Evaluation of Tropical Cyclone Forecasts with the GFDL FV3 Dynamical Core

Morris A. Bender, Jan-Huey Chen, Matthew Morin and Shian Jiann Lin

Morris.Bender@noaa.gov

Geophysical Fluid Dynamics Laboratory, NOAA

The GFDL FV3 dynamical core will be replacing NCEP's GFS global spectral model, with operational implementation scheduled for Spring of 2019. The GFS continues to be one of the best performing models for prediction of tropical cyclone (TC) track, providing valuable guidance to forecasters at the National Hurricane Center and the Navy's Joint Typhoon Warning Center.

Preliminary results using the FV3 dynamical core, are showing improved TC track and intensity performance compared to the current GFS, in forecasts running from identical GFS initial conditions. However the evaluations so far have been mostly on a limited number of cases during the 2016 Atlantic hurricane season. A more rigorous evaluation is proposed, for most of the 2015 and 2016 Atlantic and Eastern Pacific hurricane seasons, using retrospective runs of the upgraded GFS as the initial condition. Forecasts will be initialized from the 0 and 12z synoptic times, with results compared with the upgraded GFS and the upgraded HWRF. run from the 2017 version of the GFS. Comparisons will be made for a homogenous set of cases, both for track and intensity, and also compared with other top model guidance (e.g., ECMWF, UKMET). Impact on the model consensus will also be evaluated, by replacing the GFS forecasts in the model consensus with the FV3 model forecasts, as well as evaluating the improvement in the consensus with the addition of the FV3 as an additional member.

Finally, a preliminary evaluation will be made on the skill of the TC genesis using the new FV3 dynamical come, with comparisons made with the GFS and other global models, both in the Atlantic and East Pacific.