

Improving Estimation of Model Uncertainty in the NCEP Global Ensemble Forecast System

Jeffrey S. Whitaker, Thomas M. Hamill, and Philip Pegion

NOAA Earth System Research Lab, Boulder, Colorado USA
Contact: Jeffrey.s.whitaker@noaa.gov

A major focus of our assimilation and ensemble prediction group at NOAA ESRL / PSD continues to be to develop improved ensemble-based data assimilation and ensemble prediction methods, primarily but not exclusively based on existing NCEP models and assimilation methods, e.g., the GFS (Global Forecast System) model, the GEFS (Global Ensemble Forecast System) and the hybrid EnKF/GSI (Ensemble Kalman Filter/Grid-point Statistical Interpolation) data assimilation system. Our research for 2013-2014 will focus on several aspects, including the testing the impact of cycling the hybrid system at higher resolution during Northern Hemisphere tropical cyclone season using an experimental higher-resolution, semi-Lagrangian version of the GEFS, and possibly using a 4D-Ensemble-Var approach (pending adequate computing resources). We also continue to experiment with improved and existing methods for simulating model uncertainty, including operational methods at NCEP (the STTP method, Stochastic Total Tendency Perturbations), the SPPT method at ECMWF (Stochastically perturbed parameterized tendencies), Stochastic Kinetic Energy Backscatter, a perturbed boundary layer relative humidity approach, and potentially other methods in the future. Our intent is to determine both whether these methods, when cycled in the ensemble data assimilation scheme and in free ensemble forecasts improve the assimilations and ensemble forecasts respectively. Our intent is to provide evidence to help NCEP determine whether changes to their operational data assimilation and ensemble prediction methods are warranted.

