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PNSWSH

Service Change Notice 17-105 Updated
National Weather Service Headquarters Silver Spring MD
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From: Dave Myrick
 NWS Office of Science and Technology Integration

Subject: Updated: RTMA, URMA and NAM DNG upgrade and Introduction
 of RTMA with Rapid Updates:
 Effective December 12, 2017

Updated to change the scheduled implementation date to
December 12, 2017

Effective on or about Tuesday, December 12, 2017, beginning with the 1500 Universal Coordinated Time (UTC) cycle, the National Centers for Environmental Prediction (NCEP) will upgrade the Real-Time Mesoscale Analysis (RTMA), the Unrestricted Mesoscale Analysis (URMA), North American Model (NAM) Downscaled Numerical Guidance (DNG) and introduce the RTMA with Rapid Updates (RTMA-RU).

- Changes to model components
- Addition of new product fields and changes
- Product removals, including NOAAPORT
- Precipitation output changes

1) Changes to Model Components

- The new RTMA-RU is an RTMA analysis run every 15 minutes using the latest available observational data. RTMA-RU will run over CONUS only. With this upgrade 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 and new products are provided below.
- A new terrain dataset and land/sea mask will be used in RTMA and URMA for the continental United States (CONUS), Puerto Rico (PR), and Hawaii (HI). The same terrain and land/sea mask will be implemented in the National Blend of Models during a future upgrade.
- In URMA (but not RTMA), new pseudo-observations of wind, temperature and moisture will be used over the Great Lakes in an attempt to simulate over-water conditions over those lakes. The pseudo-observations are generated based on water temperature and nearby land-based observations. The adjustment formula originated with the Great

Lakes Environmental Research Lab and is also currently used in Great Lakes nowcasts.

- Hourly precipitation URMA is added to PR and CONUS domains. For Puerto Rico, coverage is from the Southeast River Forecast Center (SERFC) hourly Quantitative Precipitation Estimate (QPE). For CONUS, hourly gauge-corrected Multi-Radar Multi-Sensor (MRMS) is used to disaggregate the 6-hourly QPEs from Northwest RFC (NWRFC) and California-Nevada RFC (CNRFC) into hourly QPEs (no reliable hourly QPEs from these two RFCs), and combine these with hourly QPEs from the other 10 CONUS RFCs into a CONUS mosaic.

The filling of the NWRFC/CNRFC is done on the hourly Stage IV CONUS mosaic, as the precipitation URMA is the Stage IV mapped to the NDFD grids. The Stage IV file names remain unchanged, but now the hourly Stage IV will have NWRFC and CNRFC areas filled with time-disaggregated data, rather than left as data-free. In the earlier runs of the hourly Stage IV/precip URMA, before the corresponding 6h QPE from these two RFCs become available (as well as on occasion when there is one or more missing MRMS file in the 6h period), the CNRFC/NWRFC will still have these areas shown as data-free. The land-only data mask is removed from the PR precipitation Stage IV/URMA in order to provide full PR domain coverage for National Blend of Models (NBM).

- The built-in coastal steepening of the background error covariance's is reduced in RTMA and URMA CONUS, HI, PR and Alaska (AK) domains to reduce the appearance of zero-increment artifacts around coastlines.

- Additional observations from NOAA's Cooperative Observer (COOP) network and the UrbaNet Mesonet will be available for use in URMA (but not RTMA).

- Associated change to the NAM DNG will be as follows:

- a) The NAM DNG is used as input to the RTMA/URMA CONUS, AK, PR, and HI domains and will be upgraded to be consistent with the same new land/sea mask and terrain dataset used in RTMA, URMA and RTMA-RU.

- b) Decimal scaling (DEC) is changed from 3.0 to 6.0 for increased precision of specific humidity and to prevent zero values of specific humidity from being written out.

- c) A bug is corrected in the specific humidity computation (specific humidity was using surface pressure from NAM Nest rather than the downscaled surface pressure). The NAM DNG products can be found on the NCEP Web Services with a data/nccf/nam/prod/*smart* pattern.

2) Product Changes and Additions

The following changes will apply to products on the NCEP Web Services at:

<http://nomads.ncep.noaa.gov/pub/data/nccf/com/>

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

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

Under rtma/prod, urma/prod, nam/prod respectively.

- A new parameter, cloud ceiling height (CEIL), will be added to RTMA and URMA over Alaska. Ceiling uses a Rapid Refresh (RAP) based first guess, and includes observations from METAR sites. Ceiling is listed in meters above ground level.

Files under akurma.YYYYMMDD/ like:

akurma.tHHz.[2dvaranl|2dvargess|2dvarerr]_ndfd_3p0.grb2

Files under akrtma.YYYYMMDD/ like:

akrtma.tHHz.[2dvaranl|2dvargess|2dvarerr]_ndfd_3p0.grb2

Where YYYYMMDD is year, month and day. And HH is cycle from 00-23 (always 2 digits).

- A new parameter, significant wave height (HTSGW), will be added to URMA (but not RTMA) over CONUS. Significant wave height uses WaveWatch 3 output as a first guess field, and includes observations from buoys and satellite altimeters.

Files under urma2p5.YYYYYMMDD/ like:

urma2p5.tHHz.[2dvaranl|2dvargess|2dvarerr]_ndfd.grb2_ext

urma2p5.tHHz.[2dvaranl|2dvargess|2dvarerr]_ndfd.grb2_wexp

urma2p5.tHHz.[2dvaranl|2dvargess|2dvarerr]_ndfd.grb2

urma2p5.tHHz.[2dvaranl|2dvargess|2dvarerr]_nwrfc.grb2

Where YYYYMMDD is year, month and day. And HH is cycle from 00-23 (always 2 digits).

- A new parameter, minimum and maximum daily relative humidity, will be added to URMA (not RTMA) over CONUS, Alaska, Hawaii and Puerto Rico. Maximum relative humidity will be produced once daily with the 2000 UTC analysis and is valid for the previous 0600-1800 UTC period. Minimum relative humidity will be produced once daily with the 0800 UTC analysis and is valid the previous 1800-0600 UTC period. Note that no first guess or analysis error files will be available for minimum and maximum relative humidity, and minimum and maximum relative humidity will be in a separate file from other variables that match these names on the NCEP Web Services:

urma2p5.tCCz.[min|max]RH_ndfd.grb2

urma2p5.tCCz.[min|max]RH_ndfd.grb2_ext

urma2p5.tCCz.[min|max]RH_ndfd.grb2_wexp

urma2p5.tCCz.[min|max]RH_nwrfc.grb2

akurma.tCCz.[min|max]RH_ndfd_3p0.grb2

hiurma.tCCz.[min|max]RH_ndfd.grb2

prurma.tCCz.[min|max]RH_ndfd.grb2

Where CC=08 for minRH, and CC=20 for maxRH

- New 2.5 km grids, updating every 15 minutes, referred to as the Real Time Mesoscale Analysis with Rapid Updates (RTMA-RU). RTMA-RU represents a rapidly updating surface analysis system over CONUS that includes the latest available observed data. Grids of 2m temperature, 2m dew point, 2m specific humidity, 10m wind speed, 10m wind direction, 10m wind gust, 10m u-wind component, 10m v-wind component, surface visibility, cloud ceiling height, and surface pressure will be made and distributed 20 minutes after analysis time. RTMA-RU also leverages the 15 min forecast output from the HRRR for ceiling and visibility first guess fields and selects the corresponding ceiling

and visibility observations valid closest to analysis time in order to closely fit these data.

Data will be available on the NCEP Web Services under directory:

rtma/prod/rtma2p5_ru.YYYYMMDD

With file names like:

rtma2p5_ru.tHHMMz.2dvaranl_ndfd.grb2 -- analysis field

rtma2p5_ru.tHHMMz.2dvarges_ndfd.grb2 -- first guess field

Users should note the use of 4-digits (2-digit hour HH and 2-digit minute MM) used for analysis time in RTMA-RU files. There is no analysis error file for RTMA-RU and files are available only on the westward-expanded domain described below. Files should be available approximately 20 minutes after analysis time.

- Users should note that the hourly RTMA will run concurrently with but separately from the RTMA-RU at the top of every hour. Hourly RTMA will still be available at the same time and location, and hourly RTMA output may differ from RTMA-RU output at the top of the hour.

- 200 additional columns have been added to the CONUS output grid over the Pacific Ocean in a westward expansion of that domain. Analysis, first guess, and analysis error files including the westward expansion will now be available and are named:

[rtma2p5|urma2p5].tHHz.[2dvaranl|2dvarges|2dvarerr]_ndfd.grb2_wexp

Files will still be distributed on their original CONUS grids (NDFD, NWRFC) along with the new expanded grid. However users should note that NCEP plans to discontinue distribution of the smaller, legacy grids during a future upgrade.

- The new RTMA-RU will be available for download within the grib filter service under NCEP NOMADS:

http://nomads.ncep.noaa.gov/cgi-bin/filter_rtma_ru.pl

- The urma2p5 GRIB2 data on the NCEP Web Services will be reduced from 11 days available to 2 days available to make it more consistent with the other domains. All RTMA and URMA precipitation data will be available for 14 days of archive.

3) Product Removals

- The 5km RTMA precipitation will be discontinued on the NCEP Web Services with this upgrade.

pcpanl.YYYYMMDD/pcprtma.YYYYMMDDHH

Users should begin using the 2.5km products that are located on the same web server here:

rtma/prod/rtma2p5.YYYYMMDD/rtma2p5.YYYYMMDDHH.pcp.184.grb2

- Over NOAAPORT/SBN the hourly 5km CONUS RTMA precipitation will be discontinued. Users should instead be using the 2.5km resolution output available on NOAAPORT.

Accumulated Precipitation (APCP) WMO Header removed: LEMA98 KWBR

4) Precipitation Output Changes

The RTMA and URMA precipitation analysis files will be moving to properly align with the directory structure that follows the RTMA and URMA. Please see below for those changes.

- The RTMA precipitation GIF images will now be created from the 2.5km RTMA. The location of the files will move directories:

pcpanl.YYYYMMDD/pcprtma.YYYYMMDDHH.gif ->
rtma/prod/rtma2p5.YYYYMMDD/pcprtma.YYYYMMDDHH.gif

- The Alaska URMA precipitation will change directories and file names:

pcpanl.YYYYMMDD/pcpurma_ak.YYYYMMDDHH.06h ->
urma/prod/akurma.YYYYMMDD/pcpurma_ak.YYYYMMDDHH.06h.grb2

- The Puerto Rico precipitation will change directories and file names:

pcpanl.YYYYMMDD/pcpurma_pr.2017091006.06h ->
urma/prod/prurma.YYYYMMDD/pcpurma_pr.2017091006.06h.grb2

- New 1 hourly URMA precipitation analysis files will be available in their parent domain directories:

urma/prod/urma2p5.YYYYMMDD/urma2p5.2017091100.pcp_01h.[184|188].grb2
urma/prod/prurma.YYYYMMDD/pcpurma_pr.2017091223.01h.grb2

More information about the RTMA, URMA and RTMA-RU is available at:
<https://vlab.ncep.noaa.gov/web/715073/home>

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

RTMA and RTMA-RU:

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

CONUS hourly RTMA data will be under sub-directory rtma2p5.YYYYMMDD
15-minute RTMA-RU data will be under sub-directory rtma2p5_ru.YYYYMMDD

URMA: <http://para.nomads.ncep.noaa.gov/pub/data/nccf/com/urma/para/>

NAM DNG: <http://para.nomads.ncep.noaa.gov/pub/data/nccf/com/nam/para/>

Stage IV:

<http://para.nomads.ncep.noaa.gov/pub/data/nccf/com/pcpanl/para/>

Parallel (RTMA/URMA) Precip Analysis data will be under its various parent domain directories as noted above.

NCEP urges all users to ensure their decoders can handle changes in content order 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.

Questions, comments or requests regarding this change should be directed to the contacts below. We will review feedback and decide

whether to proceed.

For questions regarding science changes, please contact:

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For questions regarding the data flow aspects of these data sets,
please contact:

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NWS National Service Change Notices are online at:

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

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