

April 12, 2012

MEMORANDUM FOR: NCEP Model Implementation Scientific Review Team

FROM: Chris Caruso Magee, Team Lead, Production Control  
Production Management Branch, NCEP Central Operations

SUBJECT: Proposed Implementation of Global Data Assimilation System Hybrid  
Grid point Statistical Interpolation V11.0.0

The Environmental Modeling Center (EMC) has proposed implementation of the Global Data Assimilation System Hybrid Grid point Statistical Interpolation (GDAS Hybrid GSI, and referred to as 'Hybrid') V11.0.0. This system runs 8 times a day as a part of the Global Forecast System (GFS) (4 times each day to initialize the 384-hour forecast run and 4 times each day as a part of the GDAS cycle) within the NCEP Production Job Suite. The NCEP GSI analysis system produces the initial conditions for the GFS.

This implementation will improve the overall performance of the GDAS using a hybrid assimilation technique composed of an Ensemble Kalman Filter (EnKF) and 3-Dimensional variational analysis system known as the GSI.

The Hybrid includes :

- GPS RO bending angle rather than refractivity
- Inclusion of compressibility factors for atmosphere
- Retune SBUV ob errors
- Update radiance usage flags
- Prepare for monitoring NPP and Metop-B data – include NPP ATMS data
- Add GOES-13 and GOES-15 data
- Add Severi CSBT radiance product
- Satellite monitoring stats code included in Ops.
- New Sat wind data and QC
- EnKF hybrid system
- New version of Forecast model
  - Restructured to include options for Semi-Lagrangian & NSST Model
- Updated postprocessor
  - Ability to read spectral coefficient file directly
  - CAPE, CIN, & Lifted Index calculated from virtual temperature
  - Ability to output GRIB2 directly
  - 4 new variables for Fire Wx, 8 for wind energy & 3 for Severe Wx
  - Switch to use new CRTM 2.0.2 library and coefficient files

The data assimilation used by the Climate Forecast System V2.0 will not be updated at this time.

Output file changes include addition of 15 new variables (see "Updated postprocessor" above) to GFS master files, 0.5 deg pgb files, and 1 degree pgb files. In addition, the new posting procedure will eliminate the need to run chgres. The running of chgres produces intermediate GFS io files which are currently used by the GFS Downscaled Numerical Guidance (DNG). The GFS DNG will no longer be dependent on these intermediate files.

**Near real time parallel data:**

Beginning Thursday, April 12, 2012 and starting with the 1200Z cycle, a consistent parallel feed of data will be available at:

HTTP:

<http://www.ftp.ncep.noaa.gov/data/nccf/com/gfs/para/gfs.YYYYMMDDCC>

<http://www.ftp.ncep.noaa.gov/data/nccf/com/gfs/para/gdas.YYYYMMDD>

FTP:

<ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/gfs/para/gfs.YYYYMMDDCC>

<ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/gfs/para/gdas.YYYYMMDD>

where YYYYMMDD is the year, month, day and CC is the cycle (00, 06, 12, 18).

Monitoring and verification statistics from EMC's real-time hybrid parallel may be found on the web at:

<http://www.emc.ncep.noaa.gov/gmb/wd20rt/experiments/prd12q3s/vsdb/>

Hurricane tracks and intensity statistics from EMC's real-time hybrid parallel are available for the 2011 hurricane season at:

<http://www.emc.ncep.noaa.gov/gmb/wd20rt/experiments/prd12q3i/vsdb/>

A Technical Implementation Notice for the Hybrid is expected to be released soon and will be available at:

<http://www.nws.noaa.gov/os/notif.htm>

### **Request for Evaluation**

Please complete the attached "Intent to Participate" form and return to [Chris.Caruso.Magee@noaa.gov](mailto:Chris.Caruso.Magee@noaa.gov) no later than April 16, 2012. NCO requires an intent form be filed by all NCEP Service Centers. HPC, OPC, NHC, and CPC are listed as being the Service Centers primarily responsible for this evaluation. MDL is also a recommended participant. All other Service Centers are optional, as are the NWS Regions, WFOs, government agencies, or private companies not listed above. For the NCEP Service Centers, if, in your estimation the nature of the proposed change would have little or no impact on the forecast process at your Service Center, simply indicate that you do not intend to participate in the subjective evaluation and return the form.

The 30-day evaluation period will start at 12Z on Thursday, April 12, 2012 and run through May 12, 2012. Participants need to complete the attached "Model Implementation Subjective Evaluation Report" form and return to [Chris.Caruso.Magee@noaa.gov](mailto:Chris.Caruso.Magee@noaa.gov) no later than May 14, 2012. Please indicate the overall performance of the product, with any additional comments on specific cases with noteworthy positive or negative performance. Please note that NCO requires evaluators to specifically address the benefits stated in the attached form as to whether those benefits were observed or not. Any feedback you wish to provide during the evaluation period should be emailed to [Chris.Caruso.Magee@noaa.gov](mailto:Chris.Caruso.Magee@noaa.gov).

A final coordination teleconference will be scheduled to review the evaluation and address any outstanding issues. Based on the outcome of that teleconference, EMC and NCO will

prepare a recommendation for Dr. Uccellini (NCEP Director). This teleconference has not yet been scheduled.

**Points of Contact**

[Chris.Caruso.Magee@noaa.gov](mailto:Chris.Caruso.Magee@noaa.gov) (NCO)

[Russ.Treadon@noaa.gov](mailto:Russ.Treadon@noaa.gov) (EMC)

[Shrinivas.Moorthi@noaa.gov](mailto:Shrinivas.Moorthi@noaa.gov) (EMC)

**Intent To Participate  
Model Implementation Subjective Evaluation**

**Scientific Review Team Member:** \_\_\_\_\_

**Team Member E-mail:** \_\_\_\_\_

**Region, Service Center Company Representing:** \_\_\_\_\_

**(Govt Only) Authorizing Official or  
Service Center Director:** \_\_\_\_\_

**Intent to Participate:**

\_\_\_ Will Participate in the Evaluation

\_\_\_ Will Not Participate in the Evaluation

**Scientific Review Team Member:** \_\_\_\_\_

**Region, Service Center or Company Representing:** \_\_\_\_\_

**Proposed Change:** GDAS Hybrid GSI

**Model Developer:** Russ Treadon (EMC)

**Real-Time Parallel Runs:**

**General comments:** \_\_\_\_\_

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**Evaluation of expected benefits:**

Do you observe the following and are they beneficial to you?

1. Do you see significant improvement in the initial conditions for the Global Forecast System, resulting in significant improvements in model performance?

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**Recommendation:**

**Implement as proposed** \_\_\_\_

**Reevaluate after changes** \_\_\_\_

**Do not implement** \_\_\_\_