

PA7) PM_{2.5} Characteristics at Gosan and Seoul, Korea

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1. Introduction

Since a large fraction of PM_{2.5} are formed in the atmosphere by photochemical reactions among the gaseous species emitted from various sources, PM_{2.5} at Seoul and Gosan, the capital and the background area of Korea, respectively, are expected to show different characteristics. Inorganic species account for 50% or more of PM_{2.5} mass concentration and consist of sulfates, nitrates, ammonium, sodium, and chloride (Ansari and Pandis, 2000, Kim and Seinfeld, 1995). Moreover, hygroscopic property of fine particle is mainly determined by inorganic fraction (Tang, 1997). However, measurement of water content is not easy. Therefore, figuring out of inorganic composition and water content will provide efficient way to control precursor concentrations in the ambient air.

2. Data and modeling

A gas/particle equilibrium model, SCAPE2 (Kim and Seinfeld, 1993; Meng et al., 1998) was used to estimate the aerosol inorganic species fraction and water content based on the PM_{2.5} and related gaseous species measurement data at Seoul and Gosan. There were two data sets for Seoul, one from Apr. 2001 to Feb. 2002 (Kang, 2003) and the other from Nov. 2004 to Jul. 2005 (Kim, 2006). For Gosan, the data from Mar. 1996 to Jan. 2007 based on the reports published by National Institute of Environmental Research were used.

3. Results and Discussion

For each site, seasonal characteristics were examined. Fig. 1 shows averaged equivalent concentrations of the measured inorganic species at Seoul and Gosan. In terms of inorganic fraction, seasonally averaged equivalent concentrations of the measured inorganic species of Seoul contains more total nitric acid (particulate nitrate + gaseous nitric acid) and less sulfates than of Gosan for all seasons. Total ammonia fraction shows seasonal variation, sufficient amount of total ammonia existed to neutralize total nitric acid, sulfuric acid and total chloride in fall at Gosan and in all seasons at Seoul. While in spring, summer and winter at Gosan, it did not. Thus, the water content which was mainly determined by inorganic fraction and relative humidity showed different tendencies between Seoul and Gosan.

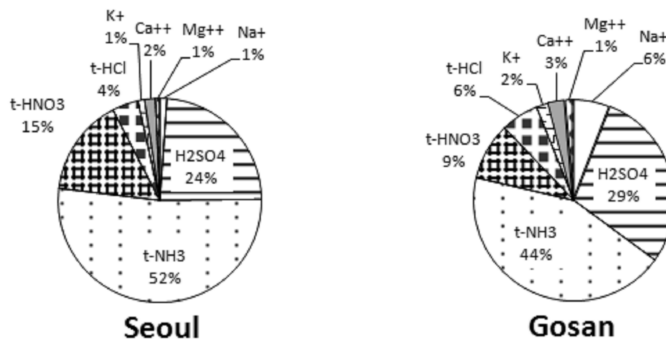


Fig. 1. Averaged equivalent concentrations of the measured inorganic species at Seoul and Gosan.

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