

# A Study on Non-Gaussian Probability Densities on Convection Initiation and Development using a Particle Filter with a Storm-Scale Numerical Weather Prediction Model

Takuya Kawabata (tkawabat@mri-jma.go.jp)  
Meteorological Research Institute, Forecast research department

Non-Gaussian probability densities in convection initiation (CI) and development are investigated using a sampling importance resampling particle filter with a nonhydrostatic numerical weather prediction model (NHM-PF). The results of the OSSE are verified with root mean square errors against the nature run in comparison with ensemble simulations without any observations (NoDA). The verifications show that PF significantly improves NoDA and the spreads of PF are smaller than that of NoDA. To summarize the non-Gaussian PDF in the CI, the non-Gaussian PDF of W was generated by some of particles with strong updraft first. Saturation and condensation process were the next source of non-Gaussianity. Autoconversion in the model process created binominal shape of PDFs in water substances.