1.251 Seasonal Characteristics of High PM2.5 Episodes in Korea between 2013 and 2016.

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Abstract:

As the public interest in particulate matter increases, the Korean government has established intensive monitoring stations during the past decade to enhance the understanding of physical, chemical, and optical characteristics of $PM_{2.5}$ in detail. We identified five episodes—two in winter and one in each other season—between 2013 and 2016, during which 24-h average $PM_{2.5}$ exceeded 70 $\mu g/m^3$ at a number of stations. We examined the variations in $PM_{2.5}$ and chemical compositions during the episodes at four monitoring stations—Baengnyeong, Seoul, Daejeon, and Gwangju: Baengnyeong station is on the westernmost island of South Korea, while the other three stations are located in metropolitan areas on the western part of the Korean Peninsula. The contributions of emissions from China and Korea were estimated using a three-dimensional air quality modeling system, consisting of the Weather Research and Forecasting (WRF) model and the Community Multiscale Air Quality (CMAQ) model. In addition, the contributions by emission source categories were estimated using the Positive Matrix Factorization (PMF) method based on measurement data at each monitoring station.