Comparison of different post-processing techniques in real-time forecast skill improvement

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Abstract

The Numerical Weather Prediction (NWP) models provide information for weather forecasts. The highly nonlinear and complex interactions in the atmosphere are simplified in meteorological models through approximations and parameterization. Therefore, the simplifications may lead to biases and errors in model results. Although the models have improved over time, the biased outputs of these models are still a matter of concern in meteorological and hydrological studies. Thus, bias removal is an essential step prior to using outputs of atmospheric models. The main idea of statistical bias correction methods is to develop a statistical relationship between modeled and observed variables over the same historical period. The Model Output Statistics (MOS) would be desirable to better match the real time forecast data with observation records. Statistical post-processing methods relate model outputs to the observed values at the sites of interest.

In this study three methods are used to remove the possible biases of the real-time outputs of the Weather Research and Forecast (WRF) model in Imjin basin (North and South Korea). The post-processing techniques include the Linear Regression (LR), Linear Scaling (LS) and Power Scaling (PS) methods. The MOS techniques used in this study include three main steps: preprocessing of the historical data in training set, development of the equations, and application of the equations for the validation set.

The expected results show the accuracy improvement of the real-time forecast data before and after bias correction. The comparison of the different methods will clarify the best method for the purpose of the forecast skill enhancement in a real-time case study.

Acknowledgements

This work is supported by the Korea Agency for Infrastructure Technology Advancement(KAIA) grant funded by the Ministry of Land, Infrastructure and Transport (Grant 18AWMP-B083066-05).

Keywords : Post-processing, Linear scale, Linear regression, Power scale, WRF

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