A Study on the Ensemble MOS for Medium Range Prediction based on Ensemble Prediction System for Global in Korea Meteorological Administration

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It is being considered that the probability prediction by ensemble model could provide plausible information for medium range forecast while the deterministic prediction by single dynamic model being the first choice by weather forecasters for short range. A post-processing technique, ensemble model output statistics (EMOS), was developed to remove systematic error and to increase prediction reliability of Korea Meteorological Administration EPSG (Ensemble Prediction System for Global) which is Korean version of MetOffice and whose initial data perturbations are generated by ensemble transform kalman filter. The EMOS is based on multi-linear regression of which equations are derived with the EPSG data sets of two and half years.

Several versions of EMOS were investigated on medium range prediction of Max/Min temperature and total cloud amount. The equations trained with ensemble mean showed lower CRPS than that with control-run or with all the 24 members. To improve the performance by increasing the number of training data, traditional method (specific projection equation derived with the corresponding single projection data), incorporated method (specific projection equation derived with corresponding projection and neighbor projection data) and generalized operator equation (GOE) of NWS/NOAA were verified. As a result, the incorporated method showed slightly better verification score than the others. Additional post-process was applied to the total cloud amount. The percentile is used to adjust the distribution of the MOS prediction according to the distribution of observed total cloud amount to mitigate one of the typical MOS properties; the MOS prediction becomes close to climatic value for long-term projection. This post-process greatly decreased CRPS and came close the ratio of ensemble spread to RMSE to one. In the view of deterministic prediction, the ensemble mean of EMOS also showed much better verification scores such as RMSE and percent of correction comparing the ensemble mean of EPSG.

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