Sources of PM2.5 during Haze Episodes in Winter in Beijing

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Beijing, the capital of China, has experienced several severe haze episodes (HEps) during November and December of 2016, with hourly average PM2.5 mass concentrations up to 400 $\mu$g/m$^3$, which has attracted a great deal of attention for its formation mechanism and its effects on public health. In this study, a comprehensive field campaign, with several online instruments (e.g., TEOM, Xact, semi-continuous OC/EC analyzer, in-situ Gas and Aerosol Compositions Monitor (IGAC), and Aethalometer (AE-33)) for simultaneous high time resolution measurement of PM2.5 chemical compositions (e.g., PM2.5, metals, organic carbon, elemental carbon, water-soluble ions and gases, and black carbon), has been conducted during 7th November to 25rd December, 2016. The primary goal of this study is to investigate the sources of PM2.5 and the formation mechanism of different HEps. Our preliminary results indicated that chemical compositions and sources of PM2.5 differently varied during the HEps. Coal combustion and vehicle emission were two major sources of PM2.5 during this period. Two typical HEps, with hourly PM2.5 concentrations up to 200 $\mu$g/m$^3$ and 400 $\mu$g/m$^3$, respectively, were chosen for further studies. Correlations among different chemical species were analyzed, and positive matrix factorization (PMF) were performed for high time resolved PM2.5 source apportionment. Potential source regions of PM2.5 sources, as well as formation mechanism of HEps will be further discussed.