Ensemble Data Assimilation on Global and Local Scales - the DWD ICON EnVAR and COSMO KENDA Systems

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Abstract:

In almost all operational centers for numerical weather prediction around the world ensemble data assimilation techniques are of rapidly growing importance. Ensemble techniques allow to describe and forecast the uncertainty of the analysis, but they also improve the assimilation result itself, by allowing estimates of the covariance or, more general, the prior and posterior probability distribution of atmospheric states.

In our talk, we will first give a survey about recent activities of the German Meteorological Service DWD, who is using an ensemble variational data assimilation system for its global ICON model. A hybrid variational ensemble Kalman filter EnVAR (following Bühner) has been developed and implemented, providing initial states for the deterministic global 13km and European 6.5km 2-way-nested deterministic forecasts of DWD as well as for the ICON-EPS with 40/20km resolution. The system is run operational since January 2016 and shows scores comparable to state-of-the-art 4D-VAR systems as run by many international centers today.

Second, we describe the setup of the high-resolution ensemble data assimilation system COSMO-KENDA (Kilometer Scale Ensemble Data Assimilation), which is the operational system at DWD since March 2017 (and further members of the COSMO consortium since 2016) to drive the high-resolution ensemble forecasting system COSMO-DE-EPS. We demonstrate the high quality of the system.