Statistical Post-Processing of The North American Multi-Model Ensembles for Probabilistic Monthly Precipitation Forecast

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ABSTRACT

The North American Multi Model Ensemble (NMME) is a forecasting system. It is a combination of several models from the Climate Modeling Center in the United States [1]. Ensemble forecasts are more accurate in predicting weather and climate. The NMME has been shown to produce better predictions than a single model on average [2,3]. The aim of this research is to evaluate the performance of monthly precipitation forecasts using RMSE and Range Histogram analysis. The NMME model is validated against observed rainfall. The analysis results show that there is over-dispersion in the predicted value. Therefore, statistical post-processing is required to calibrate the ensemble forecast. The method used is Bayesian Model Averaging (BMA) Gaussian and Gamma. Both calibration results are evaluated using the Continuous Range Probability Score (CRPS) and the percentage of observations included. Based on the results obtained, it can be seen that BMA Gamma performs better than BMA Gaussian.

Keywords: *Precipitation, NMME, BMA Gaussian, BMA Gamma, CRPS*

References:

[1] Kirtman, B. P. dan Min, D. (2009), Multimodel Ensemble ENSO Prediction with CCSM and CFS. Monthly Weather Review, Vol. 137, hal. 2908-2930. doi: 10.1175/2009MWR2672.1.
[2] Raftery, A.E., Gneiting, T., Balabdoul, F. dan Polakowski, M. (2005), Using Bayesian Model Averaging to Calibrate Forecast Ensembles, Monthly Weather Review, Vol. 133, hal. 1155-1174.
[3] Sloughter, J. M., Gneiting, T., Raftery, A. E., dan Fraley, C. (2007). Probabilistic Quantitative Precipitation Forecasting Using Bayesian Model Averaging. Monthly Weather Review, Vol. 135, hal. 3209-3220.