

Characteristics of KOSA aerosols by PIXE method in southwestern Japan

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Abstract

Atmospheric particle including KOSA (Asian dust) has lately attracted considerable attention due to their potential to affect human health and environment. From March to May, a huge volume of yellow sand (KOSA) is whipped up in the Taklamakan and Gobi deserts, riding westerly winds to sweep down on Kyushu island of Japan. Observation frequency of KOSA is an increasing tendency for the long term. In this study, we compared the elements and their concentrations of aerosol between KOSA event and non-KOSA events to reveal the characteristics of KOSA aerosols. Research site is located at Tatsutayama Experimental Area (Long.130°44' E, Lat.32°49' N) in Kumamoto Prefecture, the southwestern region of Japan. Aerosol samples were collected bimonthly by filter pack method from April 2004 to December 2006. A PTFE filter of 47 mm in diameter set up to Nilu filter holder was placed in a height of 7m above the ground. Sampling flow rate was 2 to 3 liters per minute. We obtained 66 filters. We classified to thirteen KOSA events determined by the Kumamoto meteorological observatory and fifty-three non-KOSA events. The element concentrations were determined by Proton Induced X-ray Emission (PIXE) method at NMCC. The mass concentration of aerosol showed seasonal variation with an increase in KOSA event. Concentrations of Si, Fe, Al, Ca, and Ti in KOSA event were 2.3, 2.0, 2.0, 1.6, and 1.6 times higher than those in no-KOSA event respectively. Those elements are expected to be the sources of soil particle. On the other hand, S concentrations in KOSA event were 0.7 times smaller than those in non-KOSA event. In other elements there were no differences between KOSA and non-KOSA events.