

June 15, 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 Short Range Ensemble Forecast system  
V6.0.0

The Environmental Modeling Center (EMC) has proposed implementation of the Short Range Ensemble Forecast (SREF) system V6.0.0. This system runs 4 times a day within the NCEP Production Job Suite at 0300Z, 0900Z, 1500Z, and 2100Z. The current operational SREF has 21 members consisting of predictions from the Eta Model, the Regional Spectral Model (RSM), the WRF-ARW and the WRF-NMM using a diverse set of physics configurations.

The objective of this implementation is to improve the skill and utility of forecast guidance produced by the SREF system. The improvement in forecast skill and utility will be manifested in improved probabilistic and ensemble mean fields and accomplished with a package of enhancements. The legacy Eta and RSM members will be replaced with new NEMS-NMMB members, the model version of WRF\_NMM and WRF\_ARW used by the SREF will be updated, and model horizontal resolution will be increased. Improved and additional forecast uncertainty related products and variables requested by users will be made available with this upgrade.

The SREF upgrade includes:

- eliminate 6 Eta and 5 RSM members
- add 7 NEMS-NMMB, 2 WRF-ARW and 2 WRF-NMM members
- upgrade WRF code versions (both NMM and ARW)
- increase horizontal resolution from 32km/35km to about 16km
- increase IC diversity by using multiple analysis NDAS, GFS and RR
- increase physics diversity by applying multiple physics schemes in a same model
- increase diversity of IC perturbations by mixed using of GEFS ETR, SREF BV and blending between the two
- increase dispersion of near surface variables by using multiple land surface initial states

Post-processing and ensemble product changes include:

- add precipitation bias correction
- add clustering capability
- add member-ranking capability to provide different weights for different members
- produce max, min, mode and 10-25-50-75-90% forecasts
- hourly output ensemble products (mean, spread and probability) till 39hr for AWC
- add SPC's joint probabilities of thunder, lightning, dry lightning and fire weather
- add SPC's snow-liquid ratio scheme in ensemble product generator
- downscale surface variables to 5 and 2.5km using RTMA fields

**Near real time parallel data:**

Beginning Monday, June 18, 2012 and starting with the 1500Z cycle, a consistent parallel feed of data will be available at:

HTTP:

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

FTP:

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

where YYYYMMDD is the year, month, day.

Please note that, due to limitations in available resources on NCEP's production Central Computing System (CCS), the SREF parallel will be running on the backup CCS and dissemination of the parallel output will be delayed when compared to the operational SREF. Evaluators should expect to see a 1 to 1.5 hour delay in the individual members' pgrb data and normal ensprod data, with the bias-corrected ensprod data produced about two hours later when compared to the operational SREF. Evaluators may also expect to see occasional missing cycles due to CCS work and/or switches between the two CCS supercomputers. The delay in the parallel SREF is due to NCO's having to run the parallel SREF with a smaller number of nodes, in order to lessen the impact on developers using the backup CCS. Once the upgraded SREF is implemented into production, users will receive the SREF output at the same delivery times currently observed in production.

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 it to [Chris.Caruso.Magee@noaa.gov](mailto:Chris.Caruso.Magee@noaa.gov) no later than June 20, 2012. NCO requires an intent form be filed by all NCEP Service Centers. HPC, SPC, and AWC are listed as being the Service Centers primarily responsible for this evaluation, along with the NWS Regions (except Pacific) and WFO State College. All other Service Centers are optional, as are the NWS Pacific Region, WFOs other than State College, 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 15Z on Monday, June 18, 2012 and run through July 18, 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 July 25, 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)

[Jun.Du@noaa.gov](mailto:Jun.Du@noaa.gov) (EMC)

**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

**Model Implementation Subjective Evaluation Report**

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

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

**Proposed Change:** SREF

**Model Developer:** Jun Du (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 notice more detailed and accurate forecasts, especially for precipitation, from the SREF?

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2. Do you see a reduction in the precipitation forecast bias from the SREF? Have the vast areas of light precipitation that were seen in current production SREF been reduced by the SREF upgrade?

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**Recommendation:**

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

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

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