

LETKF-based method for Hybrid Data Assimilation

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A hybrid data assimilation method based on the Local Ensemble Transform Kalman Filter (LETKF) is formulated with three schemes to enhance performance. First, by taking advantage of the cost function representation of LETKF, this hybrid method fully integrates the VAR and the EnKF elements without the necessity to re-center ensembles while the analysis ensemble perturbation represents the ensemble spread associated with the hybrid analysis. Second, using the maximum likelihood approach, the weights between dynamic (ensemble) and static (VAR) background covariances as well as the inflation parameters are estimated adaptively. Third, multiscaleness is addressed by assimilating successively from large to smaller scales. Using the 960-variable Lorenz model, the hybrid method is evaluated in the 3D- and 4D-hybrid modes and advantages of the three supplemental schemes are discussed.