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PNSWSH

Service Change Notice 17-83 Updated  
National Weather Service Headquarters Silver Spring MD  
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To:           Subscribers:  
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              -Other NWS Partners, Users and Employees

From:         Dave Myrick  
              NWS Office of Science and Technology Integration

Subject:      Updated: Implementation of the new Hurricanes in a  
              Multi-scale Ocean-coupled Non-hydrostatic (HMON)  
              Model Version 1.0.0: Effective August 15, 2017  
              and request for comments

Updated to change implementation date from August 1, 2017, to  
August 15, 2017

Effective on or about Tuesday, August 15, 2017, beginning with  
the 1200 Coordinated Universal Time (UTC) run, the National  
Centers for Environmental Prediction (NCEP) will implement the  
HMON coupled modeling system.

This version, HMON v1.0.0, is the first version for the system.  
The release has been fully tested and compared with the  
discontinued Geophysical Fluid Dynamics Laboratory (GFDL)  
Hurricane Model (GHM) results. It has shown significant skill  
improvements in terms of storm track and intensity forecasts in  
Northern Atlantic (NATL) Basin, Eastern Pacific Basin (EPAC) and  
the Central Pacific (CPAC) Basin. HMON also provides a first  
step for the NCEP Environmental Modeling Centers' (EMC) efforts  
towards unification of operational models within the NOAA  
Environmental Modeling System (NEMS) framework.

#### MODEL DESCRIPTION

The scientific and technique details are as follows:

- The dynamical core is a Non-hydrostatic Multi-scale Model on a  
B grid (NMMB).
- There are 43 vertical levels, where the model top is at 50  
hPa.
- It includes vortex relocation, but has no data assimilation.
- Two-way Coupling is with Ocean Model (HYCOM) for EPAC and CPAC  
basins; uncoupled for NATL basin.
- The HMON system will provide improved track forecasts in NATL,  
EPAC and CPAC basins. HMON also will provide improved intensity  
forecasts for NATL, EPAC and CPAC basins. The coupled HMON

system will provide additional ocean products compared with GHM.

This model is considered the replacement for the Geophysical Fluid Dynamics Laboratory (GFDL) Hurricane Model (GHM). Due to differences in underlying physics, two variables present in the GHM grib output will not be produced by HMON, and some others are being replaced by similar but not identical output. These differences are detailed in the Model Output section. For more information on the removal of the GFDL model, please see the following notices:

<http://www.nws.noaa.gov/os/notification/pns17-07gfdl.htm>

[http://www.nws.noaa.gov/os/notification/scn17-45discontinue\\_gdflaaa.htm](http://www.nws.noaa.gov/os/notification/scn17-45discontinue_gdflaaa.htm)

The 2017 HMON system has been fully tested and compared with the forecast results with 2016 operational GHM. HMON has shown significant skill improvement in intensity and track forecasts in NATL, EPAC and CPAC basins. A PowerPoint presentation explaining the new HMON model and comparing its results to GHM can be found here:

[http://www.emc.ncep.noaa.gov/gc\\_wmb/vxt/LinZhu/HMON\\_stats/FY17\\_HMON\\_OD\\_br\\_ief\\_042817.pptx](http://www.emc.ncep.noaa.gov/gc_wmb/vxt/LinZhu/HMON_stats/FY17_HMON_OD_br_ief_042817.pptx)

#### MODEL OUTPUT INFORMATION

HMON output will be available beginning Aug 1, 2017, on the following NCEP web services:

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

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

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

Parallel data will be available beginning June 28, 2017 on a storm by storm basis here:

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

The directory structure will be:

hmon.YYYYMMDD

Where YYYY is year, MM is month, and DD is day

A) HMON GRIB files will be available for the following domain resolutions:

1. domain 01 = 75 deg x 75 deg grid, resolution 0.20 deg

NAMEID.YYYYMMDDCC.hmonprs.d1.0p20.fFFF.grb2

Where NAMEID is storm name and storm identification number. CC is cycle output (00z, 06z, 12z, 18z). FFF is forecast hour valid from 000-126 at 3 hourly intervals.

2. d02 = 12 deg x 12 deg grid, resolution 0.06 deg

NAMEID.YYYYMMDDCC.hmonprs.d2.0p06.fFFF.grb2

Where NAMEID is storm name and storm identification number. CC is cycle output (00z, 06z, 12z, 18z). FFF is forecast

hour valid from 000-126 at 3 hourly intervals.

3. d03 = 8 deg x 8 deg, resolution 0.02 deg  
NAMEID.YYYYMMDDCC.hmonprs.d3.0p02.fFFF.grb2

Where NAMEID is storm name and storm identification number. CC is cycle output (00z, 06z, 12z, 18z). FFF is forecast hour valid from 000-126 at 3 hourly intervals

NOTE: As stated above, HMON grib2 output will have most of the same variables currently present in GFDL/GHM with these differences:

- Missing with no replacement due to differences in underlying model physics
  - \* Graupel [kg/kg]
  - \* Temperature Tendency by All Physics [K/s]
- Replaced
  - \* Geometric Height [m] - Replaced by Geopotential Height
  - \* Ice Water Mixing Ratio [kg/kg] - Replaced by Cloud Ice
  - \* U Component of Hourly Maximum 10m Wind Speed [m/s] - Replaced by max wind U-Component of wind, saved in the grib output as "max wind" level for U-wind
  - \* V Component of Hourly Maximum 10m Wind Speed [m/s] - Replaced by max wind V-Component of wind, saved in the grib output as "max wind" level for V-wind
  - \* Humidity Mixing Ratio [kg/kg] - Replaced by specific humidity

B) Track file in atcf format

NAMEID.YYYYMMDDCC.trak.hmon.atcfunix

Where NAMEID is the storm name and identification, CC is the cycle.

C) Swath text files at 0.03 deg resolution

NAMEID.YYYYMMDDCC.precip.asci

file maximum 10m wind: NAMEID.YYYYMMDDCC.sfcwind.asci

D) Intensity & track text files

afos format: NAMEID.YYYYMMDDCC.afos

variables: hour, latitude, longitude, heading/speed

stats format: NAMEID.YYYYMMDDCC.stats.tpc

variables: hour, latitude, longitude, minimum surface pressure, maximum surface wind

stats short format: NAMEID.YYYYMMDDCC.grib.stats.short

variables: hour, longitude, latitude, minimum surface pressure, maximum surface wind

More details about the HMON system are available at:

[http://www.emc.ncep.noaa.gov/gc\\_wmb/vxt/HMON/index.php](http://www.emc.ncep.noaa.gov/gc_wmb/vxt/HMON/index.php)

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.

Any questions, comments or requests regarding this implementation should be directed to the contacts below. We will review any feedback and decide whether to proceed.

For questions regarding these model changes, please contact:

Dr. Avichal Mehra  
Lead Physical Scientist  
NOAA/NCEP/Environmental Modeling Center  
National Centers for Weather and Climate Prediction  
College Park, Maryland, 20740.  
Tel: 301-683-3746  
E-Mail: [avichal.mehra@noaa.gov](mailto:avichal.mehra@noaa.gov)

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

Carissa Klemmer  
NCEP/NCO Dataflow Team Lead  
College Park, MD  
301-683-0567  
[ncep.list.pmb-dataflow@noaa.gov](mailto:ncep.list.pmb-dataflow@noaa.gov)

NWS Service Change Notices are online at:

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

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