



Ensemble Singular Vectors as additive inflation in the Local Ensemble Transform Kalman Filter framework with a global NWP model

Seoleun Shin (1), Ji-Sun Kang (2), Shu-Chih Yang (3), and Eugenia Kalnay (4)

(1) Korea Institute of Atmospheric Prediction Systems (KIAPS), Korea, (2) Korea Institute of Science and Technology Information (KISTI), Korea, (3) National Central University of Taiwan, Taiwan, (4) University of Maryland, Maryland, USA

We implement an ensemble data assimilation system using the 4-dimensional Local Ensemble Transform Kalman Filter (LETKF) for a global Numerical Weather Prediction (NWP) model with unstructured grids on the cubed-sphere. It is challenging to selectively represent structures of dynamically growing errors in background states under system uncertainties such as sampling and model errors. We compute Ensemble Singular Vectors (ESVs) in attempt to capture fast growing errors on the subspace spanned by ensemble perturbations, and use them as additive inflation to enlarge the covariance in the area where errors are flow-dependently growing. The performance of the LETKF system with ESVs is evaluated in Observing System Simulation Experiment (OSSE). We find that leading ESVs can help capturing fast growing errors effectively, and the use of them as additive inflation can improve the performance of LETKF.