Geophysical Research Abstracts
Vol. 19, EGU2017-11881-1, 2017
EGU General Assembly 2017

Multi-Model blending Method and Application on Reducing the uncertainty of Air Quality Models

Si Huang, Meng Zhang, Bao Guo Xie, Hui Du, Yu Jia Tang, Jian Lin, and Wen Jun Yin
IBM Research - China, Beijing, China

Abstract: In this study, the linear regression method is used to blend multi-model forecasts to reduce the uncertainties in the air quality models. The PM2.5 forecast performance of three models (WRF-Chem, CAMx and CMAQ) are evaluated over Beijing city. In order to improve the forecast skill, the PM2.5 forecast concentration of the three models are combined by the linear regression method with different weight and equal weight. The results indicate that: (1) large differences exist among three numerical models, no individual model performs better than the other two models for all statistic indexes, such as accuracy, mean absolute error (MAE), mean bias and (MB), correlations coefficients. Overall, The MAE index of WRF-Chem is lower than that of other two models, whereas CMAQ has better tendency similarity with observation and CAMx performs better in level forecast accuracy. (2) Liner regression with equal weight presents poor performance in improving the PM2.5 forecast skill, neither correlation coefficients nor MAE of the blended forecast results is better than those of the individual model forecast. On the other hand, the linear regression method with different weight brings significant improvement of the PM2.5 forecast with an appropriate training length (12 days). The MAE of PM2.5 forecast over 13 national monitoring stations of Beijing is reduced by 20%∼30% through non-equal weight linear regression method and the level accuracy increases significantly by 12%. Furthermore, the non-equal weight linear regression method can also improve the hit ratio of heavy pollution event forecast.