沖縄県辺戸岬において2012年春季に見られた高濃度硫酸塩の発生源寄与評価

Estimation of high sulfate aerosol sources in 2012 spring at Cape Hedo, Okinawa

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Air quality in Asia can cause regional-to-global environmental issues. Intensive observation campaigns approximately 1 week long have been conducted periodically from March 2010 to November 2015 at Cape Hedo, Okinawa, Japan. The period-averaged sulfate aerosol (SO_4^{2-}) concentrations for each campaign ranged from 0.34 to 6.97 $\mu g\ m^{-3}$, and the average concentration of all observations was 3.13 $\mu g\ m^{-3}$. The maximum daily mean concentrations surpassed 15 $\mu g\ m^{-3}$ in springtime 2012. The sources of this high SO_4^{2-} concentrations were estimated by using the air quality model with the tagged tracer method in this study. The main source of the high SO_4^{2-} concentrations in March was volcanoes and that in April was anthropogenic emissions from China. In March, the prevailing northerly wind transported a volcanic SO_2 plume with a low conversion ratio to Cape Hedo. The impacts of 15 volcanoes in Japan were estimated in this study, and a substantial impact of Sakurajima, which accounted for more SO_2 than anthropogenic emissions from Japan, was found. Throughout April, source apportionments from anthropogenic emissions from China were found; hence, the source was further divided into 31 provincial scales. Shandong and Jiangsu provinces, which are the first and seventh largest emission sources in China, were identified as important sources at Cape Hedo. These sources showed day-to-day variation, and the highest contribution from Shandong province was on April 23, whereas that from Jiangsu province was on April 22.

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