



The Impact of Observed Variables as Predictors on Model Output Statistics Forecast

Ruixia Zhao, Feng Xue, Xiaoqing Zeng, and Shengrong Zhao

National Meteorological Center of China Meteorological Administration, Forecast Systems Laboratory, Beijing, China
(zhaorx@cma.gov.cn)

This study addresses the issue of improving the skill of model output statistics (MOS) system by using observed variables as predictors too, instead of pure model forecast predictors. The observation predictors for every predictand station are picked from hourly observation data over areas in whole China by high pre correlation with the predictand variable. Then the pre observation parameters average over the areas in different directions are integrated together with the model forecast as the predictors in multivariate linear regression. So the weather system dynamical development can be well described by the observation predictor. The hourly 2-m air temperature forecast is evaluated to compare the skill of ECMWF output (EC-DMO), the ECMWF-based MOS (EC-MOS), and the EC-MOS with observation predictors (OBS-EC-MOS). The results from the verification clearly show that the OBS-EC-MOS always performs better than the raw EC-DMO regardless of location and season, and almost always outperforms the EC-MOS, especially when the temperature varies quite dramatically. It's just because that the most current observation predictors further update the temperature forecast, OBS-EC-MOS has the best performance among all. Average over 7251 locations in China of different seasons, its temperature mean absolute error (MAE) is below 1.5 [U+2103] for about 42-65% forecast hours among 72 hours at 1-h interval, and below 2 [U+2103] for almost all forecast hours. Furthermore, in summer the MAE is below 1 [U+2103] in the first 3 hours. The results of this study justify the use of observation predictor in MOS system by using appropriate and specifically designed rules and algorithms. And at the meantime, the using of hourly or minutely automatic observation predictors in MOS turns out to be a powerful means to provide high frequency forecast by update the most recent observation data while lack the appropriate support of numerical weather prediction.