

SWPC Announces New Director, Dr. Thomas Berger

Dr. Thomas Berger was selected as the new Space [Weather Prediction Center](#) Director and reported to duty in Boulder, Colorado on July 28.

Dr. Berger has a scientific background in solar and space physics, a strong publication record, and the leadership experience to advance the [NWS](#) space weather prediction program to the highest level possible.



Dr. Thomas Berger standing in the SWPC operations area.

Dr. Berger comes to the [NWS](#) from the [National Solar Observatory](#) in Sunspot, N.M., where he served as the project scientist for the Daniel K. Inouye Solar Telescope. When completed, it will become the world's premier ground-based solar observatory providing unprecedented abilities to view details of the Sun. Prior to that position, Dr. Berger served as a solar physicist at the Lockheed Martin Solar and Astrophysics Lab within the Advanced Technology Center in Palo Alto, Calif. As a senior staff physicist, Dr. Berger served in numerous high profile leadership positions during his 15 year career at Lockheed Martin. As a co-Investigator on the Japanese/US/UK Hinode Solar Optical Telescope, he was responsible for coordinating scientific investigations, analysis, and public outreach. Dr. Berger was the founding Chairman of the [American Astronomical Society](#)/Solar Physics Division's public policy subcommittee and has conducted visits to policy makers in Washington, D.C. Dr. Berger led the development of the Solc filter for [NASA's](#) Interface Region Imaging Spectrograph Small-Explorer mission and was responsible for primary optical design, testing, acceptance and integration. As the Chief Scientist for ground-based solar observations, Dr. Berger was responsible for planning and executing observing campaigns at the [Swedish Solar Telescope](#) on La Palma in the Canary Islands. As a Flight Scientist at the Lockheed Aircraft Corporation, he served as a design engineer on the YF-22 Advanced Technology Fighter program.

Dr. Berger holds a Ph.D. in Applied Physics/Astrophysics, M.S. in Mechanical Engineering/Fluid Mechanics, both from Stanford University, and a B.S. in Engineering Physics from University of California, Berkeley.

NCO Announces High Resolution Rapid Refresh (HRRR) Model Implementation

On September 30, 2014, [NCEP Central Operations](#) implemented the first operational version of the High-Resolution Rapid Refresh ([HRRR](#)) model on [NOAA's](#) Weather and Climate Operational Supercomputing System ([WCOSS](#)). The [HRRR](#) is the first 3-km, storm-scale, hourly-updated model run out through 15 hours to provide localized model guidance for hazardous weather in the contiguous United States. In addition, a subset of parameters is available with 15-minute output frequency throughout the entire 15-hour forecast.

The model provides forecasts of critical weather events such as thunderstorms, flash flooding, and localized bands of heavy precipitation. The implementation included dissemination onto the Satellite Broadcast Network (SBN) to provide guidance to local [NWS](#) Weather Forecast Offices, the availability for download from [NOAA's](#) Operational Model Archive and Distribution System ([NOMADS](#)), and the availability for graphical display output on the [Model Analysis and Guidance \(MAG\)](#) website.

The [HRRR](#) was five years in development and one year in transition prior to its operational implementation. The successful transition was the result of a collaborative effort between [NCEP Central Operations](#), [NCEP's](#) [Environmental Modeling Center](#), and [OAR's](#) Assimilation and Modeling Branch.



A 15-minute interval guidance image of the HRRR Simulated Radar Reflectivity over the Eastern United States domain retrieved from the Model Analyses and Guidance website (<http://mag.ncep.noaa.gov>).

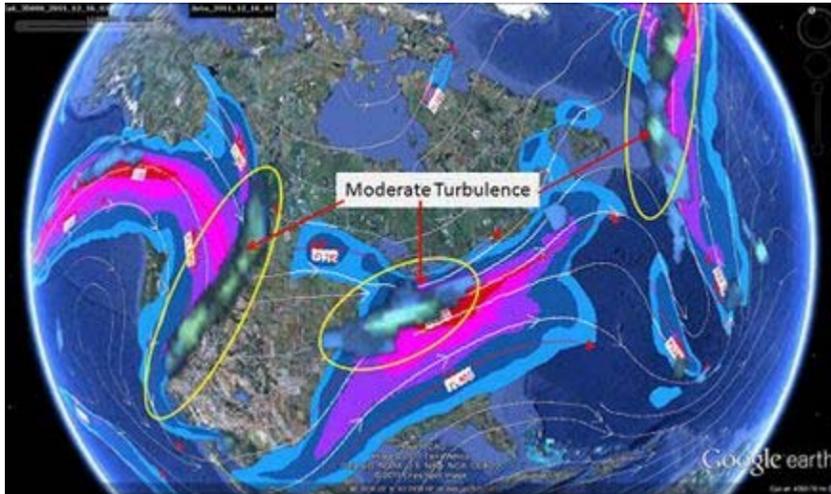
Service Center Activities

AWC – World Area Forecast Center

Did you know the Aviation Weather Center ([AWC](#)), in partnership with the [Environmental Modeling Center](#), and [NCEP Central Operations](#) team up to form the "World Area Forecast Center Washington" (WAFC Washington)? WAFC Washington is one of only two WAFCs in the world, which comprise the World Area Forecast System ([WAFS](#)). [WAFS](#) is a program developed by the [International Civil Aviation Organization \(ICAO\)](#) and the World Meteorological Organization ([WMO](#)) to improve the quality and consistency of en route predictive weather guidance provided for international aircraft operations. Currently, en route gridded forecasts and Significant Weather (SIGWX) charts are being created by the two WAFCs Centers in the U.S. and

United Kingdom. The purpose of the World Area Forecast System (WAFS) is to provide the worldwide aviation community with operational meteorological forecasts and information about meteorological phenomena required for flight planning and safe, economic, and efficient air navigation.

The WAFCs create and distribute: global gridded forecasts of upper winds, upper-air temperatures and humidity, flight level and temperature of tropopause, turbulence, icing, thunderstorms, and direction, speed and flight level of maximum winds. They also produce global High-level SIGWX (SWH) products and Medium-level SIGWX (SWM) products for limited geographical areas. The official distribution mechanism for WAFS data is via UK's Satellite Distribution System (SADIS) and the USA's WAFS Internet File Service (WIFS).



WAFS Washington Global Gridded data on Google earth.

AWC - Experimental Aircraft Association (EAA) AirVenture Fly-in

The Aviation Weather Center continues to support the [Experimental Aircraft Association's \(EAA\)](#) AirVenture fly-in, or as it is better known "Oshkosh"! AirVenture is the largest air show in North America, and also happens to be the largest outreach event for [NOAA](#). This year's attendance topped 500,000, an estimated 5 to 6 percent higher than in 2013. Those numbers were bolstered by huge increases on both Saturday and Sunday, August 2-3, which saw 20 percent more people coming through the gates than a year ago. The fly-in ran from July 28 through August 3, this summer.

"It was a tremendous week on many levels," said [EAA](#) Chairman Jack J. Pelton. "We filled Wittman Regional Airport with aircraft for the first time in several years, with both aircraft camping and parking areas completely full at midweek."

The [NOAA](#) booth can be found inside the Federal Pavilion on the [EAA](#) grounds of the Oshkosh airport. The Federal Pavilion contains several federal agencies in the "aviation business", which team up to form the International Federal Partnership. The [NOAA](#) booth is hosted by aviation meteorologists from across the [NWS](#) and [NOAA](#) aviation programs. The staffers come from the [AWC](#), various [NWS](#) Weather Forecast Office and Center Weather Unit aviation meteorologists, and other [NOAA](#) line offices like the [NOAA](#) Corps, and the [NESDIS](#) Satellite Search and Rescue program.

Typically over 50,000 people pass through the Federal Pavilion and the [NOAA](#) booth each year. They can learn about [NOAA](#) aviation programs and weather phenomena that can impact safe flight. The most popular part of the booth is the ability to go through the vast amount of data on the [www.AviationWeather.gov](#) website with an actual aviation meteorologist. If the meteorologists got paid by the question, most could retire after the week at AirVenture.

During each day, [NOAA](#) booth staff provided the weather briefing to the International Federal Partnership briefing in addition to daily weather talks inside the Federal Pavilion. These weather talks can earn pilots credits with the [FAA](#) Safety Team ([FAAST](#)) toward renewing their pilot certification. The [AWC](#) meteorologists also helped host a daily afternoon radio segment on EAS radio called "Tea and Turbulence". This 15 to 30 minute spot highlighted a different aviation weather hazard or safety information for pilots and dispatchers.

As [AWC](#) Meteorologist Ed Holicky summarized, "The time at Oshkosh was rewarding with us getting in touch with our customers and seeing everything at the world's largest air show. It emphasized the importance of our products and services to the aviation community."



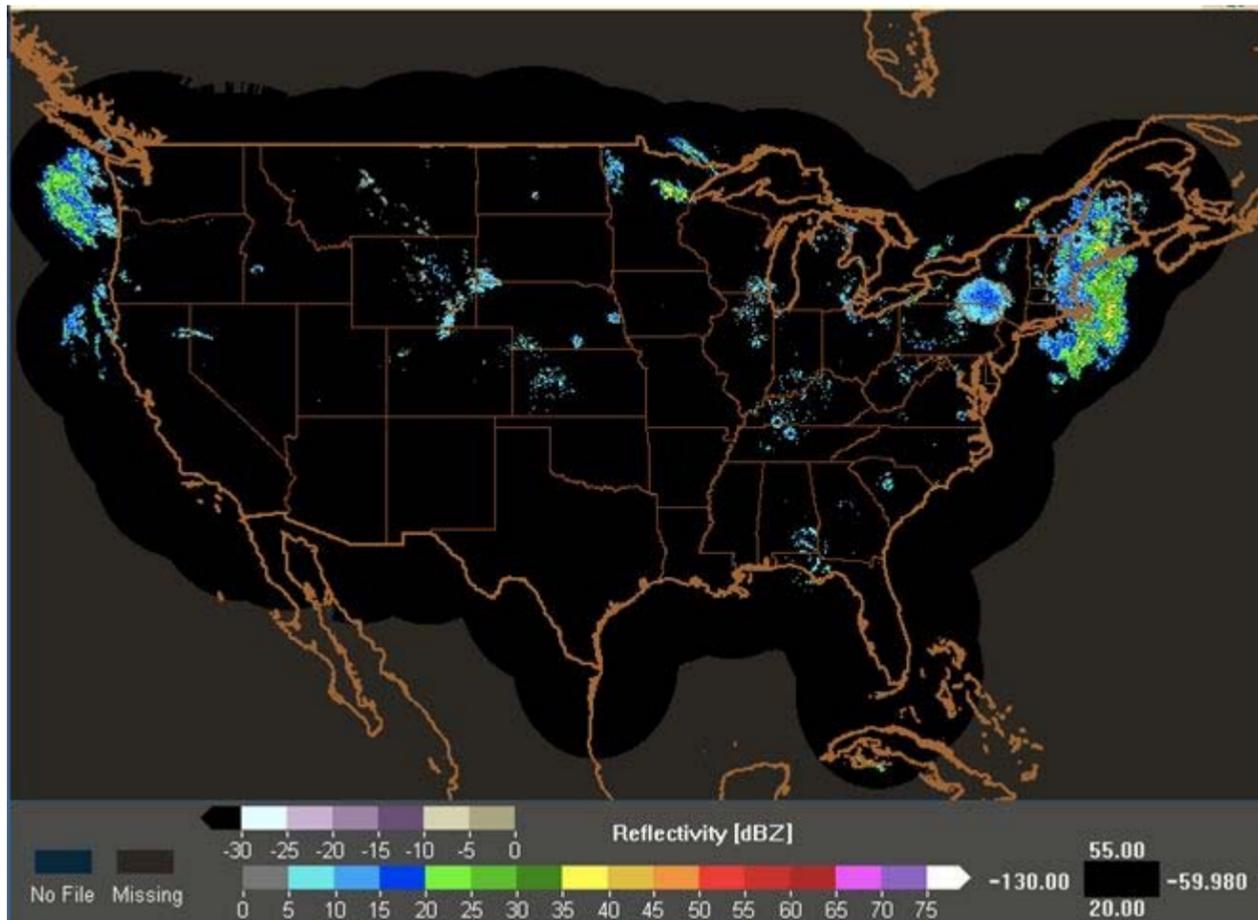
Meteorologists answering pilot questions at the NOAA booth.

NCO – First Application on NOAA's Integrated Dissemination Program (IDP) System

Over the last year, [NCEP Central Operations](#) had led the design and build-out of the commonly shared operational dissemination infrastructure known as [NOAA's Integrated Dissemination Program \(IDP\) System](#). As the system was being built and configured, a select number of strategically-aligned [NOAA](#)-based applications were chosen to be on-boarded and transitioned to an operationally supported system. The first application to be successfully implemented from a research environment to a 24x7 operational environment was the Multi-Radar Multi-Sensor ([MRMS](#)) System.

The [MRMS](#) software application, developed by the National Severe Storms Lab ([NSSL](#))/Office of Oceanic and Atmospheric Research, was implemented operationally on [NOAA's IDP System](#) in College Park, MD on September 29, 2014. Over the past year, [NCEP Central Operations](#) created the development and test environments, on-boarded the application, and developed monitoring and 24x7 support tools.

The [MRMS](#) system combines multiple radars, land-based observations, satellite-based observations, lightning data, and rain gauges to produce a suite of operationally-supported products every two minutes. These products are now available to Weather and Climate Operational Supercomputing System ([WCOSS](#)) via IDP and used as input to the recently implemented High-Resolution Rapid Refresh ([HRRR](#)) model. Moreover, the data is now disseminated from the IDP System in College Park, MD to customers such as the Aviation Weather Center, [Storm Prediction Center](#), and [Weather](#)



A Composite Reflectivity image of the Multi-Radar Multi-Sensor System generated on NOAA's Integrated Dissemination Program (IDP) System.

NHC – Storm Surge Flood Map Makes Debut

When NHC issued a Tropical Storm Watch on July 1st along portions of the U.S East Coast due to soon-to-be Hurricane Arthur, the first Potential Storm Surge Flooding Map was issued as well. The new experimental interactive map indicated the geographical areas where inundation from storm surge could occur from the hurricane and how high above ground the water could reach in those areas. The map was made available on the NHC website, and was updated every six hours shortly after the issuance of the public advisory. It was widely shown by national and local media outlets.



The NHC Experimental Potential Storm Surge graphic for Hurricane Arthur on July 3, 2014.

NHC – Message on Flood Safety

NHC Director Dr. Rick Knabb was joined by Leslie Chapman-Henderson, president & CEO of FLASH (Federal Alliance for Safe Homes), at the NHC facility on August 12th for a series of national and local media interviews. It's all to raise awareness about hurricane and flood safety, prevention and financial protection options as we enter the peak weeks of the hurricane season.

The message was simple - the greatest hazard from most tropical cyclones is water. Check your insurance policy for flood coverage - most homeowners insurance does not contain it - and find out if you live in a hurricane storm surge evacuation zone.



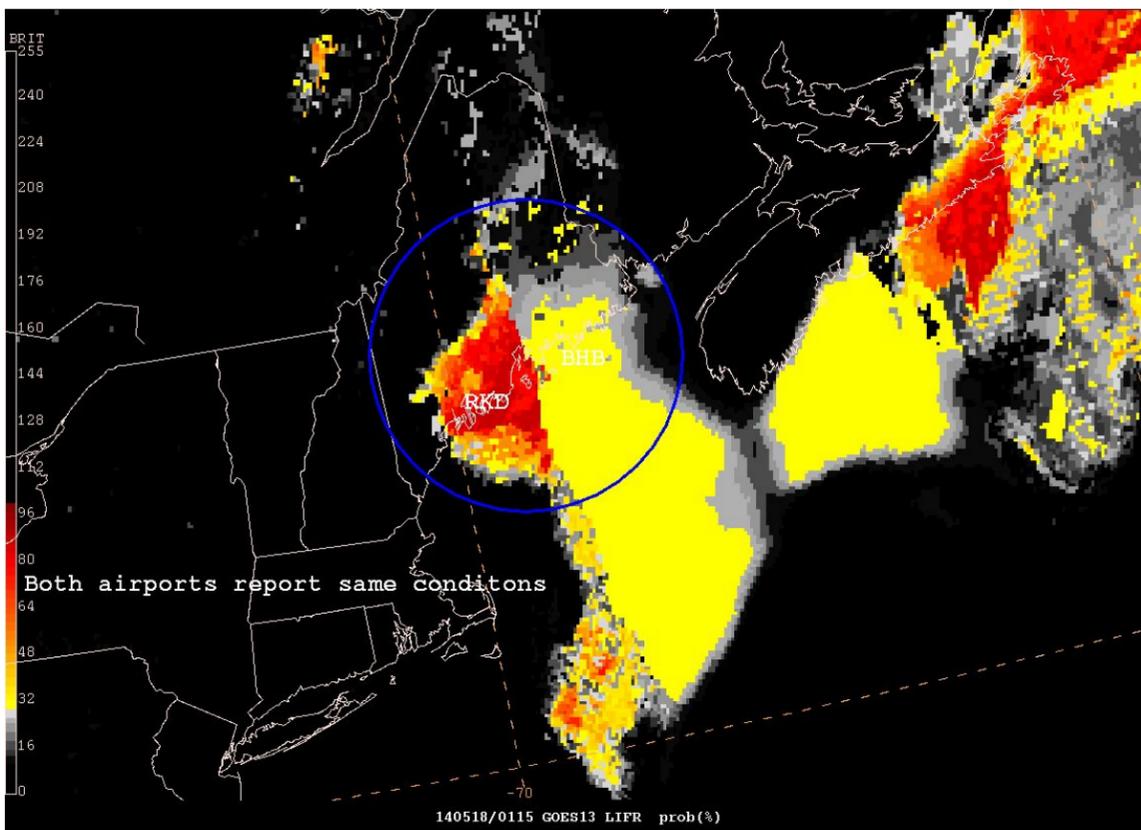
Leslie Chapman-Henderson listens as Dr. Rick Knabb emphasizes the importance of flood safety. (Photo credit: Dennis Feltgen, NOAA/NHC Communications)

OPC - US Coast Guard Summer Intern Studies Fog Product

United States Coast Guard Academy (USCGA) Cadet Kelcey Smith had the opportunity to work with the Ocean Prediction Center's Ocean Applications Branch (OPC OAB) and GOES-R Satellite Liaison this summer, studying the GOES-R Fog and Low Stratus (FLS) forecast product. Cadet Smith was stationed at the OPC after his summer deployment on a Coast Guard vessel in Oregon, where he experienced the subject of his project first-hand: fog and low stratus. During his six-week internship at OPC, Cadet Smith began to research the utility of the FLS product for diagnosing and predicting low visibility conditions in the offshore marine forecast zones. He worked closely with Michael Folmer, Joseph Sienkiewicz, and LT Christy Schultz of the OPC to identify and analyze several case studies off the Pacific Coast and the Gulf of Maine where the FLS product predicted significant reduced visibility events. Cadet Smith used visible and infrared GOES satellite imagery, MODIS imagery, and surface ship and land-based observations to validate the FLS forecasts.

While conducting his research with OPC, Cadet Smith had the opportunity to see the FLS product used first hand by an Aviation Weather Center (AWC) forecaster at the Federal Aviation Administration's (FAA) Air Traffic Control System Command Center in Warrenton, VA. Cadet Smith spent a morning shift shadowing AWC forecaster Brandon Smith as he forecasted CONUS aviation weather and advised FAA decision-makers. During the morning, Mr. Smith showed the FLS product in action for airport sites and showed Cadet Smith several cases where the FLS product performed well and allowed several airports to be opened as soon as reduced visibility conditions were forecast to clear.

Over the next semester Cadet Smith will continue his work with the OPC to analyze the case studies he identified during his summer internship and help design and produce initial FLS training for OPC marine forecasters. As part of the program, Cadet Smith will complete a poster that he will present at the American Meteorological Society Student Conference in January 2015. He will also write a research paper to summarize his internship and present his findings before graduating in May. Cadet Smith's efforts will help the OPC Ocean Applications Branch prepare to introduce new forecast tools to the marine forecasters.



One of the Fog and Low Stratus product images analyzed in the Gulf of Maine by USCGA Cadet Smith during his summer internship with the Ocean Prediction Center.

OPC – Met-Ocean Monitoring and Forecasting Workshop

Joe Sienkiewicz of the Ocean Prediction Center was invited to participate as a Subject Matter Expert at the Workshop on Met Ocean Monitoring and Forecasting for the Newfoundland and Labrador Offshore areas. The following bullets list key points:

- The oil industry will be expanding production operations farther offshore on the Grand Banks (near term), the Flemish Pass (farther east), and eventually northward into the Labrador Sea. Current production platforms and rigs are at 175 to 200 nm to the east of Newfoundland.
- Forecast improvement is needed for:
 - visibility (out to 3 days - helicopter and crane operations) with the principal source of reduced visibility being advection fog.
 - waves (out to 7 to 10 days)

- winds (out to 7 to 10 days)
- Visibility impacts helicopter operations with 93 approaches abandoned this year due to visibility dropping below minimums while in route (approximately 10%). 73 days (so far) in 2014 all flight operations were cancelled due to weather. Helicopter operations are also halted when the sea state exceeds 6 m. The increased distance from St. John's for the expanded operations farther east will require improved predictions.
- The Offshore waters of Newfoundland lie within the Environment Canada Offshore Zones and the METAREA IV High Seas domain of the U.S. via the [NWS Ocean Prediction Center](#).

The workshop was sponsored by the Hibernia Management and Development Company of Canada and organized and facilitated by AMEC. The approximately fifty attendees included representatives from oil companies, Environment Canada, meteorological service providers such as AMEC, instrument and buoy designers and manufacturers, and universities. Invited speakers gave presentations on various aspects of Grand Banks weather, observations, present and future research and operational prediction capabilities, data assimilation techniques, and ensemble prediction systems. Good discussion amongst the group took place concerning a variety of issues and topics. The entire workshop was recorded to not lose any of the discussion points.

Joe gave an update on wave prediction at [NOAA](#) and included slides discussing the display capabilities that are used by [NWS](#). The [Ocean Prediction Center](#) has found that wave information is very challenging to best represent in horizontal displays, given the number of parameters that are output from wave models.

Findings include:

- improving observations of key parameters and sharing those observations across the broader community.
- validating numerical model predictions with observations.
- investigating the use of short-term ensemble systems to anticipate marginal conditions.



Figure 1. Cape Spear, Newfoundland - the eastern most point of land in North America as seen from Signal Hill, St. John's.

WPC - Second Annual Flash Flood and Intense Rainfall Experiment

From July 7 – 25, 2014, the Hydrometeorological Testbed at the [Weather Prediction Center](#) (HMT-WPC) hosted the second annual Flash Flood and Intense Rainfall (FFaIR) Experiment. This year's experiment focused on investigating methods to improve flash flood forecasting in the 1 – 36 hour time range.

During the experiment, 23 participants from the operational forecasting, research, and academic communities used a combination of operational and experimental model data to issue a series of experimental flash flood forecasts. The first was a national 18 hour "flash flood outlook" forecast that was designed to test proposed changes to [WPC's](#) current [Excessive Rainfall Outlook](#). These changes include redefining the product to highlight the probability of flash flooding within 40 km of a point and changing the values of the probability contours. In addition to this national outlook, participants were also asked to issue two short-term probabilistic flash flood outlook forecasts focused on a regional area of interest.

Building off of last year's success, this year's experiment again featured the neighborhood probability approach. This approach, which searches for the occurrence of an event within a certain distance of a point, helps account for some of the spatial uncertainty that is inherent in high resolution model forecasts. To address the potential for errors in the expected hydrologic response, this year participants were asked to evaluate the utility of neighborhood probabilities of precipitation exceeding some percentage of flash flood guidance (FFG). Participants found that having access to these different ratios (e.g. QPF > 75% FFG) was valuable as it helped provide additional information about the range of possible forecast solutions.

Finally, the 2014 FFaIR Experiment featured the debut of a new flash flood verification database. Developed through a partnership between the Office of Hydrologic Development (OHD), [WPC](#), and the [National Severe Storms Laboratory](#) (NSSL), this database compiles flash flood observations from [NWS](#) Local Storm Reports (LSRs), [NSSL](#) Meteorological Phenomena Identification Near the Ground (mPING) reports, and stream gauge measurements from the [U.S. Geological Survey](#) (USGS). This database proved to be extremely valuable and greatly aided in the quality of the subjective evaluations conducted during the experiment.

In the coming months, HMT-WPC will continue to aid [WPC's](#) efforts to redefine the [Excessive Rainfall Outlook](#) product while also pursuing enhancements to the flash flood verification database. In addition, HMT-WPC will work with the hydrology community to explore the utility of

additional hydrologic datasets for use in the neighborhood probability approach.



Participants in the 2014 Flash Flood and Intense Rainfall Experiment discuss the morning's forecast (photo credit: Tom Workoff). Clockwise from the front: Greg Waller (WGRFC, standing), Patrick Burke (WPC), Randy Graham (WFO SLC), Kelly Mahoney (ESRL), Eric Aligo (EMC), Jason Elliot (WFO LWX), and Ryan Husted (WFO GLD).

WPC – Winter Weather Services Meeting

Winter storms have always garnered public attention. For example, a winter storm struck the mid-south late in January 2014, snarling transportation in Atlanta, GA and other major southern cities.

NCEP's [Weather Prediction Center \(WPC\)](#) provides a focused look at winter weather across the nation through their [Winter Weather Desk \(WWD\)](#). Forecasters at this desk provide winter weather expertise to field offices via direct contact with [NWS](#) field offices and through a suite of winter-related products, including deterministic and probabilistic formats.

To review existing and new [WPC](#) winter products and services, [WPC](#) hosted a 2-day meeting September 2-3, 2014. This was the first meeting of its kind in over a decade, bringing principals of the local field offices, Regional and National Headquarters, and [NCEP](#) together to discuss operational winter weather topics, with particular focus on promoting more accurate and consistent services.

Several new products were highlighted. For example, [WPC](#) has developed several new prototype winter products that are ready for evaluation by [NWS](#) Weather Forecast Offices (WFOs). Specifically a 'Winter Weather Watch Collaborator' tool that compares a multi-model ensemble of probabilistic snow amount forecast guidance to local WFO winter storm warning criteria to serve as a focus of local to national level collaboration. A second product is the Days 4-7 outlook of potential winter precipitation. This provides the probability of experiencing an inch or snow or glaze of ice on a given day. Both products were developed by [WPC](#) in collaboration with the Hydrometeorological Testbed.

Discussion also highlighted the science enabling winter weather forecast advances. This includes ensemble models, probabilistic forecasts, and post-processed snowfall guidance. In the end, nearly a dozen of topics of interest and several action items were developed during the course of the 2-day meeting, focused on achieve a more accurate, consistent, and understandable decision support message for hazardous winter weather.



Weather Prediction Center Acting Director, David Novak (standing), kicks off the Winter Weather Services meeting among an audience of principals from local field offices, Regional and National Headquarters, and NCEP.

