

## Chemical characterization of atmospheric aerosols measured at Fukuejima and Cape Hedo in the spring of 2006

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### Abstract

An intensive field program was performed to measure atmospheric aerosols at Fukuejima (32.752°N, 128.682°E) in Nagasaki prefecture, and at Cape Hedo (26.867°N, 128.249°E) in Okinawa prefecture, located in west and southwest Japan, respectively, during 13-22 March and 4-12 April 2006. A distance between the two sites was 650km. Chemical analysis of the collected aerosols with the four size ranges was made for elemental and organic carbons (EC/OC) by an thermal/optical OC/EC analyzer with improved method, water soluble ions by ion chromatography, and trace elements by PIXE. Two dust storms called as Kosa were observed in the measured period of March and April, when the mass concentration of atmospheric aerosols increased. A highly positive correlation between EC and nss-SO<sub>4</sub><sup>2-</sup> in fine particles was shown at the both sites, and the slope of linear regression equation was almost equal to that measured at Amami-Oshima (28.444°N, 129.697°E) in the spring of 2001 and 2003. The ratio of the OC concentration in coarse particles to that in the total OC was about 0.35 and 0.38 at Fukue and Hedo, respectively, and which were much higher than that measured at Phimai (15.184°N, 102.565°E) in Thailand where the dominant aerosol was emitted from biomass burning in dry season. In coarse particles at Hedo, a positive correlation was found between OC and Cl<sup>-</sup>, and total Br and Cl<sup>-</sup>, which strongly suggests that a source of some OC might be a biogenic one produced in the surface sea. According to a satellite data analysis by JAXA, the chlorophyll-a concentration in the surface water observed north of and

around the sites was high. Moreover,  $\text{CH}_3\text{Br}$  in gas phase over the sea surface increased with the lower latitude from Fukue/Kagoshima to Naze/Naha in the spring of 2001 (E2). These phenomena could support the biogenic emission of some OC in atmospheric aerosols. A highly positive correlation between Si and Al in coarse particles was also found in the spring time at the both site. The slope of linear regression equation was, however, 2.2 and 2.6 in March and April 2006 at the both sites, respectively. This significant difference in the slope between March and April indicates that the possible source region of soil dusts was different, while the same value of slope at the both sites demonstrates that the wide region including Fukue and Hedo could be covered by soil dusts with the similar property. According to the backward trajectory analysis by the NOAA HYSPLIT model, air masses arrived at Fukue/Hedo in the strong dust storm event was transported from a different inland region of eastcoast China, between March and April. The future study on soil chemistry among the different desert area in China and Mongolia should be needed.