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Technical Implementation Notice 16-17
National Weather Service Headquarters Washington DC
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From: Timothy McClung, Portfolio Manager
 NWS Office of Science and Technology Integration

Subject: GFDL Hurricane Prediction System Changes: Effective July 12, 2016

Effective on or about Tuesday, July 12, 2016, beginning with the 1200 Coordinated Universal Time (UTC) run, the National Centers for Environmental Prediction (NCEP) will upgrade the Geophysical Fluid Dynamics Laboratory (GFDL) Hurricane Prediction System.

The scientific changes to the model include the following:

- Modified detrainment of micro-physics in the Simplified Arakawa-Schubert (SAS) convection scheme.
- Modified convective time scale in calling of SAS convection.
- Bug Fixes in the SAS scheme.
- Improved representation of the storm initial wind profile.
- Changed Ocean Initialization to run with Real Time Ocean Forecast System (RTOFS) analysis in the Eastern Pacific.
- Added new functionality to ingest Global Forecast System (GFS) GRIB data to create the lateral boundary condition.

Extensive testing over multiple hurricane seasons show significant improvements in the prediction of storm track and intensity in both the Atlantic and Eastern Pacific basins. Reductions in track error averaged 25 percent in the 4-5 day lead times in the Atlantic and about 17 percent in the Eastern Pacific at days 3-5.

Intensity errors decreased about 15 percent in the 3-5 days lead times in the Atlantic. With better representation of the hurricane-ocean interaction in the Eastern Pacific through the introduction of the RTOFS analysis, the cooling in the cold wakes will be significantly reduced, increasing the reliability of the model to predict rapid intensity change events.

Impact to Output Products:

The GFDL hurricane model GRIB products are disseminated via the NCEP and NWS FTP servers and are not available on NOAAPort or via the Advanced Weather Interactive Processing System (AWIPS).

In NWS Technical Implementation Notice (TIN) 15-26:

<https://www.weather.gov/media/notification/tins/tin15-26gfdl.pdf>

NWS announced that the GRIB1 output from the GFDL would be discontinued in the 2016 hurricane season given that it had been replaced by gridded binary version two (GRIB2). Therefore, all GRIB1 output files will be removed from our servers with this upgrade. This means all the files at:

<http://tgftp.nws.noaa.gov/SL.us008001/ST.opnl/MT.ghm CY.xx/>, (where xx = cycle) will be removed.

On the NCEP ftp server:

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

and at the NOAA Operational Model Archive and Distribution System (NOMADS): <http://nomads.ncep.noaa.gov/pub/data/nccf/com/hur/prod/> in directories hur.YYYYMMDDCC (where YYYYMMDDCC is the year, month, day and cycle) only the files with *grib2 on the end and *.stats.short will remain.

There are no changes to existing GRIB2 output content; however, forecast products will be available about 10 minutes earlier due to the use of GRIB2 data for the lateral boundary generation.

More details about the GFDL hurricane prediction system are available at:

<http://www.gfdl.noaa.gov/operational-hurricane-forecasting>

NCEP encourages all 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 also any volume changes. These elements may change with future NCEP model implementations. NCEP will make every attempt to alert users to these changes prior to any implementations.

For questions regarding these model changes, please contact:

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

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National Technical Implementation Notices are online at:

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

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