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Technical Implementation Notice 12-17
National Weather Service Headquarters Washington DC
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From: Timothy McClung
 Chief, Science Plans Branch
 Office of Science and Technology

Subject: Change to Wave Model Physics: Effective May 8, 2012

Effective on or about Tuesday, May 8, 2012, beginning with the 1200 Coordinated Universal Time (UTC) run, the National Centers for Environmental Prediction (NCEP) will introduce a physics upgrade and a few minor product changes to the Multi-grid Global Wave Model.

This model is currently run using WAVEWATCH-III v3.14. The wave model will be upgraded to WAVEWATCH-III v4.5.1, which introduces several new physics packages to the wave model. The key changes are as follows:

- A new physics package for wave growth under wind seas.
- A new physics package to account for swell dissipation for swells propagating long distances.
- A new physics package for wave dissipation due to wave breaking.

The new physics packages are outlined in Ardhuin et. Al. 2010 (see full reference below). Validation studies show that the new physics significantly improve model skill for wave height, especially in regions of strong swells such as the Pacific.

The majority of the output products will remain unchanged. The number of stations available in the point output products will be reduced by 112. The stations that are being removed are - WALLOPS_?? (?? ranging from 01 to 61) and SANCLEM_?? (?? ranging from 01 to 51). These stations were added in an experimental mode and are now being removed. In addition, the spectral output files will now be compressed due to their large sizes. The uncompressed files, including the multi_1.txxz.spec_tar file (xx is the model cycle) will be removed from the NCEP server. Any downstream users actively using these spectral output files will need to adapt their software to use the compressed versions. Note that the tar files are being compressed, the individual spectral files inside the respective tarballs will not be compressed.

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

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

The files that will be compressed are:

akw.txxx.spec_tar becomes akw.txxx.spec_tar.gz
enp.txxx.spec_tar becomes enp.txxx.spec_tar.gz
wna.txxx.spec_tar becomes wna.txxx.spec_tar.ga

The file multi_1.txxx.spec_tar will be removed. The file multi_1.txxx.spec_tar.gz has been available on the server for some time.

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>

These changes will only correspond to the global wave model (multi_1). Upgrade of the hurricane wave model (multi_2) will occur at a later date.

A consistent parallel feed of data will be available on the NCEP server once the model is running in parallel on the NCEP Central Computing System in late March. The parallel data will be available 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 gridded binary (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:

Hendrik Tolman
NCEP/Marine Modeling and Analysis Branch
Camp Springs, MD
301-763-8000, x 7253
hendrik.tolman@noaa.gov

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

Rebecca Cosgrove
NCEP/NCO Dataflow Team
Camp Springs, MD
301-763-8000, x 7198
ncep.list.pmb-dataflow@noaa.gov

Reference: Ardhuin, F. et. al., 2010: Semi-empirical dissipation source functions for ocean waves: Part 1, definition, calibration and validation. J. Phys. Oceanogr., 40, 1917 - 1941.

National Technical Implementation Notices are online at:

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

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