



## **Assimilation Experiment of the Heavy Convective Rainfall Event with a Cloud Resolving Nonhydrostatic 4 Dimensional Variational Data Assimilation System**

**T. Kawabata** (1), H. Seko (1), T. Kuroda (3), K. Tamiya (1), K. Saito (1), T. Tsuyuki (2)

(1)Forecast Research Department of Meteorological Research Institute / JMA (2)Numerical Prediction Division of Japan Meteorological Agency (3)Meteorological Research Institute / JST Cooperative System for Supporting priority Research (tkawabat@mri-jma.go.jp)

The Forecast Research Department of the Meteorological Research Institute (MRI) has been developing a high-resolution nonhydrostatic 4 dimensional variational assimilation system (NHM-4DVAR) based on the Japan Meteorological Agency nonhydrostatic model (JMA-NHM) since April 2002 in the collaboration with the Numerical Prediction Division of JMA. The aim is to apply a 4DVAR technique to the mesoscale convective cloud system with a cloud resolving resolution less than 2 km. NHM-4DVAR with a horizontal resolution of 2 km is applied to the assimilation experiment. The assimilation window is from 0500 UTC to 0600 UTC, 21 July 1999 which includes the generation time of the Nerima cells but excludes their mature stage. The forward model is a full-scale JMA-NHM which includes 5 category cloud microphysical processes, while the adjoint model is a simplified model. The horizontal domain is 240 km x 240 km which covers the Kanto plain. In NHM-4DVAR, the Radial Wind data derived by the Doppler radars (RW) are assimilated with 1 minute interval by every elevation angle. GPS Precipitable Water Vapor (PWV) data are assimilated with 5 minutes interval, and the surface wind and temperature data are assimilated with 10 minutes interval. Assimilating observed data with NHM-4DVAR, the lifetime and the intensity of Nerima heavy rainfall event were well reproduced. This result shows that the deep convection under the weak environmental forcing associated with the heavy rainfall is successfully reproduced with the NHM-4DVAR. In this presentation, the system of the NHM-4DVAR and the result of the assimilation experiment will be introduced.