

ABSTRACT

Two Topics: Real-Time Mesoscale Ensemble Forecasting and Observations to Support Storm-Scale Modeling

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Through a collaborative project with scientists at the National Severe Storms Laboratory and University of Oklahoma, we are planning to implement a real-time WRF mesoscale (horizontal grid spacing ~30 km) ensemble forecasting and data-assimilation system. If all goes well, a real-time system will be available as early as spring 2007. The ensemble design will be based on initial and boundary condition perturbations and on multiple parameterization schemes that attempt to account for uncertainty in convection, PBL, radiation, and surface parameterizations. The prototype system will use the ensemble Kalman filter to assimilate surface observations; later versions will assimilate other types of observations. From the analyses produced by data assimilation, 0-18 hour (particularly 0-6 hour) ensemble forecasts will be generated. The real-time system will be evaluated in terms of how well it provides guidance for forecasting severe weather. NCAR-STEP scientists can get involved in this project in multiple ways: informally by providing input on the system design and capabilities, and formally through the Storm Prediction Center/National Severe Storms Laboratory spring program, which is an annual opportunity for researchers and operational forecasters to interact about new numerical modeling systems for operational forecasting of severe convective storms.

In our research on *storm-scale* data-assimilation and forecasting, we are currently limited by a lack of observations, which makes it difficult to assess how well current cloud modeling systems are performing. Although Doppler radar observations provide valuable real-time information about convective storms and their environments, important fields such as temperature, water vapor, cloud water, and precipitation sizes/number concentrations are not observed on the storm scales. Observations available in real-time will certainly improve (e.g., a polarimetric upgrade to the WSR-88D network is planned in the near future), but the best opportunity now for advancing modeling capabilities on the storm scale would be through field programs designed with a storm-scale modeling focus. New mobile instrumentation is available that could be used to build up a set of research cases for verifying and refining modeling and data-assimilation techniques. I will provide an update on various field programs that are being planned and discuss ways in which we might get involved.