

Characteristics and cause of the “parade blue” in Beijing 2015

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During the military parade in Beijing — a massive spectacle to mark the 70th anniversary of World War II, the Chinese government made significant efforts to clean up capital’s sky. Due to the favorable meteorology condition and the emission control measures, the air quality was significantly improved during the parade, which was called the “Parade Blue”.

By using atmospheric composition and meteorological observation data, PM_{2.5} concentration variation characteristics and relevant meteorological conditions during the period from August to September 2015 in Beijing were studied. With the application of the Comprehensive Air quality Model with extensions (CMAx), the contributions of the meteorological conditions, emission control policies and regional collaborations on emission control to the air quality in Beijing were analyzed.

The results show that, the air quality of Beijing was significantly improved during the memorial activity period (20 August to 03 September). The average PM_{2.5} concentration was 18.7 $\mu\text{g}/\text{m}^3$, reduced by 70% compared with the previous period (August 1st to August 19th) and reduced by 74% compared with the same period last year. Long period maintain of northeast cold vortex provided the favorable circulation background for the air quality improvement. During the period of memorial activity, the meteorological factors such as mixed layer height, relative humidity and wind speed presented favorable conditions in improving the air quality. In particular, the shifting of dominant wind direction on the ground level prevented the pollutant invading from the southern part of Beijing and from middle and southern areas of North China. CMAx model well simulated the variations of PM_{2.5} concentrations in Beijing. The simulation results show that, comparing with the same period last year, the meteorological conditions contributed 73% to the total change of PM_{2.5}. 33% of the PM_{2.5} reduction was attributed to the emission control polices. The contribution of PM_{2.5} in Beijing was primarily come from local emissions. The local emission reduction took account for 72% for the PM_{2.5} concentration decrease, while the surrounding areas of emission reduction contributed about 28%.