



Elemental composition and Its seasonal variation of bulk aerosols collected at the Okinawa archipelago, Japan

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Okinawa is situated approximately 1500 km south of Tokyo, Japan, 2000 km south east of Beijing, China, and 1000 km south of South Korea. Its location in Asia is well suited for studying long-range transport of air pollutions in East Asia, because maritime air mass prevails during summer, while continental air mass dominates during fall, winter, and spring. In the present study, elemental composition and its seasonal variation of bulk aerosols collected at the Okinawa archipelago was investigated by a X-ray fluorescence spectrometric method (XRF). From these results, chemical properties of aerosols transported to Okinawa archipelago and long-range transport of metal pollutions were discussed. We continuously collected bulk aerosols for 7 days at a time during 2008 – 2009. The samplings were performed by using the same type of high volume air sampler 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), respectively. XRF allows us to analyze bulk aerosols rapidly without any pretreatment. However, it is very difficult to determine trace metals in aerosol samples accurately. The concentration ratios to Al for 15-20 elements, whose accuracy was evaluated using standard reference materials (NIES No.28) and measuring by an inductively coupled plasma mass spectrometry (ICP-MS) after acid-digestion, were obtained by XRF. From seasonal variations obtained, the concentration ratios to Al for Pb and As in aerosol particles were clearly higher in winter than in summer. These results suggest that North-west wind blown in winter would transport pollutant aerosols to Okinawa archipelago from East Asia.