Data assimilation experiments of phased array weather radar with 30-second-update ensemble Kalman filter with 100-m resolution

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For preventing and mitigating natural disasters caused by local severe rainstorms, precise numerical weather prediction with higher spatial and temporal resolution would be essential. In this study, we developed a 30-second-update data assimilation system based on an ensemble Kalman filter using JMA-NHM with 100-m resolution. In the present setting of the experiments, we assimilated radar reflectivity and radial velocity derived from the every 30-second volume scan of the phased array weather radar (PAWR) at the Osaka University.
The data assimilation experiments were performed to reproduce the local heavy rainfall that had occurred in Kyoto on 13 July 2013. During the data assimilation cycles, the reflectivity patterns in the model became closer to the observations, indicating that the PAWR data were appropriately assimilated. However, the extended forecast showed a rapid error growth in about 10 minutes. This very short limit of predictability would be related to the time scales of convective activities represented by 100-m resolution, and may also be caused by an imbalance in the initial conditions due to 30-second update cycles, or could be related to potential inconsistency with the lateral boundaries. This presentation will include an introduction to the experimental system and the results of the data assimilation experiments.

Keywords: data assimiilation, ensemble Kalman filter, phased array weather radar

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