1.031 Factors contributing to the haze pollution in Wuhan during October 2014: local Emissions, regional transport and biomass burning.

Early Career Scientist

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Abstract:

Wuhan as the center of city clusters in central China has frequently experienced severe haze pollution just as Hebei-Beijing-Tianjin, Yangtze River Delta, but the major pollutants sources and transport processes in the developing region remains unclear. We investigated the sources and formation mechanism of the two typical haze processes occurred on October 7-21, 2014 in Wuhan using the Nested Air Quality Prediction Model System (NAQPMS/IAP, China) with source-tagging analysis and sensitivity analysis. This study quantitatively estimated the contribution from the local emissions over Wuhan, the remote emissions from surrounding areas and the biomass burning sources to the $PM_{2.5}$ concentration in Wuhan. The main results are as following: (1) Under the condition of strong northern and northeastern wind and high planetary boundary layer height, the air pollutants could be transported from the severely polluted North China to Wuhan, which formed a short-time haze. The long-range regional transport from the north areas (60% contribution to $PM_{2.5}$ concentration of Wuhan) and the local emission (24%) exhibited strongly influence on $PM_{2.5}$ pollution. Henan province, was found as a key source region that contributed 47% of $PM_{2.5}$ concentration. (2) During the second episode, stagnant atmosphere led to accumulation of air pollutants and then the prolonged haze process in Wuhan. The close-range transport from the eastern and northeastern surrounding regions (25%) and the local contribution (40%), were the dominating sources to $PM_{2.5}$ concentration over Wuhan. Another important source regions identified was Anhui province (daily

contribution reached 28%). (3) The hourly contribution from biomass burning to the $PM_{2.5}$ concentration in the suburb of Wuhan could be 40-60% at certain time, but biomass burning exerted less significant influence on Wuhan's $PM_{2.5}$ pollution during the entire haze period. Our results indicate that reducing the local emissions over Wuhan would be not sufficient to control the $PM_{2.5}$ pollution of Wuhan.