4.187 Properties of Aerosol Particles Originated from Siberian Forest Fires over the Western North Pacific Ocean .

Early Career Scientist

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Abstract:

Atmospheric aerosol particles play an important role in the radiation budget by scattering and absorbing solar radiation. Recently, tar balls (TBs), originated from biomass burning such as forest fires and biofuel combustion, have been known as the particles absorbing solar radiation, contributing to global warming. However, the quantitative understanding of the lifetime and removal process of TBs are not sufficient. In this study, the morphology and chemical compositions of aerosol particles including TBs collected over the Western North Pacific Ocean were characterized by individual particle analyses. Observation and samplings of atmospheric aerosol particles were carried out during R/V MIRAI arctic cruise (2016/8/22-10/5). The ambient BC mass concentrations were measured by a single particle soot photometer (SP2). In this study, we focused on the relatively high BC mass concentration event over the Western North Pacific Ocean at 46.05°N, 159.32°E on 29 September 2016. The collected aerosols were analyzed using a transmission electron microscope and an energy dispersive X-ray spectrometer.
In the sample collected at 29 September, the number fractions of S- and C-rich particles were about 30% and 70%, respectively. C-rich particles were mostly identified as TBs judging from their compositions and shapes. The backward trajectory analyses with the fire emission data suggested that the air masses were affected by Siberian forest fires. This observation found that TBs were transported over the Western North Pacific Ocean from Siberian forest fires. The internal mixing of TBs in this sample will be discussed. Our results are important to understand the long-range transport of TBs originated from Siberian forest fires.