

November 4, 2013

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 Rapid Refresh v2.0.0 and Real-Time  
Mesoscale Analysis v2.2.0

The Environmental Modeling Center (EMC) has proposed implementation of the Rapid Refresh (RAP) v2.0.0 and Real-Time Mesoscale Analysis (RTMA) v2.2.0.

### **RAP v2.0.0**

The RAP v2.0.0 changes are designed to provide overall forecast improvement on the synoptic scale including upper-level winds, temperature and humidity, with specific local improvement to forecasts of 2-meter temperatures and dew points and 10-meter winds. This implementation specifically includes:

- A major upgrade to the data analysis and assimilation system
- A major upgrade to the prediction model
- New parameters added to the output grids
- Update to the station list used for BUFR output soundings.

Please see the RAP Technical Implementation Notice (details below) for specifics on the RAP v2.0.0 changes.

### **RTMA v2.2.0**

The RTMA v2.2.0 upgrade includes the introduction of the UnRestricted Mesoscale Analysis (URMA). RTMA v2.2.0 changes include:

- Upgrade the RTMA for Hawaii and Puerto Rico to include the use of FGAT, bias correction for background temperature, updated observational errors, improved background error model calibration, and the assimilation of satellite derived wind observations.
- Add the capability to blend the RTMA first guess winds with those from the NCEP Hurricane WRF to improve the analysis of tropical systems.
- Upgrade the GSI-RTMA to current state-of-the art, which includes the analysis of 10-m wind gust and surface visibility, and the routine computation of cross-validation statistics
- Expand the geographical coverage of the 2.5-km CONUS RTMA northward from 51 N to 56 N to cover the NWRFC area of forecast. The analysis will be disseminated in two separate GRIB2 files. One for the true NDFD CONUS domain and the other for the NWRFC domain.
- Change the spatial resolution of the Alaska RTMA from 6-km to 3-km.
- Add the analysis of wind gust and visibility to all RTMAs
- Removal of the 5km CONUS products, except for those on NOAAPORT.

URMA is an improved analysis created six hours after analysis time (with the exception of precip) in order to include a more complete set of observational data. There will also be a change to the products available from the North American Model (NAM) Downscaled Numerical Guidance (DNG) system.

### **Real time parallel data:**

Because the parallel RTMA v2.2.0 is being fed by the parallel RAP v2.0.0 (and not by the current operational RAP), the decision was made to run these two evaluations side-by-side. Beginning Tuesday, November 5, 2013 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/rap/para/rap.YYYYMMDD>

[http://www.ftp.ncep.noaa.gov/data/nccf/com/rtma/para/\\*.YYYYMMDD](http://www.ftp.ncep.noaa.gov/data/nccf/com/rtma/para/*.YYYYMMDD)

<http://www.ftp.ncep.noaa.gov/data/nccf/com/urma/para/urma2p5.YYYYMMDD>

FTP:

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

[ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/rtma/para/\\*.YYYYMMDD](ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/rtma/para/*.YYYYMMDD)

<ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/urma/para/urma2p5.YYYYMMDD>

where YYYYMMDD is the year, month, day. The wildcard (\*) for the RTMA paths above is used because there are multiple domains for which the RTMA is run. Evaluators may select any or all of the domains to review.

### **Technical Implementation Notices**

Technical Implementation Notices (TINs) for the RAP update and RAP bufr sounding update are available at:

<http://www.nws.noaa.gov/om/notification/tin13-38rap.htm>

[http://www.nws.noaa.gov/om/notification/tin13-35nam\\_rap\\_bufr.htm](http://www.nws.noaa.gov/om/notification/tin13-35nam_rap_bufr.htm)

The TIN for the RTMA should be posted this week. Its location on the web will be sent to model evaluators as soon as it is available.

### **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 November 8, 2013. NCO requires an intent form be filed by all NCEP Service Centers.

For the RAP upgrade, SPC, WPC, AWC, all NWS Regions (except Pacific), and the FAA are listed as being primarily responsible for this evaluation. OPC and NHC are optional, as are the NWS WFOs, government agencies, or private companies not listed above.

For the RTMA upgrade, WPC, NWS Eastern, Western, and Alaska Regions, the Northwest River Forecast Center, the University of Utah, and Florida Institute of Technology are listed as being primarily responsible for this evaluation. All other NCEP Centers, NWS Regions not listed above, WFOs, government agencies, or private companies are optional.

For the NCEP Service Centers, if, in your estimation, the nature of the proposed changes to the RAP or RTMA 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 Tuesday, November 5, 2013 and run through December 5, 2013. 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 November 8, 2013. There are separate forms below for RAP and RTMA. 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 the NCEP Director. This teleconference has not yet been scheduled. Depending on the NCEP Director’s schedule, we will either hold one 2-hr briefing and discuss the RAP first, then RTMA second, or we will schedule 2 separate 1-hr briefings.

**Points of Contact**

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

[Geoffrey.Manikin@noaa.gov](mailto:Geoffrey.Manikin@noaa.gov) (EMC - RAP)

[Manuel.Pondeca@noaa.gov](mailto:Manuel.Pondeca@noaa.gov) (EMC – RTMA)

**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 -- please circle RAP/RTMA/both

\_\_\_\_ Will Not Participate in the Evaluation -- please circle RAP/RTMA/neither



3. Do you observe more accurate upper-level forecasts for wind, temperature, moisture, and cloud fields, also from improvements to data assimilation and model?

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**Recommendation:**

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

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

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

**Model Implementation Subjective Evaluation Report**

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

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

**Proposed Change:** RTMA v2.2.0

**Model Developer:** Manuel Pondeca (EMC)

**Real-Time Parallel Runs:**

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

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**Evaluation of expected benefits:**

Please respond to the following questions and note if they are beneficial to you?

1. Does the NWRFC benefit from a high resolution RTMA that covers their entire domain of interest? It is noted that the NDFD CONUS domain of the present RTMA only covers a portion of the NWRFC domain.

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2. Does the 3-km Alaska RTMA resolve an outstanding issue with the 6-km Alaska RTMA's lack of a proper horizontal resolution that can handle the topographic complexity of the area?

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3. Does the use of the Hurricane WRF in helping to create the RTMA first guess for winds result in improved analyses for tropical systems?

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4. Are the new RTMA analyses of wind gust and surface visibility useful/beneficial to you?

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**Recommendation:**

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

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

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