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PNSWSH

Service Change Notice 17-75
National Weather Service Headquarters Silver Spring MD
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From: Dave Myrick
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Subject: Upgrade to the Great Lakes Wave System: Effective July 25, 2017

Effective on or about July 25, 2017, beginning with the 1300 Coordinated Universal Time (UTC) run, the National Centers for Environmental Prediction (NCEP) will make a major upgrade to the Great Lakes Wave forecasting system (GLW), henceforth labeled Great Lakes Wave Unstructured (GLWU).

Upgrade highlights:

- Change underlying wave code to WAVEWATCH III v5.16.0.
- Replace native grid for all output.
- Output hourly cycles on Web and NOAAPort.
- Make physics upgrades.

The upgrade includes:
1. For all output, replace native wave model curvilinear 2.5km Lambert Conformal computational grid with unstructured grid with element sizes ranging from 2.5km offshore, to 250m at the coast. The new native wave model unstructured computational grid will provide resolution of wave guidance in the nearshore zone not possible previously with a 2.5km grid. The new spatial grid also resolves properly islands and several coastal features, such as peninsulas, in a way important for defining wave-climate variations near the coast, unavailable for this set of products up to this upgrade.

2. Make physics tune up to augment the benefits of higher nearshore resolution, adding improved skill to the increased resolution. This combination provides marine forecasters in the Great Lakes region with augmented confidence and expanded usability relative to the existing GLW guidance.

3. Add new hourly cycles to help small craft advisory, expanding the availability of wave guidance to better reflect rapidly-changing conditions that may be hazardous to small recreation and/or commercial marine vessels. The new cycles also bring wave guidance to a schedule consistent with other short-range products at NCEP, including the HRRR.

For all output, GLW model will add hourly cycles out for a short-range forecast for 20 cycles, not including 01, 07, 13 and 19 UTC, which will remain long-range forecast output.

4. Add wave-physics tune up for nearshore applications, including changes to input, dissipation and a multiple discrete interaction approximation (multiple-DIA) parameterization for nonlinear wave-wave interactions

5. Make upgrades to the latest public release of WAVEWATCH III including several bug fixes, and updates to source-functions that allowed better tuning of the wave model to the requirements of the new GLW unstructured grid.

6. Include more effective ice concentrations interpolation and gap-filling algorithms to eliminate exaggerated ice concentration coverage nearshore, fixing previous land-sea masks inconsistencies.

For all output, the cycles 03, 09, 15, and 21 UTC will shift to cycles at 01, 07, 13, and 19 UTC instead.

Web Output Product Changes:

The following changes apply to products available on the NCEP dissemination sites:
http://nomads.ncep.noaa.gov/pub/data/nccf/com/wave/prod/
ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/wave/prod/
http://www.ftp.ncep.noaa.gov/data/nccf/com/wave/prod/

1. The directory structure is changing glw.YYYYMMDD -> glwu.YYYYMMDD
Where YYYY is year, MM is Month, DD is day.

2. All file names will change the prefix glwn.* -> glwu.*

3. New output files with this upgrade:
glwu.glwu.tCCz.nc - To be used experimentally at marine forecast offices for the development of improved, more accurate wave guidance products.
glwu.grlc_2p5km_sr.tCCz.grib2 - 2.5km resolution, short range forecasts from 00 to 48.
glwu.grlr_500m.tCCz.grib2 - 500m resolution, short range forecasts from 00 to 48.
glwu.tCCz.ripin_tar glwu.tCCz.ts_tar.gz
Where CC is cycle

4. The long-range forecast hours will be extending from 147 to 149 for files like: glwu.grlc_2p5km.tCCz.grib2, where CC is cycles 01, 07, 13 and 19 UTC.

5. The point output DBLN6 will no longer be available as the point falls outside the new unstructured grid. This will affect the following files:
glwn.tCCz.bull_tar
glwn.tCCz.cbull_tar
glwn.tCCz.csbull_tar
glwn.tCCz.spec_tar.gz

6. Additional point stations will be available. A description of these additional stations can be found here:

http://www.nco.ncep.noaa.gov/pmb/changes/docs/GLWU_stations.pdf

Web Output Product Removals:

1. On the NCEP web services, the following legacy 4km files are being removed as was announced previously:
glwn.grl.tCCz.grib2

2. On the NCEP web services, the following files are being removed with this upgrade as they are no longer supported under the Great Lakes Wave model system:
glwn.wstp.grlc_2p5km.tCCz.grib2

NOAAPort/Satellite Broadcast Network (SBN) Product Changes:

1. On NOAAPort/SBN, the 4km wave on grid 176 will be removed. Users can find the output at the higher resolution 2.5km already available. To view the full list of output World Meteorological Organization (WMO) headers being discontinued, please click here:

http://www.nco.ncep.noaa.gov/pmb/changes/docs/glw_removal_headers.txt

2. New output will be available on hourly cycles for forecast hours 00-48. This data will be in addition to the already available 6-hourly cycles. There will not be any new WMO headers; users will just see hourly cycle output using the already defined WMO headers for forecast hours 00-48.

3. For the existing 6-hourly cycle output, forecast hours will be extended from 147 to 149. See the first section above for details how the 6-hourly cycle output is shifting. Additional WMO headers will match pattern:
EPKT88 KWBJ

Sample output files from the new physics are available at:

ftp://polar.ncep.noaa.gov/waves/dev/glwu.latest_run/

Details about the NCEP Wave Models are found online at:

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

A consistent parallel feed of data is available on NCEP para NOAA Operational Model Archive and Distribution System (NOMADS):

http://para.nomads.ncep.noaa.gov/pub/data/nccf/com/wave/para
http://para.nomads.ncep.noaa.gov/pub/data/nccf/noaaport/wave/

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 Service Change Notices are online at:

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

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