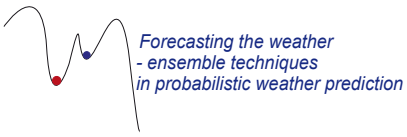
EMS Annual Meeting Abstracts
Vol. 8, EMS2011-454, 2011
11th EMS / 10th ECAM



Developments to improve a mesoscale ensemble prediction system using singular vectors

K. Ono (1), Y. Honda (1), and M. Kunii (2)

(1) Japan Meteorological Agency, Numerical Prediction Division, Japan (kou.ono@met.kishou.go.jp), (2) Department of Atmospheric and Oceanic Science, University of Maryland, USA

We conducted a daily ensemble forecasting experiment to confirm the feasibility of a mesoscale ensemble prediction system (MEPS) based on singular vectors in 2010 (see our presentation). From this experiment, we identified the following problems of this system.
One problem is that the ensemble spread near the surface is too small in this system. This affects the probability scores. This is because the mesoscale SVs (MSVs) do not have enough amplitude near the surface, and we do not perturb lower boundary. Therefore, the accuracy in forecasting of the surface elements is not sufficient. In order to solve this problem, we started developing a physical perturbation method. As a first step of the development, we are trying to develop a multi-parameter method. Another problem is that the MSVs are not derived necessarily in a suitable region for ensemble prediction. For example, it occasionally occurs that there are no meteorological systems accompanied with precipitation in the SV-derived regions. This may cause lowered probability scores. To solve this problem, we tried to reflect uncertainty information in MSV calculation using ensemble forecast from one day before. We adopted two methods. One method is to use a forecast error variance matrix derived from the ensemble forecast from one day before as an initial norm. However, this method did not produce a good result. Another method is to evaluate a final norm in a subspace which is spanned by ensemble perturbations derived from the ensemble forecast from one day before. By using this method, MSVs are derived in the region where the ensemble spread calculated from a previous forecast is large, indicating that the uncertainty information is well reflected in MSVs.
In this poster, we will show the preliminary results.