

Peak Performance

Late Summer 2013 Edition



Performance Branch, NWS Office of Climate, Water, and Weather Services, Silver Spring, Maryland August 2013

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Verification Efforts at NWS Phoenix, AZ

By Dan Leins, NWS Phoenix, AZ

The verification efforts at National Weather Service (NWS) Phoenix, AZ were greatly expanded in 2010 to encompass additional products and services. For years, office verification focused mainly on Government Performance and Results Act (GPRA)-related metrics with emphasis on Flash Flood Warning and Winter Storm Warning statistics, as well as aviation verification for the main airport in the County Warning Area (CWA), Phoenix Sky Harbor. Aside from the aviation statistics, this information was seldom seen or referenced by the staff outside of Storm Data. A new approach to verification was developed with the primary goal of sharing office performance with everyone in real-time. It encompassed any non-routine products that could be verified, such as

Severe Thunderstorm Warnings, Wind Advisories, Freeze Warnings, Heat Warnings, Winter Weather Advisories, Airport Weather Warnings, and Dust Storm Warnings.

An increased emphasis was placed on obtaining ground truth in real time, and everyone in the office participated in gathering reports and observations. From mining the MesoWest observations database, to contacting storm spotters in or near a warning area, the staff was instrumental in making this enhanced verification program work. Once an event was over, “event summary” emails were sent out to the staff within 1–2 days (while the event was fresh in everyone’s mind) and included simple Probability of Detection (POD), False Alarm

[Continued on next page...](#)

Verification Efforts at NWS Phoenix, AZ – Continued from Page 1

Ratio (FAR), Critical Success Index (CSI), and Lead Time statistics. Verification statistics were also broken down zone by zone and hour by hour to help identify any over-warning/under-warning biases. The summary concluded with a takeaway to identify areas in which the office excelled, or areas where the office could have done better. These efforts continue today, and have been expanded to include quarterly and annual verification summaries. These reports are made available to the staff, and have heightened everyone’s awareness of office performance.

In addition to verifying against legacy criteria,

the office is attempting impact-based verification in 2013 (Figure 1). Social media streams, local news media, law enforcement, emergency managers, and spotters are sought out to report any weather impacts during a given event. This allows us to answer the question, “Was someone affected by this event even though it may have come up short of legacy criteria”? If the answer is “yes,” then the product was probably justified. If not, a closer scientific examination of the event may be warranted. A comprehensive comparison study of legacy and impact-based verification stats will be completed at the end of the year once enough events occur and trends can be established.

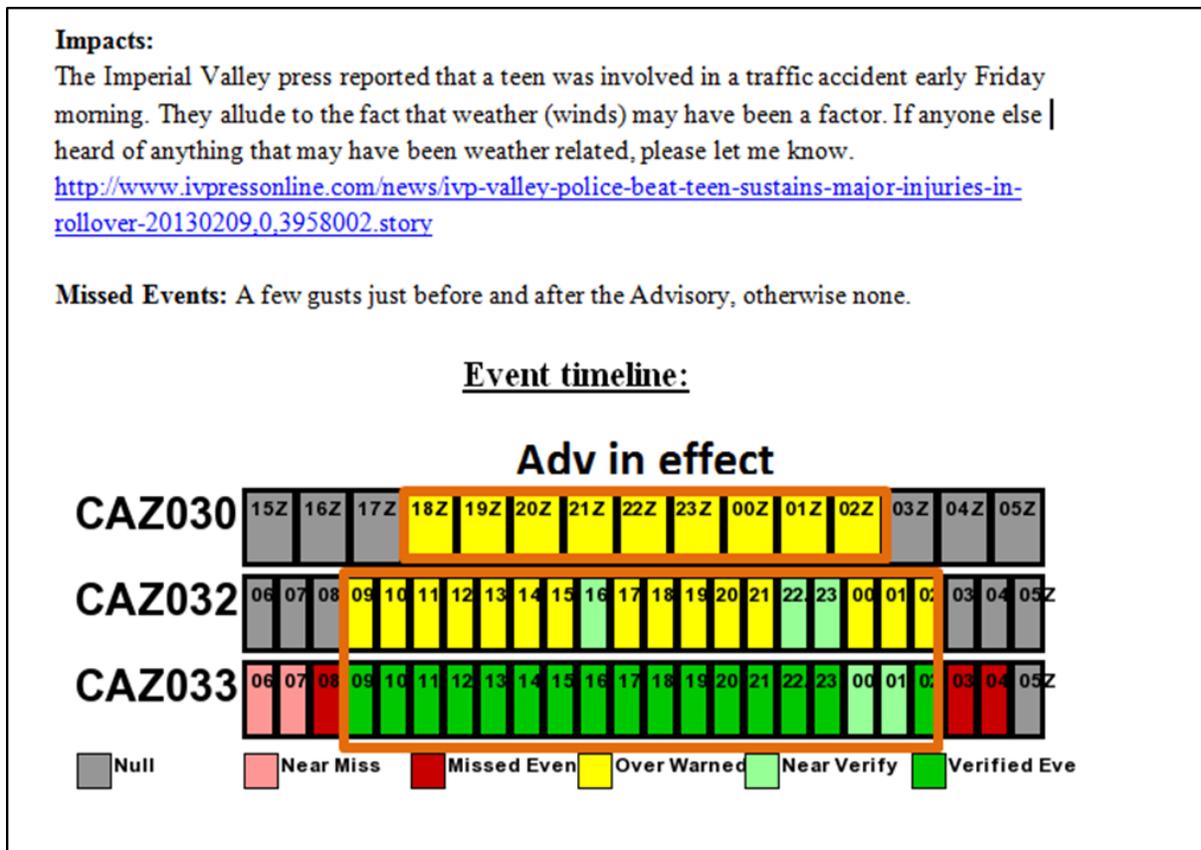


Figure 1: Example of a verification summary email for a Wind Advisory across southeast California. Impacts are discussed in the first section, while legacy verification is presented in a color-coded table.

The Performance Branch Welcomes Two New Contractor Replacements

By Doug Young, NWS Headquarters

Recently, we welcomed Keyou Gao and Naseer Azizi to the Performance Branch (OS52).

Keyou is a software engineer who will be working on a variety of projects for OS52. Keyou is assisting Guy Pittman with our data importers, and will be helping senior software engineer, Lhou Mechtat, develop Web interfaces. Eventually, the plan is to have Keyou begin developing the front end and reports section of the Marine Verification program.

Keyou was born and grew up northeast of mainland China. He first traveled to the United States in the spring of 1994 to visit his wife who was a visiting scholar at Southern Illinois University in Carbondale.

Previously, Keyou was a Chinese Editor for a University Newspaper in China. His hobbies include cooking, gardening, and mushroom forging. He took a liking to the Information Technology (IT) industry and started computer software programming in November 2000.



Naseer Azizi is replacing Dave Rancourt, who will primarily be working on other IT projects within NWS Headquarters. A native of Gaithersburg, MD, Naseer attended Montgomery College where he played on the Germantown Montgomery College basketball team as a shooting guard. To pursue a career in IT, Naseer transferred and attended the University of Maryland, Baltimore County (UMBC), where he majored in IT Management with a minor focus on Biology.

Here in the Performance Branch at NWS Headquarters, Naseer is focused on daily system tasks of NOAA8203, Performance Management System, and maintaining the integrity of the NOAA8203 data. Naseer also works with the software development team to ensure the Performance Branch systems can run our customized software to its fullest potential.

Some of Naseer's hobbies include playing basketball, remodeling old gardens, and experimenting with new technology software or hardware. ■■■



Welcome aboard, Keyou and Naseer, we look forward to working with both of you!

Marine Verification Changes Coming This Fall



By Chuck Kluepfel, NWS Headquarters

The marine verification program is currently being rewritten. There are two primary reasons for the re-write. Foremost, the old data collection system that feeds the program will become unavailable and a more reliable data collection process has been developed. The other reason is the realization that the marine verification program in its current form has not been meeting the needs of today's NWS nor those who use NWS warnings and forecasts. In an effort to come up with the best possible program rewrite, we began collaborating with the Marine and Coastal Services Branch about a year ago. The coding is well underway.

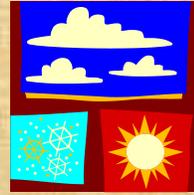
In the new system, the number of verification points is expected to more than triple. Most of the new points come from automated observations located along the Nation's coastlines, taken by the National Ocean Service. They have been included on the National Data Buoy Center web site for the past few years, and it doesn't make sense to continue ignoring these points, even though they may not fully represent the atmosphere over the open marine waters. We will also include some high seas and tropical offshore buoys not used in the past. Simultaneously, research is ongoing to use remotely-sensed altimeters to verify wave height forecasts over the offshore and high seas waters, but research money is slim these days.

The coded alphanumeric Marine Verification Forecasts (MVF) will become a thing of the past, as we will begin taking all forecast information directly from the National Digital Forecast Database grids. This will enable us to verify wave forecasts out to Day 5 and wind forecasts out to Day 7, while the legacy program has always been limited to verifying Day 1.

The legacy marine program previously allowed the user to compare marine forecast performance to the performance of a select guidance product; however, technical problems in collecting and processing the data eliminated that capability about a year ago. The new system is expected to restore this capability (with more models to choose from). However, comparing marine forecast performance to the performance of a select guidance product may not appear in the initial software build because this new verification system needs to be online by October 1, 2013, to maintain the integrity collecting all Government Performance and Results Act (GPRA) data. Other bells and whistles that are likely to appear in 2014 will be a return to providing warning and small craft advisory verification, which will be important in developing impact-based statistics for the marine program. This will be a first for the marine services program and will ultimately be an important tool as we seek to redefine and modernize future GPRA measures and goals. ■■■



Fly...with Ointment



By Beth McNulty, NWS Headquarters

Aviation-related Surveys

Part 1: Getting Feedback from Users

The pilot report is a traditional form of aviation feedback. This article looks at other ways to get aviation weather feedback. No feedback of any kind occurs if the user does not speak up. Today, we'll look at using outreach activities and brief surveys.

Feedback takes on a personal touch during conversations at an outreach event. For one thing, conversations allow you to clarify the other person's comments. Asking a series of tactful questions keeps a conversation going by showing interest in the other person and their opinions.

Brief surveys are an anonymous feedback mechanism. Survey responses range from a simple user score to lengthy open-ended comments.

The NWS has two avenues for aviation surveys:

1) TAF users' survey on the AWC Aviation Digital Data Service (ADDS) site at:

<http://www.aviationweather.gov/adds/tafs/>

2) Biennial inclusion into the NWS general satisfaction survey.

Many aviation users will be quite willing to give feedback about aviation products, and the rest of NWS. Conversations at outreach events and open-ended survey questions can quickly become a discussion of the entire NWS services. The challenge for us is to keep the feedback focused on aviation. We can do that by knowing whom we are asking (pilot, dispatcher, casual aviation enthusiast), and their primary interest in weather. All information from the user is valuable, and reflects our strengths and weaknesses. We need to use the information to continuously improve our products.

This process of gathering feedback and applying it to improving our products and services is the essence of the quality management system (QMS) we discussed in earlier episodes.

Next Issue:

**Part 2: Asking relevant
survey questions** ■■■



By Sal Romano, NWS Headquarters

Service Assessment Program

NWS Evaluates its Service during the Oklahoma Tornadoes

A series of tornadoes and associated weather hazards impacted the Oklahoma City, OK metropolitan area on May 19, 20, and 31, 2013 resulting in over 40 fatalities, hundreds of injuries, and billions of dollars in property damage. This event presented a unique learning opportunity in regard to forecast and warning operations, post storm data acquisition, dissemination services, interactions with the media, public response, and safety awareness information.

A 6-member Service Assessment Team was formed for the evaluation of services effort.

To continue strengthening relationships with other federal agencies involved with disaster work, this assessment has a co-leader from the National Transportation Safety Board. In addition, the Service Assessment Team made use of 13 subject-matter experts/consultants. The Service Assessment Team performed its assessment activities during the week of July 15-19 and is currently summarizing the results of the assessment in a draft report. The team's leaders are scheduled to brief NWS leadership on October 22, 2013. Public release is planned for a mid-December timeframe. ■



*The world makes way
for the man who knows
where he is going.
-Ralph Waldo Emerson*

The EF-Scale: What is this scale really trying to measure?

By Brent MacAloney, NWS Headquarters

The preliminary rating of the El Reno, OK tornado event occurring on May 31, 2013 as an EF-5, based on mobile Doppler radar data, had many in the meteorological community asking, "What is the EF-scale really a measure of?" Some would argue it is a rating based on estimated wind speeds in the tornado and others would argue that it is rating based solely on damage caused by the tornado,

from which one can infer estimated wind speeds. Well, which one is it? That is a great question and one that has been on my mind going back to the time when the NWS was still using the F-scale to categorize a tornado's strength. In fact, this has turned into such a hot topic, that it even got the attention of the NWS Director, Louis Uccellini. Subsequently, Dr. Uccellini sent out the following memo on June 6th, 2013:

Memo from Louis Uccellini:

All,

The decision to upgrade the El Reno tornado from a preliminary EF-3 to a preliminary EF-5 is being discussed and debated within the science community this week. This discussion gives me an opportunity to remind everyone to review and follow the NWS policy directive that governs how we rate tornadoes.

Directive NWSI 10-1604, *Post-Storm Data Acquisition*, requires us to use the EF scale, which is an impact-based rating assigned to a tornado after extensive investigation of the damage it caused. EF ratings are determined by observed damage rather than measured wind because we have no consistent way to measure wind speed for every tornado that occurs. Adhering to NWSI 10-1604 ensures we continue to use consistent methodology throughout the country for assigning EF ratings.

Tornado research is an exciting and rapidly evolving area of science, and we are able to capture more information about the character of tornadoes than ever before. We are updating Directive NWSI 10-1604 to allow the option of including this new information, when available, in the narrative of tornado summaries. The new policy will allow NWS to document available data that are scientifically valid and reliable without changing the objective and consistent EF assessment. Until the update is finalized into policy, WFOs should continue to follow current policy.

I reiterate that the upgrade to EF-5 is preliminary, and will be the topic of continued review and discussion before we finalize the official status of the El Reno tornado.

Louis

The EF-Scale: What is this scale really trying to measure? – Continued from Page 7

In the days after this preliminary rating of the El Reno, OK tornado, the national Warning Coordination Meteorologist program manager, Chris Maier spent several hours researching this topic. As Chris was digging through the storm events database and various journal articles, he came across the following information, which he sent me in an email:

Email from Chris Maier:

We have at least three precedents dating back to 2005 (F-3 Vera, Texas) where mobile Doppler radar from research projects was used to support F-/EF-Scale ratings. For a scientific overview of the EF-Scale including a mention of this issue (pp. 649-650) please reference the May 2013 BAMS article by Edwards et al

<http://journals.ametsoc.org/doi/pdf/10.1175/BAMS-D-11-00006.1>

Mobile radars provide high-resolution velocity data at the height of the radar beam, and new methods are under development to relate such winds to an estimated 3-s gust at 10 m AGL."

So, it looks like the rating of the El Reno, OK tornado using mobile Doppler radar (**Figure 1** on next page) may be unorthodox, but certainly not unprecedented based on the information in this article. Having a precedence set on tornadoes occurring in previous years and the fact that the current Storm Data Preparation policy and EF-scale Rating Guide does not explicitly say "thou shall not use mobile Doppler radar data in the rating of tornadoes" leaves the rating assignment of the tornado up to the local office management's interpretation of the policy.

If you look at the impact of adjusting tornado ratings based on mobile Doppler radar data from a pure numbers standpoint, where this has been done to approximately 3 out of 19,000 tornado events since 2000, it does not seem like a big deal. In fact, some may argue this is barely in the noise level.

However, when you think about the fact that in all of these cases, E/EF-scale rating was raised instead of lowered, there is a risk of skewing some of the climatological data for higher-end events. Over the same time period (since 2000) there have only been 13 tornadoes rated as an F-5 or EF-5. In this case, raising even one event of thirteen to an EF-5 significantly affects the statistics.

So, what is the right thing to do when you are entering data? Right now, for the sake of consistency and maintaining the integrity of the database, we ask that everyone sticks with rating tornadoes based strictly on damage caused on the ground, as outlined in the EF-scale training and EFKit:

[\(http://www.wdtb.noaa.gov/courses/ef-scale/\)](http://www.wdtb.noaa.gov/courses/ef-scale/).

We continue to encourage storm data focal points to enter additional information, such as estimated wind speeds from mobile Doppler radar units, into the tornado's event narrative. For those tornadoes which do not have any visible ground damage, the StormDat program has been expanded to allow users the ability to rate the tornado EF-Unknown (EF-U).

The EF-Scale: What is this scale really trying to measure? – Continued from Page 8

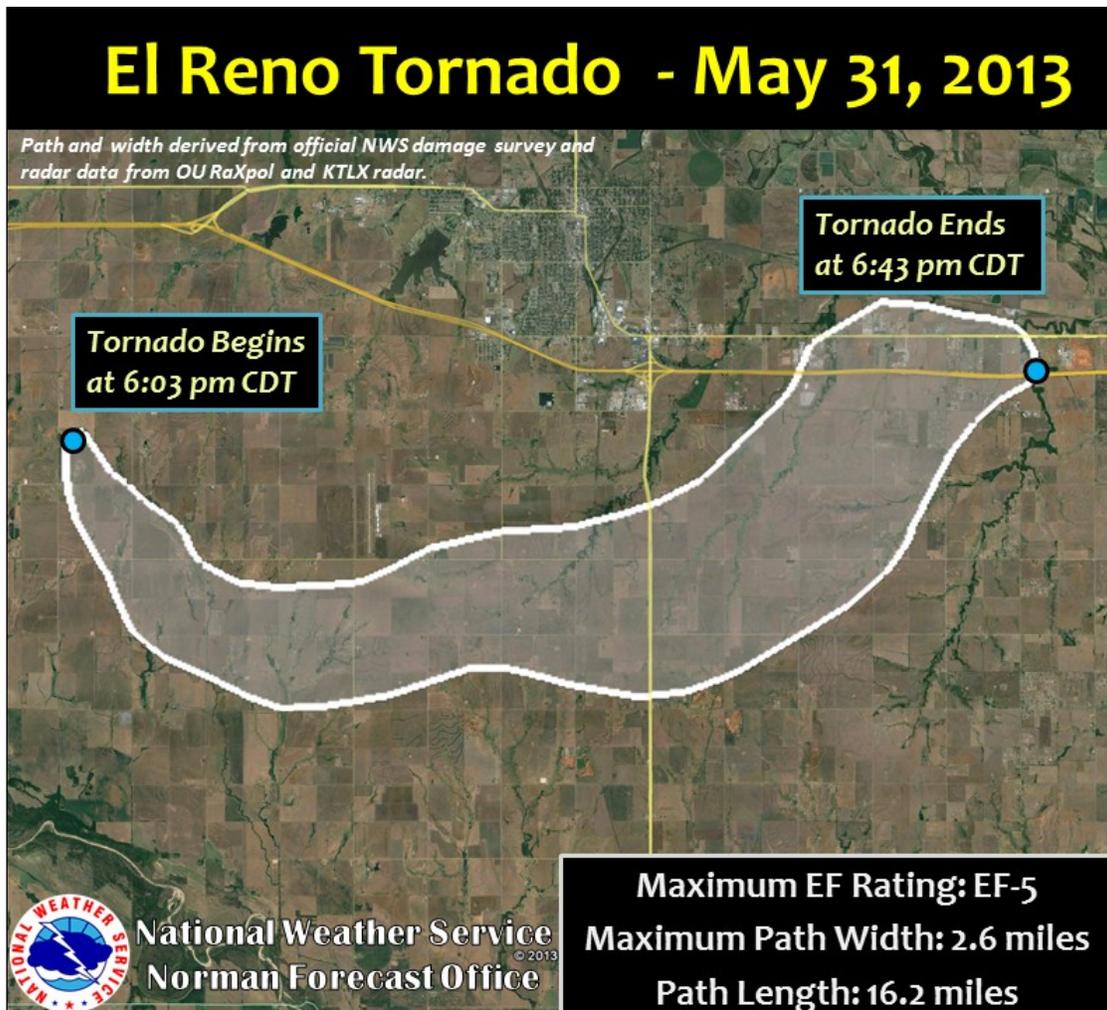


Figure 1: Path and width derived from official NWS damage survey and radar data from Oklahoma University's RaXpol and KTLX radar.

Source: <http://www.srh.noaa.gov/oun/?n=events-20130531>

While you are off continuing to enter storm data, there is a team of scientists and stakeholders meeting regularly to develop some sort of policy that meets scientific standards and expands the information collected in storm data associated with tornado reports to help meet the needs of a wider audience. This team, named the EF-Scale Steering Committee, is being led by

James LaDue at the Warning Decision Training Branch in Norman, OK. The Steering Committee plans to have a face-to-face meeting in Fiscal Year 2014's First Quarter to make policy decisions. The Committee hopes to present the proposed policy at the American Meteorological Society's annual meeting in Atlanta, GA in January 2014. ■■■

Snapshot: Service Assessment Actions

- **Hurricane and Post-Tropical Cyclone Sandy** - Released May 5, 2013
25 Total Actions, 3 (12%) Closed Actions.
- **Remnants of Tropical Storm Lee and the Susquehanna River Basin Flooding of September 6-10, 2011 (Regional Service Assessment)** - Released July 26, 2012
11 Total Actions, 1 (9%) Closed Actions
- **Historic Derecho of June 29, 2012** - Released February 05, 2013
14 Total Actions, 4 (29%) Closed Actions
- **The Missouri/Souris River Floods of May – August 2011 (Regional Service Assessment)** - Released June 05, 2012
29 Total Actions, 17 (59%) Closed Actions
- **May 22, 2011 Joplin Tornado (Regional Service Assessment)** - Released September 20, 2011
16 Total Actions, 10 (62%) Closed Actions
- **Hurricane Irene in August 2011** - Released October 05, 2012
94 Total Actions, 52 (55%) Closed Actions
- **Spring 2011 Mississippi River Floods** - Released April 11, 2012
31 Total Actions, 17 (55%) Closed Actions
- **Washington, D.C. High-Impact, Convective Winter Weather Event of January 26, 2011** - Released April 01, 2011
6 Total Actions, **6 (100%) Closed Actions**
- **The Historic Tornado Outbreaks of April 2011** - Released December 19, 2011
32 Total Actions, 26 (81%) Closed Actions
- **Record Floods of Greater Nashville: Including Flooding in Middle Tennessee and Western Kentucky, May 1-4, 2010** - Released January 12, 2011
17 Total Actions, 16 (94%) Closed Actions
- **South Pacific Basin Tsunami of September 29-30, 2009** - Released June 04, 2010
131 Total Actions, 129 (98%) Closed Actions
- **Southeast US Flooding of September 18-23, 2009** - Released May 28, 2010
29 Total Actions, **29 (100%) Closed Actions**
- **Mount Redoubt Eruptions of March - April 2009** - Released March 23, 2010
17 Total Actions, **17 (100%) Closed Actions**
- **Central US Flooding of June 2008** - Released February 03, 2010
34 Total Actions, 33 (97%) Closed Actions
- **Mother's Day Weekend Tornadoes of May 10, 2008** - Released November 06, 2009
17 Total Actions, **17 (100%) Closed Actions**
- **Super Tuesday Tornado Outbreak of February 5-6, 2008** - Released March 02, 2009
17 Total Actions, **17 (100%) Closed Actions** ■■■

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Web Links

Stats on Demand

<https://verification.nws.noaa.gov>

Real-Time Forecast System:

<http://rtvs.noaa.gov/>

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**Please consider contributing
to our next issue:**



Articles Due:

Monday, September 30, 2013

*Questions and comments on this
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