P25 Investigating the capability of GSI four-dimensional ensemble variational data assimilation for WRF-ARW applications.

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Recent developments in the Grid-point Statistical Interpolation (GSI) data assimilation system to utilize the four-dimensional ensemble variational (4DEnVar) data assimilation technique has been tested by NOAA NCEP for its 2016 implementation of the Global Forecasting System (GFS). As with the hybrid data assimilation technique currently used for all NOAA operational systems, the 4DEnVar technique utilizes a combination of static background error covariances and ensemble covariances to estimate background uncertainty, which brings flow dependent features into the analysis. Additionally, the 4DEnVar technique uses a localized linear combination of nonlinear trajectories of ensemble perturbations to represent the time evolution of errors within the data assimilation time window.

In order to investigate the utility of 4dEnVar for regional applications, the DTC has been testing 4DEnVar for WRF-ARW applications. This paper will demonstrate the capability of the 4DEnVar within GSI when coupled with WRF, including the basic mechanics of how the technique is implemented for regional observation time windows. Pseudo-single observation tests will be used to demonstrate the impacts of tuning observation errors, weighting, and horizontal and vertical localization. Impact on covariances, including state variables and non-traditional variables such as cloud liquid water will be investigated.