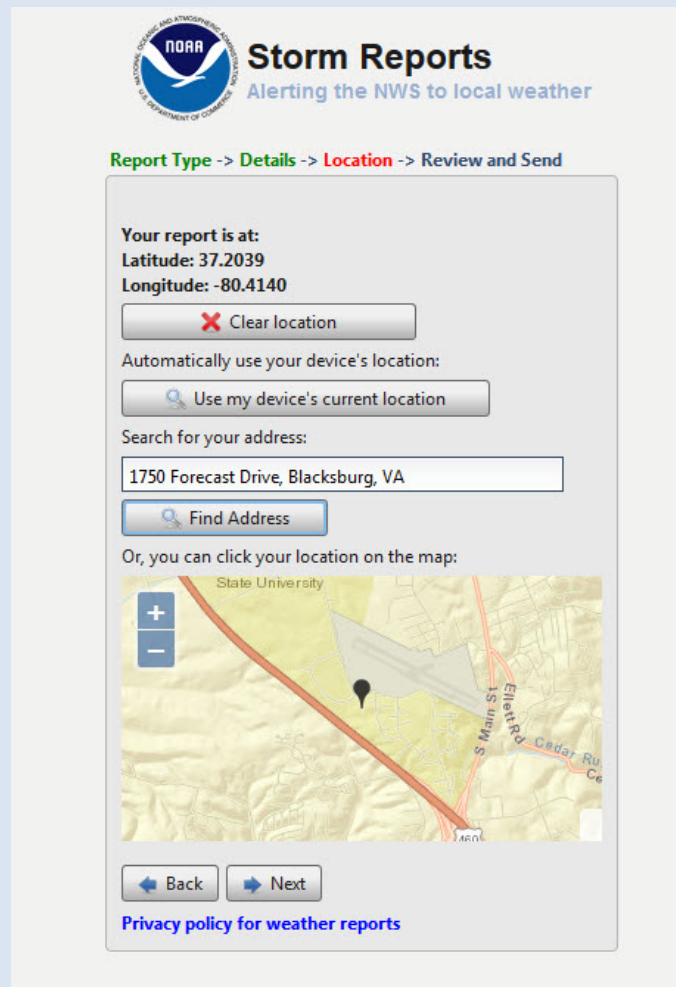

After selecting a type, when you click 'Next,' depending on what you chose to report, you will get a screen asking for details regarding what you are reporting, and most importantly the time you observed what you're reporting. Here's an example for flooding:

You can also choose the calendar option shown by the red arrow to select a different date.

On the next screen, you select the location where you observed the weather. Your options are using your a) device, b) searching by address, or c) zooming in on the map and left clicking your *location.*

The last page shows a summary of what you entered. Make sure to check it for accuracy. You can always use the back button to make changes before sending the report. There is an option of providing your name and contact info, but it is not required.

Storm Reports
Alerting the NWS to local weather

Report Type -> Details -> Location -> **Review and Send**

Here is the information you'll be sending:

Report time: 0856 PM 11/10/2018
Latitude: 37.2015
Longitude: -80.4113

You are reporting: Flooding.

Details:
Test

If you wish to provide a name, spotter ID, or contact info, you can do so here.

This is optional, and if provided, will only be used if additional information is needed.

John Doe - Trained Spotter

◄ Back   ➡ Send Report!

Privacy policy for weather reports

When you send the report, the NWS will get alerted to this new report, where it is reviewed and may be sent out as a local storm report and/or included in a public information statement. If you have questions on the new storm reports interface email us at rnk.webmaster@noaa.gov.

Visitors Get a Behind-The-Scenes View of Operations at the 2018 NWS Blacksburg Open House

Phil Hysell, Warning Coordination Meteorologist

Approximately 230 people visited the National Weather Service office in Blacksburg on October 20th, 2018 during our biennial open house. Guests were treated to outdoor exhibits and activities including the Roanoke County Fire Safety/Severe Weather Safety Trailer, VDOT snow plows, an

Amateur Radio communications trailer, and a robot from the Red Cross promoting preparedness. Virginia Tech Meteorology also participated sharing their storm chase experiences and showcasing weather stations being placed across the region. Visitors could also learn how to measure precipitation by tossing water balloons into a rain gauge

A tour of the NWS operations center was also provided, where guests were able to learn about our mission, saw computer systems used to create forecasts and warnings, and explanations of how weather instruments are used to collect weather data. The tour concluded with a visit to our upper air shelter, where hourly balloon launches were conducted using smaller balloons with cardboard radiosonde models attached.

Science and Operations Officer (SOO) Steve Keighton explains the forecast process

We greatly appreciate those who assisted with this event, as well as those who traveled to our facility to tour our operations.

Recent WFO Staff Changes

There have been a lot of personnel changes occurring at NWS Blacksburg over the past 6 months or so! We have welcomed several new employees and bid adieu to one of own.

Jacob (Jake) Ruckman (Meteorologist Intern)

Jake recently accepted a General Forecaster position at WFO Juneau, AK. He arrived in Blacksburg in the late winter of 2015 after a stint in the U.S. Air Force and completing a degree in Meteorology from St. Louis University. During his nearly 4 years at WFO Blacksburg Jake became highly proficient in all aspects of WFO operations and was a valuable team member. He should be well prepared for the very different climate and forecast challenges of the Alaska panhandle. Jake will head north in early 2019.

Jeffrey Moss (Electronics Technician)

Jeffrey Moss reported to NWS Blacksburg in August 2018 to fill the Electronics Technician (ET) vacancy in the Electronics team. Jeff grew up in the mountains of western North Carolina and studied Natural Resource Management at Western Carolina University where he met his wife Amanda. Upon graduation he went straight to work with the U.S. Geological Survey (USGS) in Charlotte, NC as a Hydrologic Technician. During his time there, Jeff was responsible for maintaining real-time stream gages, rain gages, and ALERT gages. He became interested in electronics as the technician role was very electronics oriented. In 2011 he transferred to the NWS office in Hilo, Hawaii as a Meteorological Technician and later worked as an ET. Fate intervened once again and they moved back to Charlotte with the USGS again to be closer to family. Jeff resumed his old duties as the lead technician for the Charlotte ALERT radio network which consists of almost 100 ALERT real-time gages. Jeff is excited to be here and has already brought a new set of skills to the office including expertise in stream flow measurements which the office is experimenting with.

Ben Gruver (Meteorologist Intern)

Ben arrived in mid-September as a new Meteorologist (Intern) at the Blacksburg office just in time for Hurricane Florence. Ben was a volunteer and Capstone Student while attending VA Tech and spent lots of time working at the office as a student. He is a native of Roanoke, Virginia and I lived there all my life up until recently. He attended Virginia Western Community College in Roanoke for three years before transferring to Virginia Tech for two years, earning his Meteorology degree in May, 2017. When not working Ben enjoys all things outdoors, including hiking and road biking, especially on the Blue Ridge Parkway. He is also a weather buff, maintaining a Davis weather station, which uploads weather data from his backyard in Bent Mountain to Weather Underground and CWOP/MADIS. In addition to the above, he maintains a weather website that hosts weather data, as well as other neat weather tidbits. Ben said he is very excited to officially join the awesome team in Blacksburg!

Vance Joyner (Meteorologist Intern)

The newest arrival at NWS Blacksburg is Vance Joyner who arrived at the WFO on October 1st, 2018. Vance was born in Worcester, MA, but grew up in Williamsburg, VA. He spent 4 years at Virginia Tech from 2011-2015, earning Bachelor's degrees in Physics and German. After deciding to pursue meteorology, he relocated south to Tallahassee to get his Master's degree in meteorology from Florida State. His research concerned improving derecho forecast lead time and accuracy with GFS output. Over the summer of 2017 he volunteered at WFO Charleston, SC, learning firsthand how a National Weather Service office operates. He also contributed to research on identifying pulse thunderstorm patterns with GOES-East data while in Charleston. Excited to be able to make his triumphant return to the mountains, and more specifically Blacksburg. Vance is a big fan of the Hokies and enjoys watching movies.

Blue Ridge Thunder

National Weather Service

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