Geophysical Research Abstracts
Vol. 13, EGU2011-4522, 2011
EGU General Assembly 2011

Characterization of heavy metal contents in the bulk atmospheric aerosols collected at Okinawa island, Japan by X-ray fluorescence spectrometric method (XRF)

Yoshito Oshiro (1), Akihide Itoh (2), Sotaro Azechi (1), Yuka Somada (1), Daishi Handa (1), Takemitsu Arakaki (3), and Akira Tanahara (4)

(1) Graduate School of Engineering and Science, University of the Ryukyus, Okinawa, Japan (e073307@eve.u-ryukyu.ac.jp), (2) Department of Science Education, Faculty of Education, University of the Ryukyus, Okinawa, Japan, (3) Department of Chemistry, Biology and Marine Science, Faculty of Science, University of the Ryukyus, Okinawa (arakakit@sci.u-ryukyu.ac.jp), (4) Instrument Research Center, University of the Ryukyus, Okinawa, Japan

East Asia's economy has been expanding rapidly, and air pollutants emitted from this region have been also increasing due to the increased industrial activities and automobiles. Air pollutants including atmospheric aerosols are transported eastwards reaching as far as North America and European regions. We studied heavy metal contents of atmospheric aerosols using an X-ray fluorescence spectrometric method (XRF). The XRF enables us to analyze heavy metal contents of bulk aerosols rapidly without any chemical pretreatments. Preparing several different amounts of standard reference materials (NIES No.28) of Japanese National Institute of Environmental Studies on quartz filters, we evaluated quantitative responses of XRF method by comparing with the metal contents determined by an inductively coupled plasma mass spectrometry (ICP-MS) after acid-digestion. Among the evaluated metals, Al, Fe, Ti, V, and As showed good quantitative responses to the contents. We then used XRF method to determine heavy metal contents in authentic atmospheric aerosols collected in Okinawa, Japan. Okinawa, consisting many small islands, is situated approximately 1500 km south of Tokyo, Japan, 2000 km southeast of Beijing, China, and 1000 km of South Korea. Its location in Asian is well suited for studying long-range transport of air pollutants in East Asia because maritime air mass prevails during summer, while Asian continental air mass dominates during fall, winter, and spring. The maritime air mass data can be seen as background and can be compared with continental air mass which has been affected by anthropogenic activities. Therefore, Okinawa region is suitable area for studying impacts of air pollutants from East Asia. We simultaneously collected bulk aerosol samples by using identical high volume air samplers at Cape Hedo Atmospheric Aerosol Monitoring Station (CHAAMS, Okinawa island), Kume island (ca. 160 km south-west of CHAAMS), and Minami-Daitou island (ca. 320 km south-east of CHAAMS). We report and discuss spatial and temporal distribution of heavy metals determined by the XRF method in the bulk atmospheric aerosols collected at the three locations in Okinawa during June, 2008 to June 2010.