The Improvement of Initial Condition Perturbations on Taiwan Ensemble Prediction System

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Abstract

A Weather Research and Forecast model (WRF) based ensemble prediction system (WEPS) covered East Asia area was developed for well handle the forecast uncertainty and provide the reliable probabilistic forecasts. Initial conditions were obtained by using the analysis from the WRF reginal deterministic forecast system in Central Weather Bureau and adding perturbations from an Ensemble Adjustment Kalman Filter (EAKF) to obtain a 20-member ensemble. However, the spin-up issue existed due to the imbalanced initial condition from simple arithmetic combination, and the imbalanced IC would cause the model failed. To improve the initial perturbations the blending scheme was used to combine EAKF and deterministic forecast. The blended analysis is weighted toward the reginal deterministic analysis for scales greater than the cutoff length, and is weighted toward the EAKF forecast lower than cutoff length.

In this study, we reported the report of five experiments. The control run used the simple arithmetic to combine EAKF and deterministic analysis. The others used blending schemes with different cut-off length, 300 km, 1200 km, 1800 km, and 2400 km respectively. The system was more stable by using the blending scheme, none members failed in the experiment period. And the performances shows the spread would be decrease by using blending scheme, and that improved the over-dispersed results of the control run. Furthermore, the RMSE is improved. The experiment with 1200 km cut-off length has the best performance.

Key word: ensemble forecast, blending scheme