



Development and verification of a non-hydrostatic global atmospheric model using horizontal spectral element and vertical finite difference method on a cubed sphere

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Korea Institute of Atmospheric Prediction Systems (KIAPS) was founded in 2011 by Korea Meteorological Administration (KMA) as a non-profit foundation to develop Korea's own global NWP system including framework, data assimilation, and so on. The final goal of KIAPS is to develop a global non-hydrostatic NWP system by 2019 for operational use at KMA. This presentation covers an introduction to the current state of the newly developed non-hydrostatic global atmospheric model in KIAPS. And simulated results for several weather cases using the model will be shown. The simulations are run at about 25 km resolution using GFS analysis without data assimilation.

The dynamical core of the model is using the Euler equation set in a flux form based on the terrain following mass-based vertical coordinate (Klemp et al., 2007), which is discretized by horizontal spectral element method (SEM) and the vertical finite difference method (FDM) for the spatial discretization and a time-split third-order Runge-Kutta (RK3) for the time discretization (Choi et al., 2014). By using horizontal SEM, which decomposes the physical domain into smaller pieces with a small communication stencil, we can achieve a high level of scalability. By using vertical FDM, we also provide an easy way for coupling the dynamics and existing physics packages. The physics package coupled with the dynamical core is from the Global/Regional Integrated Model Systems (GRIMs) (Hong et al. 2013) which have been used as a test-bed to evaluate any new package developed in WRF model.

References

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