Physicochemical characterization and size-resolved source apportionment of airborne particles in Himeji City

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Abstract

As a part that, an epidemiological study on the effects of chemical composition of airborne particulate matter (PM) and ozone on asthma attacks, we carried out size-resolved sampling of PM in Himeji City, and elemental and ionic composition analyses of the PM sample. Size-resolved PM was collected using a 3-stage NLAS impactor (Tokyo Dylec Co., Ltd.; particle cut size at sampling stages was 10, 2.5 and 1.0 μm for a flow rate of 3 L/min) with a 1 week sampling interval, and the PM sampling was began in November, 2009. Concentrations of several elemental and ionic species in the PM sample were determined by PIXE and ion chromatography analysis, respectively. In addition, sources analysis of the PM was performed by Positive Matrix Factorization (PMF) model using analytical data. The research results are important for the physicochemical characterization of PM in atmosphere, enabling evaluation of various PM emission sources and atmospheric processes.

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