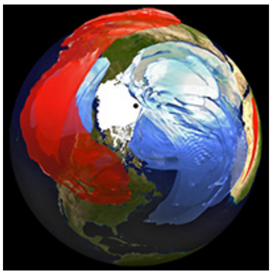

Contribution ID: **74** Type: **Poster presentation**

On the development of NCEP 127-L GFS with its top extending to the mesopause

Version 15 of the NCEP Global Forecast System (GFS) was implemented into operation on June 12, 2019. The spectral dynamic core, which had been in use by NCEP global forecast models in the past few decades was replaced by the GFDL Finite¬ Volume Cubed-Sphere Dynamical Core (FV3). Major changes in model physics include the replacement of Zhao-Carr microphysics with the GFDL microphysics, improved ozone parameterization, and a new parameterization of the middle atmospheric water vapor photochemistry. Work is now underway towards building the GFS version 16 for implementation in 2021. The number of model vertical layers will be doubled and the model top will be extended from the upper stratosphere to the mesopause (˜80 km height). Upgrades in model physics include 1) employing a new scheme to parameterize both stationary and non-stationary gravity waves that are not explicitly resolved by the model, 2) replacing the current Noah land surface model with the community Noah land surface model with multiparameterization options (NoahMP), 3) using a new scale-aware turbulent kinetic energy based moist eddy-diffusivity mass-flux vertical turbulence mixing scheme to better represent the PBL processes and, 4) updating the RRTMG radiation package to improve solar absorption by water cloud and the cloud overlapping algorithm. This presentation will focus on the investigation of the impact of gravity-wave drag physics on the simulation of QBO, SAO and polar night jets in GFS.v16. Changes in other components of the system including system infrastructure, data assimilation, post-processing and product generation will also be briefly described. Preliminary results from forecast sensitivity experiments with fixed initial conditions and cycled experiments with data assimilation will be presented.

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