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PNSWSH

Technical Implementation Notice 14-40 Corrected  
National Weather Service Headquarters Washington DC  
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From:         Timothy McClung  
              Chief, Science Plans Branch  
              Office of Science and Technology

Subject: Corrected: Changes to the Hurricane (multi\_2) and the Global  
(multi\_1) Wave Models: Effective January 7, 2015

Corrected to notify users of a directory change explaining where to pull  
data from on the NCEP FTP/HTTP servers.

Effective Wednesday, January 7, 2015, beginning with the 1200 Coordinated  
Universal Time (UTC) run, the National Centers for Environmental  
Prediction (NCEP) will upgrade the Hurricane and Global wave models to  
WAVEWATCH III v4.15.1 and at the same time, the underlying grids will be  
changed.

The Hurricane wave model (multi\_2) uses a blend of Global Forecast System  
(GFS) winds and hurricane winds at 10 m above Mean Sea Level (MSL) as  
forcing conditions, while the Global wave model (multi\_1) uses just the  
GFS forcings and is run side by side with the GFS forcing. Both models  
use the same set of grids with the exceptions that the multi\_2 system has  
two additional regional grids (for blended hurricane winds) and the  
multi\_1 system has an Arctic grid (that is not needed for propagating  
hurricane driven winds). Also, the multi\_1 system provides wave guidance  
out to 180 hours, while the multi\_2 system only goes out to 126 hours  
(which is the extent of the hurricane guidance). It is useful to think of  
multi\_1 as an early guidance and multi\_2 as a late guidance that includes  
the effects of hurricane wind forcings.

The implications of the changes are highlighted below.

HURRICANE WAVE MODEL (multi\_2):

The Hurricane Wave model has been upgraded to the new physics package that  
the Global Wave model uses. With this change, both the Global and  
Hurricane wave models now use the same physics. The advantages of the new  
physics packages are:

- Better swell dissipation characteristics (this has implications for  
storms in the Pacific that have a strong swell component).

- Better wave growth and decay properties as the storm passes.
- A much better representation of the wave spectra, leading to a more accurate estimate of peak frequency and consequently storm arrival times.
- Update of the bathymetry of the various grids to be ETOPO1 based. ETOPO1 is a one arc-min global relief model of the Earth that is provided by the National Geophysical Data Center:

<http://www.ngdc.noaa.gov/mgg/global/global.html>

The bathymetry used to be based on the ETOPO2 bathymetric set which was an earlier two arc-min global relief model.

- Hurricane winds are now forced by the Hurricane Weather Research and Forecast (HWRF) model as opposed to the Geophysical Fluid Dynamics Laboratory (GFDL) model.

Wave products are being delayed by an hour. Due to the timing of the products, the hurricane wave model was being run using the previous cycle hurricane winds. Thus, a 12 UTC wave model would use 06 UTC hurricane winds. By delaying the wave product delivery by an hour, the 12 UTC cycle wave model would use the 12 UTC cycle hurricane winds. Thus, the wave products are actually being delivered earlier.

GLOBAL WAVE MODEL (multi\_1):

The grids of the wave model are updated to be ETOPO1 based (as opposed to ETOPO2 based).

The masks for the regional grids (wc\_10m, at\_10m and ep\_10m) are updated as per requests of Ocean Prediction Center (OPC) and the Weather Forecast Office (WFO) in Guam.

There has been a change to a sub-section of output points that were requested by the OPC. They have now requested a smaller set of output points. The list of current and new points is listed here:

[http://www.nco.ncep.noaa.gov/pmb/changes/wave\\_multi\\_bndry.shtml](http://www.nco.ncep.noaa.gov/pmb/changes/wave_multi_bndry.shtml)

The output data from these models are disseminated on the NCEP server at:

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

On January 8, 2015, with the 1200 UTC cycle, NCEP will send the operational output of the upgraded WAVEWATCH III (v4.15.1) to the following directories:

Global Wave - /prod/multi\_1.YYYYMMDD/

Hurricane Wave - /prod/multi\_2.YYYYMMDD/

Both Global and Hurricane Wave - /prod/wave.YYYYMMDD

On January 21, 2015, with the 1200 UTC cycle, NCEP will no longer populate the combined Global and Wave directory:

/prod/wave.YYYYMMDD

And the operational Wave will be available in the new directories as follows:

Global Wave - /prod/multi\_1.YYYYMMDD/  
Hurricane Wave - /prod/multi\_2.YYYYMMDD/

\*Where YYYYMMDD equates to Year, Month, Day.

Sample output files from the new physics are available at:

<ftp://polar.ncep.noaa.gov/pub/waves/develop/>

Details about the NCEP Multi-grid Wave Model are online at:

<http://polar.ncep.noaa.gov/waves/index2.shtml>

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

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

For questions regarding these model changes, please contact:

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National Technical Implementation Notices are online at:  
<https://www.weather.gov/notification/archive>

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