

Hydrometeorological Prediction Center 2008 Accomplishments Report

1. Introduction

The Hydrometeorological Prediction Center (HPC) made progress on several fronts during 2008. Collaboration between HPC forecasters and National Weather Service (NWS) field offices continued to increase with HPC working with the regions to provide quality guidance in a timely manner. HPC continued to increase the number of products provided in new formats including GIS and XML. As in past years, HPC successfully forecast several significant weather events.

2. Major Accomplishments

Alaska Desk Upgrades Product Suite – At the start of 2008, the Alaska Desk product suite consisted of a daily forecast discussion issued for the benefit of the Alaska Region forecast offices and a set of surface maps depicting pressure patterns and frontal positions for each day of the medium-range period. This forecast discussion focused on model diagnostics and the preferences of the HPC forecaster with respect to model or model blend. On February 4 HPC began issuing a complete forecast package for Alaska, including all parameters in the NWS National Digital Forecast Database. This forecast package includes surface and 500-millibar prognostic charts, as well as sensible weather parameters in both graphical and gridded forms.

HPC Upgrades the Product Suite for Short-Term Forecasts - On March 17 HPC introduced an upgraded product suite for HPC's short-term forecasts. HPC added forecast graphics for 6 hours and for 60 hours on its twice daily suite. These changes were introduced in support of aviation operations, to fill a void between the short-term and the medium range forecasts, and in response to a customer survey conducted in 2007.

Backup of HPC Quantitative Precipitation Forecasts Is Successful - During the week of March 3-7 HPC Senior Forecaster Mike Eckert participated in the National Severe Storms Workshop in Norman, OK. While there, Mike provided additional training to Storm Prediction Center (SPC) staff on preparation of Quantitative Precipitation Forecasts (QPFs). On March 7, Mike conducted a test of the backup, issuing all HPC QPF products from SPC. This activity was part of the HPC effort to ensure a reliable Continuity of Operations (COOP) by ensuring a reliable backup system for HPC QPFs.

HPC Forecasters Participate in Flood Conference Calls - During April the Midwest states were hit by a series of heavy rain events generating significant flooding, most noticeably along the Missouri and Mississippi River Basins. HPC participated in daily conference calls organized by the U.S. Army Corps of Engineers to brief emergency

managers and mitigation workers. This HPC effort enabled the emergency workers to plan for flood mitigation based upon the rainfall expected over the next several days.

International Activities Office Staff Visits NCEP - On July 15, Dan Thompson, Chief of the NWS International Activities Office, and several of his staff visited NCEP. The purposes of the visit were familiarizing Mr. Thompson with NCEP's International Desks, exploring ways of leveraging the International Desks in achieving the NWS Director's goals for NWS international activities, and beginning the process of preparing the International Desks Partnership Agreement between NCEP and the International Activities Office for FY2009. Excellent overviews and tours were provided by Desk Coordinators Mike Davison and Wassila Thiaw and a lively brainstorming session was led by Mr. Thompson.

NCEP Briefs at National Videoteleconferences for Hurricane Dolly - From July 22-25, on numerous occasions, the Tropical Prediction Center and HPC briefed leadership at the national, regional, and state levels prior to, during, and after the landfall of Hurricane Dolly. These presentations, conducted as part of the NOAA-FEMA Hurricane Liaison Team, provided up-to-the-minute information to FEMA Administrator David Paulison, his national and regional staffs, Texas state emergency management, and representatives of the Departments of State, Health and Human Services, Transportation, Energy, Defense, and others, and included representatives from the White House. The NWS was commended for the quality of all aspects of its forecasts and support during Dolly.

HPC Supports Federal Emergency Management Agency (FEMA) for Tropical Storm Fay - HPC provided rainfall forecast support for the FEMA Hurricane Liaison Team daily audio and video teleconferences from Saturday, August 9, through Monday, August 18, as Fay approached and then crossed the Florida peninsula several times before making its final landfall in Louisiana. The most significant impacts from Fay were the heavy rains. Areas around Melbourne got 15 to 20 inches with several reports near 25 inches.

HPC Supports NWS Field Offices and the Department of Homeland Security for National Political Party Conventions - HPC was an active participant in daily conference calls to provide weather support to the Democratic National Convention in Denver, Colorado, August 26-28. Weather was a significant concern, particularly for the outside events on the final day. HPC was part of the NWS team providing similar support for the Republican National Convention in St Paul, Minnesota, August 31 to September 4.

Federal Emergency Management Agency Expands Backup Program for Hurricane Liaison Team. Tim Rush, FEMA Hurricane Liaison Team (HLT) representative, participated in the HPC portion of the HLT briefing on September 11. HPC is the backup for the National Hurricane Center (NHC) and would host the HLT videoteleconference (VTC) in the event NHC was unable to do so. In addition, Tim worked with HPC management to identify the assets and requirements for HPC to host the VTC.

September is Busy Month for Hurricane Support – HPC management and forecasters participated in numerous Hurricane Liaison Team videoteleconferences with FEMA during September. Starting on September 1 with Hurricane Gustav affecting the lower Mississippi Valley, HPC also participated in VTCs for Ike and Hanna. HPC was involved in these calls every day from September 1-8, and 10-13. HPC also provided the precipitation forecasts for these storms.

HPC's National Forecast Chart Schedule is Upgraded to Twice Daily - This chart, initially intended as a briefing tool for NWS and NOAA Headquarters, has become the most widely viewed chart on the HPC web site. The chart is a synthesis of the major weather forecast events from HPC, SPC, and TPC. A new afternoon issuance now complements the original 5 a.m. version.

HPC-Produced Selected Cities Product is Replaced by an Enhanced Version – The Selected Cities Summary, listing past and forecast weather for about 160 cities in the United States, was replaced on December 9, 2008, by an improved product. The new product derives forecast data from the National Digital Forecast Database and extends out seven days rather than the two days in the HPC product. The new version, which is sent in XML format, is a collaboration among HPC, NCEP Central Operations, and the NWS Meteorological Development Laboratory (MDL). HPC is responsible for selecting the national high and low temperatures four times a day. MDL provides the forecast information while NCO provides the observed high and low temperatures and observed precipitation for each city. The new product is generated hourly, while the older HPC version was produced twice daily.

Outreach, conferences, and visitors

HPC - WFO Visiting Forecaster Program Completes Second Year – Under this highly successful program, forecasters from NWS Weather Forecast Offices visit HPC for three days to learn about HPC forecast procedures and capabilities and to share experiences from their home offices with HPC staff. As part of this, most visitors provide a seminar highlighting the unique programs or capabilities of their home office. Six forecasters from conterminous U.S. offices visited HPC in 2008. HPC sent one staff member to WFO Louisville, where he met with the office's staff to learn about their programs. He also provided a presentation on HPC programs to staff from several offices who were visiting at the time. With the advent of Alaska medium-range forecast products from HPC in October 2007, two forecasters from Alaska visited HPC and one HPC forecaster went to Anchorage as part of the forecaster exchange.

HPC - RFC Visiting Forecaster Program Continues – In an ongoing effort to improve understanding between HPC meteorologists and River Forecast Center hydrologists, HPC hosts a forecaster exchange program with RFCs. Three HPC forecasters visited RFCs while one RFC hydrologist visited HPC. Steve Flood visited the Missouri Basin RFC, Dan Petersen visited the Ohio RFC, and Christopher Hedge visited LMRFC. Daniel

Kozlowski, from the California-Nevada RFC, visited HPC. The visits ranged from two to four days and were very successful.

HPC Director addresses the American Association for the Advancement of Science (AAAS) - Jim Hoke, HPC Director, gave a presentation entitled “The Challenges of Weather and Climate Prediction” at AAAS Headquarters in Washington, D.C., on March 5. At the invitation of the association’s Senior Scientists and Engineers group, Jim reviewed the great strides made in forecasting weather and short-range climate variability, the techniques that are used, and NOAA’s plans for the future. The large number of questions during the 90-minute presentation served as an indication of the group’s interest in the topic. A major on-going effort of the group is assisting with science education by working in the classrooms of secondary schools in the Washington area and elsewhere in the U.S. As an aside, one of the founders of the AAAS and its first president (in 1848) was William C. Redfield, an entrepreneur and meteorologist.

HPC Forecaster Attends Incident Meteorologist (IMET) Workshop - Pam Szatanek participated in the 2008 IMET Workshop in Boise, Idaho, on March 17-20. The workshop focused on landmark case studies from the 2007 season, annual training requirements, and future developments in the IMET program. HPC has successfully been incorporated into the program and has been slated to house a Type I IMET once the expansion phase gets underway.

Federal Emergency Management Agency Senior Staff Visits HPC - HPC's Jim Hoke and Kevin McCarthy met with several FEMA senior staff April 15, to discuss HPC participation in FEMA briefings beyond the Hurricane Liaison Team (HLT). This meeting was set up by FEMA's Matthew Green, the FEMA HLT focal point at the Tropical Prediction Center (TPC). The other FEMA participants were Glenn Cannon, FEMA Assistant Administrator, Disaster Operations Directorate, and Bob Powers, his Deputy Assistant Administrator.

After a tour of HPC operations, an overview of the National Centers for Environmental Prediction (NCEP) organizational structure was provided. Mr. Powers expressed FEMA's need to talk with the forecast experts for particular hazards including being able to ask follow-up questions. FEMA would like to see an expansion of HPC support to them to include other significant rainfall and flooding threats such as the Midwest river flooding in spring 2008 and to major winter snow and ice storms. HPC reaffirmed the existing NCEP/FEMA partnership, which has resulted in support by TPC, Storm Prediction Center, NCEP Central Operations, and HPC on many occasions.

HPC Scientist Lectures at Tropical Prediction Center - On April 8 Michael Brennan, HPC Science and Operations Officer (SOO), gave a lecture on the use of QuikSCAT ocean vector wind data for tropical cyclone analysis at the World Meteorological Organization (WMO) 2008 RA-IV Workshop on Hurricane Forecasting and Warning, held at the TPC. The class was attended by operational forecasters from the United States National Weather Service, as well as forecasters from Canada, Nicaragua, the Netherlands Antilles, the Dominican Republic, Jamaica, Belize, Panama, Cuba, Bermuda, Colombia, Trinidad and Tobago, Costa Rica, Mexico, Martinique, Honduras, Guatemala,

Grenada and St. Lucia. The lecture and accompanying lab focused on practical applications of QuikSCAT data in analysis of tropical cyclone intensity, center fixing, and wind field structure.

HPC Presents at the Cooperative Program for Operational Meteorology (COMET)

- On April 16, Michael Brennan, HPC Science and Operations Officer (SOO), gave a lecture at the Cooperative Program for Operational Meteorology, Education, and Training (COMET) Mesoscale Analysis and Prediction Course (COMAP) in Boulder, Colorado. Course attendees included SOOs from approximately 15 National Weather Service Weather Forecast Offices. This lecture focused on the use of potential vorticity thinking in operational forecasting, particularly in the identification and tracking of the impact of latent heating in model forecasts of extratropical cyclones, low-level jets, and moisture transport.

HPC Participates in American Meteorological Society (AMS) Conference - Michael Brennan, HPC Science and Operations Officer (SOO), attended the American Meteorological Society's (AMS) 25th Conference on Hurricanes and Tropical Meteorology in Orlando, Florida, from April 27 through May 2. Mike presented a poster entitled "Verification of Quantitative Precipitation Forecast Guidance from Numerical Weather Prediction (NWP) Models and the Hydrometeorological Prediction Center for 2005–2007 Tropical Cyclones with Continental U.S. Rainfall Impacts", co-authored with HPC's Jessica Clark and Mark Klein.

Chinese Scientific Delegation Visits HPC - Scientists from the Chinese Meteorological Administration were hosted by HPC on April 28 and 29. The primary interests of the delegation were the details of the real-time processes followed by the HPC forecasters in the preparation of their products. In addition to extensive familiarization on those topics by the HPC forecast staff, the visitors also received an overview of the National Centers for Environmental Prediction (NCEP) by Dr. Uccellini, overviews by the leadership of several NCEP centers, and presentations on forecast verification. They also obtained a first-hand understanding of the NCEP seamless suite of products through their attendance at the daily map discussion of the HPC and Climate Prediction Center (CPC).

HPC Forecaster Participates in World Meteorological Organization Workshop at the Tropical Prediction Center - Michael Eckert, Senior Branch Forecaster at HPC, participated in the annual WMO Tropical Cyclone Forecasting Workshop at TPC in April. In addition to participating in the training as a forecaster, Mike taught a section of the workshop on tropical cyclone quantitative precipitation forecasting (QPF). HPC is the backup for TPC in the tropical cyclone program, and is a key office for QPF associated with tropical cyclones.

HPC Meteorologist Participates in Puerto Rico Weather Camp - HPC International Desks Coordinator Michel Davison participated in the University of Puerto Rico's Weather Camp held from July 14-19. The workshop was open to a select group of junior and senior high school students who were interested in meteorology, atmospheric sciences, oceanography, environmental sciences, and applied physical sciences. One of the goals of the workshop was to encourage students to pursue careers in NOAA-related

fields. Michel discussed the climatology of the Americas, which covered topographical features and terrain, ocean currents, atmospheric circulations, tropical cyclones, and other factors affecting climatology.

Senior Hydrologist at the Middle Atlantic River Forecast Center visits HPC - Ms. Paula Cognitore visited the Washington area in September as part of the Department of Commerce Mentorship Program. While at the HPC, she met with HPC management and forecasters, attended the daily NCEP map discussion, and participated in the weekly NWS staff meeting via videoteleconference and the daily NCEP operations staff meeting. Her visit was helpful in providing insights into both the technical and managerial activities of the NWS and an NCEP national center.

Federal Emergency Management Agency Mitigation Assessment Team visits HPC - Daniel Zell and Colleen Bailey of Dewberry and Davis LLC came to HPC on September 11 to discuss the June 2008 Midwest flooding as part of the FEMA Mitigation Assessment Team. This assessment is being conducted in parallel with the NWS Service Assessment on the flooding, with both studies focusing on Iowa. Jim Hoke, HPC Director and team lead for the NWS Service Assessment, served as their host. Discussion focused on the preliminary findings of the assessment teams and how the two assessments dovetail, leading to a consistent federal picture of actions that can be taken to mitigate future catastrophic flooding events. In addition, the visitors received a tour of the operations of the National Centers for Environmental Prediction in the World Weather Building and attended the daily HPC map discussion.

HPC Meteorologist Participates in AARP Conference - NOAA staffed a booth at the American Association of Retired Persons conference in Washington, District of Columbia, September 4-6. Bruce Sullivan, HPC Senior Branch Forecaster, assisted in the effort, providing hourly briefings all three days on the status and expected impact of Hurricanes Hanna and Ike, as well as providing information on the Community Collaborative Rain, Hail, and Snow program (CoCoRaHS).

HPC Participates in the Rainfall-River Forecasting Joint Summit in St. Louis - At the request of Brigadier General Michael Walsh, Commander of the Mississippi Valley Division of the U.S. Army Corps of Engineers and the President of the Mississippi River Commission, about 15 NWS staff members participated in the Rainfall-River Forecasting Joint Summit, held in St. Louis on October 7-9. The purpose of the meeting was to bring together representatives of those two organizations and the U.S. Geological Survey to further collaboration among those three agencies in light of the lessons learned for the major flooding in the Midwest during 2008. The second day of the summit featured a public forum, attended primarily by representatives of the river shipping and transportation industry, levee drainage districts, and the media. HPC Director Jim Hoke and Service Coordination Hydrologist Steve Buan of the North Central River Forecast Center were the NWS panelists at the forum. The major message from those who addressed the panel was the need for accurate, timely, and consistent forecasts of river stage out through at least seven days for all river stages from very low to very high water.

HPC Participates in the Integrated Water Resources Science and Services (IWRSS) Joint Strategy Meeting – At the request of the organizers, HPC Director Jim Hoke spoke to the attendees of Joint Strategy Meeting III of the Integrated Water Resources Science and Services initiative, held in Hanover, New Hampshire, on October 15-17. Emphasis of the talk were the many opportunities that exist for NOAA, the U.S. Army Corps of Engineers, and the U.S. Geological Survey to partner in addressing urgent water resources issues of the Nation. These opportunities have been noted by the Service Assessment Team for the June 2008 Midwest Floods, of which Dr. Hoke is the team lead. The IWRSS project was initiated to facilitate this partnership among these three agencies and others.

HPC Forecasters Participate in Scientific Workshops - Dan Petersen, HPC winter weather focal point, delivered a presentation at the Northeast Regional Operations Workshop in Albany, associated with SUNY Albany and the Albany Weather Forecast Office. In addition, Paul Kocin, HPC Alaska Desk focal point, spoke on “Winter Storms in a Changing Climate” at Stony Brook University. Both forecasters brought back an increased understanding of the processes of winter and coastal storms to share with HPC forecasters.

HPC Participates in the National Weather Association Annual Conference - Mike Eckert and Dan Petersen, forecasters at HPC, attended the National Weather Association annual conference in October. Their presentations prompted a great deal of discussion leading to potential changes in HPC methodology for improved collaboration with NWS Weather Forecast Offices.

Media activities

HPC forecasters were interviewed by numerous media outlets throughout the year, including radio, television, and the print media. CNN Radio, National Public Radio, and several other national networks contacted HPC for live or taped interviews on a number of occasions. As part of this, Mike Davison, HPC International Desks Coordinator, provided many interviews in Spanish.

International Desks

The HPC International Desks is a program for training meteorologists from South and Central America and the Caribbean Basin in the techniques of weather analysis and forecasting. Due to the large number of forecasters trained, over 200, and the extensive training International Desks Coordinator Mike Davison has provided at workshops and international meetings, Mr. Davison, has excellent contacts within the meteorological services of the countries served. When weather events are likely to have a significant impact, Mr. Davison is frequently contacted by former visiting scientists for his expertise. On many occasions, Mr. Davison has been proactive in contacting the foreign meteorological services in order to ensure they were prepared for significant weather events.

HPC Recognizes Jeffrey Krob for Contributions to the International Meteorological Community - On March 11, HPC presented Jeffrey Krob, a National Environmental Satellite, Data, and Information Services (NESDIS) employee, with a Service Award in recognition of his work in developing major enhancements to PCGRIDDS. PCGRIDDS is one of the most comprehensive and easily exportable software systems for data assimilation and interpretation. Jeff developed the Windows version (WINGRIDDS) of the DOS PCGRIDDS software. This software is available free of charge and is used by several national and military weather services, especially in the Caribbean Basin, South America, and Africa. This software provides capability for users with minimal investment to display and analyze model output and observations. Mr. Krob's support has been instrumental in furthering the science of meteorology in the Americas and Africa.

HPC Delivers Remote Training via the Internet - Mr. Michel Davison, HPC International Desks Coordinator, has pioneered the use of the Internet to provide remote training to meteorologists in the Caribbean Basin and South America. For several years, Mike has conducted monthly distance learning training in support of the Virtual Institute for Satellite Integration Training (VISIT) sponsored by the World Meteorological Organization. The primary mission of VISIT is to accelerate the transfer of research results based on atmospheric remote sensing data into operational meteorology using distance education techniques. Because of the success of these training sessions, the regional training center in Venezuela is developing a class to allow participants to get credit towards their degrees for participating in the monthly training sessions.

HPC Staff Conduct Forecasting Workshop in Argentina - Michel Davison, HPC International Desks Coordinator, and Edwin Danaher, Chief of the HPC Development and Training Branch, led a workshop on forecasting in Buenos Aires, Argentina, June 9-13. Name of the workshop was the Second Workshop on Advanced Operational Training on Application of Numerical Weather Prediction, Satellite Meteorology, and Marine Prediction. The workshop was held at the invitation of Argentina's Servicio de Hidrografía Naval. There were 26 participants, who were from Argentina's Servicio Meteorológico Nacional, Air Force, and Navy.

HPC International Desks Coordinator Presents at Workshop in Cordoba, Argentina - Mike Davison attended the International Satellite Training Workshop, which was sponsored by the World Meteorological Organization, September 22 to October 3. Representatives from the following countries attended the training sessions: Argentina, Bolivia, Brazil, Chile, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Peru, and Uruguay. Mr. Davison was one of fifteen instructors who were invited to lecture during the workshop. Mr. Davison received compliments from the two co-chairs, Mr. Jerome Lafeuille, WMO Chief of Space-based Observing Systems, and Dr. Herbert Puempel, WMO Chief of the Aeronautical Meteorology Unit.

3. Awards and Certifications

2008 Isaac Cline Regional Award Winner:

Michael Eckert - in the Hydrometeorology Category. For his work as leader of the Quantitative Precipitation Forecast program at HPC. In that capacity he has written training and forecast manuals for HPC and conducted outreach with users within and outside of the NWS.

HPC Isaac Cline winners:

Christopher Bailey – in the Meteorology Category. For contributions to the development, maintenance, and verification of automated products for the HPC Medium-range Forecast Desk and the new Alaska Desk for possible use in preparing the National Digital Forecast Database. These contributions have been essential to the success of HPC in advancing its mission into new areas.

Michael Eckert - in the Hydrometeorology Category. (See Regional Award above.)

Mark Klein - in the Support Services Category. As HPC Webmaster, for constantly enhancing the content and organization of the HPC web site, as well as maintaining the software to generate the graphics and populate the site. He has designed a website with extensive content, with around 1000 products, that is easy to navigate and user friendly.

Certification:

Pam Szatanek - formally inducted into the ranks of NOAA Incident Meteorologists (IMETs) during the 2008 IMET Workshop in Boise, Idaho, March 17-20. With her induction the number of certified IMETs in NOAA became 78.

4. On-Going HPC Staff Publications in 2008

Brennan, M.J., G.M. Lackmann, and K.M. Mahoney, 2008: Potential vorticity (PV) thinking in operations: The utility of non-conservation. *Wea. Forecasting*, **23**, 168–182.

Brill, K.F., 2009: A general analytic method for assessing sensitivity to bias of performance measures for dichotomous forecasts. *Wea. Forecasting*, **24**, 307-318.

Brill, K.F., and F. Mesinger: Applying a general analytic method for assessing bias sensitivity to bias adjusted threat and equitable threat scores. *Wea. Forecasting*. Submitted.

- Davison, M., 2008: Cross-equatorial upper systems. COMET Module in Spanish, University Corporation for Atmospheric Research, Boulder, Colorado.
- Hoke, J.E., et al.: Central United States flooding of June 2008. Service Assessment, National Weather Service, NOAA, Silver Spring, Maryland, 103 pp. In final review.
- Junker, N.W., M.J. Brennan, F. Pereira, M.J. Bodner, and R.H. Grumm, 2009: Assessing QPF Uncertainty with Standardized Anomalies and Ensemble Guidance at the Hydrometeorological Prediction Center. *Bull. Amer. Meteor. Soc.*. In press.
- Knabb, R., C. Hennon, and M.J. Brennan: The operational use of QuikSCAT ocean surface vector winds at the National Hurricane Center. *Wea. Forecasting*. Submitted.
- Kocin, P.: Northeast snowstorms, Volume 3, The Twenty-first Century. In progress.

5. Photos



HPC meteorologists Katie Collins, Jackie Kost, and Mary Beth Gerhardt at the Surface Analysis Desk around shift change.



At the HPC Holiday Party in December, former and present co-workers reminisce about the good old days.



HPC International Desk Coordinator, Michel Davison (front and center), and Development and Training Branch Chief Ed Danaher (sixth from right), presented a one-week workshop on forecasting in Buenos Aires, Argentina.