

NOUS41 KWBC 121918  
PNSWSH

Technical Implementation Notice 13-39  
National Weather Service Headquarters Washington DC  
220 PM EST Tue Nov 12 2013

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From: Tim McClung  
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Office of Science and Technology

Subject: Upgrade to RTMA and Initial Implementation of URMA:  
Effective December 18, 2013

Effective on or about Wednesday, December 18, 2013, with the 1400 Universal Coordinated Time (UTC) cycle, the National Centers for Environmental Prediction (NCEP) will upgrade the Real-Time Mesoscale Analysis (RTMA) and introduce the Unrestricted Mesoscale Analysis (URMA). The upgraded RTMA includes:

- Adding variables
- Changing resolution for Alaska
- Adding a new output grid
- Removing the 5km CONUS products except for those on NOAAPORT

URMA is an improved analysis created 6 hours after analysis time (with the exception of precip, see URMA section below) to provide 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. More specific details of the changes are provided below.

#### Addition of New Fields:

Hourly grids of 10m wind gust and surface visibility will be added to CONUS at 2.5km horizontal resolution, and Hawaii and Puerto Rico at 2.5km. Similar grids, except 3-hourly, will be added for Guam at 2.5km. These fields will be available in the existing RTMA output files and will be disseminated over NOAAPORT using the WMO headers listed in Table 1 below.

#### Change of Resolution for Alaska grid:

The current Alaska grid 6km resolution will be replaced with a 3km resolution grid (grid number 91). The output products will contain hourly grids of 2m temperature, 2m dew point, 10m wind

speed, 10m wind direction, 10m u-wind component, 10m v-wind component, 10m wind gust, surface pressure, surface visibility, and model terrain height. The geographic coverage of the grid is online at:

[www.nco.ncep.noaa.gov/pmb/changes/docs/akrtma3p0\\_domain.png](http://www.nco.ncep.noaa.gov/pmb/changes/docs/akrtma3p0_domain.png) .

The 3km products will be disseminated via the NCEP server, NOMADS and NOAAPORT. In addition, the 6km grids currently available in the National Digital Guidance Database (NDGD) at

<ftp://tgftp.nws.noaa.gov/SL.us008001/ST.opnl/DF.gr2/DC.ndgd/GT.rtm/AR.alaska/>

will be replaced by the new 3km grids. The 6km Alaska grids will remain on NOAAPORT until such time as the Advanced Weather and Information Processing System (AWIPS) can convert to using the 3km grids. The WMO headers for the 3km AK grids are listed below in Table 2

Addition of new grids for NWRFC:

New output grids will be generated on a 2.5km grid that covers the area of responsibility of the North West River Forecast Center (NWRFC). The geographic coverage of the grid can be seen at:

[http://www.nco.ncep.noaa.gov/pmb/changes/docs/nwrfc\\_domain.png](http://www.nco.ncep.noaa.gov/pmb/changes/docs/nwrfc_domain.png).

The output products will contain hourly grids of 2m temperature, 2m dew point, 10m wind speed, 10m wind direction, 10m u-wind component, 10m v-wind component, 10-m wind gust, surface pressure, surface visibility, and model terrain height. The NWRFC products will be disseminated via the NCEP server and will be available for http download on NOMADS.

Implementation of URMA:

Updated grids for the 2.5km CONUS and NWRFC domains, along with the grids of 6-hour accumulated precipitation will be referred to as the Unrestricted Mesoscale Analysis (URMA). URMA represents an improved analysis more suited for verification since it adds nearly all of the observations which are not used for the initial analysis due to transmission latency issues. Grids of 2m temperature, 2m dew point, 10m wind speed, 10m wind direction, 10m u-wind component, 10m v-wind component, 10-m wind gust, surface pressure, and surface visibility will be made and distributed 6 hours after the initial grids are made.

URMA will also include 6-hourly grids of accumulated precipitation, remapped from the NCEP stage-IV precipitation. The 6-hourly precipitation accumulation fields covering a 24h (12Z-12Z) period are available beginning at 15:35 UTC; the CONUS mosaic is remade each hour as NCEPS receives new regional

analyses from RFCs. Complete CONUS coverage is generally achieved by 21:35 UTC.

With the exception of the precipitation grids, each of the above analysis grids will be accompanied by a grid of the corresponding analysis uncertainty. The GRIB encoding for the URMA grids will be the same as that for the RTMA grids for the same elements, except that the generating model process number for URMA will be 118 (it is 109 for the RTMA). URMA will be available on the NCEP server, NOMADS, NDGD, and will be sent over NOAAPORT with the WMO headers listed in Table 2

Change in filenames and directory structure:

Previously, the grids for the analysis and the analysis error were contained in the same output files. This file will be split into an analysis-only file and an analysis error-only file. On NOMADS and the NCEP server, the following three filenames will be available, with this example the 0000 UTC cycle for 2.5km CONUS:

```
rtma2p5.t00z.2dvaranl_ndfd.grb2 -- analysis grids
rtma2p5.t00z.2dvarerr_ndfd.grb2 -- analysis error
rtma2p5.t00z.2dvargen_ndfd.grb2 -- first guess field
```

In addition, the directory structure under which the RTMA products are available on the NCEP server will change. Today, the files are available in directories:

```
../com/{model}/prod/{model}.YYYYMMDD
```

where {model} is akrtma, gurtma, hirtma, prrtma, rtma, and rtma2p5, depending on geographic region. With this upgrade, the first {model} will be replaced with a generic "rtma" directory name, and then the multiple geographic region names will follow after the "prod" directory level.

Removal of 5km CONUS RTMA products:

In TIN 11-20, NCEP announced that the 2.5km CONUS RTMA products were a replacement for the 5km grids. The 5km products had to be retained until such time as AWIPS could transition to the 2.5km grids. While the 5km grids will remain on NOAAPORT for a while longer, NCEP will remove the 5km CONUS grids from NOMADS and the NCEP ftp server with this upgrade.

Additional RTMA enhancements:

The old grids for CONUS at 5km and Alaska at 6km that will be distributed only on NOAAPORT will henceforth be sampled from the corresponding double-resolution grids, thus benefiting from the more recent, improved science used to create the latter.

An hourly cross-validation will be added to CONUS RTMA at 2.5km and URMA at 2.5km.

There will be improved quality of the grids of surface pressure for Alaska, Hawaii and Puerto Rico thanks to the use of an improved background field.

Associated change to the NAM DNG:

The NAM DNG is used as input to the RTMA. To support some of the changes to the RTMA system, more NAM DNG data is being made available. Output will now be available hourly up to forecast hour 12 for the Alaska, Hawaii and Puerto Rico domains. In addition, 10m wind gusts and surface visibility will be added hourly out to forecast hour 12, while today it is only available every 3 hours. The NAM DNG products can be found at

<ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/nam/prod/>

with filenames with \*smart\* in the name.

More information about the RTMA and URMA is available at:

<http://www.emc.ncep.noaa.gov/mmb/rtma/para/>

A consistent parallel feed of data will be available on the NCEP server via the following URLs:

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

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

NCEP urges all users to ensure their decoders can handle changes in content order, changes in the scaling factor component within the product definition section (PDS) of the GRIB files, changes to the GRIB Bit Map Section (BMS), and volume changes. These elements may change with future NCEP model implementations. NCEP will make every attempt to alert users to these changes before implementation.

Table 1: WMO Headings assigned to grids of wind gust and visibility for all available domains. Here, \* is C for Puerto Rico, G for Guam, H for Hawaii, I for 2.5km CONUS RTMA, and K for 3km Alaska. For URMA, \* is Q for 2.5km CONUS URMA.

WMO HEADING	RTMA PARAMETERS
LN*A98 KWBR	wind gust analysis
LN*A98 KWBR	wind gust analysis uncertainty
LK*A98 KWBR	visibility analysis
LK*A98 KWBR	visibility analysis uncertainty

Table 2: WMO Headings assigned to RTMA grids for 3km Alaska, and to URMA grids for 2.5km CONUS. Here, \* is Q for 2.5km CONUS URMA, and K for 3km Alaska RTMA.

WMO HEADING	RTMA PARAMETERS
LT*A98 KWBR	temperature analysis

LT\*A98 KWBR temperature analysis uncertainty  
LR\*A98 KWBR dewpoint temperature analysis  
LR\*A98 KWBR dewpoint temperature analysis uncertainty  
LN\*A98 KWBR wind speed analysis  
LN\*A98 KWBR wind speed analysis uncertainty  
LN\*A98 KWBR wind direction analysis  
LN\*A98 KWBR wind direction analysis uncertainty  
LU\*A98 KWBR u wind component analysis  
LV\*A98 KWBR v wind component analysis  
LP\*A98 KWBR surface pressure analysis  
LP\*A98 KWBR surface pressure analysis uncertainty  
LH\*A98 KWBR RTMA model terrain height  
LEIA98 KWBR 6-hour Accumulated precipitation (2.5km for  
CONUS only)

For questions regarding these changes, please contact:

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For questions regarding the dataflow aspects of these datasets,  
please contact:

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NWS National Technical Implementation Notices are online at:

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

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