

# NCEP Quarterly Newsletter - March 2011



## **NCWCP Project Set to Restart**

The [General Services Administration](#) has reached an agreement with a court-appointed receiver on issues related to the new Supplemental Lease Agreement #4 for the [NOAA Center for Weather and Climate Prediction](#). The NCWCP, which will be located on a new 50-acre section of the University of Maryland's [M-Square Research and Technology Park](#), was originally scheduled to be completed in late summer of 2009, but was put on hold in December 2008 after the development firm contracted to build the center filed for bankruptcy.

The Circuit Court for Prince George's County, Md., approved the agreement between GSA and Douglas P. Wilson Companies and authorized Douglas P. Wilson Companies to petition the U.S. Court of Appeals for the Federal Circuit for dismissal of a previous claim filed by Maryland Enterprises. This motion was filed on December 10, 2010 and the Federal Court granted the motion on February 9.

These actions clear away all remaining legal obstacles to restart work on the NCWCP project. GSA and Douglas P. Wilson Companies have indicated their intention to execute the Supplemental Lease Agreement by early March, with work restarting within 30 days of execution.

Some highlights of the currently-projected approximate major construction and occupancy milestones include:

- Early April 2011: Work restarts.
- Late January 2012: Phase 1 occupancy occurs: data center and portions of the first floor. This limited occupancy will allow installation and testing of computer systems and the initial installation of systems furniture on portions of the first floor.
- Late March 2012: The entire building will be substantially complete. While lease payments will begin at this point, and the building will be available for completion of the furniture installation, no NOAA employees will be allowed to occupy the building at this time, except for personnel working in the data center.
- Late May 2012: Furniture installation completed, and Certificate of Occupancy issued. This will allow the full-scale move-in of staff to begin.
- Late July 2012: Move-in of staff completed.

Once completed, the 268,762 square-foot office and research complex will become the new home for two sections of NOAA's [Satellite and Information Service](#), as well as the [Air Resources Laboratory](#) and five of the nine centers that make up the NWS [National Centers for Environmental Prediction](#). Approximately 800 people will work in the facility.

This news comes after much work and coordination with GSA. NOAA will continue to work with GSA to ensure that all work is properly installed, inspected and tested as appropriate, and that the schedule outlined above is adhered to.



NOAA Center for Weather and Climate Prediction in Riverdale, MD

---

## NCEP Enters Procurement Process for New Operational Supercomputing System

NOAA is soliciting written proposals to acquire advanced high performance computing (HPC) systems to meet its operational computing requirements. The new primary and backup Weather and Climate Operational Supercomputing System (WCOSS) will replace the current operational HPCS platforms at the National Weather Service (NWS) National Centers for Environmental Prediction (NCEP) headquartered in Camp Springs, Maryland. The new systems will help NOAA meet its strategic goals related to weather, climate, air quality, coastal and ocean resource management, and national commerce support.

The objectives of the WCOSS acquisition is to acquire a fully integrated solution to include the primary and backup WCOSS (two operational HPCS), facilities to house the primary and backup WCOSS, HPCS related services, facilities related services, balanced HPCS lifecycle technology expansions/refreshes with facilities, project management services, and the capacity for growth options.

A single indefinite delivery, indefinite quantity contract, subject to the availability of funds, is anticipated for award on or about October, 2011. This contract consists of a five (5) year base period with a three (3) year option period and a two (2) year transition option. The total duration of this contract, inclusive of all options, shall not exceed ten (10) years. The amount of all orders placed under this contract shall not exceed \$502M.

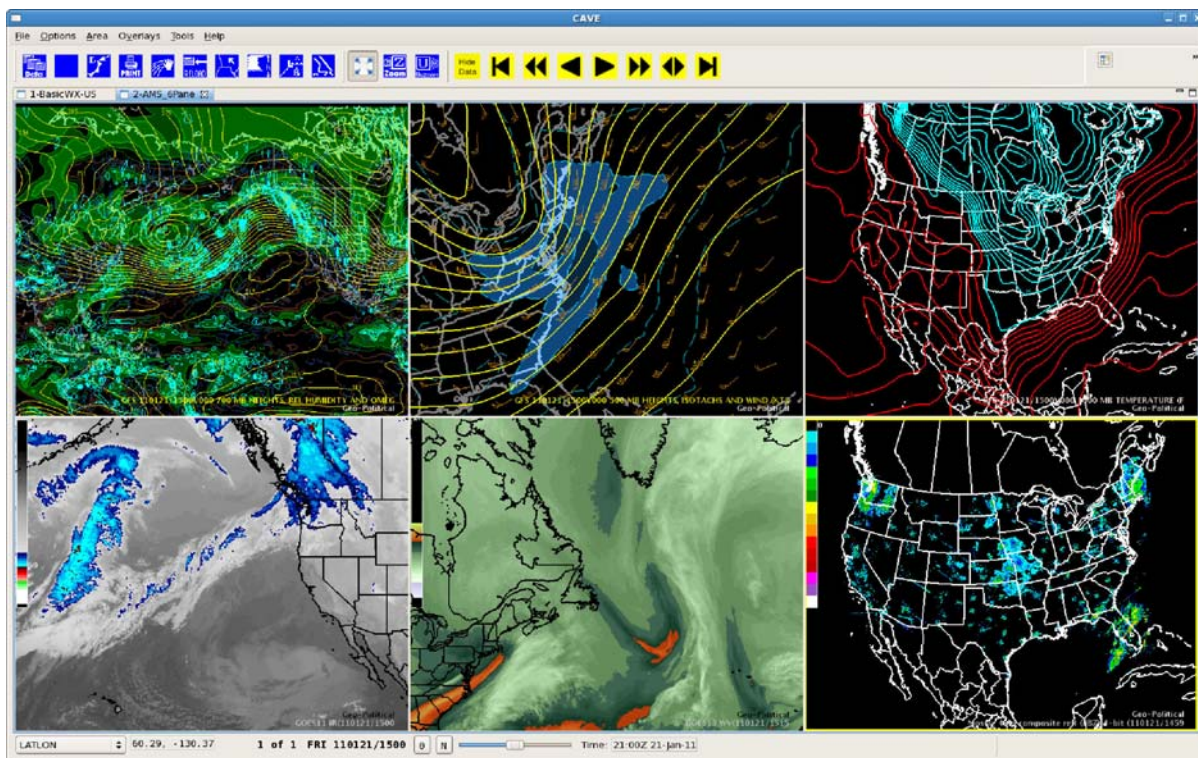


Current NCEP High Performance Computer Hardware

---

## NAWIPS Migration to AWIPS-2

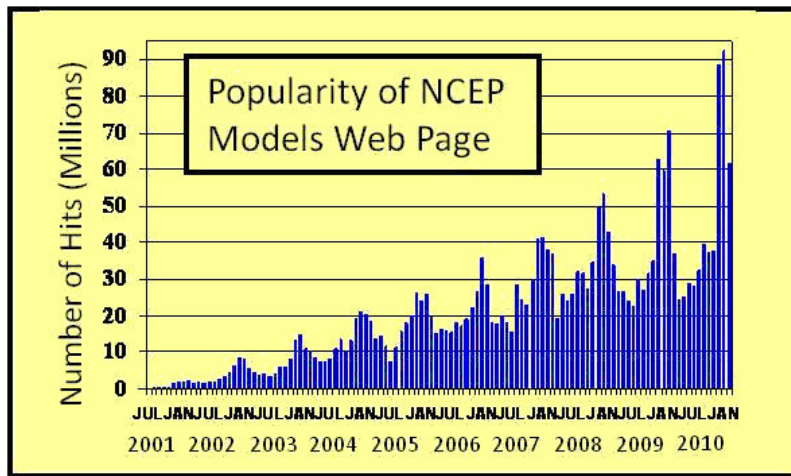
The second half of 2010 saw the continued migration of the National Centers (NC) Advanced Weather Interactive Processing System (NAWIPS) functionality to the new National Weather Service (NWS) AWIPS-II architecture. Started in 2008 and in parallel with the national effort of migrating AWIPS-I to AWIPS-II, the goal of the NC migration is to move all NCEP forecaster capabilities onto the same common platform that all NWS forecast offices will be enjoying in the future. The benefits to the entire NWS will include more efficient workflow and collaboration opportunities between offices, and also a better positioning of the NWS and its partners for adopting new technologies. A workshop was held in August, 2010, for NAWIPS site managers and stakeholders where migrated functionality was evaluated and future requirements were discussed. The arrival of a complete AWIPS-II testbed system late in the year allowed for full integration testing of the software by both software developers and forecasters. The goal of forecaster integration testing, or FITs, is to greatly reduce the risk of software defects as the migration moves into the system and field operational and testing evaluation (SOTE and FOTE, respectively) phases. FOTE begins in July 2011, and the entire NAWIPS migration to AWIPS-II is expected to be complete in the first half of FY12.



Snapshot of the National Center Perspective in AWIPS II with multi-panel configuration

## Redesign of Model Analysis and Guidance Website

Starting in 2010, NCEP Central Operations redesigned the website hosting graphical numerical model analyses and guidance. The Model Analysis and Guidance website will replace the Model Analysis and Forecast website that has existed since 2001 to facilitate viewing weather forecast model output. This capability has grown enormously in popularity since its inception. Each year, the site experiences record setting access as reflected by the monthly total number of hits in the graph below. The yearly peak is seen in the winter months, particularly when snowstorms threaten the east coast.




Monthly Number of hits (millions) for NCEP Model Access Web Page

Development and testing of the new website have centered on two main areas: functional and meteorological. Functional development and testing are concentrated on correct functionality and behavior of the web application and its components; meteorological testing is focused on correct and applicable presentation of the data and enhancing the products, diversity, and availability of data. Major accomplishments are: Several new geographic areas, use of Flash based technology in image loops for faster loading and better-looking images, ability to zoom in and out of static images, documentation for frequently asked questions; users guide; what.s new section, and more robust application and back end processing which reduces the amount of computer processing that is needed. The new MAG site becomes operational on March 15th, 2011.


The website can be accessed here: <http://mag.ncep.noaa.gov> or from NCEP's main website: <http://www.ncep.noaa.gov>.

weather.gov



# National Weather Service

## NCEP Central Operations




Home
News
Organization
Search 
Search


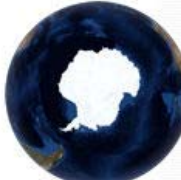
NCEP Home > NCEP Central Operations > Systems Integration Branch > Model Analyses and Guidance

### Model Analyses and Guidance

This site becomes operational on March 15th 2011, replacing the Model Analysis and Forecast site.

Select Model Guidance, Observations and Analyses, or Tropical Guidance

MODEL GUIDANCE	OBSERVATIONS AND ANALYSES	TROPICAL GUIDANCE
		
<p><b>USER'S GUIDE</b>  <a href="#">Frequently Asked Questions</a></p> <p><b>More information is available in the Product Description Document</b></p> <p><b><a href="#">Read Latest Information and News</a></b> <i>(Opens in a new window)</i></p>		

**USA.gov**  
Government Made Easy

NOAA/ National Weather Service  
 National Centers for Environmental Prediction  
 5200 Auth Road  
 Camp Springs, Maryland 20746  
 NCEP Internet Services Team

Disclaimer  
 Credits  
 Glossary

Privacy Policy  
 About Us  
 Career Opportunities

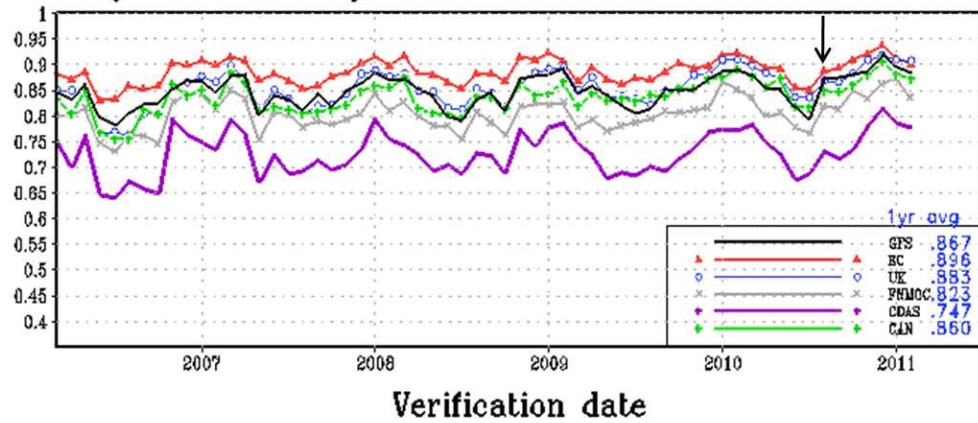
New look for NCEP Model Analyses and Guidance website.

## GFS Upgrade

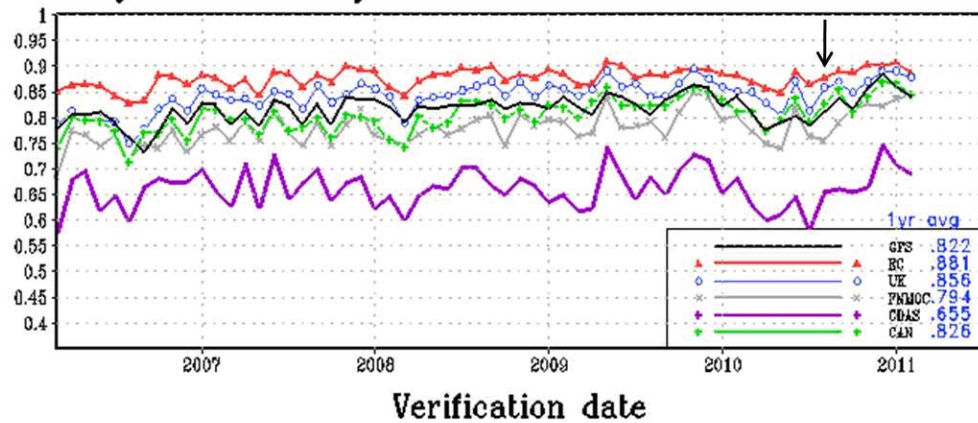
An extensive set of improvements to NCEP's Global Forecast System was implemented into NCEP operations on Wednesday, July 28, 2010, following three years of development, evaluation and testing. One of the major changes is an increase in the model's horizontal resolution from approximately 35 km to 27 km. Additionally, a number of improvements have been made to the model's ability to represent physical atmospheric processes. These improvements include an upgraded radiation and cloud package, upgraded specification of gravity wave drag, a higher resolution grid for hurricane relocation, an upgraded boundary layer scheme, the use of a higher resolution snow analysis, a new mass flux shallow convection scheme and an updated deep convection scheme. Also, the model now has a horizontal resolution of 27 km through 192 hours in support of the GFS MOS development, which is an additional 12 hours from the previous version. The model's resolution from 192 to 384 hours remains at 70 km. Finally, the availability of three hourly forecast output was extended out to 192 hours from 180 hours.

The result of this set of changes is improvement in the overall accuracy of the model's forecasts as shown by the monthly anomaly correlation scores before (up to July 2010) and after the implementation. See graph below. Note the immediate large increase in skill in the Northern Hemisphere in the month following the implementation (referenced by the arrow on the graph). This is one of the largest month to month changes ever seen with this performance statistic.

**Anomaly Correl day 5 Z 500mb n hem lat 20-80**



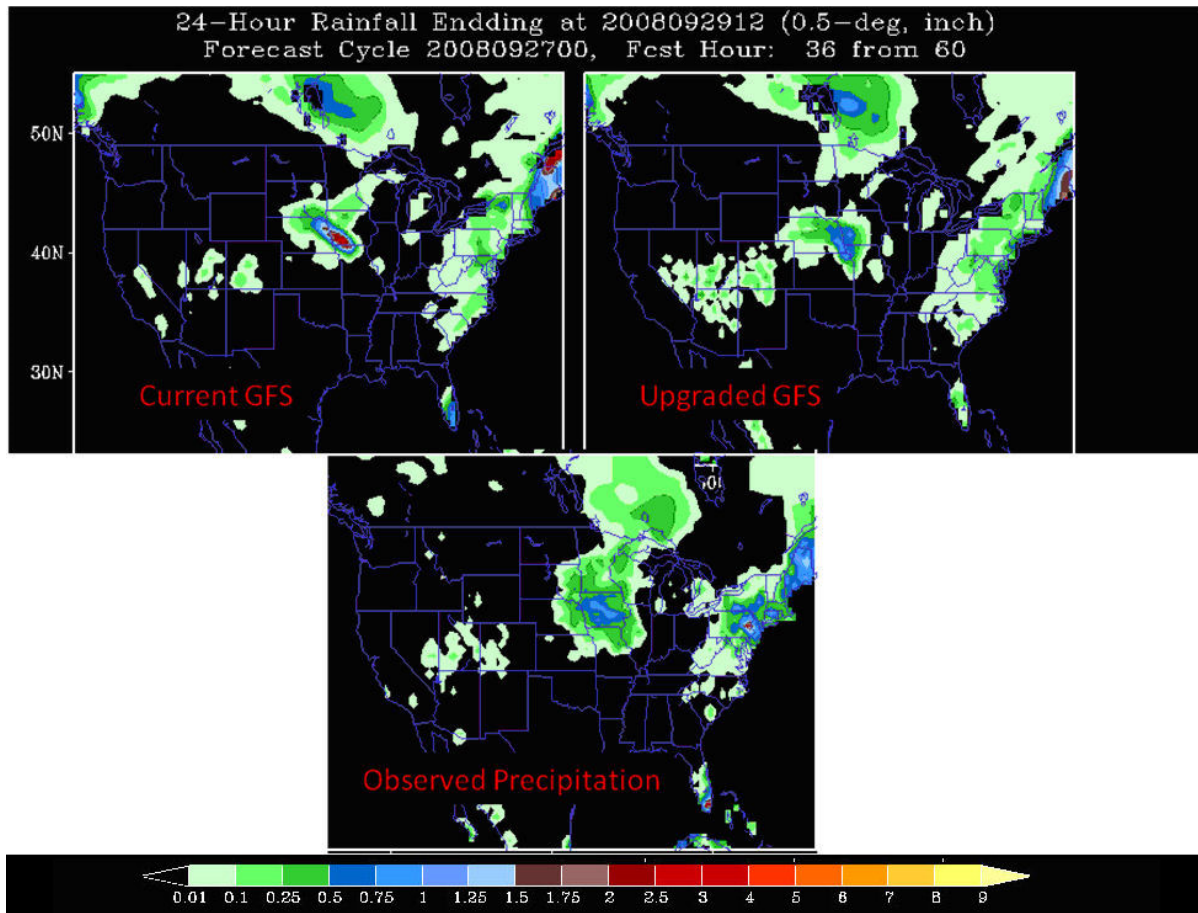
**Anomaly Correl day 5 Z 500mb s hem lat 20-80**



GFS graph showing one of the largest month to month changes ever seen with this performance statistic.

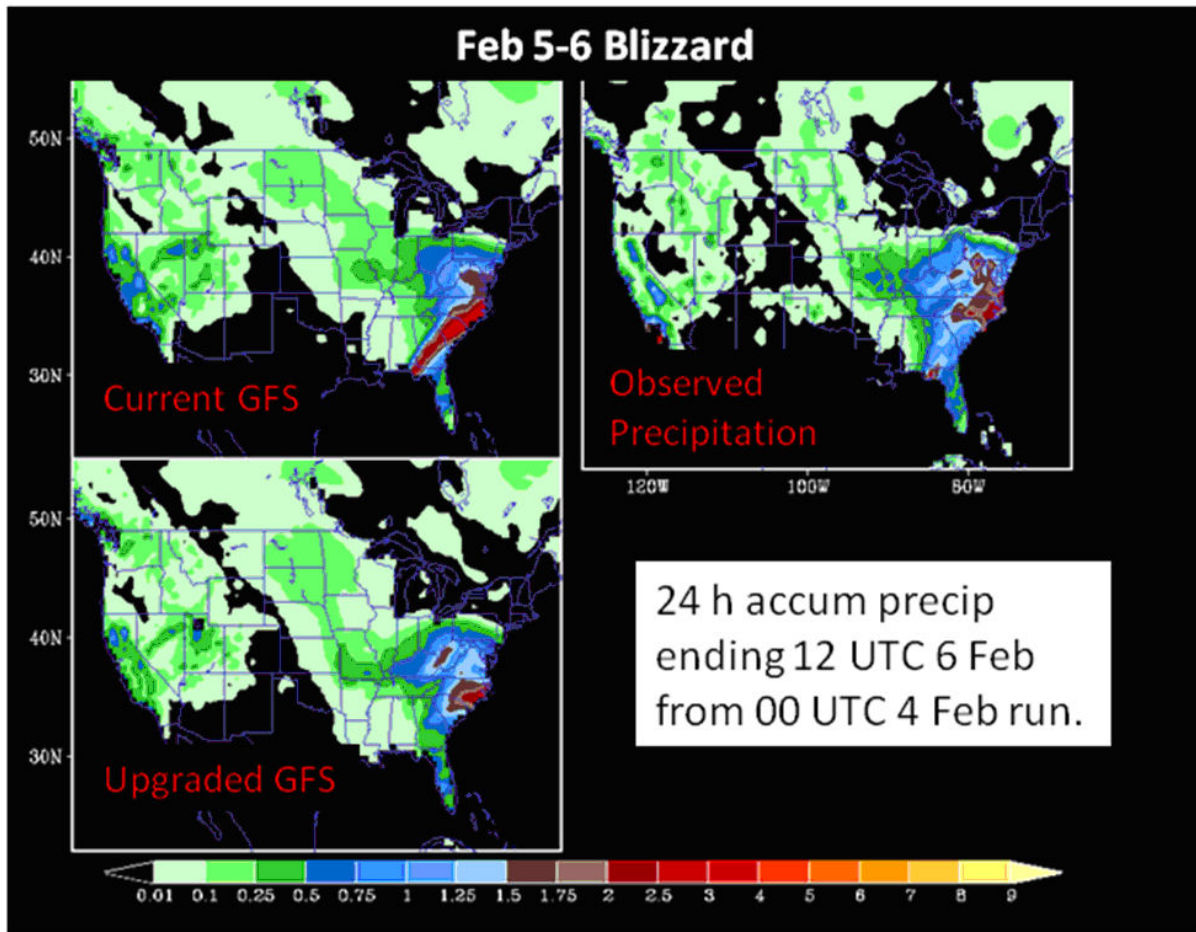
Anomaly correlation scores can be viewed from the following link: <http://www.emc.ncep.noaa.gov/gmb/STATS/html/aczhist6.html>

In addition, a significant improvement in precipitation verification scores resulted from a reduction in the appearance of spurious excessive amounts of precipitations occurring over small geographic areas. An example of the elimination of these so-called "bulls-eyes" is illustrated in the maps below.



An example of the elimination of so-called "bulls-eyes".

The general improvement in precipitation scores can be seen from the Feb 5-6, 2010 East coast blizzard event:



The general improvement in precipitation scores can be seen from the Feb 5-6, 2010 East coast blizzard event

Another important result of the GFS upgrade is a significant improvement in the GFS forecasts of hurricane track and intensity. In the Eastern Pacific, an improvement of 50% in both track and intensity GFS forecasts at day 5 was observed for both the 2008 and 2009 hurricane seasons. In the Atlantic, a 10% improvement in the 5 day track forecast and a 30% improvement in intensity at day 5 were observed in GFS forecasts over the same time period.

---

## NCEP Celebrates Major Implementations (NUOPC and CFS)

National Centers for Environmental Prediction is in the process of rolling out major implementations to two systems that will have a significant impact on joint efforts to advance earth system prediction out to seasonal timescales. On January 18, NCEP celebrated these significant implementations with a reception on January 18. Invited guests include representatives from the Navy and Air Force, along with Jack Hayes and other NWS officials.





Cake-cutting duties are shared by RADM David Titley, Oceanographer and Navigator of the Navy, CAPT James Pettigrew, Commanding Officer, Fleet Numerical Meteorology and Oceanography Center, Jack Hayes, NWS Director and Col Leanne Siedlarz, Chief, Weather Policy & Exploitation Division, USAF

On January 18, the [North American Ensemble Forecast System](#) received an upgrade. This implementation represents the initial operating capability of the National Unified Operational Prediction Capability that will provide the National Weather Service, Air Force and Navy operational forecast centers access to ensemble model output from the three global models (NWS Global Forecast System, Canadian Global Model, NAVY NOGAPS Model) for applications across all service areas. The primary focus is to improve the weather forecast out to 16 days in advance, especially for extreme events. "The addition of the Navy model to the NWS and Canadian global ensemble models is an important step for the agencies to leverage resources to improve the nation's weather prediction capabilities out to two weeks in advance," said **Louis Uccellini**, director of NCEP.

The ceremony also celebrated the upcoming implementation of Version 2 of the [Climate Forecast System](#), scheduled for April. The CFS is the NOAA operational dynamic, fully coupled model, used to develop NWS forecasts ten months out in the future. Considerable advancements over version 1.0 have been made in the physics, resolution, coupling, data assimilation, and ocean model.

Combined with reanalysis and reforecast data sets, this new version will remarkably improve week 3 and 4 forecasts and seasonal forecasts.

"With the new Climate Forecast System we expect to see improvements in our seasonal predictions, especially outlooks for the hurricane season and winter weather," said Uccellini.

NWS Director **Jack Hayes** noted that the Climate Forecast System upgrade "represents a major improvement in our modeling capability to predict climate variability and climate events such as El Nino and La Nina six to nine months in advance."

The system was recently delivered to India during **President Obama's** trip there in November 2010, and has now been adopted by the [Center for Ocean Land Atmosphere Studies](#) for use in the Coupled Model Intercomparison Project 5 decadal runs.



Jack Hayes, NWS Director, and Suranjana Saha and Shrinivas Moorthi of NCEP's Environmental Modeling Center make the first cut to commemorate the upcoming implementation of the Climate Forecast System version 2, as NCEP Director Louis Uccellini and staff involved in the effort look on.

Jack Hayes, NWS Director, and Suranjana Saha and Shrinivas Moorthi of NCEP's [Environmental Modeling Center](#) make the first cut to commemorate the upcoming implementation of the Climate Forecast System version 2, as NCEP Director Louis Uccellini and staff involved in the effort look on.

---

## **Global Hawk Used for Winter Storm Reconnaissance**

Since December, 2010, the Winter Storms Reconnaissance (WSR) program has been very active tasking the USAF and NOAA aircraft with flights from Mississippi, Alaska, Hawaii and Japan to collect airborne data in the Gulf of Mexico and Pacific to improve model guidance. On March 3-4, 2011, the first ever WSR flight using an Unmanned Aerial Vehicle (UAV) for WSR was conducted using the NASA Global Hawk aircraft. The flight's multiple missions focused on accomplishing both Earth System Research Laboratory's Atmospheric Rivers investigation and WSR. During its 22 hour flight between 55,000 and 65,000 feet, the aircraft used its dropsonde system to launch about 80 sondes. It was also fitted with a High Altitude MMIC Sounding Radiometer (HAMSR) to obtain temperature and moisture profiles from which radar depiction can be emulated. The mission also served to examine the significantly greater capabilities of the UAV with regard to its contribution to examining data assimilation processes and its future potential to perform weather reconnaissance missions operationally.



Global Hawk Unmanned Aerial Vehicles

---

## **NOAA's WP-3D to Investigate Madden-Julian Oscillation (MJO)**

The Climate Predictions Center and Office of the Director are working closely with NOAA's Office of Oceanic and Atmospheric Research, the Climate Program Office and the Office of Marine and Aviation Operations to facilitate the use of the NOAA WP-3D aircraft this fall for the Dynamics of the Madden-Julian Oscillation (DYNAMO) project. The current plan is to have the WP-3D aircraft operate for 200 hrs from the island of Diego Garcia in the Indian Ocean collecting data in coordination with surface radars, ships, buoys and other observing systems to gain a better understanding of the MJO and its influences on global weather and climate.



NOAA WP-3D Aircraft

## **Service Center Activities**

### **New Director of SPC**

Dr. Russell Schneider was selected as the new Director for NCEP's Storm Prediction Center (SPC) effective August 29, 2010. Schneider has been the science support branch Chief at the SPC in Norman, Okla., since 1997. The branch is responsible for maintaining the SPC's leadership in science and technology and for supporting its national forecast mission. These efforts include the collaborative scientific research efforts in

the NOAA Hazardous Weather Testbed.

Schneider earned his Bachelors, Masters, and Ph.D. degrees in Atmospheric Sciences from the University of Wisconsin at Madison.



Schneider has spent his entire career at the NWS. After graduation, he began his NWS career at NCEP's Environmental Modeling Center before becoming the first science and operations officer at the Hydrometeorological Prediction Center.

Author and co-author of numerous professional publications, Schneider also served as an associate editor of the American Meteorological Society Journal Weather and Forecasting for more than a decade. He led NWS convective watch decentralization efforts, receiving a Department of Commerce Bronze Medal for his contributions. Schneider currently serves as an adviser to the GOES-R Program, the new Development Testbed Center Ensemble Testbed, and for warn-on-forecast efforts. He has enjoyed a life-long fascination with severe weather since a series of major tornado outbreaks in 1965 and 1967 near his childhood home in suburban Chicago.

Dr. Louis Uccellini, director of NCEP, said of Schneider, "He possesses the vision, management experience and recognition amongst a diverse user community to address the major challenges facing NOAA, the NWS, and the SPC, as we embark on addressing ongoing opportunities that link severe weather forecasts to decision

support services across the nation."

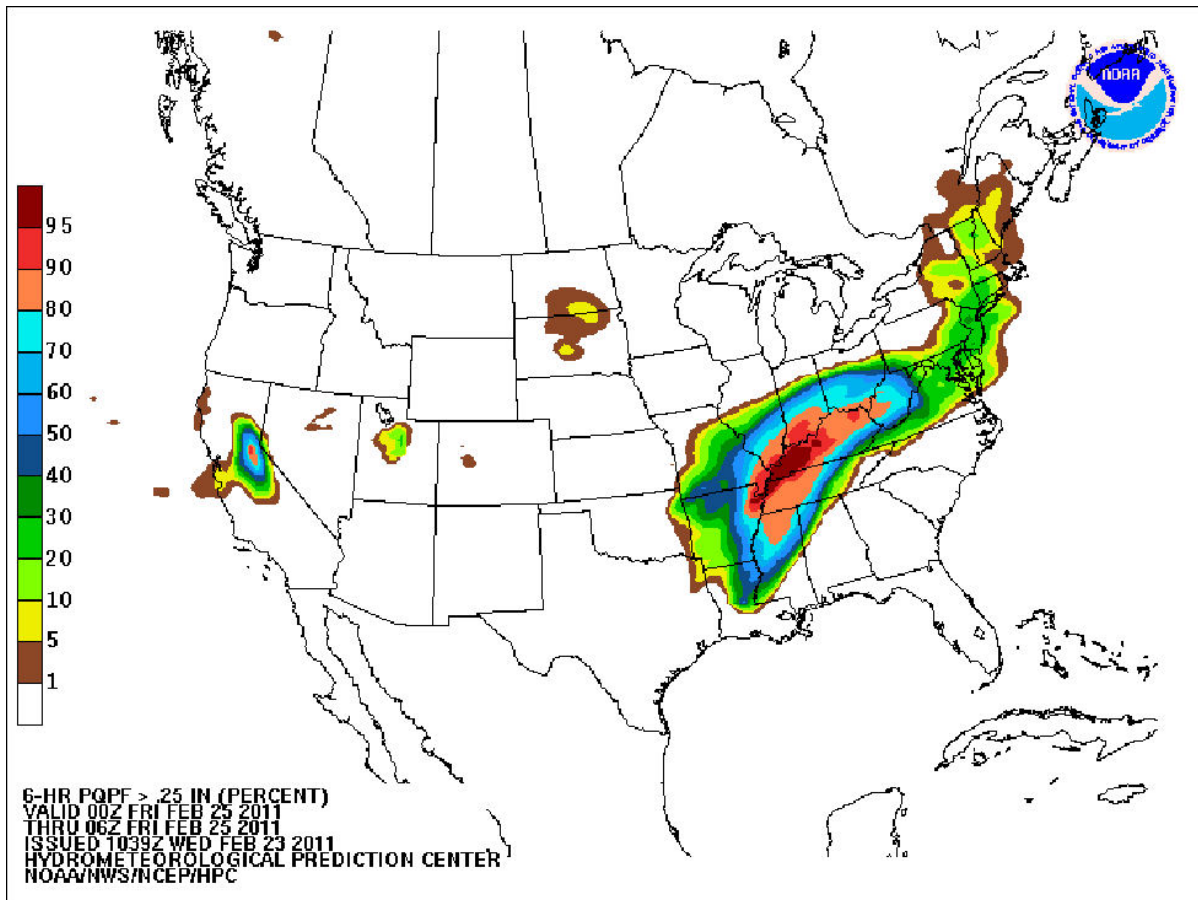
---

## 6-Hour Probabilistic Quantitative Precipitation Forecasts

The Hydrometeorological Prediction Center 6-hour probabilistic quantitative precipitation forecasts (PQPFs) have been issued on an experimental basis since the autumn of 2009 and will become operational in the spring of 2011. These forecasts provide information on the probability of various rainfall amounts. The forecasts are made available in two different forms. First, the probabilities of rainfall exceeding a given threshold, for example 0.25 inch, are displayed. Second, the amount of precipitation associated with a given probability, for example the 75th percentile, can be viewed.

The PQPFs are generated at 6 hour intervals through 72-hours. They are based on the HPC deterministic QPFs, with the probability component derived from ensemble models. The models used to derive the probabilities include the ensemble runs from the Short-Range Ensemble Forecast (SREF) system, along with the individual model output from the NCEP Global Forecast System (GFS), North American Mesoscale model (NAM), and the European Centre for Medium-Range Weather Forecasts (ECMWF) model. These model runs constitute an ensemble from which uncertainty information is obtained to construct a probability distribution about the HPC QPF. This distribution is used to generate probabilistic forecasts of precipitation.

HPC PQPF products and a more complete explanation can be found on the HPC probabilistic QPF web page.



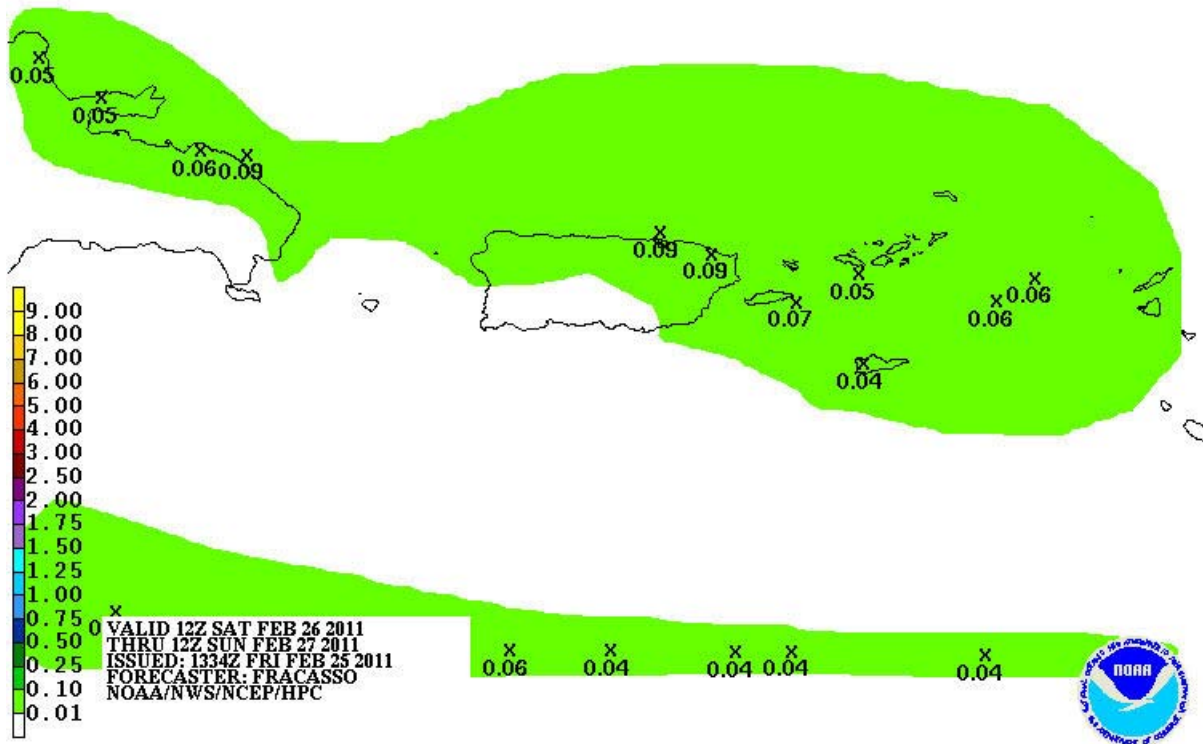
An example of a chart showing the probability of 6-hr QPF exceeding 0.25 inches.

## HPC Supporting QPF Forecasts for Puerto Rico

In May 2010, NWS's Southern Region requested QPF support for Puerto Rico and the US Virgin Islands. Michel Davison of the HPC International Training Desk spearheaded a proof of concept trial to see if the support was useful to WFO San Juan PR. Based upon their response, HPC management decided to investigate developing an operational program with the Forecast Operations Branch to provide the same QPF support to the WFO San Juan area of responsibility that is currently provided to the CONUS. In August, HPC Director Dr. James Hoke, accompanied by HPC Operations Branch Chief Robert Kelly, and NWSEO representative Christopher Hedge, visited the WFO in San Juan to discuss the possibility of a program, and to be briefed by the WFO staff on the particular hydrologic challenges and the local terrain impact on precipitation patterns. The visit also included a trip to the University of Puerto Rico, Mayaguez, to consult with graduate students and their professor on their research involving precipitation in Puerto Rico.

By the end of December 2010, HPC Forecast Operations Branch had taken over responsibility for experimental QPF for the forecast area of WFO San Juan. HPC issues these forecasts once daily, in 6-hour increments, for a period through the following day. The International Desk continues to generate a forecast discussion message in the early morning concerning weather systems affecting the eastern Caribbean, essentially a focused early issuance of the existing forecast discussion, which continues to be issued in the afternoon for the broader Caribbean areas.

The QPF program is being evaluated by WFO San Juan and HPC. This experimental program will run for one year, and then a determination will be made by NCEP and NWS Southern Region as to its continuation and operational status.

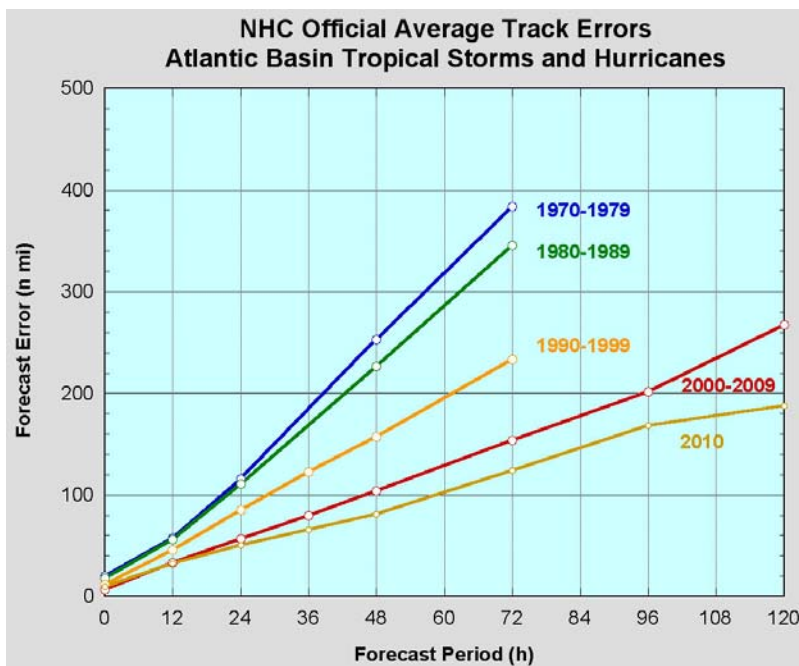


### 24 HR QPF FROM 1200Z 20110226

Example of Quantitative Precipitation Forecast for Puerto Rico

## Media Response to 2010 Hurricane Season

The 2010 Atlantic Hurricane Season ended at 1800 UTC on November 7, 2010 when the last advisory was issued for Tropical Storm Tomas. The season finished with 12 tropical systems reaching hurricane strength, 7 reaching tropical storm strength and 1 tropical depression. The forecast track error for the 2010 season is shown in the accompanying graph, along with a history of track error over 4 previous decades.



NHC Director Bill Read discusses the impacts of Hurricane Tomas on the island of Haiti during a press briefing at the National Hurricane Center on November 4.

Even though none of the 12 hurricanes that roamed the Atlantic waters during 2010 made landfall on U.S. soil, NOAA's National Hurricane Center was a hub of media activity for much of the season.

More than three dozen media outlets from television, radio, print and internet came to the facility on June 1 to obtain interviews with NHC personnel regarding the season.

Hurricane Alex, the first hurricane of the season and one of the most intense June tropical cyclones on record, struck northeast Mexico. But its track over the southwest Gulf of Mexico raised concerns that it could exacerbate the flow oil towards the northern Gulf coastline.

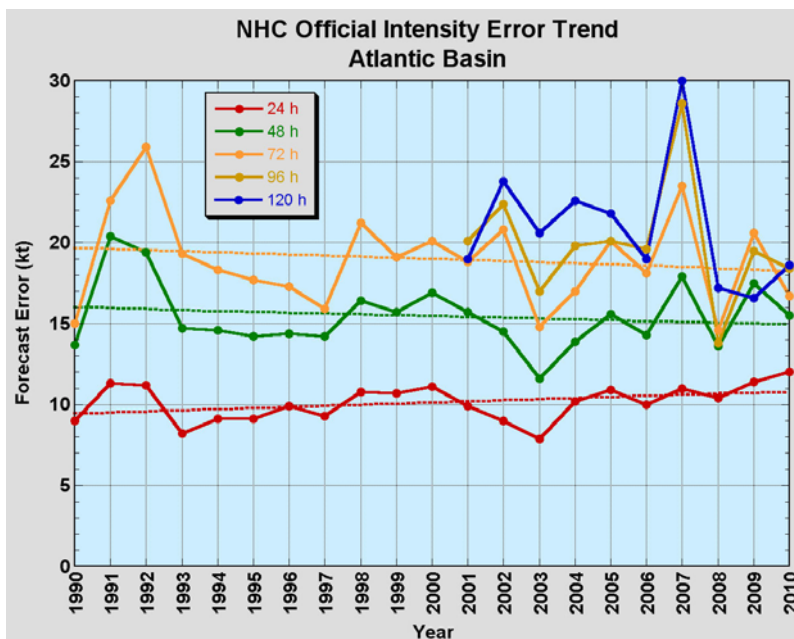
Hurricane Earl's curving track off the U.S. East coast prompted more than 70 live television interviews during the three day event, including all of the major TV networks and The Weather Channel. Live top-of-the-hour briefings were available on the Internet along with audio podcast recordings.

Late in the season, Hurricane Tomas took aim on the earthquake ravaged nation of Haiti. NHC Director Bill Read provided a press briefing to more than a dozen media outlets, discussing the expected impacts of the storm on Haiti.



NHC Director Bill Read discusses the impacts of Hurricane Tomas on the island of Haiti during a press briefing at the National Hurricane Center on November 4.

Some recent work funded by NOAA's Hurricane Forecast Improvement Program (HFIP) has offered tantalizing hints on how tropical cyclone intensity forecasts could be improved - forecasts that have shown little increase in skill over the past few decades, demonstrated in the figure below.



Researchers at Penn State University and the NOAA AOML/Hurricane Research Division have conducted experiments inserting Doppler radar data from the core of tropical cyclones into high-resolution models with advanced data assimilation schemes, and both groups have reported substantial improvements in forecasts of tropical cyclone intensity. The results are considered preliminary since only a small number of cases have been examined thus far, but work is ongoing to look at additional cases.

---

## **Gulf Oil Spill Effect on Hurricanes**

One of the earliest questions that arose after the explosion at the DeepWater Horizon oil rig and resulting leak was the impact of the spill to a hurricane. With the hurricane season fast approaching, hurricane specialists at NOAA's National Hurricane Center worked closely with NCEP, NWS and NOAA Communications to develop a two-page document that addressed the most common questions and concerns regarding the impact of hurricanes on the oil spill. Separating fact from fiction, the document was linked on the NHC website for quick and easy access.

Even though the 2010 hurricane season tied for the third most active on record with 19 storms, no hurricanes passed directly over the oil spill, and a dissipating tropical depression Bonnie had no impact.



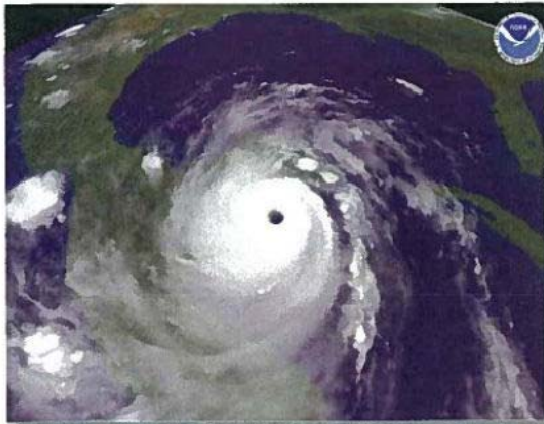


## NOAA's Oil Spill Response

# Hurricanes and the Oil Spill

### What will happen to a hurricane that runs through this oil slick?

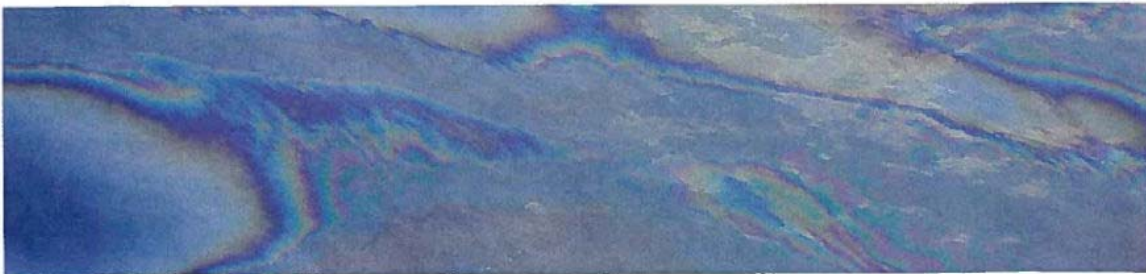
- Most hurricanes span an enormous area of the ocean (200-300 miles) — far wider than the current size of the spill.
- If the slick remains small in comparison to a typical hurricane's general environment and size, the anticipated impact on the hurricane would be minimal.
- The oil is not expected to appreciably affect either the intensity or the track of a fully developed tropical storm or hurricane.
- The oil slick would have little effect on the storm surge or near-shore wave heights.



### What will the hurricane do to the oil slick in the Gulf?

- The high winds and seas will mix and "weather" the oil which can help accelerate the biodegradation process.
- The high winds may distribute oil over a wider area, but it is difficult to model exactly where the oil may be transported.
- Movement of oil would depend greatly on the track of the hurricane.
- Storms' surges may carry oil into the coastline and inland as far as the surge reaches. Debris resulting from the hurricane may be contaminated by oil from the Deepwater Horizon incident, but also from other oil releases that may occur during the storm.
- A hurricane's winds rotate counter-clockwise. Thus, in **VERY GENERAL TERMS**:
  - A hurricane passing to the west of the oil slick could drive oil to the coast.
  - A hurricane passing to the east of the slick could drive the oil away from the coast.
  - However, the details of the evolution of the storm, the track, the wind speed, the size, the forward motion and the intensity are all unknowns at this point and may alter this general statement.

(continued on back)



A two-page NOAA "Hurricanes and the Oil Spill" addressed the most common questions of the impact of hurricanes on oil.

## NHC Conducts Workshop for the AMS Broadcast Meteorology Conference

More than 100 broadcast meteorologists descended on Miami in June, 2010 to take part in the 38th annual American Meteorological Society Conference on Broadcast Meteorology. The National Hurricane Center provided a one-day short course on tropical weather covering a variety of tropical issues. The highlight of the course was a hands-on hurricane forecast exercise, guiding the broadcasters through the intricacies and difficulties of preparing and issuing an advisory package in a compressed 90 minutes. The exercise and the short course left many participants with a new appreciation of the NHC forecast process.



NHC Director Bill Read talks with broadcast meteorologists during an open forum at the facility.

A few days later, the broadcasters traveled to NHC for a tour of the facility. As fate would have it, Tropical Storm Alex had formed and was aiming at the Yucatan peninsula, so the visitors saw the operations area in high gear. Time was allotted at the end of the tour for a casual open forum with Director Bill Read, discussing whatever issues were on the broadcasters' minds.

---

## **NCEP Improves Volcanic Ash Services and Modeling Following Eyjafjallajokull**

The April-May 2010 eruptions of Eyjafjallajokull volcano in Iceland caused unprecedented disruptions in air traffic across the North Atlantic and Europe. As the event unfolded, the ripple effect of this series of eruptions was felt worldwide as over 100,000 flights were cancelled leading to losses exceeding \$3 billion dollars. During the third day of the eruption, NOAA formed the Volcanic Ash Working Group (VAWG) and charged it with enhancing collaboration supporting strategic efforts for improved volcanic ash observation and prediction. The VAWG benefits from the expertise of leading world experts in volcanic ash services, observations, and modeling from NESDIS, OAR, NWS, FAA, and USGS. The VAWG, chaired by the Aviation Weather Center (AWC) Deputy Director, Clinton Wallace, is organized into a Services Team led by the NWS Volcano Program Manager, Jeffrey Osienksy; and a Science Team led by the Air Resources Laboratory's (ARL) Barbara Stunder.



Marco Fulle, Osservatorio Astronomico, Trieste, Italy

Photo Credit: Marco Fulle, Osservatorio Astronomico, Trieste, Italy

Since last year's eruption, NCEP has been a principal partner on the VAWG and led efforts to make improvements to volcanic ash services and modeling. NCEP Central Operations (NCO), who along with NESDIS' Satellite Analysis Branch jointly operate the Washington Volcanic Ash Advisory Center (VAAC); the Environmental Modeling Center (EMC); and AWC are leading the implementation of improvement efforts coordinated by the VAWG. NCO, in partnership with ARL, recently operationally implemented upgrades that allow the Senior Duty Meteorologist (SDM) to better initialize the HYSPLIT dispersion model by retaining ash from previous forecasts. Additionally, new volcanic ash satellite analysis techniques developed by NESDIS are being integrated into the HYSPLIT initialization by ARL and evaluated by the Aviation Weather Testbed (AWT) for production of volcanic ash SIGMET (i.e., aviation warnings). Also, EMC is working to integrate a NASA developed dispersion algorithm into the GFS. These improvements aim to minimize the impact of volcanic ash on the aviation industry globally.

---

## **AWC and Southern Region Offices Collaborate on Forecasts**

The Aviation Weather Center (AWC) and 4 Southern Region CWSU's/WFO's (Atlanta, Memphis, Ft. Worth, Houston) teamed up for a 30 day collaboration experiment from mid January through mid February 2011. The objective of the project was to derive a more consistent, responsive, and accurate NWS aviation product suite. During the experiment, AWC forecasters generated an aviation decision aid graphic focusing on turbulence, icing, thunderstorms, and ceiling/visibility parameters in each of the 4 CWSU's forecast area. The graphic provided a quick look at the aviation weather impacts to assist the CWSUs in spinning up their morning operations. NWSChat was used to collaborate on the aviation forecasts and pass along real-time critical information between AWC and the CWSU's/WFO's. Although a formal assessment is yet to be completed, preliminary results look positive. Paul Witsaman, Southern Region Aviation Meteorologist, reported that the CWSU's/WFO's found high value in the expertise the AWC forecasters lent to the aviation forecast process during high impact events, such as the Superbowl, and that NWSChat provided an efficient means for collaborating among offices. The real-time turbulence reports from the CWSUs were very helpful to the AWC forecast operations, according to AWC's Domestic Operations Branch Chief, Debra Blondin. A more thorough assessment will be carried out over the next couple of months to evaluate whether the collaboration

increased forecaster situational awareness and ultimately improved consistency, responsiveness and accuracy of the aviation forecast product suite.

**Experimental CWSU Forecast Products**  
Aviation Weather Center CAWS System

Home News Organization Search  Go

CWSU TRACON Forecast Survey CWSU TRACON PDD

**SR Experiment Forecast View Page**

**Criteria for SRH TRACONS**  
Use the G-Airmet product, Convective SIGMET product, TAF TDA, model data and satellite imagery to determine whether the 12z, 15z, and 18z timeframes will need to be green, yellow, or red according to the following criteria for each of the TRACONS:

**Icing (blw 18kft)**  
Green: None or light  
Yellow: Moderate  
Red: Severe

**Turbulence (blw 18kft)**  
Green: None or light  
Yellow: Moderate  
Red: Severe

**Thunderstorms (% Coverage)**  
Green: 0-30%  
Yellow: 30-70%  
Red: >70%

**Visibility**  
Green: >6mi  
Yellow: 3-6mi  
Red: <3mi

**Ceiling**  
Green: ZFWZTL >4,000ft  
Yellow: ZHU >3,500ft  
ZME >3,000ft  
Red: ZFWZTL 1,000-4,000ft  
ZHU 1,000-3,500ft  
ZME 1,000-3,000ft  
All <1,000ft

\*MouseOver\* to see area affected... \*Click\* to view Forecast

CWSU

TIME

**TURB**

**ICING**

**CIG/VSBY**

**TSTMS**

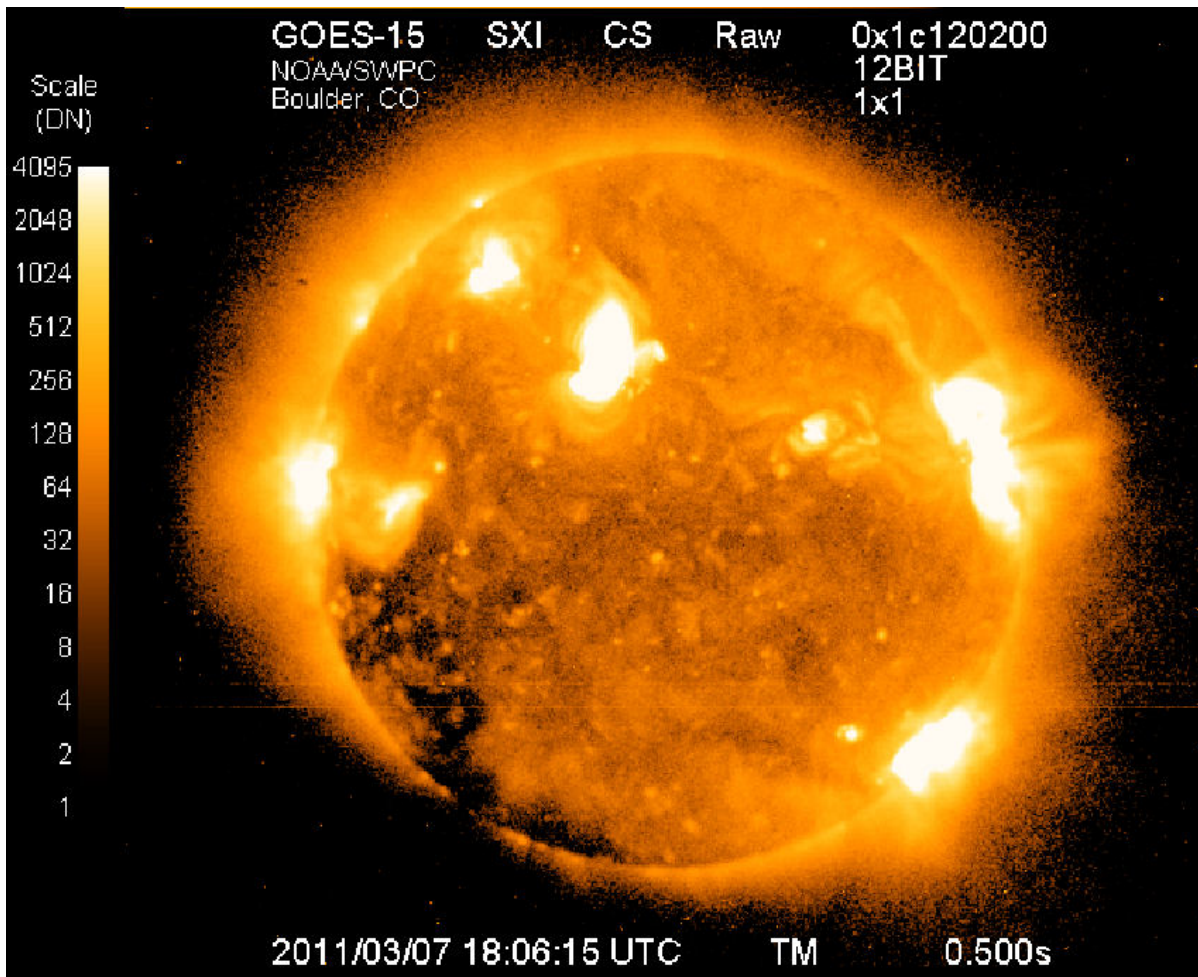
Web page constructed for AWC/Southern Region collaborative experiment.

## AWC Hosts Traffic Flow Management/Collaboration Decision Making Seminar

The Aviation Weather Center hosted the FAA Traffic Flow Management/Collaborative Decision Making Seminar on February 3-4, 2011. Thirty two attendees from the Aviation Weather Center, Pleasant Hill Weather Forecast Office and Central Region Headquarters participated in the seminar. The FAA instructors provided informative briefings and reviewed operational scenarios to provide familiarization with Air Traffic Control Command Center activities. The seminar topics included: Overview of Traffic Flow Management, Traffic Flow Management and Collaborative Decision Making, TFM/CDM tools and technology, and TFM/CDM operations. The attendees and instructors engaged in active discussions on weather related issues affecting traffic flow management. Feedback on the seminar was very positive with one AWC attendee noting: "the seminar was extremely well worth it, especially learning very specifically how our forecasts impact the decision making process within the aviation community. I think all of our forecasters should attend one of these."

## SWPC Launches its Space Weather Prediction Testbed

The Space Weather Prediction Testbed (SWPT) is a new activity to enable the transition to operations of actionable forecasts, warnings, and data to mitigate the impacts of space weather. The SWPT will foster research and identify and test new modeling capabilities, research results, and observations to improve NOAA's space weather services. The societal benefits of SWPT actions include: effective airspace management to safeguard life and property; reliable navigation services; preventing satellite launch failures; and protection of the electric power grid.



GOES Solar Image

The regions of space that create or modify space weather are vast and diverse, and the SWPT will focus on three distinct regions of the space environment in the development of new models and products. Disturbances that originate at the sun must propagate through interplanetary space to reach Earth's magnetosphere/ionosphere/atmosphere system. The SWPT will work with the newly transitioned Wang-Sheely-Arge Enlil geomagnetic storm prediction model to improve upon the observation-driven inputs to the model that are used to initiate the disturbances and that affect their propagation through interplanetary space to Earth. At Earth, the magnetosphere responds by accelerating particles and transmitting energy down to the ionosphere and upper atmosphere. In order to predict the response of the magnetosphere, or geospace, to solar-driven disturbances, the SWPT will collaborate with the NASA Community Coordinated Modeling Center where several geospace models are currently being run and tested to identify the most mature candidate for transitioning into operations. To provide the needed ionospheric services, the SWPT will first introduce data-driven, now-cast products to assist GPS customers. The SWPT will then develop ionospheric forecast capabilities by combining the resources of NOAA, NASA, FAA, DOD, and NSF to develop the Whole Atmosphere Model, which is an extension of the NCEP GFS model up to 600 km.

---

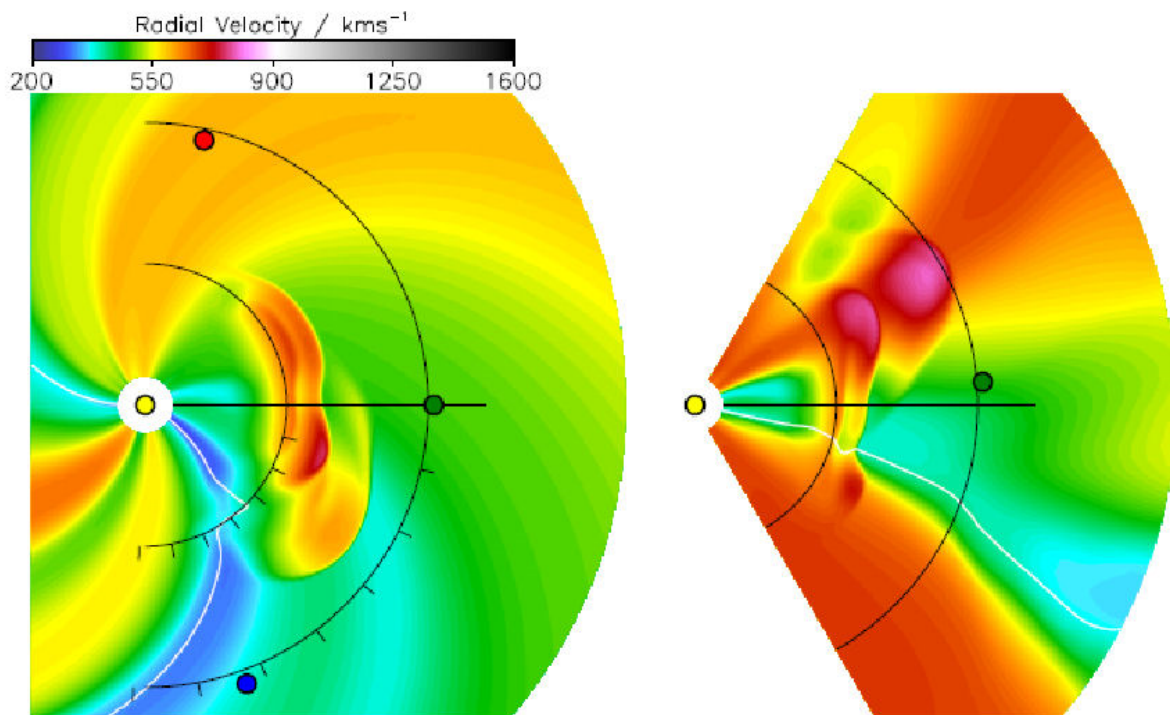
## Transition of the WSA-Enlil Model to Operations at SWPC

The [Space Weather Prediction Center \(SWPC\)](#) has been transitioning the first large-scale, physics-based space weather prediction model into operations on the NWS [National Centers for Environmental Prediction \(NCEP\)](#) supercomputing system. The model is intended to provide 1-4 day advance warning of geomagnetic storms from quasi-recurrent solar wind structures and Earth-directed coronal mass ejections (CMEs). Such storms disrupt communications, wreak havoc upon sensitive geomagnetic systems, and pose dangers for satellite operations. A team has been put together at SWPC to bring an advanced numerical model -

developed with broad participation of the research community - into operational status, much as NCEP terrestrial models now run routinely to warn of storm fronts, hurricanes, tornados, etc.

Modeling of the slowly changing solar wind is driven by observations of the solar surface magnetic field, which are accumulated over a solar rotation and composited into a synoptic map. When an Earth-directed CME is detected in coronagraph images from [NASA](#) spacecraft, its essential properties (including speed, direction, and size) provide supplementary dynamic inputs. The subsequent run of the WSA-Enlil modeling system is then used to predict the arrival time of the CME at Earth, along with estimates of its intensity and duration. The accompanying figure illustrates a modeled CME recently used for a trial forecast during the transition process.

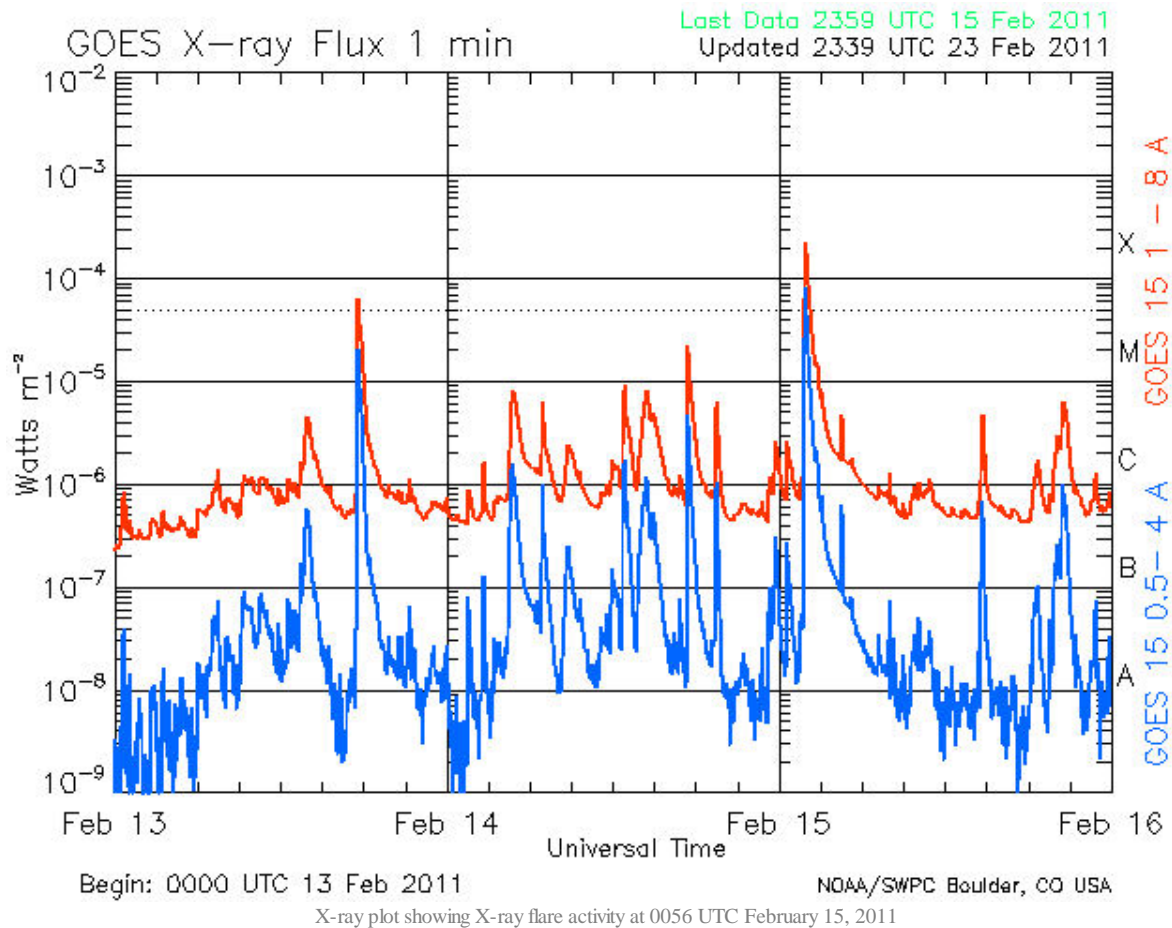
Sample output for WSA-Enlil cone run for the 1 Aug 2010 multiple CME event. Graphic shows the velocity structure for three CMEs in the outburst en route to Earth, about 0500Z on 3 Aug. Left panel depicts the velocity structure in the Ecliptic plane, looking down from above the solar north pole. Earth is the green circle to the right, and the positions of the STEREO A (red circle) and B (blue circle) spacecraft are also shown; velocity is gauged by the color scale at top. The first CME (slower, yellow-gold) will miss Earth to the East, but the two partially merged CMEs (faster, red-orange) that follow appear to be along the Sun-Earth line. The right panel showing a north-south cut along the Sun-Earth line, however, indicates that the latter two CMEs will in fact pass safely to the north of Earth.



Sample output for WSA-Enlil cone run for the 1 Aug 2010 multiple CME event

## SWPC - The Sun is Awakening

During the week of February 13th, the Space Weather Prediction Center saw the most solar activity it had arguably seen in years. This was but another indication that the sun is reawakening from a prolonged solar minimum. On the evening of Monday, February 14 (8:56 pm EST) there was a R3 radio blackout (strong on the NOAA scale for radio blackouts) associated with an X-ray flare from active region NOAA 1158, as shown in the X-ray plot below. This X-ray flare was the largest observed since December 2006. An Earth-directed Coronal Mass Ejection (CME) accompanied this flare. A CME is a very large emission of plasma from the sun that disrupts the flow of the solar wind and can sometimes interfere with the operation of satellites, electronic communications, and electric power transmission on the Earth.



This same active region had also produced an R2 (Moderate) X-ray flare midday on Sunday, February 13 (12:38 pm EST) which also had an Earth-directed CME. In all, there were three Earth-directed CMEs, with the expected arrival of the first on Thursday, February 17. As a result of these CMEs, geomagnetic storming reaching the G1 level (Minor on the NOAA scale for geomagnetic storms) began Thursday, February 17. This activity punctuated the early phase of the new Solar Cycle 24.

Although the flare was strong, the accompanying geomagnetic storm was relatively minor because of the favorable orientation of the magnetic field in the cloud of passing plasma. However, a major airline re-routed its aircraft away from the most northerly polar routes in anticipation of continued space weather that may hamper vital communications. Dayside High Frequency (HF) disruptions (on the side of the Earth facing the Sun) were reported as a result of the flares noted above. Auroral activity did increase at higher latitudes by Thursday night, although the moon, which was full at the time, made it more difficult to see any faint aurora. This activity, while relatively unremarkable by historical standards, did garner a lot of media attention due to the lack of solar activity in recent history. The Space Weather Prediction Center supported numerous customer inquiries and more than 35 interviews with the domestic and international media, in addition to several live radio and delayed TV recordings for the local news.

## Space Weather and FEMA Strengthening Partnership

Our Nation is embarking on ambitious plans to modernize infrastructure which will be based on advanced technological resources vulnerable to space weather. These technological advances are cornerstones in our national security and emergency response systems. Consequently, the [Federal Emergency Management Agency \(FEMA\)](#) is working with the [NOAA Space Weather Prediction Center](#) to ensure the Nation is prepared for space weather events that could disrupt critical infrastructure.

FEMA Administrator Craig Fugate designated FEMA Region VIII, based in Denver, as the FEMA Region of

Excellence for space weather. In February 2010, the joint US/EU Workshop on Managing Critical Disasters in the Transatlantic Domain---The Case of a Geomagnetic Storm, was held at NOAA in Boulder. Primary participants included DHS/FEMA, DoE, the North American Electric Reliability Corporation (NERC), the European Commission (EC), and agencies responsible for Sweden's critical infrastructure. The exercise simulated the transatlantic response to a severe solar storm of magnitude and duration comparable to the space weather superstorms of 1859 and 1921.



FEMA Administrator, Craig Fugate, visits SWPC

Since the February 2010 Workshop, SWPC has engaged in several activities to ensure emergency management agencies are prepared to manage the consequences of severe space weather. SWPC staff provided briefings to Regional Interagency Steering Committee (RISC) meetings, Regional Emergency Communications Coordination Working Group (RECCWG) meetings, and FEMA Region leadership in nine of the ten FEMA Regions.

SWPC coordinated with FEMA on NOAA space weather alert and warning notification procedures. Telephone and email notification procedures are now in place. SWPC also developed guidance material to accompany the alerts and warnings.

The next solar maximum is expected in 2013 and our advanced technological infrastructure will face challenges from the increase in solar activity. SWPC will continue to work closely with FEMA to advise when space weather may directly or indirectly cause or exacerbate a major disaster or emergency, or interfere with or seriously degrade FEMA's response & recovery capability.

---

## **New WMO-Compatible 30-Year Climatology Introduced at CPC**

NOAA's Climate Prediction Center (CPC)'s mission includes monitoring the US and global climate. Spatial maps of real-time mean and anomalies, historical time series and indices of many stratospheric, tropospheric, and oceanic variables are used to describe the state of the global climate system including the status of the [El Nino Southern Oscillation \(ENSO\)](#), the stratospheric ozone hole, etc. These maps and indices are published on line in the monthly [Climate Diagnostics Bulletin \(CDB\)](#), which is very popular among the researchers and public decision makers in government, university and private companies in the US and around the world. Data used in this bulletin includes NOAA satellite measured outgoing longwave radiation (OLR), raw observations, global sea surface temperature (SST), precipitation, as well as many of the analysis fields such as winds, temperature, height, humidity, etc. from the NCEP/NCAR Reanalysis climate data assimilation system (CDAS) and global ocean data assimilation system (GODAS). Until now, anomalies have been computed using several different base periods. However, beginning with the January 2011 issue of the CDB, the base period for all computed anomalies has been switched to the common 30 year climatology (1981-2010) for the



display of all global climate anomalies and indices.

The most recent monthly CDB is available here: <http://origin.cpc.ncep.noaa.gov/products/CDB/>.

The following two maps show the times series of the Southern Oscillation Index (SOI), a popular measure of the status of ENSO, based on the new and old climatologies. CPC plans to provide access to users of both sets of maps and indices for a few months.

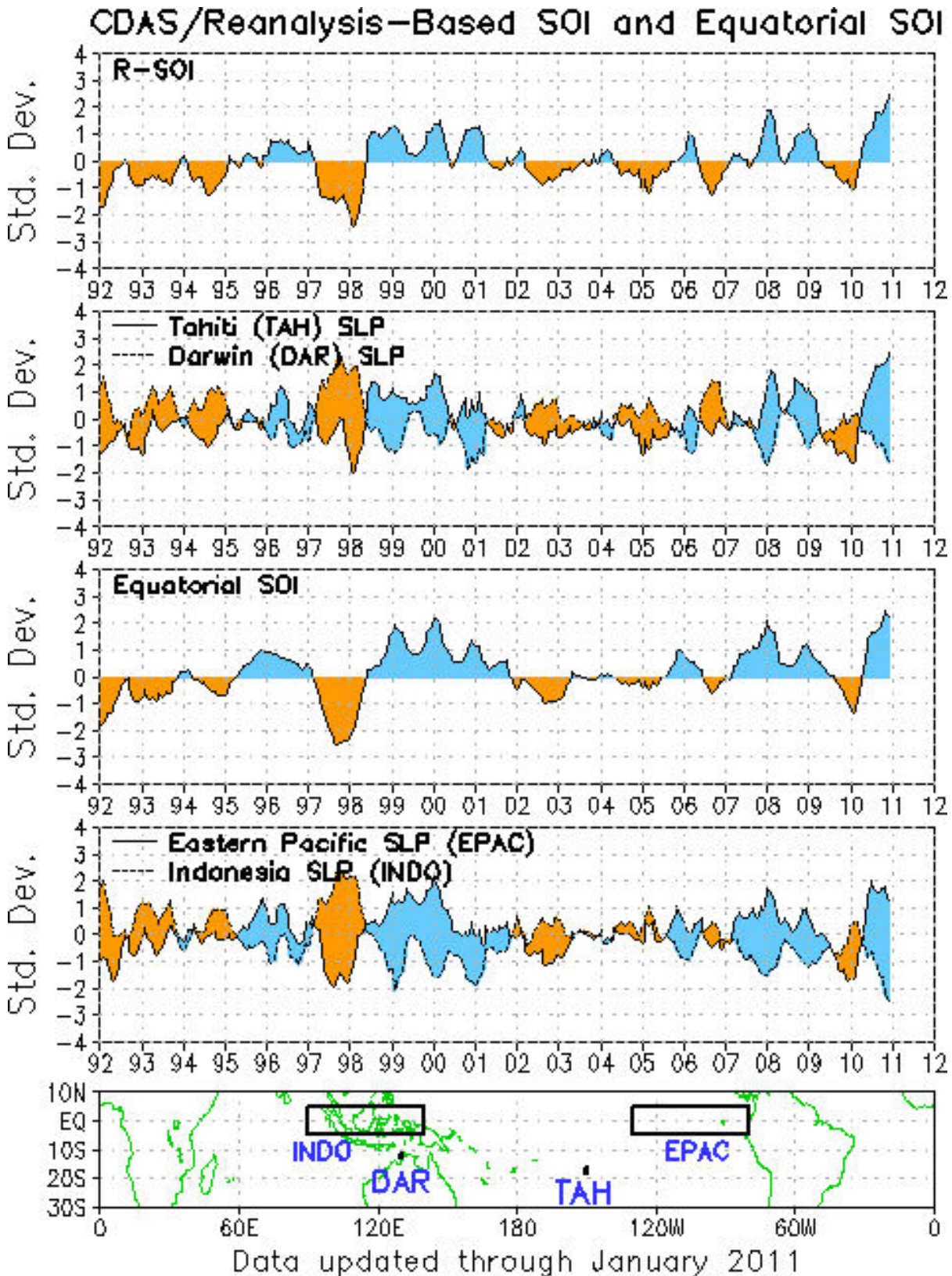


Fig. 1a. Three-month running mean of a CDAS/Reanalysis-derived (a) Southern Oscillation Index (RSOI), (b) standardized pressure anomalies near Tahiti (solid) and Darwin (dashed), (c) an equatorial SOI ([EPAC] - [INDO]), and (d) standardized equatorial pressure anomalies for (EPAC) (solid) and (INDO) (dashed). Anomalies are departures from the 1981-2010 base period means and are normalized by the mean annual standard deviation. The equatorial SOI is calculated as the normalized difference between the standardized anomalies averaged between 5N-5S, 80W-130W (EPAC) and 5N-5S, 90E-140E (INDO).

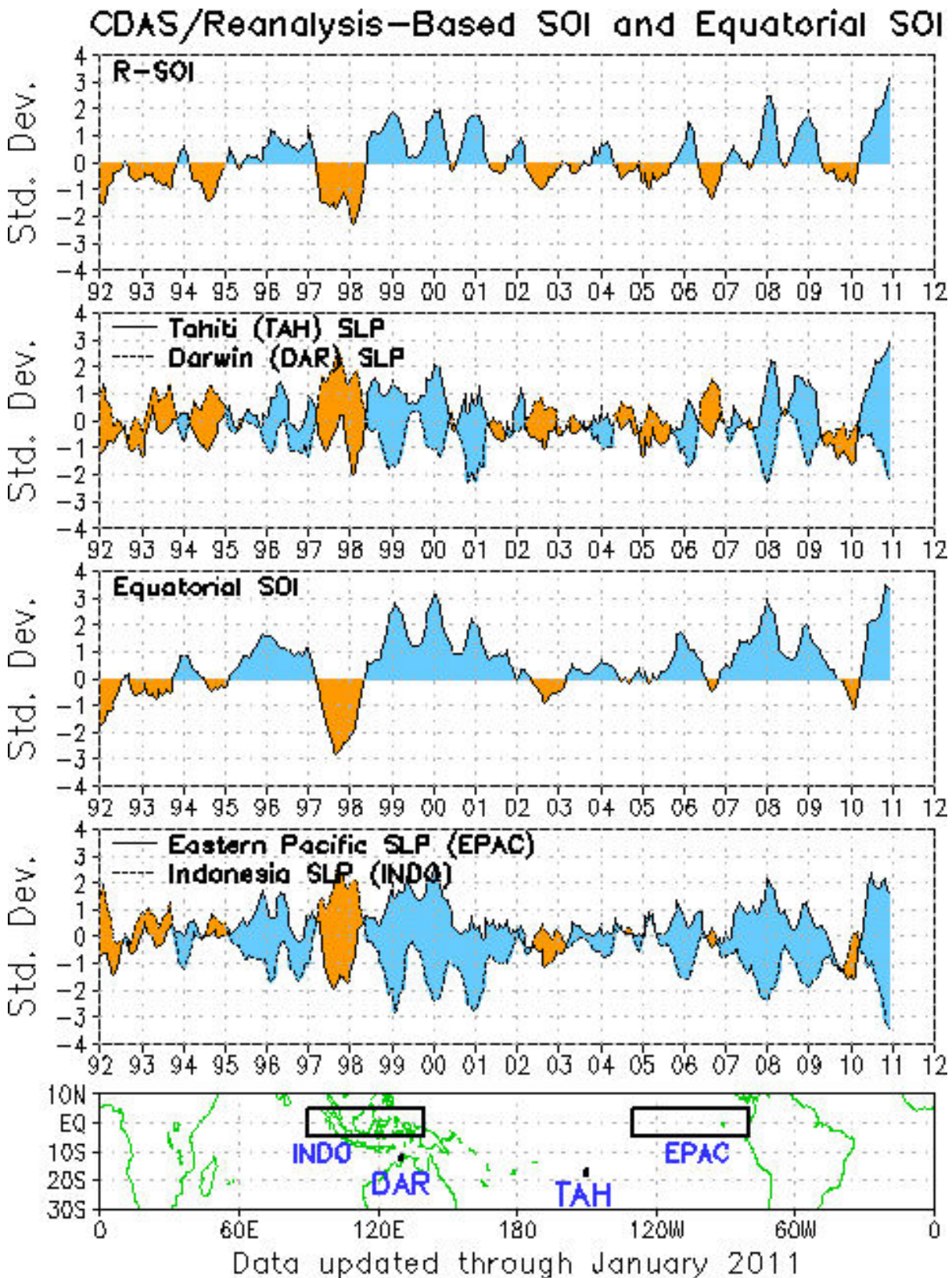
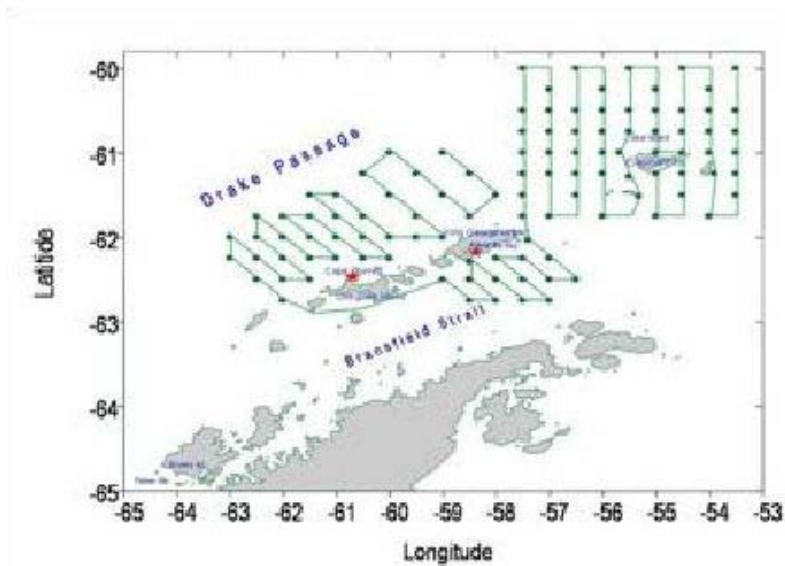


Fig. 1b as in Fig. 1a except for the old 1979-95 base period.

## OPC Supports NOAA's NMFS 2011 Antarctic Field Experiment

January 8, 2011, the [Ocean Prediction Center \(OPC\)](#) began providing twice daily weather forecast support for the Antarctic Ecosystem Research Division of NOAA's [National Marine Fisheries Service](#) to support the Antarctic Marine Living Resource (AMLR) program field campaign. The primary support area is in the Southern Ocean area off the Antarctic Peninsula. OPC provides a 5 day text forecast, satellite image, and 48

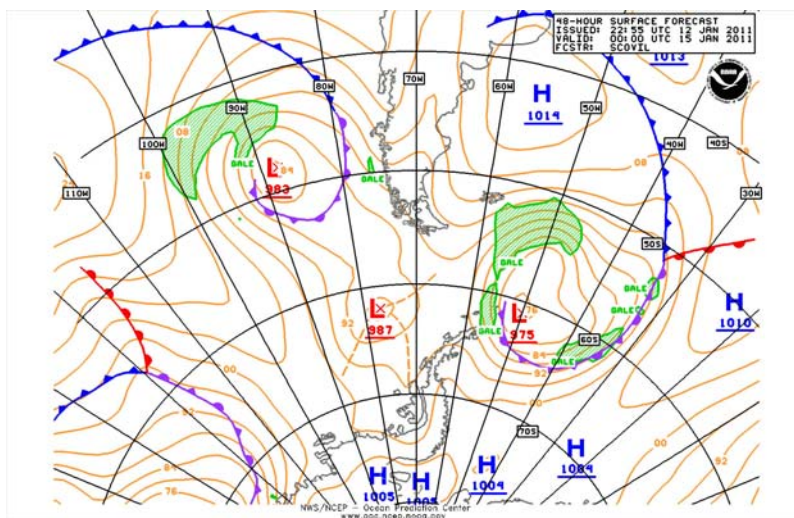
hour wind/wave and surface charts that are emailed directly to the ship.



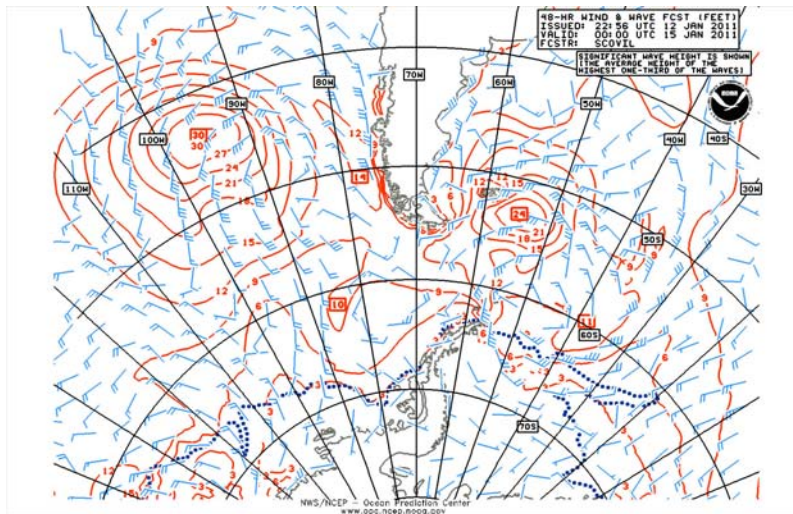
Field Survey Data Collection

The AMLR Program attempts to assess the status of Southern Ocean krill and finfish populations, and their predators, by conducting annual multi-faceted collaborative in situ research studies. A chartered research vessel is used to conduct predator/prey studies in the vicinity of two field stations in the South Shetland Islands. The vessel platform is used primarily to collect environmental, oceanographic, primary productivity and prey data (zooplankton abundance and distribution, specifically Antarctic krill *Euphausia superba*). Concurrently, the AMLR Program collects predator data at the field stations located at Cape Shirreff on Livingston Island (seabird and seal studies) and at Copacabana in Admiralty Bay on King George Island (seabird studies only).

OPC received the following feedback from Anthony Cossio of the Antarctic Ecosystem Research Group: "The forecasts have been great and extremely helpful. We have been able to use the predictions to evade a few large storms and keep us working." The special support will last through March 2011.



48 hour Surface Forecast valid 00 UTC 15 Jan 2011



48 hour Wind & Wave Fcst valid 00 UTC 15 Jan 2011

## UCAR Conducts Review of All National Centers

The University Corporation for Atmospheric Research (UCAR) assembled teams comprised of a cross section of the weather and climate community to conduct a [comprehensive review of NCEP](#) in 2009. The review teams examined each center and the Office of the Director, providing findings and recommendations to improve efficiency, meet emerging requirements, and enhance the services the centers provide to the overall user community. The [final reports from the review](#) were delivered to NCEP in early 2010. Immediately upon receipt of these reports, NCEP worked to assimilate the recommendations, develop action plans to address the recommendations, and began executing on the action plans. These plans were also presented to the NOAA leadership to ensure they were aware of the content and included pertinent items within the performance measures of the leaders involved. In October 2010, NCEP held a strategic planning offsite meeting to address the actions and incorporate them into the FY11 Annual Operating Plan, ensuring appropriate alignment with the NWS Services Roadmap and Strategic Plans. NCEP also developed a mechanism for continual feedback from UCAR type review teams to ensure that the community has a mechanism to interact with NCEP and influence future direction the centers take. In January 2011 the directors of the centers gathered at the annual AMS meeting to engage and update the review teams and provide a progress report on some 260+ recommendations supplied by the review teams. This annual update event will occur each year during the AMS and help ensure transparency as NCEP and the NWS evolves to best meet emerging needs.

The UCAR reports can be found at <http://www.ncep.noaa.gov/director/#reviews>.



NCEP Managers Participate in Review Process

<http://www.ncep.noaa.gov/newsletter/>