PEAK PERFORMANCE

NWS Office of Climate, Water, and Weather Services
Silver Spring, Maryland

August 2008

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New TAF Training Modules

By Chuck Kluepfel, NWS Headquarters

The National Weather Service (NWS) Training Center in Kansas City is scheduled to complete the training module titled, *Terminal Aerodrome Forecast (TAF) Verification: Stats on Demand (SOD),* by the end of August 2008. We extend our thanks to Jerry Griffin (Training Center), for leading the effort on this rewrite of an earlier module. Thanks also to the following people for their efforts in this work: Jason Alumbaugh, Marquette, Michigan (MQT); Scott Carpenter, Billings, Montana (BYZ); Aaron Dorn, Aberdeen, South Dakota (ABR); Dustin Harbage, Jackson, Kentucky (JKL); Brent MacAloney, NWS Headquarters Performance Branch, and Mike Graf and Kevin Johnston, NWS Headquarters Aviation Services Branch. I'm also working on a supplemental TAF training module titled *Interpreting TAF Verification: the Impact of Temporary (TEMPO) Forecasts,* which concentrates on better understanding the TAF TEMPO and operational impact forecast verification reports. The scores calculated for the operational impact forecasts are often *strongly* influenced by the use of TEMPO forecasts. I expect to complete this more advanced module by the end of August. It is based upon a couple of presentations I gave on the road last year to aviation workshops. I recommend that you take a look at each of the modules when you get a chance. If you are not too familiar with the TAF Stats on Demand program or have been viewing the numbers without a full understanding of their meaning, I recommend that you start with the more introductory module. The more advanced module assumes a basic understanding of the system and is designed to take you deeper.

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New TAF Training Modules – Continued from Page 1

I have a few comments to make about TEMPO forecasts based upon Stats on Demand reports. **Figure 1** contains a TEMPO verification report for the entire National Weather Service during fiscal year 2007. It includes significant weather type data, which consists of various forms of precipitation and obstructions to vision. Please concentrate on the number of hours that TEMPO forecasts were justified or passed the variability test (column d). Each TAF is evaluated every 5 minutes, based upon the latest transmitted Automated Surface Observing System (ASOS)/Automated Weather Observing System (AWOS) observation as an Aviation Routine Weather Report (METAR) or Special Weather Observation (SPECI). A fairly complex algorithm is conducted whenever a TEMPO forecast is in effect to see if the observation record supports the actual variability forecasted by any TEMPO group. The only "variability" expected of any significant weather type is the starting and stopping of the phenomena—precipitation intensity is not considered. See the more advanced training module for more details.

Ideally, if all our TEMPO forecasts are actually experiencing variability in the observations, the numbers in column (d) would match the numbers in column (c). In reality, the values in column (d) tend to be about 10 to 20 percent of the total TEMPO use (in column c) for that element so we probably have some work to do in terms of winnowing down TEMPO usage. For example, take a look at the thunderstorm line. Nationally for fiscal year 2007, 15,830 hours (21%) out of a total 75,143 TEMPO thunderstorm hours were justified, which means that 21% of the TEMPO thunderstorm forecast hours passed the variability test. Any over-forecasting of TEMPO conditions hurts flight operations because it

TEMPO FORECASTS (EVALUATION BY 5-MINUTE INTERVALS)

	Condition Observed (Hours)	TEMPO FORECAST (Hours)	Justified TEMPO		Unjustified TEMPO			
			Number of Hours	Hits % of (d)	Number of Hours	TEMPO S/B FM % of (f)	TEMPO Benign % of (f)	TEMPO Hurt % of (f)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
LIQUID PRECIP	259992	297172	111636	42%	185535	30%	2%	58%
SNOW TYPES	100200	109313	30158	46%	79155	42%	1%	41%
ICE TYPES	7581	5205	367.8	43%	4837	13%	1%	76%
FREEZING PRECIP	4248	6894	1334	47%	5559	18%	2%	68%
FOG / MIST	439357	316391	38730	60%	277661	44%	4%	38%
HAZE / SMOKE	111585	18128	1982	52%	16146	51%	13%	26%
THUNDERSTORM	34305	75143	15830	43%	59313	6%	0%	92%
HAIL	508	550	2.4	17%	547.3	0%	0%	100%
SQUALLS	889	49	1.4	47%	47.1	0%	0%	100%
BLOWING SNOW	6898	8675	477.8	63%	8197	30%	2%	40%
BLOWING SPRAY	64	12	0.0	---	11.8	33%	0%	67%
VOLCANIC ASH	19	0	0.0	---	0.0	---	---	---
DUST / SAND	4657	1245	29.1	57%	1215	8%	1%	84%

Figure 1: TEMPO verification report for the entire National Weather Service for the fiscal year 2007.

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New TAF Training Modules – Continued from Page 2

forces pilots and flight operations personnel to plan around TEMPO forecast conditions that did not happen. A TEMPO forecast implies high certainty (greater than 50% probability) and high variability in the phenomena included.

Thus, if we limit our TEMPO usage to times when we are almost certain that fluctuating conditions will occur, our tendency to over-forecast them should drop. Our users do not want us utilizing TEMPO forecasts to communicate uncertainty. When uncertain conditions begin to change, they prefer that we amend our TAF, frequently if necessary. The only tools we have to legitimately communicate thunderstorm forecast uncertainty in a TAF are (a) the PROB30 change indicator beyond the 9th projection hour of the TAF, and (b) the use of vicinity thunderstorms (VCTS) for any projection.

Next, take a look at the fog/mist element. Out of a total of 316,391 TEMPO hours that included fog/mist, only 38,730 hours (or 12%) were justified. This means that TEMPO usage for fog/mist was unjustified or lacked sufficient variability in the observation database 88% of the time. Of these 277,661 hours that the TEMPO forecast was unjustified for fog/mist, 44% of the hours were hits. While it would be nice to get credit for these *hits*, they were not tabulated as hits but as "TEMPO should be from (FM)" hours. This was because the required fluctuating nature of the TEMPO forecast was not supported by the observation record. In general, the NWS should forecast TEMPO fog or mist less frequently and prevailing fog or mist (using the FM change indicator) more frequently. That's nice, but what should *you* do? Check out your personal numbers and adjust your TAFs for your known biases accordingly.

Technically speaking, the TEMPO reports do not provide verification statistics, but they provide each forecaster with valuable feedback on the use of TEMPO forecasts.

Two More for the Road

By Wayne Presnell, NWS Headquarters

Two more national service assessment teams have been formed by the NWS in 2008. Deadly tornadoes affected northeast Oklahoma and southwest Missouri on May 10, 2008, Mother's Day weekend, and historic flooding occurred in the Midwest throughout the month of June. The NWS has not formed more than three national service assessment teams in one calendar year since 1998. The most national assessment teams formed in one year by the NWS is 7 in 1992. The NWS forms national service assessment teams to evaluate its performance during significant hazardous weather events.

One of the tornadoes during the Mother's Day Weekend outbreak reached EF4 on the Enhanced Fujita Scale and caused 19 fatalities (preliminary count). This EF4 tornado caused six fatalities and numerous injuries in the town of Picher, Oklahoma. Picher used to be a lead and zinc mining town with a population of 16,000 before WWII. Unstable ground and contaminations caused by the mining have reduced the town's population to about 800 in 2008. Speculations indicate this catastrophic event will be the eventual end of the town **(Figure 1)**.

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Two More for the Road – Continued from Page 3

Figure 1: Cleanup crews continue work in a neighborhood in Picher, Oklahoma, Monday, May 12, 2008. (AP Photo/ Sue Ogrocki)

The violent tornado moved east from Picher and caused 13 fatalities near the community of Racine, Missouri, south of Joplin, Missouri. The majority of these fatalities occurred in automobiles as people tried to escape the tornado. The NWS does not recommend using a vehicle to escape tornadoes.

Several days of heavy rain on top of saturated soils caused catastrophic flooding across the Midwest. Some of the states significantly impacted are Iowa, Wisconsin, Illinois, Missouri, and Indiana. Soils were saturated from above normal amounts of snow during the winter and consistent spring rains. The heavy rain that fell from June 1-15, 2008, across the area was more than the soil and waterways could handle. Review the map of June *1-15, 2008 Precipitation Totals* on page 6 **(Figure 2)**. There were many flood records broken across the Midwest during June. As of June 30, 2008, there have been 24 (preliminary count) fatalities due to the flooding and damage is close to $5 billion.

Despite high quality services from the NWS during these events, the number of fatalities was unusually high. The assessment teams will focus on NWS operations, services, and societal impacts. Is there a way for the NWS to elicit better responses to hazardous weather warnings and watches? These teams will attempt to find that out. The teams will also identify areas for improvements and make recommendations, which will aid decision makers in their preparedness strategies. The team will identify best practices for other NWS offices to emulate during similar severe weather events.

Please see Two More for the Road (Precipitation Totals) on Page 6

ASK CHUCK!

By Chuck Kluepfel, NWS Headquarters

Question: Please explain the difference between the National Fire Danger Rating System (NFDRS) point forecasts and zone forecasts.

Answer: I will defer to a Fire Weather expert, Larry Van Bussum, NWS Headquarters Fire Weather Operations Coordinator:

"When a zone forecast is sent, it is a trend forecast (for example, temperature up 2°F, RH down 3%, etc.). We have encouraged our offices to go to individual forecasts for each NFDRS station because with grids it is relatively easy to get first guesses for each station and tweak them. The zone trend was instituted pre-grids as a way to get numerous NFDRS forecasts done without making each from scratch. The dangerous thing about trends is illustrated by the following example:

> You have two stations in a zone. One is showing a 5% RH, and the other has 15%. You forecast a trend down 5%. That brings the 15% station down to 10%. Unfortunately, that trend forecast also lowers the 5% forecast to 0%, which is not realistic.

"To counter this problem, we recommend using the grids as the first guess field. You are not saving time anymore by preparing trend forecasts for a zone when the grids already give you the first guess forecasts for individual stations. In my opinion, there is no reason to be doing trend forecasts for NFDRS zones anymore, and the practice should be discouraged."

"That being said, if an office prepares a trend forecast, then the individual stations are still given a forecast with the second issuance of the Fire Weather Observation (FWO), and those forecasts can be verified—they are just like forecasts for individual stations."

What is the NFDRS?

Excerpt from National Weather Service NFDRS webpage:

http://www.wrh.noaa.gov/sew/fire/olm/nfdrs.htm

The National Fire Danger Rating System (NFDRS) is a set of computer programs and algorithms that allow land management agencies to estimate today's or tomorrow's fire danger for a given rating area. NFDRS characterizes fire danger by evaluating the approximate upper limit of fire behavior in a fire danger rating area during a 24-hour period. Calculations of fire behavior are based on fuels, topography and weather, or what is commonly called the fire triangle. NFDRS output gives relative ratings of the potential growth and behavior of any wildfire. Fire danger ratings are guides for initiating pre-suppression activities and selecting the appropriate level of initial response to a reported wildfire in lieu of detailed, site- and time-specific information. It links an organization's readiness level (or pre-planned fire suppression actions) to the fire problems of the day.

Two More for the Road – Continued from Page 4

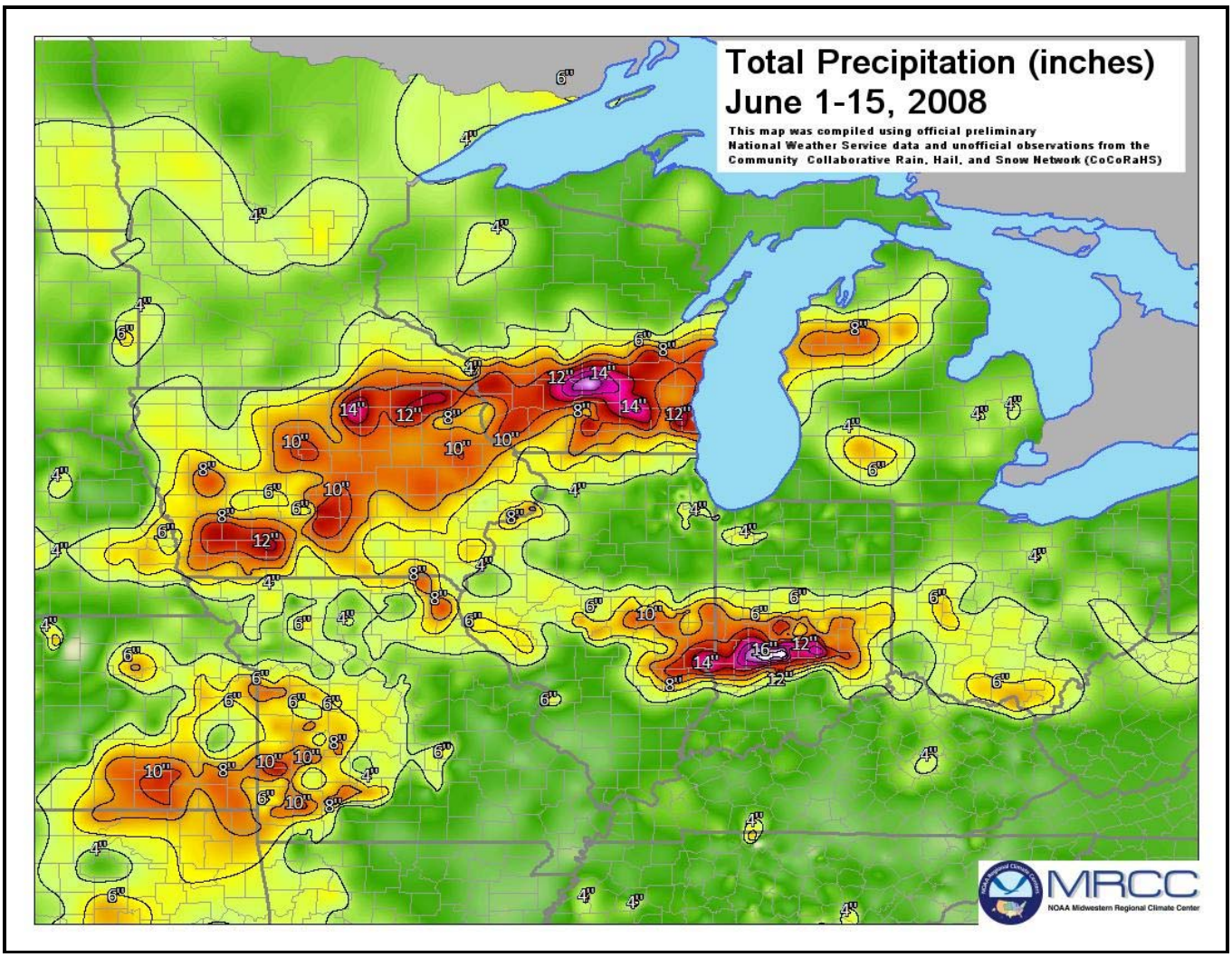

Figure 2: Map of precipitation totals observed (inches) during the period June 1-15, 2008. The maximum of 16+ inches fell across central Indiana with 14+ inches observed across northern Iowa and south-central Wisconsin. This image is courtesy of the Midwest Regional Climate Center.

On the Road Again...

"I did go home having learned a lot and with some wonderful memories."

By Brent MacAloney, NWS Headquarters

Here in Washington, DC we are now in the *dog days of summer*. The days are long and packed with bad air quality, a lot of heat with more humidity. It's no wonder this is the time of year where I try to escape Silver Spring and head out on the road. This year I was able to land three weeks of travel in early June, away from this "yuck".

First up, I was invited to speak at the Southern Region Meteorologist-in-Charge (MIC)/ Hydrologist-in-Charge (HIC) Workshop held in Norman, Oklahoma the first week of June. Since this was the first time I had been invited to any sort of Southern Region led workshop, I was excited about the opportunity to interact with a new audience. This was also the first time I was able to demonstrate the Storm-based Warning verification to a *live* audience. Many of these managers had never seen all their severe weather events overlaid with the warnings issued on a mapping interface. They were able to witness how the detailed analysis allows their forecasters the ability to see how we performed in "warning the public." I came away feeling like the MICs and HICs were really excited about this new program.

A great discussion took place at the end of this presentation as several MICs relayed information from their Warning Coordination Meteorologists (WCMs) and Storm Data Focal Points on how we can make the StormDat program better. In particular, forecast offices were looking for more detailed county boundary information in the StormDat mapping interface. Currently, the Performance Branch contractors are in the process of adding this feature to the program.

I finished this trip by swinging by the National Weather Center in Norman on my way to the airport. It happened to be a great day for this visit, as severe weather was raging from Colorado to Maryland. This gave me the opportunity to see a lot of severe weather projects in action. The Severe Hazards Analysis and Verification Experiment (SHAVE) was in full swing as a phone bank full of university students made calls to areas in which the students estimated severe weather occurred. The goal here is to create a high resolution dataset of verified weather events for the Hazardous Weather Testbed (HWT). More information regarding this program can be found on the Internet at: http://ewp.nssl.noaa.gov/projects/shave/index.php.

During the second week of June, I was off to Alaska for several presentations. First up was a visit to the Anchorage Weather Forecast Office (WFO) to give a presentation at the Alaska Region WCM Meeting. I enjoy verification discussions with the Alaska Region. This gets me away from the typical hot topics of the lower 48 states, like severe weather verification. Up there forecasts in the aviation, winter weather, and marine worlds are their "bread and butter." This day ended nicely with a relaxing bike ride on the Tony Knowles Coastal Trail along the Cook Inlet with my wife, Manina, who was along for the trip.

Next, I went over to the Alaska Regional Headquarters for a Performance Branch program

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On the Road Again- Continued from Page 7

overview presentation. We feel it is very important to visit each of the Regions on a two year cycle to present the latest in our development efforts, as well as hear the local concerns and needs. I had a great discussion with the Alaska Region folks regarding all aspects of the program including winter storm verification and service assessments.

On my last day in Anchorage, I went back over to the WFO to discuss verification with the staff. As part of that, I had a wonderful discussion with Robin Radlein, Hydrologist-in-Charge at the Alaska - Pacific River Forecast Center, regarding the challenges and unique situations faced in Alaska with regard to getting quality flooding observations and how that impacts their verification. In today's society with the ever expanding population density that we are accustomed to seeing, it's amazing to think there are still places on the Earth with little or no inhabitants. Alaska is truly unique in that sense.

After the Anchorage visits, we took a long drive up to Fairbanks, Alaska. On our way, we ran into a NWS Cooperative Observer Program (COOP) observer, who runs Mukluk Land, a famous roadside attraction in the town of Tok, Alaska. If you are in the area, this is a "must see" attraction. Who wouldn't want to be photographed next to the "World's Largest Mukluk" or the "Largest Collections of Outhouses in Alaska?"

At this point I was ready for a relaxing weekend! We spent our days off on a beautiful ride up to the Chena Hot Springs, panning for gold at Dredge #9 **(Figure 1)**, and eating all the rhubarb pie I could find at the Fairbanks Farmers Market.

As Monday rolled around it was back to business. I had plenty of work on my hands at the Fairbanks WFO. The "Fairbanks Johns" (Dragomir and Lingaas) set up a full day of training for their staff on everything from the new Storm-based Warning verification program to understanding the Point Forecast Matrices (PFM) probability of precipitation (PoP) data; also, reading contingency tables. What a great day of training and discussion! Nothing is better than sitting in front of a room, explaining how to interpret data on a verification report and watching everyone in the room get that "oh yeah, I get it now" look on their faces. It's an *amazing* feeling.

Figure 1: Brent shows off all the gold he found at Dredge #9 in Fairbanks, Alaska.

As my time in Fairbanks came to an end, Manina and I headed back to Anchorage. As we did, we stopped by Denali National Park to enjoy some of the wonderful sights and wildlife that the park has to offer. Back in Anchorage, we stumbled on a store where I had the opportunity to try on an authentic Mush Coat **(Figure 2)**, worn in Iditarod Competitions (Dog Sled Races).

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On the Road Again- Continued from Page 8

Figure 2: Brent all dressed up and ready to take part in the Iditarod (Dog Sled Race).

To close out my trip to Alaska, I took some leave so that I could hang out with a great friend, my former Lyndon State College classmate and currently an Alaska Region employee, Aimee Fish. She and her husband graciously took me and Manina kayaking around Lake Eklutna **(Figure 3)**, before it was time to leave the beautiful, clean, cool air of Alaska and head back to Maryland.

I was sad and really not looking forward to the long red eye flight home, but by this point I hadn't been at work in almost 3 weeks and I knew it was time to return. Although I boarded the plane kicking and screaming, I did go home having learned a lot and with some wonderful memories!

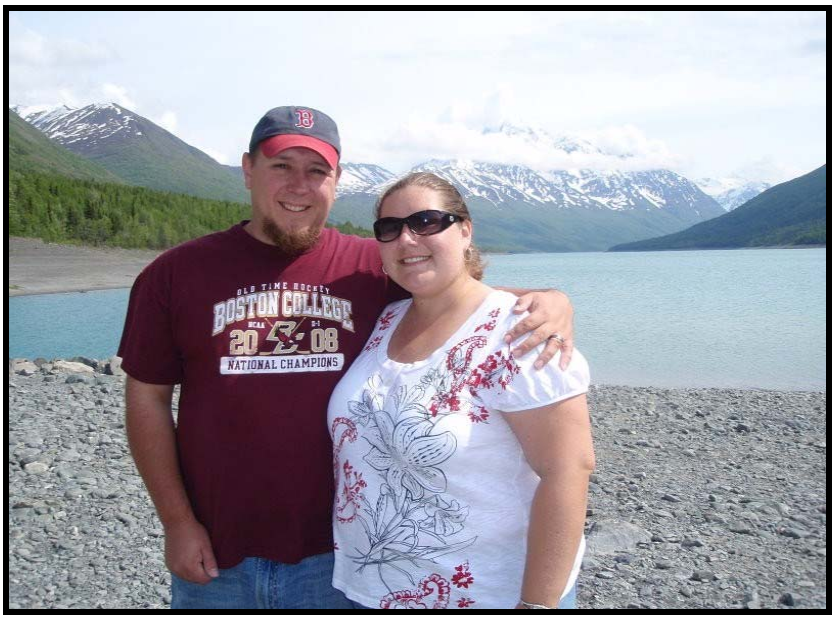

Figure 3: Brent and Manina after a Kayaking adventure on Lake Eklutna, Alaska.

Next up for me is a trip to the La Crosse, Wisconsin and Buffalo, New York forecast offices; also a possible trip to Boulder, Colorado to work with the good folks at the National Center for Atmospheric Research (NCAR) on a storm data users survey they are conducting. Until then, I hope your summer travels are safe, fun and adventurous. Cheers and enjoy your summer!

Just can't wait to get back on the road again!

Summer 2008 Marked by Deadly Rip Currents

Excerpt from NOAA's Homepage

Each year, about a hundred people drown in rip currents. NOAA offers valuable advice to help you avoid and/or survive a rip current:

Learn how to swim!

When at the beach:

- Whenever possible, **swim at a lifeguard-protected beach.**
- Never swim alone.
- Learn how to swim in the surf. It's not the same as swimming in a pool or lake.
- Be cautious at all times, especially when swimming at unguarded beaches. If in doubt, don't go out.
- Obey all instructions and orders from lifeguards. Lifeguards are trained to identify potential hazards. Ask a lifeguard about the conditions before entering the water. This is part of their job.
- Stay at least 100 feet away from piers and jetties. Permanent rip currents often exist along side these structures.
- Consider using polarized sunglasses when at the beach. They will help you to spot signatures of rip currents by cutting down glare and reflected sunlight off the ocean's surface.
- Pay especially close attention to children and elderly when at the beach. Even in shallow water, wave action can cause loss of footing.

If caught in a rip current:

- Remain calm to conserve energy and think clearly.
- Never fight against the current.
- Think of it like a treadmill that cannot be turned off, which you need to step to the side of.
- Swim out of the current in a direction following the shoreline. When out of the current, swim at an angle--away from the current--towards shore.
- If you are unable to swim out of the rip current, float or calmly tread water. When out of the current, swim towards shore.
- If you are still unable to reach shore, draw attention to yourself by waving your arm and yelling for help.

If you see someone in trouble, don't become a victim too:

- Get help from a lifeguard.
- If a lifeguard is not available, have someone call 9-1-1.
- Throw the rip current victim something that floats--a lifejacket, a cooler, an inflatable ball.
- Yell instructions on how to escape.
- Remember, **many people drown while trying to save someone else from a rip current.**

You may visit NOAA's Home Page at:
http://www.noaa.gov/

Wayne's World

How High is the Water, Mama?

By Wayne Presnell, NWS Headquarters

Remember the song by Johnny Cash *Five Feet High and Rising*? In it, Cash often asks the question, "How high is the water, Mama?" or "How high is the water, Papa?" and at the end of each verse the reply would be, "2 feet high and rising" or 3 feet high and rising" until the final verse when it was "5 feet high and rising." Johnny Cash wrote that song about a flood, which affected his family's farm during the winter of 1937-1938 in northeastern Arkansas. Cash said that the flood left behind a rich fertile soil that produced their best cotton crop ever the next season.

Many in Iowa, Missouri, Illinois, Wisconsin, and Indiana probably asked that same question during the month of June 2008 as disastrous flooding occurred across those states. Preliminary estimates indicate the flooding is responsible for $5 billion in damage and more than 20 fatalities.

Comparisons of this event have been made to the Flood of 1993 across the central part of the country.

Here is a summary of the comparisons:

Meteorologically speaking, what were some of the factors that caused the anomalous flooding? In winter/spring of 1992-1993, the central part of the U.S. received much above normal amounts of precipitation and thus, the soil was saturated and water levels were above normal heading into summer. This may have been associated with the positive phase of El Nino conditions in the Pacific Ocean during 1992 but by early 1993, water temperatures had returned to normal in the Pacific Ocean (neutral phase). During the late spring and summer of 1993, the Bermuda High, a semi-permanent area of High Pressure (surface and aloft) normally centered near Bermuda in the Atlantic Ocean **(Figure 1)**, was anomalously centered north and west of its normal position and was stronger than normal. This meant that the weather systems, which normally would move quickly through the central part of the U.S. to the eastern part, would slow down considerably and be forced to move north toward Canada. Also, warm and humid air near the surface, normally brought into the southeastern U.S. during spring and summer, was being pumped into the central U.S. These factors allowed for areas of rain to generate day after day over the same areas.

During winter/spring 2007-2008, the central U.S. received much above normal amounts of precipitation and soil was saturated and water levels were high similar to 1993. The center of the Bermuda High has been further north and west than normal but not to the degree it was in 1993. The Bermuda High is not as anomalously strong as it was in 1993 and has not provided the

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Wayne's World: How High is the Water, Mama? – Continued from Page 11

tremendous block like in 1993. The jet stream has been stronger than usual across the western and central U.S. this year and as a result, the Colorado Low has been slower to migrate north. The Colorado Low is typically most prominent during winter and spring when the jet stream is strongest. Weather systems this year across the central U.S. have been slow moving, but not blocked. Unlike 1992-1993, conditions in the Pacific Ocean were in the negative phase, La Nina, during most of 2007 and early 2008 and has since returned to the neutral phase.

Figure 1: Normal location of Bermuda High. Image courtesy of NASA.

The similarities between the two flooding episodes are: the time of the year, the areas affected, wet antecedent conditions, and an anomalous Bermuda High.

However, in terms of overall impact, the 1993 flood was greater, affecting a larger area for a longer time. Some rivers remained above flood stage for 4-6 months in 1993. The duration of flooding should be on the order of 4-6 weeks in 2008. In 1993, precipitation anomalies were greater and centered farther west than in 2008.

In 1993, 118 NWS river forecast points set new records. In 2008, preliminary data indicates that 36 new records were established: 22 in Iowa, 11 in Wisconsin, and 3 in Indiana. No new records were set on the Mississippi River in 2008.

Still, 36 locations saw levels that exceeded those in 1993. The most impressive record occurred in Cedar Rapids, Iowa, where the Cedar River exceeded the previous record by more than 11 feet. Unquestionably, people in those areas would claim this flood was worse than the one in 1993.

Over 1,000 levees failed in 1993. The number will be closer to 50 levee failures in 2008. The lower number of levee problems can be attributed to the different nature of the flooding and levee improvements made since 1993. Direct damages in 1993, adjusted for inflation, amounted to about $25 billion. Preliminary estimates for the 2008 flooding indicate direct damages may be closer to $5 billion. The 2008 flooding will have a greater impact on agriculture while the 1993 flood affected more urban areas.

Another similarity between 1993 and 2008 was the high quality service provided by NWS offices in the affected areas. While the tools have changed, most notably the availability of Advanced Hydrologic Prediction Services, high quality services of the NWS staff was evident in both events.

Hopefully, there is a *silver lining* to the disastrous flooding of 2008. Maybe, as in the case of the Cash family in 1938, the flood waters will leave behind a rich fertile soil which will produce a bumper agriculture crop next season. Then, folks in the flooded areas can ask, "How high is the corn, Mama?" And the answer will be, "Five feet high and rising."

Storm-Based Warning Verification Has Arrived

By Brent MacAloney, NWS Headquarters

On October 1st, 2007, the National Weather Service (NWS) officially began issuing short-duration warnings using latitude/longitude points to define the warned area, otherwise known as Storm-based Warnings. Previously these warnings had been issued using county boundaries to define the warned area. This change was made to more accurately define the threatened area, while reducing the population unnecessarily warned.

With this change in how warnings are issued, the Performance Branch was presented with the challenge of developing a new suite of verification metrics used to track the accuracy of these storm-based warnings. Unlike the traditional county-based warning verification methods which had been used to monitor performance since the early 1980s, these new metrics would rely heavily on geospatial tools to analyze each warning and event. The result was a suite of verification scores more representative of the service provided to the public for all severe thunderstorm, tornado, flash flood, and special marine warnings.

This suite of verification scores is now available to all NWS forecasters via several "Stats on Demand" programs located on the Performance Management website. From these programs, users can produce graphical images outlining performance for every warning and verifiable event while viewing the data plotted on a Google™ Maps image. The benefit here is that forecasters can analyze data and easily find areas where they may improve their warning accuracy and quality.

The method of verification for these storm-based warnings varies from the severe weather events to the flash flood events. For tornado (TOR), severe thunderstorm (SVR), and special marine warning (SMW) products, verifying observations are plotted in storm data at single points or along a path. These types of events are evaluated in one minute segments for the duration of the event. That way if a tornado has a path of 20 miles and is on the ground for 40 minutes, the event will be evaluated for the duration of this event. See **(Figure 1)** for an example. In the County-based Warning verification method, the event was mainly evaluated when the event first began.

Flash flood verification is handled differently. Flash flood events are entered into storm data as areas, as opposed to paths. This allows us to analyze the areal and spatial extent of the event. In this system, your probability of detection score will be higher for the more time and area of the event contained within the boundaries of a warning. See **(Figure 2)** for an example.

Training modules giving a brief overview of how events are handled are available on the Performance Management website, under Performance Management >> Training. These training modules were developed a year ago and contained hypothetical examples of events and warnings. Now that an actual set of data has been collected and analyzed, we plan to update the examples in the training module.

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Storm-Based Warning Verification Has Arrived – Continued from Page 13

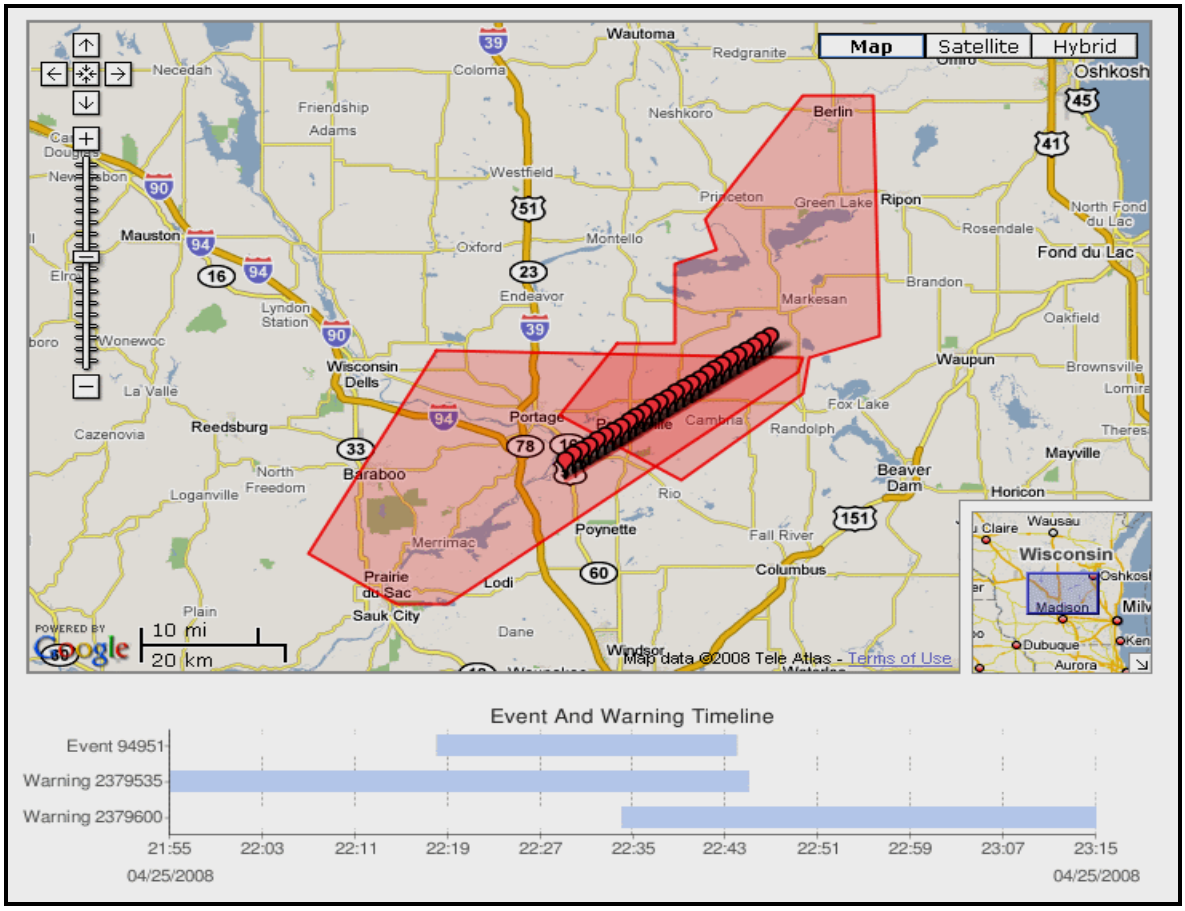

Figure 1: Sample of a Tornado event/path. This event is evaluated in one minute segments for the duration of the event.

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Storm-Based Warning Verification Has Arrived – Continued from Page 14

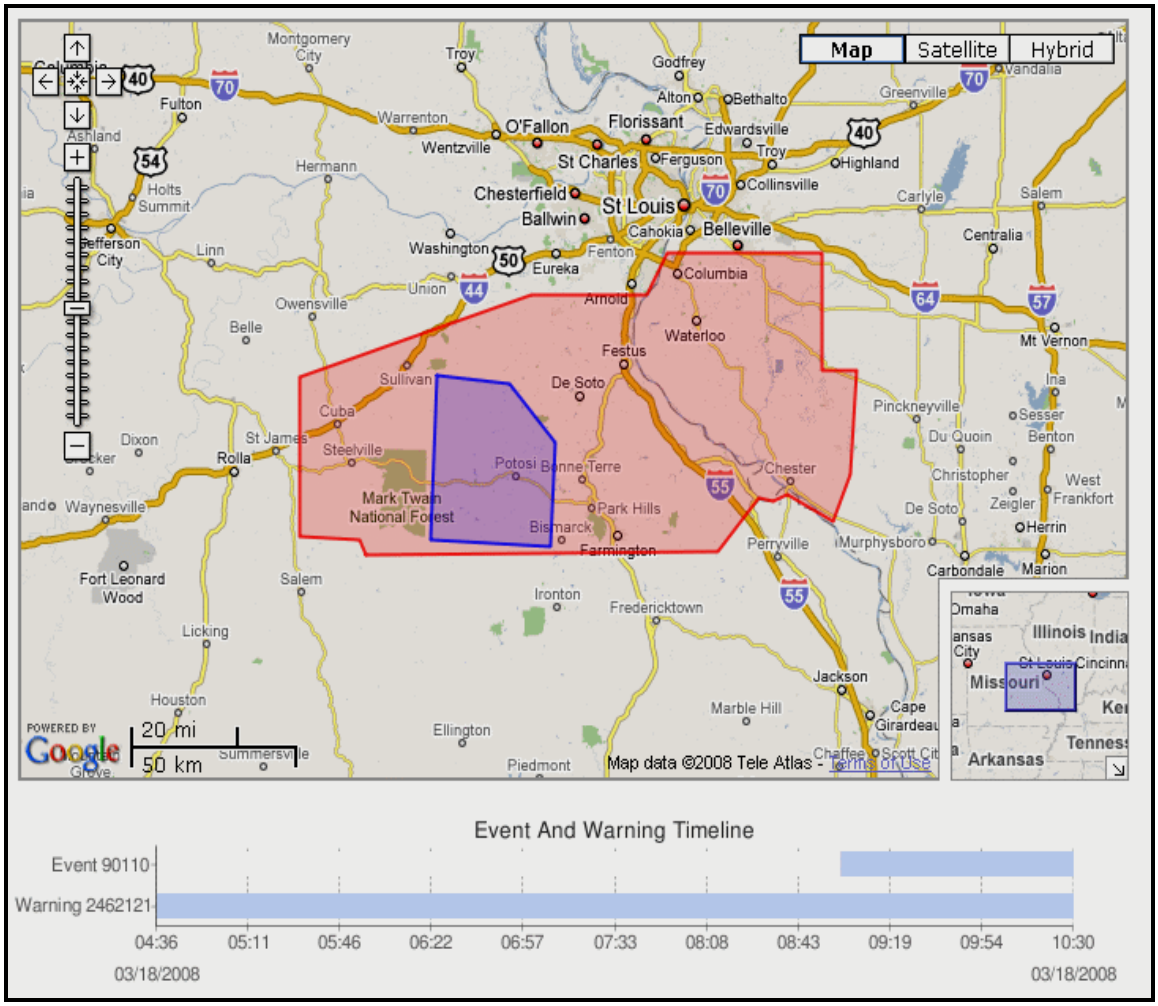

Figure 2: Sample of a Flash Flood episode. The red polygon represents the warning, and the blue polygon is the verifying event entered into storm data.

Stats on Demand interfaces can be found here:

Flash Flood Verification
https://verification.nws.noaa.gov/stats/flashflood/request.aspx

Severe Thunderstorm and Tornado Verification
https://verification.nws.noaa.gov/stats/severe/request.aspx

Special Marine Warning Verification
https://verification.nws.noaa.gov/stats/marine/request.aspx

Please be sure to address any comments, questions, or concerns you have about these interfaces and the information contained in them to NWS.Verification@noaa.gov.

The Skinny

AWS Convergence Technologies, Inc., Requests NWS to Evaluate New Products and Services

By Doug Young, NWS Headquarters

On May 13, 2008, Jim Anderson, Director of Business Development-Weatherbug Professional, provided background and details about their observational networks, and demonstrated how these networks may be utilized to help NWS field forecasters maintain an accurate National Digital Forecast Database (NDFD) and improve forecast and warning services. Jim's presentation included an UrbaNet briefing that demonstrated "plume" dispersion and graphs depicting data quality improvement. "UrbaNet" is a surface research network involving NOAA's Air Resources Laboratory (ARL) and the private sector, which is designed to explore the use of using integrated commercial and government meteorological data in forecasting within the complex topology of the urban environment. Data from UrbaNet sites may benefit areas such as Agriculture, Hurricane Preparedness and Public Safety. Jim also showed the benefits of using UrbaNet data to improve forecasts.

In conjunction with the presentation, AWS asked if the NWS would be interested in selecting various WFOs to evaluate some of its products through a private web portal. The intent of this collaborative exercise may reap several benefits. It will help foster our partnership with AWS and serve as an example of partnering with other private sector organizations. Additionally, it will allow the NWS to evaluate this data for scientific accuracy and determine whether it can be used practically in forecast and/or warning operations. By evaluating this data and providing feedback to the AWS, the tool can be improved to better meet the needs of AWS customers *and* help the NWS better achieve its mission to protect life and property and enhance the national economy.

I held further meetings with NWS General Council, the Office of Strategic Planning and Policy, and other stakeholders to determine how to best proceed. As a result of that guidance and additional discussions with the National Performance Management Committee, we (the NWS) have decided to carefully move ahead with this project by requesting approximately a dozen volunteer WFOs from the CONUS regions to participate in a 60-day evaluation of certain AWS products.

Initial functionality would allow WFOs to access a product command console specifically designed for their county warning and forecast area. The command console allows forecasters to obtain a suite of live observational data (Figure 1), deviations from NDFD forecast graphics (Figure 2), and active alerts (Figure 3).

The future of this tool in NWS operations will largely depend upon WFO feedback on whether this meets current needs, or whether it can be modified to provide useful and timely information to supplement data gaps. Stay tuned for more details about this project in later editions of the Peak Performance newsletter.

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"The Skinny"- Continued from Page 16

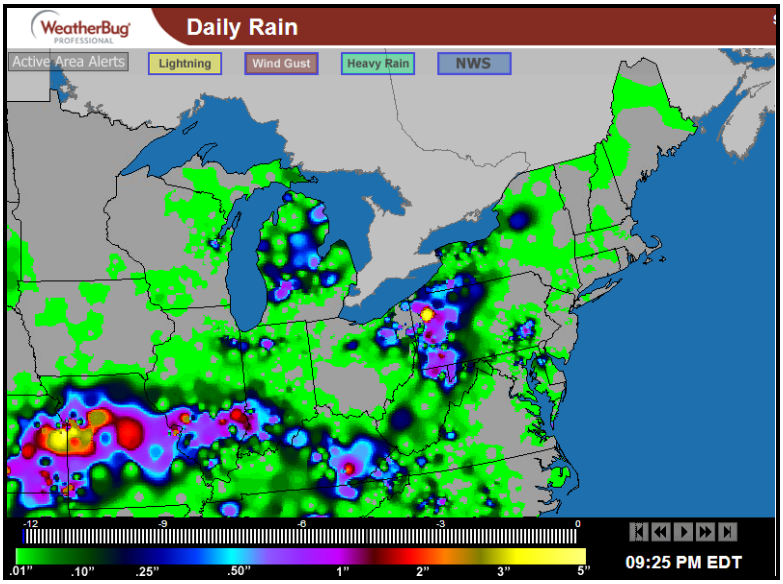

Figure 1: Real-time rainfall data (Beta)

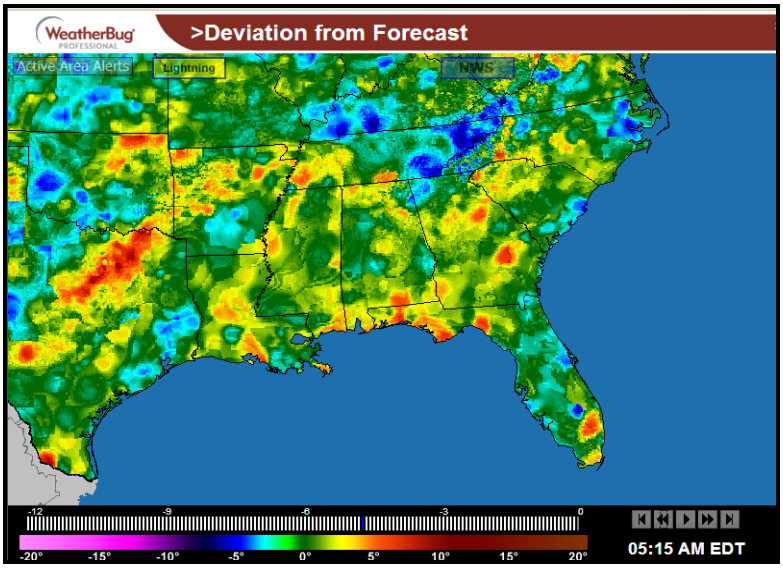

Figure 2: Deviation from NDFD Forecast (Beta)

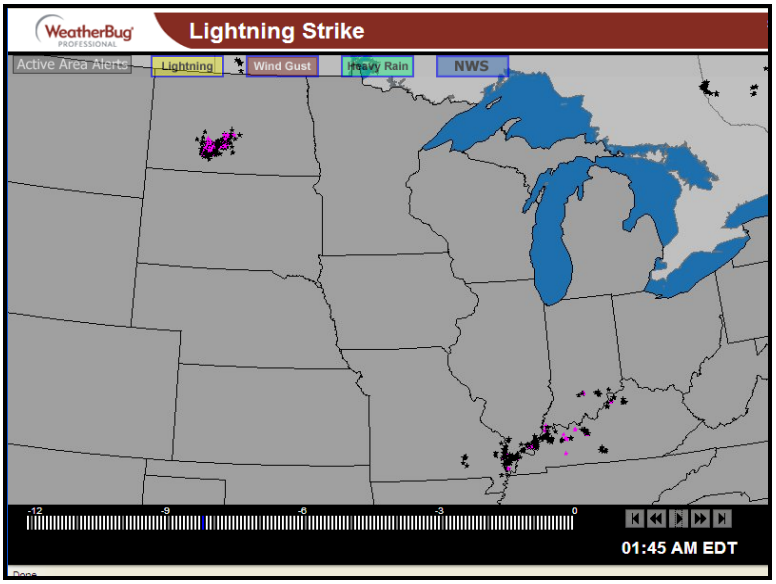

Figure 3: Real-time Lightning Strike Data (Beta)

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Web Links

Stats on Demand
https://verification.nws.noaa.gov

NDFD Verification:
https://apps.weather.gov/ndfd-stats/verification/index.htm

Real-Time Forecast System:
http://www-ad.fsl.noaa.gov/fvb/rtvs/

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"When performance is measured, *performance improves*. When performance is measured and reported back, *the rate of improvement accelerates*."
Thomas S. Monson

Questions and comments on this publication should be directed to Freda Walters.

Please consider contributing to our next edition.