



Implementation of RAP/HRRR operational system for precipitation forecast over Southeast China

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The hourly-updated hybrid data assimilation system (RAP/HRRR) is developed at Fujian Meteorological Center of China for operational precipitation forecast. The 9km resolution RAP (Rapid Refresh) covering Southeast China is coupled with the higher-resolution 3km HRRR (High-Resolution Rapid Refresh) model that covers Fujian province. Long-term sensitivity experiments for the rainy season of Southeast China (i.e. from May to August) are conducted to investigate the best combination of data assimilation schemes and physical parameterizations in RAP/HRRR. Observations from various sources, including surface measurements, sounding, Doppler radar, satellites and aircraft, are assimilated in this system through Hybrid EnKF-3DVar method. High-frequency analysis noise is reduced by digital filtering. Using the dynamic filtering blending method, the large scale information from global model is updated in the RAP through partial cycle. Both the retrospective and the real-time forecasting performance of the RAP and HRRR for those rainfall events are evaluated. The evaluation results demonstrate that the RAP/HRRR system has good capability of forecasting 12-hour precipitation. Especially, for the 3-hour precipitation forecasts, the thread scores of light, moderate and heavy rainfall show better performance than the control experiments without hybrid data assimilation during the experimental months over Southeast China.