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PNSWSH

Service Change Notice 18-60
National Weather Service Headquarters Silver Spring MD
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From: Dave Myrick
 NWS Office of Science and Technology Integration

Subject: Upgrade Hurricane Weather and Research Forecast (HWRF) Model:
Effective July 9, 2018

Effective on or about Monday, July 9, 2018, beginning with the 1200 Coordinated Universal Time (UTC) run, the National Centers for Environmental Prediction (NCEP) will upgrade the HWRF coupled system, coupling to the Princeton Ocean Model (POM) and the WaveWatch III (WW3) for the National Hurricane Center (NHC) and Central Pacific Hurricane Center (CPHC) basins and coupling to the HYbrid Coordinate Ocean Model (HYCOM) for the Joint Typhoon Warning Center (JTWC) basins.

The scientific and technical enhancements include the following:

- Upgrade of dynamic core from Weather Research and Forecast (WRF) version 3.8.1a to WRF version 3.9.1 (with bug fixes).
- Model horizontal resolution has been increased from 18/6/2km to 13.5/4.5/1.5km, with adjusted domain 2 (d02) and domain 3 (d03) sizes.
- The sizes of the two nested domains are slightly reduced, with d02 changing from 24 degrees to 18 degrees, and d03 from 7 degrees to 6 degrees to fit in available resources.
- Model vertical resolution for the JTWC basins (Western Pacific /WPAC/, North Indian Ocean /NIO/, and Southern Hemisphere /SH/) has been unified to be the same as the NHC and CPHC basins (North Atlantic /NATL/, Eastern Pacific /EPAC/, and Central Pacific /CPAC/) with the L75 (model top 10 mb) configuration.
- Improved cloud overlap method for the Rapid Radiative Transfer Model for General Circulation Models (RRTMG) radiation scheme.
- Stochastic physics for data assimilation (DA) ensembles.
- Grid-Point Statistical Interpolation (GSI) upgrades, changes to disable Special Sensor Microwave Imager (SSM/I) Channel 2.

- Admitting new datasets (GOES-16 Atmospheric Motion Vectors, NOAA-20, Stepped Frequency Microwave Radiometer /SFMR/, Tail Doppler Radar /TDR/ data from G-IV) and considering dropsonde drifts.
- Unified HWRF/HMON coupler.
- Add ocean coupling (HYCOM) for Southern Hemisphere basins.
- Updating to use wave initial conditions from global wave model.

The 2018 HWRF system has been fully tested and compared with the forecast results with 2017 operational HWRF. It has shown overall improved skill in intensity forecasts and neutral to positive impact on track forecasts in all global basins.

Product Changes to the NCEP Web Services:

<http://nomads.ncep.noaa.gov>
<ftp://ftp.ncep.noaa.gov>
<http://www.ftp.ncep.noaa.gov>

File name and resolution changes in HWRF storm and core gridded binary version two (GRIB2) files:

From {stormid}.{yyyymmddhh}.hwrff*.core.0p02.f{hhh}.grb2 to
 {stormid}.{yyyymmddhh}.hwrff*.core.0p015.f{hhh}.grb2 and
 From {stormid}.{yyyymmddhh}.hwrff*.storm.0p02.f{hhh}.grb2 to
 {stormid}.{yyyymmddhh}.hwrff*.storm.0p015.f{hhh}.grb2

where stormid is the storm identification number, yyyymmddhh is year, month, day and cycle, and hhh is forecast hour.

A new variable, PRATE (instantaneous precipitation rate) is added in HWRF GRIB2 output files for all domains:

{stormnm}{stormid}.{yyyymmddhh}.hwrffprs.*.0p*.f{hhh}.grb2

Timing output will be up to 25 minutes later than the 2017 HWRF version for WPAC, NIO, and SH basins, and up to 10 minutes later for NATL, EPAC, and CPAC basins. All forecast products for all basins will be available before T+6:10.

Sample HWRF products from 2018 HWRF are available at:

<http://para.nomads.ncep.noaa.gov/>

More details about the HWRF system are available at:

www.emc.ncep.noaa.gov/index.php?branch=HWRF

NCEP encourages users to ensure their decoders are flexible and are able to adequately handle changes in content order, changes in the scaling factor component within the product definition section (PDS) of the GRIB files, and any volume changes which may be forthcoming. These elements

may change with future NCEP model implementations. NCEP will make every attempt to alert users to these changes prior to any implementations.

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

For questions regarding these model changes, please contact:

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National Service Change Notices are online at:

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

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