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PNSWSH

Service Change Notice 20-45
National Weather Service Headquarters Silver Spring MD
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From: Grant Cooper
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 National Center for Environmental Prediction

Subject: Announcement of RTMA/URMA/RTMA-RU upgrade including
 changes to NAM SmartInit, effective May 26, 2020, and
 request for comments

Effective on or about May 26, 2020, beginning with the 1200 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) and the RTMA Rapid-Update (RTMA-RU). Changes will also take place for the North American Model (NAM) SmartInit output over Puerto Rico as noted below.

This upgrade will include:

- Changes to analysis components
- Addition of new product fields and changes
- Product changes, including data hosted on web services and data on the Satellite Broadcast Network SBN/NOAAPORT

More information about the upgrade can be found at this website:
https://www.emc.ncep.noaa.gov/users/meg/rtma_urma_v2p8/

A) Changes to Analysis Components

1. Introduction of similarity theory calculations in the forward operator for the assimilation of near-surface winds to account for non-standard anemometer heights associated with mesonet observations
2. Extending the significant wave height analysis to the Great Lakes and Guam
3. The sea/land mask of the background is used for the significant wave height analysis
4. Re-tuning of the sky cover analysis to: ensure consistency with the ceiling analysis, introduce quality control over water at night when satellite observations are of lower quality, and refine data thinning and decorrelation lengths to produce a more consistent analysis
5. The addition of a sky cover analysis to RTMA-RU
6. Increase in analysis resolution over Puerto Rico from 2.5 km to 1.25 km for consistency with NDFD
7. Introduction of enhanced background error for temperature in complex terrain for OCONUS (was implemented in CONUS in v2.7)
8. Introduction of refined observation selection algorithm for OCONUS (was implemented for CONUS in v2.7)
9. Removal of a 1-2-1 smoother currently applied to the derived dewpoint increments to address a moist bias in complex terrain
10. Use of radar-only MRMS QPE instead of first-run Stage II/IV for precipitation RTMA; discontinuation of various Stage II analyses
11. Stage IV analysis changing from GRIB1 to GRIB2
12. Add 6h/24h snowfall analysis from NOHRSC to the precipitation URMA system
13. Smoother offshore filling of ConUS precipitation URMA
14. New temperature downscaling is used for Guam, Hawaii and Puerto Rico in the background fields (HiresW and NAM Smartinit).
15. New wind downscaling is used for CONUS and Alaska in the background fields (HRRR Smartinit)
16. Land cover is used instead of vegetation type for the coastal adjustment of the background fields (RAP Smartinit)

B) Product changes and additions on the NCEP Web Services under rtma/prod and urma/prod:

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

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

1. The precipitation RTMA will change its hourly run schedule from hh:33 to hh:15 and be available approximately 18 minutes earlier.
2. Change hourly run schedule for precipitation URMA from hh:33 to hh:55. This will cause the files to be available approximately 22 minutes later, but allows more time for River Forecast Centers' (RFCs) current hour's Quantitative Precipitation Estimations (QPEs) to be included and provide more complete ConUS coverage for first-run QPE. Impact on Alaska (AK) and Puerto Rico (PR) QPE timeliness vary depending on the receipt time of the QPEs: if an AK or PR QPE is received between hh:33 and hh:55, it will be included in the v2.8 pcpURMA earlier (by ~38min) than in v2.7; if it is received between hh:55 and (hh+1):33, it will be included in the v2.8 pcpURMA later (by ~22min) than in v2.7.
3. New files in urma/prod/urma2p5.YYYYMMDD/ - 6h/24h snowfall analysis from the National Operational Hydrologic Remote Sensing Center (NOHRSC), is added to precipitation URMA (ASNOW Total Snowfall [m]) for CONUS:
 - snowfall_wexp.YYYYMMDDHH.06h.grb2,
 - snowfall_wexp.YYYYMMDDHH.24h.grb2Where YYYY is year, MM is month, DD is day, HH is hour
4. A new file in rtma/prod/rtma2p5.YYYYMMDD/ - radar quality index on the g184 NDFD grid, as a companion array to the precip RTMA data:
 - rqirtma.YYYYMMDDHH.grb2Where YYYY is year, MM is month, DD is day, HH is hour
5. A new parameter, significant wave height (HTSGW), will be added to the following RTMA GRIB2 files under rtma/prod/gurtma.YYYYMMDD/:
 - gurtma.tCCz.2dvarXXX_ndfd.grb2Where XXX is anl, ges, or err, and CC is cycle
Significant wave height uses WaveWatch 3 output as a first guess field, and includes observations from buoys and satellite altimeters.
6. A new parameter, sky cover (TCDC), will be added to the following RTMA-Rapid Update GRIB2 files in rtma/prod/rtma2p5_ru.YYYYMMDD/:
 - rtma2p5_ru.tCCmmz.2dvarXX_ndfd.grb2Where XX is anl or ges, CC is cycle, mm is minute

7. Increase in grid resolution over Puerto Rico from 2.5 km to 1.25 km for consistency with NDFD. This affects the following files in `rtma/prod/prrtma.YYYYMMDD/`:

- `prrtma.tCCz.2dvarXXX_ndfd.grb2`

Where XXX is `anl`, `ges`, or `err`, and CC is cycle

8. New 1.25km grid resolution for Puerto Rico also applied to NAM Smartinit:

- `nam/prod/nam.YYYYMMDD/nam.tCCz.smartprHH.tm00.grib2`

Where YYYY is year, MM is month, DD is day, CC is cycle, HH is hour

9. Changes to GRIB encoding in `pcpRTMA` and `pcpURMA`:

- For `pcpRTMA`, Lat/Lon of the South Pole is now set to (-90,0). It previously defaulted to (0,0).

- Level for `pcpRTMA` is now at "0 m above mean sea level" (v2.8, from MRMS QPE). In v2.7 it was at "surface" (from Stage IV/RFC QPEs)

- For both `pcpRTMA` and `pcpURMA*`: the "resolution and component flags" Octet changed from 8 to 56. For CONUS NDFD grid these are equivalent. For more information on this encoding please see Office Note 388 here:

https://www.nco.ncep.noaa.gov/pmb/docs/grib2/grib2_doc/

* Note that in v2.7 `pcpURMA` in PR already had the Resolution and component flags set to '56'.

C) Product changes and additions on the NCEP Web Services under `pcpanl/prod/`:

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

1. Add another rerun for ConUS Stage IV 24h mosaic (30h after valid time) to supplement the current 1/2/3/5/7-day rerun schedule in order that RFC QPEs updated on the 2nd day might get out to the public faster.

2. As with the precipitation URMA, run time for Stage IV is delayed from hh:33 to hh:55 in order to allow more time for RFCs' current hour's QPEs to be included in the first run Stage IV and provide more complete ConUS coverage sooner than in current production Stage IV. Impact on timeliness of Alaska and

Puerto Rico Stage IV is the same as discussed in Section B for pcpURMA.

3. In pcpnl/prod/pcpanl.YYYYMMDD/, Stage IV analysis changed from GRIB1 to GRIB2. File name changes are as follows:

- ST4.YYYYMMDDHH.XXh.gz -> st4_conus.YYYYMMDDHH.XXh.grb2
- st4_ak.YYYYMMDDHH.XXh.gz -> st4_ak.YYYYMMDDHH.XXh.grb2
- st4_pr.YYYYMMDDHH.XXh.gz -> st4_pr.YYYYMMDDHH.XXh.grb2
- st4.YYYYMMDDHH.XXh.gif -> st4_conus.YYYYMMDDHH.XXh.gif

Where YYYY is year, MM is month, DD is day, and HH is hour for the end time of the accumulation period, and XXh=01h,06h or 24h

D) Product removals from NCEP Web Services under pcpnl/prod/:

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

Discontinuation of various Stage II analyses. Stage II predates Stage IV, they are the multi-sensor (radar+gauges), radar-only/gauge-only precipitation analyses over ConUS, made from radar digital precipitation arrays and gauge data (METAR and HADS) received at NCEP. Up until RTMA v2.7, Stage II multi-sensor analysis was used to supplement the RFC QPE-based Stage IV as a source for pcpRTMA. RTMA v2.8 begins using radar-only MRMS instead of Stage IV + Stage II as source for pcpRTMA. Other programs at NCEP using the Stage II are switching to using either MRMS QPE or the Stage IV. External users of Stage II are advised to use MRMS QPE (now outperforming Stage II) or the Stage IV.

List of files to be discontinued:

- PPP15.YYYYMMDDHH.gz
- PPP15.YYYYMMDDHH.XXh.gz

Where PPP is gage, multi, rad, or radunb, YYYY is year, MM is month, DD is day, and HH is hour for the end time of the accumulation period, and XXh is 06h or 24h

- ST2RRYYYYMMDDHH.Grb.gz
- ST2RRYYYYMMDDHH.XXh.gz

Where RR is gg, ml, rd, or un, YYYY is year, MM is month, DD is day, and HH is hour for the end time of the accumulation period, and XXh is 06h or 24h

- st2mlYYYYMMDDHH.XXh.gif

Where YYYY is year, MM is month, DD is day, and HH is hour for the end time of the accumulation period, and XXh is 06h or 24h

- st2vuYYYYMMDDHH.gif

Where YYYY is year, MM is month, DD is day, and HH is hour for the end time of the accumulation period

E) Changes to data on Satellite Broadcast Network SBN/NOAAPORT

1. The change in resolution from 2.5 km to 1.25 km over Puerto Rico necessitates a change to the SBN for PR RTMA, NAM Smartinit and various precipitation grids. Overall this will change the third letter from "C" to "E" for all fields. The headers will change as follows:

RTMA:

LHCA98	KWBR	->	LHEA98	KWBR
LKCA98	KWBR	->	LKEA98	KWBR
LNCA98	KWBR	->	LNEA98	KWBR
LPCA98	KWBR	->	LPEA98	KWBR
LRCA98	KWBR	->	LREA98	KWBR
LTCA98	KWBR	->	LTEA98	KWBR
LUCA98	KWBR	->	LUEA98	KWBR
LVCA98	KWBR	->	LVEA98	KWBR

Precip URMA:

LECA98	KWBR	->	LEEA98	KWBR
YECZ98	KWBR	->	YEEZ98	KWBR

NAM SmartInit:

See full list of changes here:

https://www.nco.ncep.noaa.gov/pmb/changes/nam_smartinit_changes.shtml

2. Addition of snow analysis for CONUS pcpURMA to the SBN. The WMO headers are:

YSQG98	KWBR	*	6h	snowfall
YSQO98	KWBR	*	24h	snowfall

A consistent parallel feed of data will be available on the NCEP

server via the following URLs:

<https://para.nomads.ncep.noaa.gov/pub/data/nccf/com/rtma/para/>
<https://para.nomads.ncep.noaa.gov/pub/data/nccf/com/urma/para/>
<https://para.nomads.ncep.noaa.gov/pub/data/nccf/com/pcpanl/para/>
<https://para.nomads.ncep.noaa.gov/pub/data/nccf/NOAAPORT/>

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. NCEP will evaluate all comments to determine whether to proceed with this upgrade.

For questions regarding these 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:

<https://www.weather.gov/notification/>

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