EMS Annual Meeting Abstracts
Vol. 14, EMS2017-80, 2017

Ensemble Data Assimilation Implemented to the Unstructed Centroidal Vornoi Hexagonal Mesh Model with a C-grid Staggering and a Selective Grid Refinement

Ji-Sun Kang and Minsu Joh
Korea Institute of Science and Technology Information, Daejoen,Korea (jskang@kisti.re.kr)

We have been implementing an ensemble data assimilation system to NCAR MPAS (National Center for Atmospheric Research Model for Prediction Across Scales) which incorporates an unstructured centroidal vornoi hexagonal meshes using a C-grid staggering and a selective grid refinement. Because of such defining features of the model grids, there are some issues that we need to be careful during the data assimilation process. First of all, observation operator should be well constructed not to distort information of variables between model and observation spaces. Especially, the wind component of this model is unique. Wind variables are defined at the edge of each cell, which causes about three times more numbers of wind variables than the scalar variables defined at the center of each cell. Besides, the wind directions are determined depending on the direction of each cell's sides (mostly hexagons), such as orthogonal/parallel direction to the sides. Thus, we have thought how to consider those wind variables fairly well for the data assimilation, and tested several different ways. In this study, we have applied Local Ensemble Transform Kalman Filter (LETKF) method to MPAS assimilating conventional observation data. We will present the resultant analyses from the different methods of wind observation operator within MPAS-LETKF system, and discuss the impact of different treatment of wind variables in terms of accuracy and computing costs.