

Ensemble Kalman Filter Data Assimilation for the MPAS system

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The Model for Prediction Across Scales (MPAS; <http://mpas-dev.github.io/>) is a global non-hydrostatic numerical atmospheric model based on unstructured centroidal Voronoi meshes that allow both uniform and variable resolutions. The variable resolution allows locally high-resolution meshes that transition smoothly to coarser resolution over the rest of the globe, avoiding the need to drive a limited-area model with lateral boundary conditions from a separate global model.

Recently we established an interface between the MPAS and the Data Assimilation Research Testbed (DART; <http://www.image.ucar.edu/DARes/DART>) system, and successfully completed analysis/forecast cycling experiments with real observations for summer months of 2008. Assimilated observations are all conventional data as well as satellite winds and GPS radio occultation refractivity data.

Through these retrospective studies, we will examine issues specific to the MPAS grid, such as smoothing in the interpolation and the update of horizontal wind fields, and show their impact on the Ensemble Kalman Filter (EnKF) analysis and the following short-range forecast. Because interfaces for several other models are available within DART, we compare the MPAS results to those from cycling experiments with an identical EnKF and identical observations using either the Community Atmosphere Model (CAM) for the uniform grids or the Weather Research and Forecasting (WRF) regional model driven by boundary conditions from MPAS for the local, high-resolution grid.