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Technical Implementation Notice 14-20 Amended
National Weather Service Headquarters Washington DC
750 AM EDT Tue Jun 3 2014

To: Subscribers:
           -Family of Services
           -NOAA Weather Wire Service
           -Emergency Managers Weather Information Network
           -NOAAPort
           Other NWS Partners, Users and Employees

From: Timothy McClung
           Chief, Science Plans Branch
           Office of Science and Technology

Subject: Amended: GFDL Hurricane Prediction System Changes: Effective June
18, 2014

Amended to change the effective date from June 12, 2014 to June 18, 2014.
If NWS declares a Critical Weather Day, this implementation may be
completed a day or two before or after the scheduled date.

On or about Wednesday, June 18, 2014, 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:

- Increased horizontal resolution of inner nest from 1/12th to 1/18th
degree.
- Improved specification of surface exchange coefficients (Ch, Cd).
- Improved specification of surface roughness and wetness over land
(climatology replaced by Global Forecast System (GFS)-based values).
- Modified Planetary Boundary Layer (PBL) with variable Critical
Richardson Number.
- Improved targeting of initial storm maximum wind and storm structure in
initialization.
- Advection of individual micro-physics species.
- Removed vortex specification for storms of 40 knots and less.
- Upgraded ocean model to about 9 km resolution Message Passing Interface
(MPI)-Princeton Ocean Model (POM) with unified trans-Atlantic basin and
three-dimensional (3D) ocean for Eastern Pacific basin.
- Introduced direct interpolation from GFS hybrid to GFDL sigma
coordinates.

Extensive testing over multiple hurricane seasons show significant
improvements in prediction of storm intensity at all forecast time levels
in both the Atlantic and Eastern Pacific. Intensity errors decreased
about 15 percent in the 3-5 days' lead times in the Atlantic, with about
six percent in the critical 1-2-day lead times. Reduced track error

averaged six percent in the 1-4-day lead times and neutral at day five. The excessive over-intensity bias of the GFDL model for weak systems was greatly reduced, increasing the reliability of the model as an intensity guidance tool.

Impact to Output Products:

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

There are no changes to existing output content. These changes will result in no change in product dissemination time, or increase in product size.

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 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.

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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