

Initial Condition Perturbation Tests within Experimental Regional Ensemble Forecasting (ExREF) System for the purpose of Hydrometeorological Testbed

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The National Oceanic and Atmospheric Administration (NOAA) established the Hydrometeorological Testbed (HMT) to develop, test and demonstrate new methods and tools to improve hydrometeorological services including quantitative precipitation estimation (QPE) and forecasting (QPF). For the purpose of supporting the HMT real time ensemble weather forecasts, as well as research activities targeting better understanding and improvement of QPF, an Ensemble Forecasting System (EFS) has been developed at NOAA/ESRL/GSD. For the past several years the EFS has been modified, tested, evaluated and tuned as a part of collaboration between the NOAA/ESRL/GSD, NOAA/EMC, NOAA/HPC and Developmental Testbed Center (DTC). Originally the area of integration was over the western part of the US, while the latest version of the system is covering North American (NA) area. This NA ensemble, named Experimental Regional Ensemble Forecasting (ExREF) system, in addition to supporting the HMT activities will serve, as a testbed for future generations of operational ensemble forecasting systems. One of the recently implemented features into the ExREF is initial conditions perturbation. The approach preserves coarser-resolution information from global forecasts and complements it with the high-resolution information provided by the output from a regional modeling system. At initial times limited area models are initialized by the dynamically downscaled global forecasts. This approach is simple and computational inexpensive with a great potential to improve precipitation forecast especially during the first few forecast hours (00-06hr), which is crucial for flash-flooding events. So far, the approach has been tested for a month long period over the NA domain. The approach will be submitted for a more extensive evaluation by HPC forecasters and testing by DTC. Depending on the results, the new initial conditions perturbation approach may be transferred to operations by collaboratively working with EMC colleagues.