*Forecasting the weather
- ensemble techniques
in probabilistic weather prediction*

Studies at MRI toward cloud resolving ensemble NWP -Next generation supercomputer project and the Tokyo metropolitan area deep convection field campaign-

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Accuracy of the quantitative precipitation forecast of operational mesoscale NWP has been remarkably improved in recent years, but precise prediction of heavy rainfalls in unstable atmospheric conditions is still a difficult and challenging subject. Several studies have been conducted at the Meteorological Research Institute (MRI), including development of a cloud-resolving data assimilation system[1], assimilation of mesoscale remote-sensing observation data such as GPS[2,3], and development of a mesoscale ensemble prediction system in the WWRP B08RDP project[4,5]. Computer resource and observation data are keys to realize full-scale dynamical and probabilistic forecasts of local heavy rainfalls for disaster prevention.

A next generation supercomputer "K" is under construction in Kobe, western Japan, as a national funded science project of Japan. The supercomputer started its operation in April 2011 and the whole system will be completed in the autumn of 2012. A five-year plan of high performance NWP has been endorsed as one of the five strategic research fields on the next generation supercomputer[6]. One of the goals of this project is to show plausibility of the probabilistic quantitative forecast of heavy rainfalls for disaster prevention by cloud resolving ensemble NWP. A NWP system using incremental LETKF has been developed at MRI and JMA expecting the application to the 'K' computer.

As for observation data, a field campaign in the Tokyo metropolitan area with a dense observation network is planned by MRI and the National Research Institute for Earth Science and Disaster Prevention (NIED). The field experiment is conducted in the summers of 2011-2013 as a possible international test-bed for deep convection.

References
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