Geophysical Research Abstracts
Vol. 21, EGU2019-13626, 2019
EGU General Assembly 2019

A numerical study of source contributions over the basin topography: source appointment of fine particulate matter in Xi'an, China

Xiaochun Yang (1,2), Qizhong Wu (1), and Han Xiao (1)
(1) Beijing Normal University, Beijing, China , (2) Xi'an meteorological bureau,Xi'an, China

Many studies have analysed the source regions of fine particulate matter in cities using numerical models, but most of them focused on several haze episodes or months. In this work, the Comprehensive Air Quality Model with Extensions (CAMx) together with the Particulate Source Apportionment Technology (PSAT), have been applied to analyze the major source regions of $PM_{2.5}$ in Xi'an based on long-time simulated data. There are total 759 daily results from April, 2016 to October, 2018, and such large number data can reduce the deviation. Firstly, according to the model evaluation, the model has good performance, while the fraction of predictions within a factor of two of the observations(FAC2) is 65%, especially in the winter, the FAC2 reaches to 81% and the Mean Bias(MB) is smallest, 4.75μg/m^3. Comparing the daily observed and simulated results at the different pollution levels, the model overestimated the $PM_{2.5}$ concentrations at Level_1 level and some underestimated at Level_4 level, heavy pollution. By using the PSAT in CAMx model, a detailed source region contribution matrix is derived for all points within the Xi'an and its six surrounding areas, and long-range regional transport. The results show that the local emission in Xi'an is the major source in urban area, which contributing more than 73%. According to the analysis results based on pollution grades, the better air condition has more local contribution and less transport contribution, and the worse air condition is just the opposite. In the Level_1 ($PM_{2.5}$ $\leq$75μg/m^3), the contribution of local emissions is 75%, Xianyang city which is the second largest contributor to Xi'an, while in the Level_4($PM_{2.5}$ $>$250μg/m^3), the local contribution decreases to 72%, and the contribution of Xianyang city increases to 13%. The transport fine particulate matter ($PM_{2.5}$) gives more affection in pollutant days in Xi'an city, so that people based on meteorological observations mistakenly believe that most of the air pollution is transmitted