P57 Real-time WRF Ensemble-RTFDDA system with downscaling of multiple global model forecasts for SGCC electric power applications.

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The WRF-based mesoscale multi-physics, multi-land surface perturbation and multi-scale (nested-grid) ensemble real-time four-dimensional data assimilation (E-RTFDDA) and forecasting system is currently being used to support electric power applications for the State Grid Corporation of China (SGCC). These applications include predicting icing on power lines, lightning threats on transmission grids, and wind power. Currently, there is no well-defined method to construct a mesoscale ensemble forecast system. Physics-based, observation and data assimilation perturbations, and stochastic perturbations are the main approaches for building mesoscale ensemble members. However, in general, they still do not generate enough spread in the mesoscale ensemble forecast. It is hypothesized that perturbations in large-scale model forecasts used to drive mesoscale ensemble models (through the initial/boundary conditions) may have more important impact on the ensemble forecast performance. By using different available global models to initialize different mesoscale ensemble members, it may be possible to generate more desired spread in the ensemble forecast. In particular, it may be possible to generate the representative PDF in the mesoscale ensemble forecast with the fewest ensemble members by this approach. This study investigates the ensemble forecast generated from the perturbations in the initial/boundary conditions of four different global models: GFS, GEM, ECMWF, and GSM in the E-RTFDDA.