# 1.024 Investigation of the factors controlling the variation of aerosol surface area concentrations in Fukuoka, Japan.

Early Career Scientist

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Abstract:

Observation of the ambient aerosol surface area concentrations is important to understand the aerosol toxicity because an increased surface area may be able to act as an enhanced reaction interface for certain reactions between aerosol particles and biological cells, as well as an augmented carrier surface for co-pollutants. In this study, the concentration of aerosol surface area was measured from April 2015 to March 2016 in Fukuoka, Japan. We investigated the monthly and diurnal variations in the correlations between the aerosol surface area and black carbon (BC) and sulfate concentrations. Throughout the year, aerosol surface area concentration was strongly correlated with the concentrations of BC, which has relatively large surface area since BC particles are usually submicron agglomerates consisting of much smaller (tens of nanometers) sized primary soot particles. In June 2015, however, the coefficient of determination for this correlation between the aerosol surface area and BC concentration was lower than in other months, as a result of high sulfate concentrations. For June, the number of data points for which the hourly sulfate concentration was ≥ 15 μg $m^{-3}$ and the aerosol surface area concentration was ≥ 150 $\mu m^2$ $cm^{-3}$ was extremely large. That is, high sulfate concentrations increased aerosol surface area concentrations, which resulted in a

weakening of the correlation between the aerosol surface area and BC concentrations. In addition, the correlation between the aerosol surface area and BC concentrations was weakest in the afternoon because certain secondary formed aerosols increase. This may be also because Fukuoka is generally dominated by the land and sea breeze, and BC concentrations decrease under those conditions due to the afternoon inflow of a clean airmass.