

Sterling Reporter

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National Weather Service Baltimore MD/Washington DC Forecast Office

Spring 2015

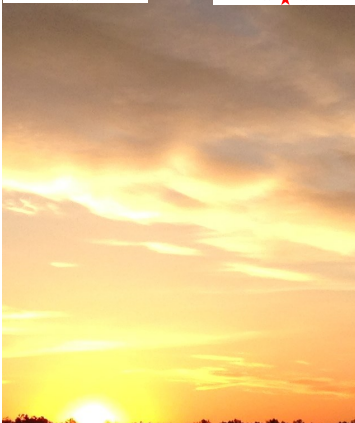


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Cover photos: Amy Bettwy

MIC's Corner

By, James E. Lee
Meteorologist in Charge

I have mentioned before in past issues of *The Sterling Reporter* that the Baltimore/Washington Weather Forecast Office (WFO) has tremendous capabilities with our best-in-the-world technology systems, such as the WSR-88D Weather Radar, numerical weather prediction models, the Advanced Weather Interactive Processing System, and GOES/POES satellites. This technology is outstanding; however, I want to emphasize to you that these systems by themselves do not produce the forecast, or issue warnings, or ensure our office utilities are paid. It is the combined efforts of our 25-member staff that makes us able to fulfill the National Weather Service (NWS) mission to protect of life and property from weather and water hazards. These dedicated men and women who occupy our office here in Sterling, VA, ensure that the NWS mission is achieved 24 hours per day, 7 days a week, for every day of the year.

Since our last issue of the *Sterling Reporter*, the Baltimore/Washington Weather Forecast Office (WFO) has experienced many staff changes:

Departures: Two long-time staff members, Senior Forecaster Brandon Pelquin and General Forecaster Greg Schoor, received promotions to WFO Wilmington OH, and the Warning Decision Training Branch in Norman, OK, respectively. With the promotion of Brandon and Greg, our office lost almost two decades of experience for our area. Kyle Struckmann, Emergency Response Specialist Meteorologist, also received a promotion to NWS National Operations Center in Silver Spring, MD. Amy Bettwy, Meteorologist Intern, received a promotion to the Aviation Weather Center

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Winter 2014-15 Summary

By Dan Hofmann, Meteorological Intern / Climate Program Leader

This past winter was anything but normal. Much like Winter 2013-14, the much colder-and-snowier than normal pattern did not really get going until January.

Winter appeared to be getting an early start when the average monthly temperature for November tallied at 2 to 5° F below normal, capped with widespread accumulating snow the day before Thanksgiving (November 26th). But the next widespread accumulating snow did not come until the morning of January 6th, when a strong Arctic front dropped a band

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in Kansas City, MO. Carl Barnes, Meteorologist Intern, transferred to WFO Charleston SC to join his newly wedded spouse who attends graduate school in that area. Senior Forecaster Jared Klein transferred to WFO Mt. Holly NJ, and Steve Goldstein transferred to the NWS National Operations Center in Silver Spring, MD.

Last, but certainly not least, our Administrative Support Assistant Josephine Bergner is retiring after 30 years of federal service with NOAA. Josie has been part of our staff here at Sterling for over 20 years. Josie’s experience, knowledge, dedication and presence will be sorely missed, but we are all wishing her best wishes in her new adventure.

Arrivals: Our office has hired six new staff members over the past year: Two Senior Forecasters, Ray Martin and Luis Rosa; two General Forecasters, Ashley Sears and Andrew Snyder, and two Meteorologist Interns, Isha Renta and Matthew Elliott. Ray comes to Sterling from WFO Elko NV, where he served as a General Forecaster. Luis’ arrival is a homecoming of sorts, as he is transferring here from WFO San Juan for his second stint at Sterling, as he was a General Forecaster here for several years before his San Juan Senior Forecaster experience. Ashley laterals to our office from WFO New York City where she was a General Forecaster, and Andrew received a promotion from the Intern ranks at WFO Wilmington OH. Isha arrives at Sterling from the US Navy civilian ranks at Dahlgren, VA, and Matthew comes to us from the Warning Decision Training Branch in Norman, OK.

So you can see that we’ve had lots of comings and goings at our office. While losing this amount of experience in a short time is challenging for office operations, it is offset by the anchor of our remaining staff, coupled with the promise of our new employees.

If you have any questions, please call me at 703-996-2200, extension 222, or email me at James.E.Lee@noaa.gov.

MIC’s Corner (continued, above)

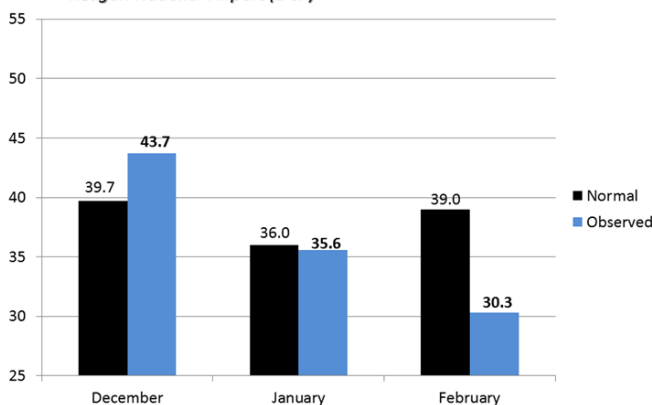
Winter Summary (continued, below)

of moderate snow across the Washington, DC metro area during the morning rush hour. It was this front that ushered in the first of several rounds of record-breaking cold to the region. It was not quite as intense as the intense cold outbreak of early January 2014, but it was very cold nonetheless.

Meteorological winter begins December 1st and ends at the end of February. On average, this is the coldest 3-month period of the year. As noted in the graphics below and on the next page, December temperatures averaged above normal at Reagan National Airport (DCA), Baltimore-Washington Thurgood Marshall International Airport (BWI), and Dulles International Airport (IAD). There was also no measurable snowfall at DCA and IAD in December.

Washington, DC

Reagan National Airport (DCA)



But the new year brought a colder and snowier pattern. February wound up being one of the coldest months on record at BWI and IAD, and snowfall for the month at all three sites was around twice the monthly normal value.

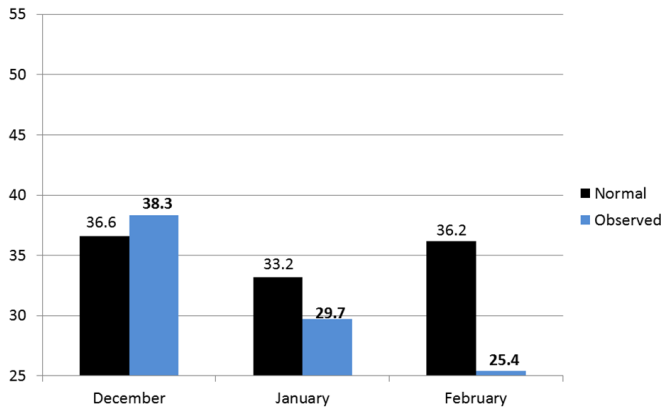
Snowfall for the meteorological winter was near normal, but including the early snow in November and late snow in March pushes the annual snowfall significantly above normal. For reference, the annual snowfall is recorded from July 1st of a given year through June 30th of the following year to encompass the entire cool season.

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Winter Summary (continued)

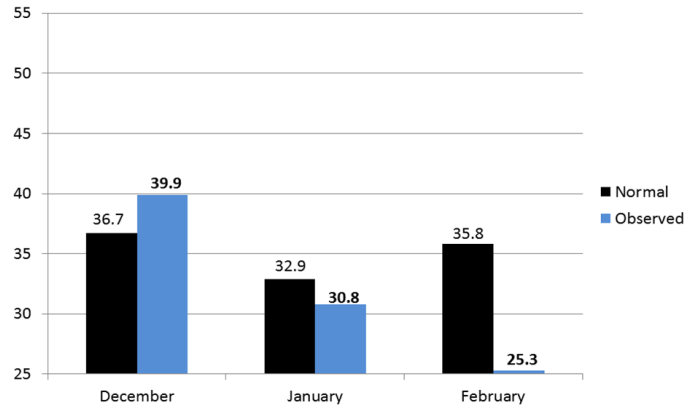
Dulles International Airport

(IAD)



Baltimore, MD

Baltimore-Washington Thurgood Marshall International Airport (BWI)



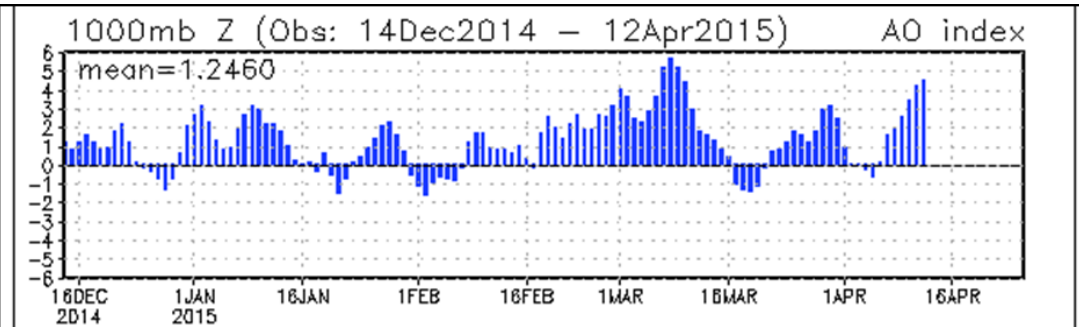
Site	Nov	Dec	Jan	Feb	Mar	Apr	TOTAL
Washington, DC	Trace (0.5")	Trace (2.3")	3.6" (5.6")	9.8" (5.7")	4.9" (1.3")	0.0" (0.0")	18.3" (15.4")
Baltimore, MD	0.3" (0.4")	0.2" (3.0")	5.9" (6.8")	14.6" (8.0")	7.7" (1.9")	0.0" (0.0")	28.7" (20.1")
Dulles Airport	1.6" (0.5")	Trace (3.5")	8.7" (7.3")	16.1" (7.6")	10.5" (2.8")	0.0" (0.3")	36.9" (22.0")

2014-15 monthly snowfall totals (in bold), compared to normal (in parenthesis).

Now that we have looked at the stats, let's look at the science.

From a meteorological standpoint, the most notable thing about this winter was that none of the warning-level snowfall events (5 inches or greater) in the Baltimore-Washington metro area occurred with the presence of a coastal low pressure system. Virtually all extended cold periods and most significant snowstorms east of the Blue Ridge Mountains occur when climate indices known as the Arctic Oscillation (AO) and North Atlantic Oscillation (NAO) are in the negative phase, favoring coastal low pressure tracks originating in the Gulf of Mexico and moving up the Eastern Seaboard.

But the AO was predominately positive this past winter, and its negative phases did not correlate with our coldest and snowiest periods. Additionally, the NAO was positive virtually the entire season.

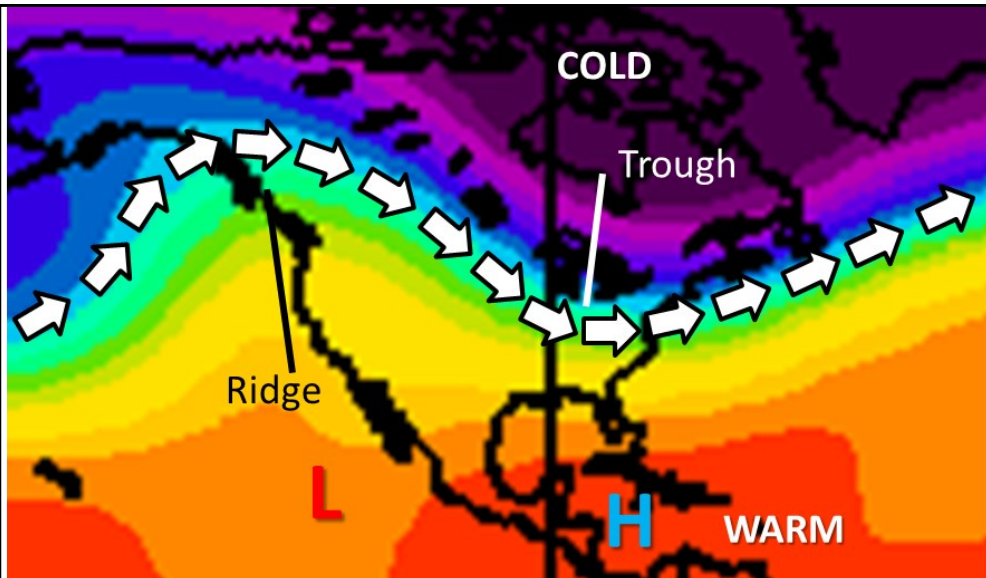


Above: NAO phase this past winter, from the NOAA Climate Prediction Center (CPC).

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Winter Summary (continued)

So, if the typical pattern indicators were in a phase opposite what is usually favorable for cold and snow, why was it so cold and snowy? Persistent ridging along the West Coast favored below normal heights over the northeastern part of the United States, which favors below normal temperatures and can lead to more snow than normal.



But a persistent sub-tropical ridge over the northwestern Caribbean Sea and Gulf of Mexico as well as a semi-permanent area of low pressure near the Baja of California may have diluted the more typical ridge-trough pattern, and altered the jet stream enough to not show up in the more typical climate signals, but not enough to avoid sending bouts of cold and snow barreling towards the Mid-Atlantic.

So, even though at face-value our usual go-to reference indices suggested near- to above-normal temperatures and below normal snowfall for our area, the exact opposite happened, especially during the second half of the winter.

Semi-permanent low near Baja and high near Cuba may have diluted the North American ridge-trough pattern.

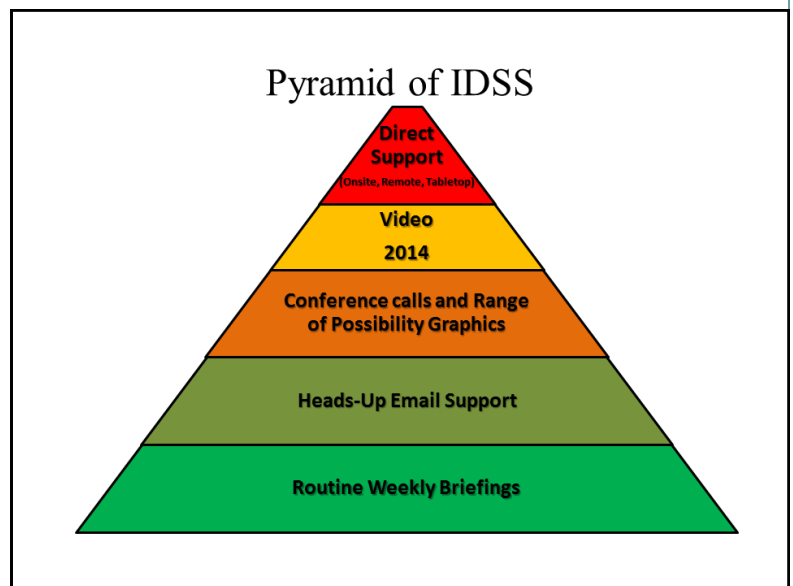
Above: Average 500-mb heights (jet-stream pattern) over North America during January and February. Source: NOAA Earth System Research Laboratory (ESRL).

It just goes to show there is always more to learn about the weather!

Pyramid of Decision Support

By Kyle Struckmann, ERS Meteorologist

When hazardous weather threatens, the National Weather Service in Sterling initiates decision-support services to help emergency managers, transportation departments, and other government agencies mobilize resources for the event. Forecast services are based on the “pyramid of support” (graphic). Decision support has been used on numerous weather events since its inception. This article illustrates services provided for severe thunderstorms, flooding and coastal flooding that took place May 15-17, 2014.



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Decision Support (continued)**Level 1: Routine decision support:**

In December 2013, the NWS Baltimore/Washington began weekly webinars for all of its core customers. These webinars take place each Monday morning, when one of the Emergency Response Meteorologists summarizes all potential hazardous weather for the region over the course of the next week. In addition to this webinar, NWS also participates in a West Virginia conference call each Monday and Friday morning for emergency managers throughout the state. The Monday before the flood event, NWS Baltimore/Washington conducted its regular weekly webinar and participated in the bi-weekly West Virginia call, outlining the threat in both calls.

Level 2: Heads-up Email Support:

When forecasters determine there is potential for a specific hazardous weather event, this threat is written into the Hazardous Weather Outlook. This also triggers a “heads-up” email for all core customers. This e-mail is issued to approximately 400 government emergency managers across the region, with a statement summarizing the threat and dynamic links to web sites that they can refer to for frequent updates. Late afternoon on Monday, May 12, one of our Emergency Response Meteorologists issued this e-mail describing the potential for severe thunderstorms, flooding due to heavy rain, and coastal flooding that would begin Thursday, May 15. An updated e-mail was issued the next day.

Level 3: Conference Call/Webinar Support:

By Wednesday, May 14, the NWS was entering the “watch” phase for this event. A flash flood watch was issued Wednesday afternoon. Heads-up emails were upgraded to conference call and webinar support. Two conference calls with county emergency managers were held Wednesday afternoon, and statewide calls were scheduled the next day for Maryland, Virginia and West Virginia. Numerous ad-hoc phone briefings were also held with core customers to discuss local impacts specific to their needs. This support continued through the duration of the event, including support for ongoing river flooding after the rain stopped. From Wednesday, May 14 through Friday, May 16, 37 calls were conducted for the following groups:

City/County emergency managers: 21
Utilities and other private companies: 7
State emergency management agencies: 3
Federal agencies: 3
Departments of transportation: 3

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Decision Support (continued)

Levels 4 and 5: Video and on-site support:

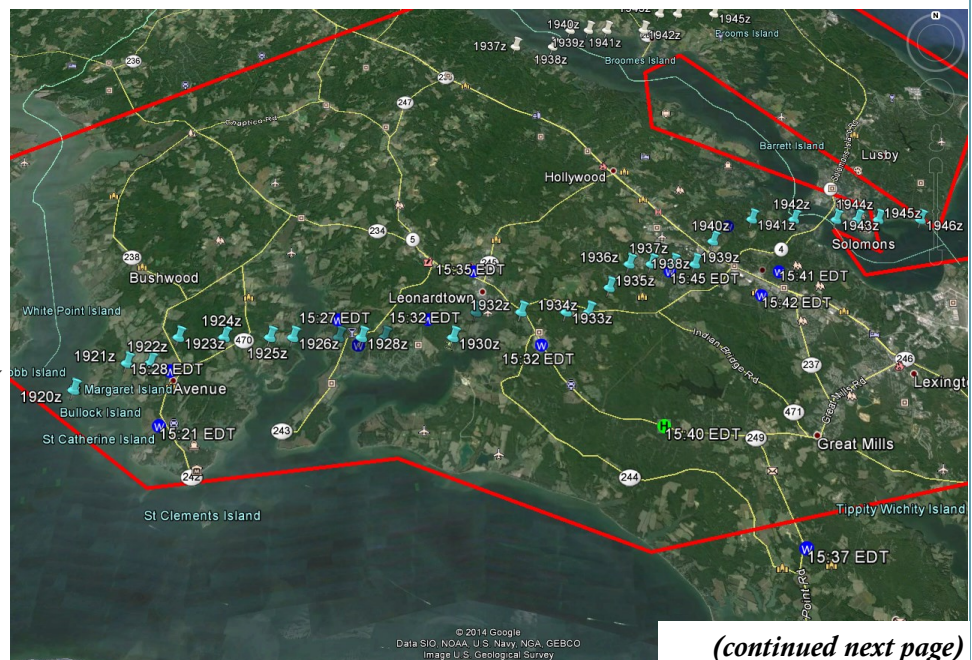
The NWS is developing video support options, which are expected to start later this year. In certain events, the NWS deploys an Emergency Response Meteorologist to an Emergency Operations Center to provide in-person support for local or state government emergency managers. This may occur either through a significant weather event like a major winter storm or a tropical system, or a planned large-scale public event, such as the 4th of July fireworks at the National Mall in Washington, D.C. Last year, Emergency Response Meteorologists were deployed to support the City of Baltimore Mayor's Office of Emergency Management at the Preakness Stakes in Baltimore on May 17, 2014 and the City of Fredericksburg, VA, Department of Emergency Management for the Marine Corps Half Marathon on May 18, 2014. On-site support gives the NWS the most direct link possible with incident commanders, who direct deployment of first responders, supporting agencies and resources that protect large numbers of citizens.

Post-Storm Verification

By Heather Sheffield, General Forecaster

Severe weather can occur year round in the Mid-Atlantic and forecasters at the National Weather Service in Sterling, VA are always prepared. Heading into the summer season, thunderstorms will be common and some of them may become severe, producing damaging winds, large hail and tornadoes. Warning forecasters interpret and analyze radar and satellite data while staying tuned to the changing conditions. Another important role completed by forecasters is to collect reports of what did occur, verifying the resultant damage to determine the intensity of the thunderstorm activity. Our network of over 6,000 spotters, trained in the necessities of severe weather spotting for the Mid-Atlantic region call in reports of hail, thunderstorm wind-related damage, and flooding. Spotters as well as anyone who has witnessed severe weather are also encouraged to e-mail photos of hail or wind damage to lwz-report@noaa.gov.

Reports of severe weather that are not immediately obtained during a severe weather event are retrieved through post-storm verification efforts by the staff in the hours and days following an event. The difficulty in obtaining reports depends on several factors, including areal extent of the potential damage or hail swath, how populated the affected area might be, and even the time of day. The procedure begins with analyzing radar data, matching-up reports that have been received with times and locations relative to the



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Verification (continued)

thunderstorm activity. After analyzing the storm, more phone calls are made to spotters located near the affected area. At times, the public may be called upon for their experiences and recollections from the storm, including local residents, business, and officials who may have received public reports themselves.

Technology plays a large role in the success and expedience of performing post-storm verification. Besides archived radar data, mapping applications such as Google Earth, various mapping webpages, online public directories, and even social media can point staff to additional severe weather reports. In summer 2013, a tornado was confirmed by a NWS Survey Team on June 13, 2013 in St Mary's County. It had a path length of 13.8 miles and path width of 200 yards. The survey team and other forecasters analyzed the radar data and collected all the reports for this event. There were many reports of trees down from Colton's Point, MD to California, MD. The route was discussed before leaving the office of the best location(s) of thunderstorm wind damage. The Google Earth image (previous page) shows Central St Mary's County outlined in red depicting the Tornado Warning that was issued for a thunderstorm. Inside the warning box, wind (W) and hail



(H) reports are shown as well as the path the tornado took shown as time stamps (blue thumb nails). The times were estimated by radar. Post-storm verification is very important to operations at the NWS Sterling Forecast Office. If you ever come across large hail or damage from strong winds don't hesitate to contact us!

For more information on the St Mary's County tornado, please see June 2013's "Storm Data" under "Local Programs" at www.weather.gov/lwx

Weather Communications on Social Media

By Andrew Snyder, General Forecaster/Social Media Program Leader

"Everybody talks about the weather..." it seems. That's especially true in the world of social media, where the weather is often a favorite topic about which to comment and photograph. We're no different here at the National Weather Service (it *is* our job after all!), as we have built our presence on Facebook and Twitter over the past several years.

Our goal is to post useful and relevant information to help you be prepared, whether the weather is sunny and mild or unusually severe. In addition to forecast information, we will post local climate data, interesting weather news and photos, science tidbits, upcoming NWS events, and safety reminders.

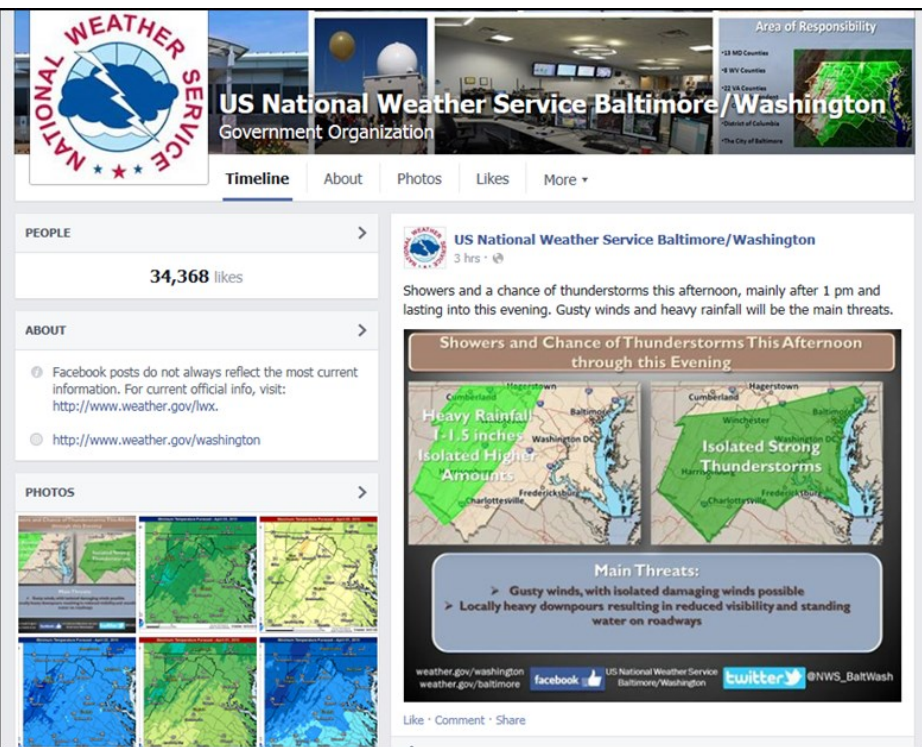
Social media is all about having conversations, though, so we'd like to hear from you, too! In particular, "ground truth" reports of hazardous weather aid us in both issuing and verifying our forecasts and warnings. What do we mean by hazardous weather? If you have attended one of our spotter training sessions in the past, you know this type of weather could lead to threats to life and property.

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Weather Communications (continued)

Such reports would include: hail (include a size comparison or measurement), trees and large branches blown down, structural wind damage, and flooding. We also appreciate your rainfall totals and snowfall and ice measurements. Include a picture if you can – they are worth a thousand words! Please be as descriptive as possible about what happened, your location, and what time it occurred. While we monitor our social media feeds during periods of active weather, the most efficient way to contact with us with an urgent report remains via telephone.

In addition, if you see a trustworthy post about hazardous weather conditions in your social media feeds, please share it with us. There is a tremendous flow of valuable information on social media, but we can only monitor and tap in to a small fraction of it. You can help us by directing us to the most useful reports.



We value our social media followers and encourage you to be actively involved with our feeds. Liking, commenting on, or sharing one of our posts lets us know that you value the content and would like to see more in the future. Also, your shares and retweets help spread important weather messages to your family and friends, which can in turn be shared to others. This practice helps spread weather awareness throughout your community and our region. Studies have shown that individuals often need to receive messages in a number of ways before they decide to take appropriate action. People

are more likely to act when they receive information from a trusted source such as a family member, friend, or community leader.

Social media has opened new doors for sharing and gathering weather information. Your help goes a long way toward accomplishing effective and responsible weather communication. If you haven't already, please give us a follow!



Lightning Explained

By Steve Zubrick, Science and Operations Officer



A typical cloud-to-ground (CG) lightning "flash" starts as a series of descending "stepped leaders" from cloud to ground. These leaders progressively lower bundles of negative charge towards the ground and are not visible by the human eye. They move VERY fast; lowering a charge bundle a distance vertically of ~1 city block in 1 microsecond; with a pause of 40-60 microseconds between progressive charge lowerings.

Once a stepped leader gets close to the ground (~30-50 ft. up), a ginormous voltage potential (~10 million volts) develops. Positive charge ions from the ground "sense" the negative charge being lowered and begin streaming upwards to meet the stepped leader.

Once they meet (30-75 feet up), a channel of ionized charge is established between cloud and ground. At THIS point, a powerful and very visible "return stroke" rockets upwards through this preferred charge channel from earth to the cloud at a speed much faster than what it took the stepped leader to descend. This return stroke is extremely bright and HOT (30,000° C; 54,000° F; hotter than the sun's surface!!). It's what we humans see.

Also, this rapid and explosive heating of air surrounding the channel causes an atmospheric shock wave that we call thunder.

Finally, once the return stroke hits the cloud, more bundles of negative charge stream downward as a "dart leader" traveling down through this channel. When the dart leader nears the ground, another big return stroke travels back up from the ground to cloud. This process of a (non visible) dart leader followed by (visible) return strokes can happen up to 10 times; typically 4 return strokes on average.

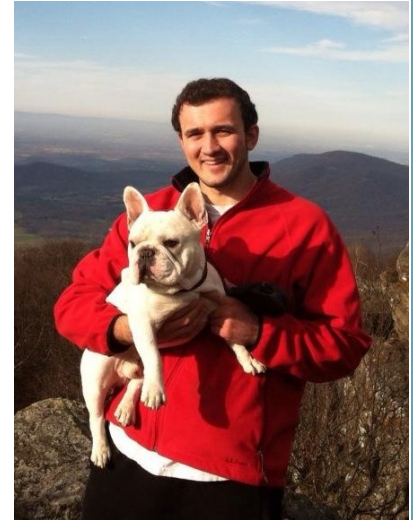
There is a 1/20 second gap between the two return strokes. This gap is just perceptible by the human eye, and so the series of 4-10 return strokes appears to "flash". The entire process explained above, is called a lightning "flash".

Summer Student Bios

By *WOODY! Senior Forecaster*

NWS Sterling has had a history of hosting extremely talented college students each summer as part of the student intern volunteer program. 2014 was far and away the largest group of applicants this office has seen. Three applicants were ultimately chosen from this pool.

Stas Speransky (right). Stas was a summer student in 2014. He graduated from the Masters Program in Meteorology at Florida State University in December, and is now an instructor at the National Weather Service Warning Decision Training Branch in Norman, OK. Prior to arriving at our office, Stas had traveled to the NWS Birmingham, AL office to obtain his certification to launch weather balloons, which he began doing at Sterling in his first week here. The research project he worked on was designed by MIC Jim Lee, and dealt with developing a technique that enhances skill at predicting surface wind gusts in a stable atmosphere.



Sierra Sult (left). Sierra was our first-ever student from the relatively new meteorology program offered by Virginia Tech University. She will graduate with a BS in Meteorology this May. Just like Stas, Sierra leapt into learning NWS Sterling operations in her first week. Her project was also designed by MIC Jim Lee, and dealt with “the production of a more effective NWS digital database for winter mixed precipitation type environments in the Mid Atlantic.” Sierra loves sports, including running, soccer, and cycling.

James Stanley (right). In past years NWS Sterling has been pleased to host several students from the meteorology program at North Carolina State University, as well as had several NC State graduates become full-time employees. James Stanley graduated from there last December. His mentors were Ken Widelski and Steve Zubrick. His research dealt with the evaluation of the performance of a suite of winter probability products which debuted at NWS Sterling during the wild winter of 2013-14. James’ hobbies include singing, dancing, and playing drums.



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Student Bios (continued)

In other student intern news, NWS Sterling is very excited to announce that three recent members of our program have been selected to full-time positions at NWS Forecast Offices:



Joe Wegman (left). Joe spent three summers with us (2007-2009) studying the effects of upslope snow along the western ridges of the Allegheny Highlands. The results of Joe's study are used each winter by Sterling forecasters. After receiving his undergraduate degree from SUNY-Oswego Joe went on to obtain a Masters of Meteorology degree from the University of Illinois. We were excited to learn that last May Joe was selected for a Meteorologist Intern position at the NWS Anchorage office. In addition he also became the father of a baby girl.

Michelle Cohen (right), who received her undergrad degree from Tufts University, worked here during the summer of 2011. She researched/ authored an extensive analysis of the January 26, 2011 snowstorm which caused incredible afternoon gridlock on Washington DC roads. After her internship with us Michelle spent two years at the Meteorological Development Laboratory developing model equations. Michelle is now a Meteorologist Intern at the NWS Medford, Oregon office. She says she's learning mountain, marine AND desert weather forecasting there.



From our class of 2013...recent Ohio State graduate **Chris Birchfield (left)** was chosen for a Meteorologist Intern position at NWS Brownsville, TX last year. We heard the applicant pool for the position was enormous, and suspect Chris' tremendous work with us two summers ago played a part in his selection. During his time with us Chris worked extremely hard. His research presentation on "Probabilistic Snowfall Forecasts" was awarded second place in the student division at the National Weather Association conference in the autumn of 2013.

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*Student Bios (continued)***2015 offers to be another promising year, with two student intern selections made.**

Katie Thomas (right) is a third year undergraduate student attending George Mason University. She is majoring in Atmospheric Science, concentrating in Meteorology with a minor in Geographic Information Systems. Her fascination with extreme weather began as a child while living and traveling in southern Africa. She then lived in Texas where she witnessed very powerful hurricanes, such as Katrina and Ike, which fueled her interest in the field of severe weather. Outside of academics, Katie co-founded ForecastGMU, a social media and weather blog for George Mason University, and she also co-hosts a weekly weather radio show on her school's radio station. She is a member of The American Meteorological Society, the National Weather Association, The National Society of Collegiate Scholars, Gamma Phi Beta Sorority and also works part-time off campus. She recently interned with the Channel 7 WJLA Weather Center in Arlington, VA.



Seth Garland (left) is currently a Third Year student at the University of Virginia studying atmospheric and environmental sciences. He is part of the UVA Rugby team, as well as a cadet in the Air Force ROTC Detachment 890. His passion with meteorology started when "[he] was in elementary school and watched the movie "Twister" with Helen Hunt and Bill Paxton." He was fascinated and wanted to know all he could about the force nature can release during severe weather events. This passion for weather is what prompted him to declare himself as an environmental science (atmospheric science) major upon entering UVA. Upon commissioning into the Air Force after graduation, he will serve as a Weather Officer. After serving his required years in the Air Force, he plans to look into a career as a Smokejumper, fighting the wildfires out West. Every Smokejumper team has a meteorologist who analyzes weather data to help plan the safest way to go about fighting the fire; similar to a Weather Officer. Once he is ready to move on from the Smokejumper career, he wants to follow his desire of being a Storm Chaser, studying and researching tornados.

Kid's Weather Days with the Washington Nationals and Baltimore Orioles

By Greg Schoor, General Forecaster

What better way to teach kids about weather and weather safety than a day at the ballpark? The Washington Nationals again teamed up with local FOX-TV affiliate WTTG Channel 5, hosting the fifth annual Kid's Weather Day at Nationals Park, just a few blocks south of the U.S. Capitol Building. A week later, the Baltimore Orioles and local CBS-TV affiliate WJZ-13 in Baltimore hosted their own event, the seventh-annual "Field Trip Day" at Camden Yards.



Chris Strong and Ron Gird demonstrate lightning safety with an interactive quiz and a Van de Graaff machine at "Kid's Weather Day at Nationals Park" on May 7, 2014.

On the morning of May 7, 2014, over 5,000 local area students piled into the stands behind the visiting team dugout at Nationals Park. FOX 5's Weather Team, meteorologists Tucker Barnes, Gwen Tolbart, Chief Meteorologist Sue Palka, and anchor Wisdom Martin led the festivities. The event was covered with commentary and several Jumbotron presentations of the common and sometimes uncommon weather hazards that affect the Mid-Atlantic region. The past several years have brought a

number of memorable high-impact weather events to the National Capital Region, including recent snowstorms, flash flooding, tornadoes and severe thunderstorms, the effects of Hurricane Sandy, and a powerful derecho a couple of summers ago.

One week after Kid's Weather Day, WJZ-13 and the Baltimore Orioles hosted Field Trip at Camden Yards in downtown Baltimore, MD. WJZ-13 Weather Team meteorologists Bob Turk, Tim Williams, and Chelsea Ingram welcomed over 10,000 area students, teachers, and chaperones with their own weather-related presentations, videos, trivia, and entertainment.

At both events, when the topics turned to weather science and forecasting, Chris Strong, Warning Coordination Meteorologist, represented the National Weather Service Baltimore-Washington office by explaining the purpose of the oversized, beige balloon and the small white box with a little orange parachute he was holding.

"Are there any future meteorologists here today?" Strong inquired of the crowd with a number of enthusiastic screams accompanying his question.

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Kid's Weather Days (continued)

Chris Strong (center) explains the radiosonde he is holding to Fox 5 meteorologists Tucker Barnes and Sue Palka, as Wisdom Martin looks on, at "Kid's Weather Day at Nationals Park" on May 7, 2014.

A number of students and adults alike wanted to know the purpose of the oversized balloon that greeted them as they entered the stadium. With a microphone in one hand and the radiosonde, balloon combination in the other, Strong addressed their curiosities. "We want to know what's going above us, so we launch one of these weather instruments in the atmosphere. We do this from

our office twice a day, as is done all across the country, all across the world. These weather instruments are going up at the same time to measure temperature, winds, humidity. Weather comes at us from the sky. And nothing beats putting a thermometer up there and seeing how conditions are happening right now could affect us later on.

After an enthusiastic five-second countdown from several thousand kids, Strong released the balloon which took less than a minute to completely disappear from view in the low overhead stratus layer.

Mascots from each MLB franchise also joined the party to help bolster the excitement level of any already ecstatic crowd. With thoughts of summer fun and plenty of outdoor activities on the minds of these kids and their families, but the main message of these events was weather safety and awareness.

Representatives from National Weather Service Headquarters in Silver Spring, MD joined the festivities at Nationals



NWS's Owlie SKYWARN, joins the FOX5 Weather Team as students at "Kid's Weather Day at Nationals Park" on May 7, 2014.

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Kid's Weather Days (continued)

Park with a special guest. Owlie SKYWARN, played by Sean Potter, Communications Specialist from the NOAA/NWS Office of Communications & guided by Melody Magnus from NWS Outreach, gave kids a friendly face to associate with the message of weather safety and awareness. Ron Gird, NOAA/NWS Outreach Program Manager educated kids with a lightning safety computer demonstration, quizzing them on safe and unsafe places to be when lightning is in the area. After taking the quiz, kids then were able to get a better appreciation for electric charge by working with a Van De Graaff machine. Strong also gave multitudes of kids a good case of static cling, a hair-raising experience, with the hands-on demonstration of the machine. Many were given a sudden and exciting jolt, enough to give them an appreciation for the power of electricity, albeit in an incredibly small dose.

Plenty of cloud cover greeted the attendees of each event with mild morning temperatures and typical high humidity during the Spring in the Mid-Atlantic. An early morning thunderstorm complex from the Ohio Valley rolled across the Appalachians on the morning of May 7th, with Washington D.C. in its sights. On-duty meteorologists at the NWS Baltimore-Washington Forecast Office tracked the complex and timed the arrival well after the event ended, which gave kids a safe real-life example of lightning safety, a message that was being delivered throughout the event.

The uniformed members of WJZ-13's Weather Team, Chelsea Ingram (left), Tim Williams, and Bob Turk (right), with Chris Strong and Greg Schoor from NWS Baltimore-Washington (center), at "Field Trip Day at Camden Yards" on May 14, 2014.



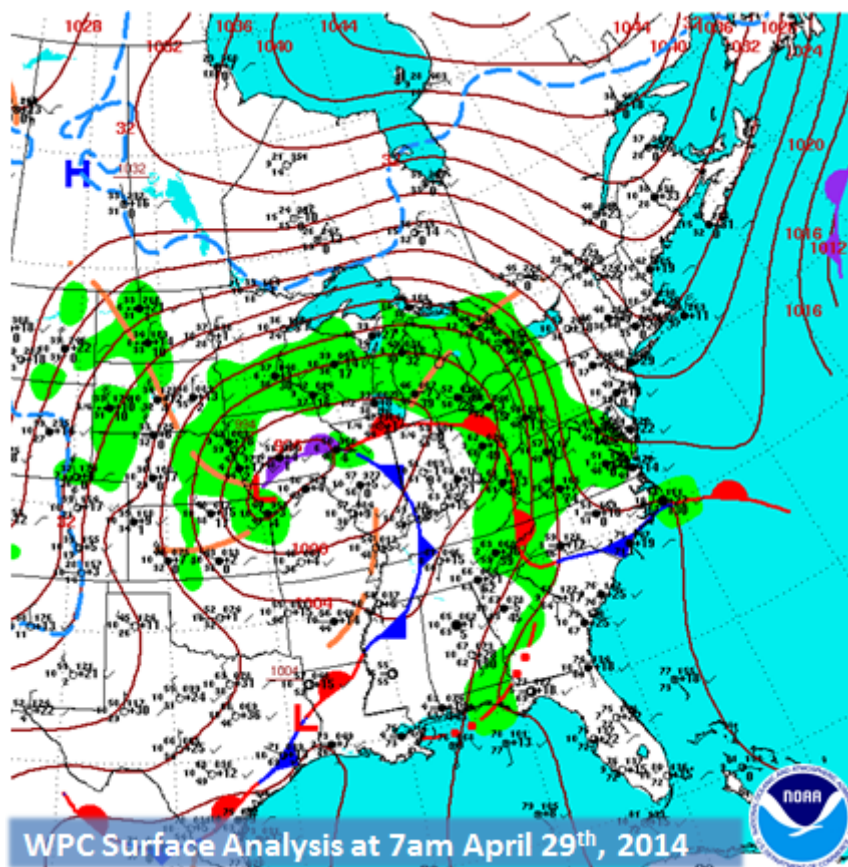
Heavy Rainfall Events in Late April and May 2014

By Jason Elliott, Senior Service Hydrologist

Although the mid-Atlantic had experienced a long and snowy winter, the melting of the snow was gradual and the area largely avoided flooding problems. As springtime arrived, however, the cold and snowy pattern gave way to a milder and wetter one, and two significant flooding events occurred in less than three weeks' time, with virtually the entire Baltimore/Washington Hydrologic Service Area receiving heavy rain and at least minor flooding from one – or in a few cases, both – events.

Late April 2014 Flood Event

The first event occurred April 29th and 30th 2014. Very strong high pressure was centered east of Hudson Bay in Canada, forcing cold air southward into the region. Meanwhile, aloft, deep moisture was pushing into the area on a southerly/southwesterly wind around an upper low over the Midwest. This combination led to a chilly, heavy rain due to atmospheric lift up and over the stalled surface front to our south and west.



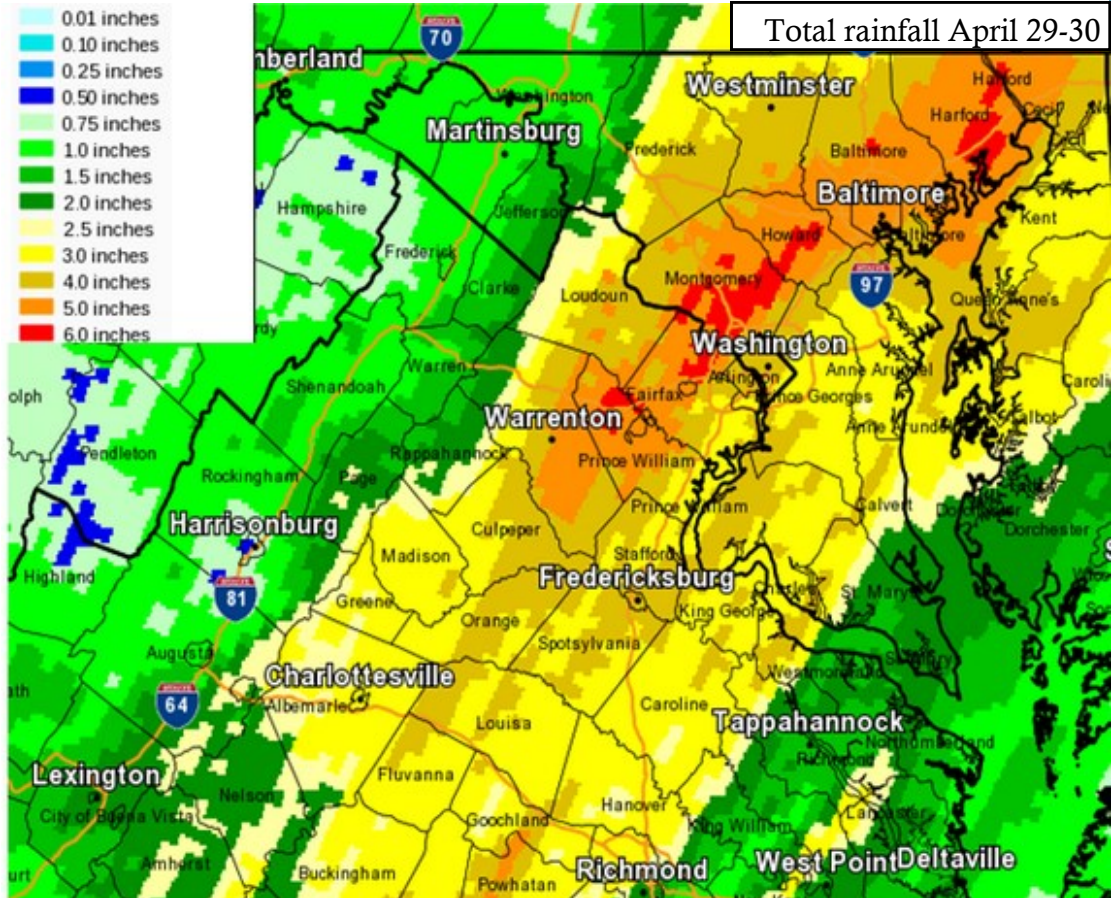
Overall, rainfall rates were not excessive, but the rain was consistently moderate to heavy for many consecutive hours. For example, a rain gauge in Ellicott City (Howard County, MD) recorded more than two tenths of an inch of rain every hour for eleven hours – but never more than a third of an inch in any hour. There was some locally heavier rain in a narrow band from Montgomery County, MD to Harford County, MD. In these areas, an inch of rain fell in about an hour during the late afternoon. When combined with the steady rain that had already fallen, this was enough to cause localized flash flooding. The USGS stream gauge on Turkey Branch near Rockville, MD rose over four feet in just 15 minutes with flooding reported in the area. A block-long landslide occurred in Baltimore, damaging eight vehicles and

forcing some residents out of their homes for weeks.

(continued next page)

Heavy Rains (continued)

As shown in the image (right), event rainfall totals were three inches or more in most areas east of the Blue Ridge and Catoctin Mountains. This was enough to cause widespread flooding throughout the metropolitan areas and in the Rappahannock River basin. The flooding on the Rappahannock was the worst since 1996, with the water level at Fredericksburg's City Dock reaching a peak of 22.3 feet. In total, 38 river gauges monitored by the



Baltimore/Washington National Weather Service office exceeded their defined flood stages. This included flooding in the Laurel area due to significant releases from Duckett Dam.

Mid-May 2014 Flood Event

While the area was still recovering from the end-of-April event, conditions again became favorable for heavy rain by the middle of May. Similar to the April event, deep moisture spread into the region with an upper low over the Midwest. Unlike the April event, warmer air was able to push northward into the area, as high pressure moved offshore sooner.

This led to a shorter period of heavy rain, but with somewhat heavier rain during the peak of the event, especially just west of the metropolitan areas. Unlike the previous event, rainfall was less significant closer to the Chesapeake Bay in the Baltimore metro area, confining most of the flooding to areas west of I-95 and sparing the larger cities from a second round of significant flooding.

The heavy rain further west did cause significant flooding. On Opequon Creek, which runs just west of Berryville, Virginia to just east of Martinsburg, West Virginia, the river level was the highest since 1996. Sadly, one fatality occurred when a motorist drove into the floodwaters of the creek. Minor to moderate flooding occurred over a widespread area, and the water funneled into the

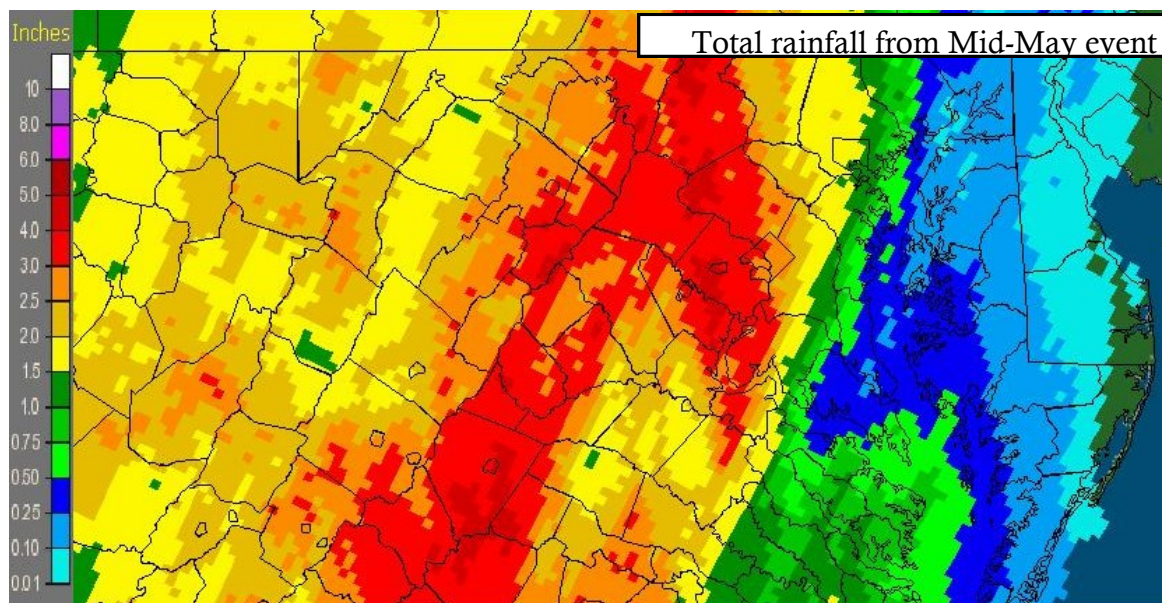
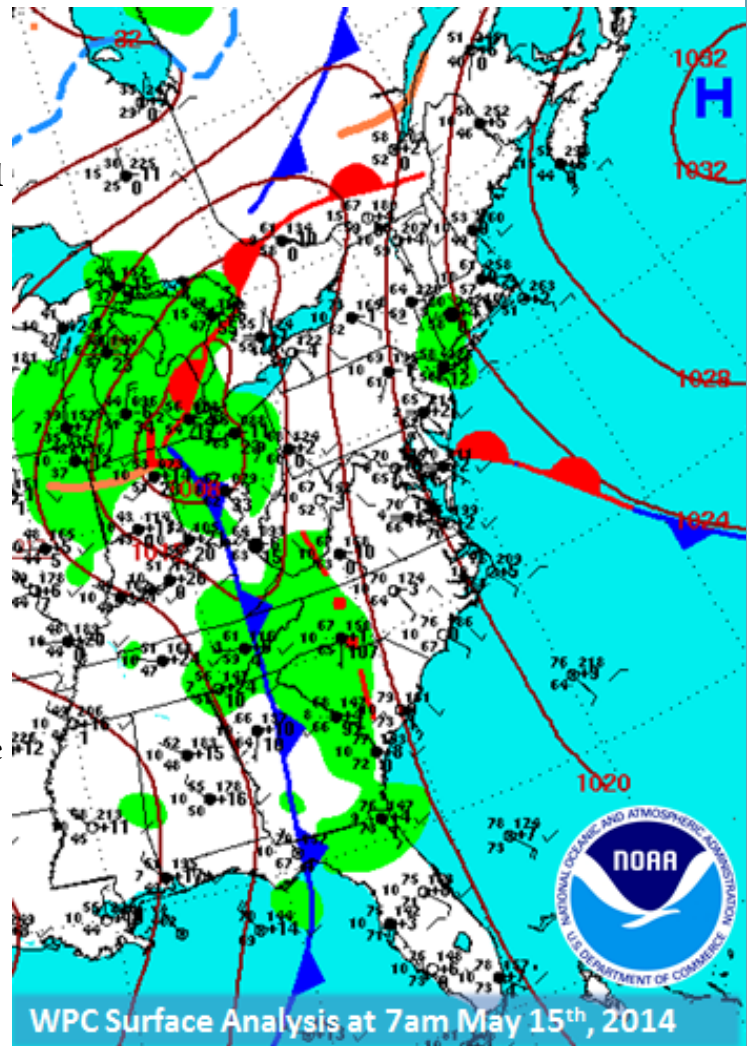
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Heavy Rains (continued)

Potomac River, causing flooding of the White's Ferry Store and low-lying areas near Washington DC's Potomac Park and Waterfront.

In all, 56 stream gauges monitored by the National Weather Service exceeded their defined flood stages in this event. 19 of these locations flooded in both the late April and mid-May 2014 events, including seven river forecast points.

Over the past several years, the National Weather Service Baltimore/Washington office has been field surveying stream gauges to determine flood levels. These events show that this work has benefitted the people of the mid-Atlantic region by providing better, more meaningful warnings during flood situations. The effort is still ongoing, and some of the existing impacts and flood levels are being reviewed following the recent floods. We use your reports, USGS datum reassessments, FEMA Flood Insurance Studies, LiDAR aerial photography, as well as our field work and other available data to make and revise these determinations. Please contact us if you have any questions, or images or historical references that might assist in ensuring the most accurate information possible.



2014 Cooperative Length of Service Awards

By Calvin Meadows, Observation Program Leader

Congratulations to Reverend Richard Weaver and to Mrs. Alice Allen!

Reverend (ret) Richard Weaver is the recipient of the Edward H. Stoll Award in recognition of your 50 years of dedicated service as a Cooperative Weather Observer.

This award is presented in honor of Edward H. Stoll (1886-1981) who was the Cooperative Weather Observer for over 76 years at Elwood, Nebraska (1905-1981). He was the first to receive this prestigious award for 50 years of weather observing.

Rev. Weaver joined the Cooperative Network as a back-up observer for the station at Dale Enterprise in Rockingham County Virginia in September of 1964. After his mother-in-law, Mrs. Grace Grove, died he took over duties as the primary observer in 1987. Although Rev. Weaver has stepped down as the primary observer, he has resumed his role as the station's back-up observer.

The Dale Enterprise Cooperative Network station has been in existence since August 1880. Throughout this time the station has remained at the same locations (except for localized equipment moves) and the Grove/Weaver family has been involved in reporting its weather.

Mrs. Alice Allen is the recipient of the Dick Hagemeyer Award for serving 45 years faithfully as a Cooperative Weather Observer.

This award is presented in honor of Dick Hagemeyer (1924-2001), whose career in NOAA spanned 51 years, the last 20 as Director, Pacific Region. Early in his career, he served as Cooperative Program Manager and was an ardent supporter of the Cooperative Observer Program.

Mrs. Allen joined the Cooperative Network in July of 1969. When it became necessary to relocate Craigsville Cooperative Station, Alice stepped forward to offer her home as the new location and her services as the primary observer. Between Alice and Lewis, her husband, the Allen family has provided 45 years of dedicated service to the National Weather Service.

Cooperative Network stations provide the National Weather Service with daily, observational data in support of our nation's climatology and the local Weather Service Office's forecast programs. Observers serve on an unpaid basis reporting temperature and precipitation data daily, and at the end of each month.

2015 Cooperative Length of Service Awards

By Calvin Meadows, Observation Program Leader

In recognition of the outstanding service that these individuals, families, and institutions have provided the nation's climatological and hydrological communities in general, and WFO Sterling in particular, we are proud to present the following awards for:

10 Years: Mr. Steven F. Durst, in Bayard WV

20 Years: Mr. Wayne A. Fyre, in Edinburg VA

Mr. Scott Tester and Mrs. Kathy Tester, in Sperryville VA

Mr. Daniel Gropper, in Vienna VA

Mr. William Pancake, in Keyser, WV

Mr. William F. Davis, in Keyser WV

50 Years: Mr. William Speiden, in Somerset VA

Mr. Timothy Thomas, in Cumberland MD

75 Years: Shenandoah National Park/Fire Management Office, in Luray VA

Mark Twain is credited with having made the remark, "Everyone talks about the weather, but nobody does anything about it." **We don't know how much you have talked about the weather, but we do know that you have taken time to do something about it and for that we are profoundly grateful for your help!!**

SKYWARN®

We have had a busy SKYWARN® class schedule this spring, with 6 classes still scheduled for April and May! Please visit our SKYWARN page to see if there is a class near you.

www.weather.gov/lwx/skywarn

We will be scheduling SKYWARN® classes for the fall very soon. If your county or city is interested in hosting a class, please email the LWX SKYWARN® office coordinator, Ashley Sears at ashley.sears@noaa.gov.



We need your Storm Reports!!

Events of tornadoes, hail, damaging winds,

and flooding are very important to us.

How to report:

Telephone: 1.800.253.7091

Amateur Radio: WX4LWX

Email: LWX-report@noaa.gov



Photo Courtesy of Isha Renta

Spring 2015

Contributors:

Jason Elliott

Calvin Meadows

Greg Schorr

Heather Sheffield

Andrew Snyder

Kyle Struckmann

Editor in Chief:

Dan Hoffman

Assistant Editor:

Ashley Sears

Meteorologist-in-Charge:

James E. Lee

National Weather Service
Baltimore MD/Washington
DC

43858 Weather Service
Road

Sterling, VA 20166

703.993.2200