Characteristics of Atmospheric Aerosol Particles and gases observed by R/V Mirai over the Bering Sea and Arctic Ocean during September 2016

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Atmospheric aerosol particles play an important role in Arctic climate through the absorbing and scattering of solar radiation. Also, the deposition of light-absorbing particles on the surface reduces the albedo and accelerates snow/ice melting by absorbing the sunlight. However, the observational information has been still insufficient to assess their contribution over the Arctic region. In this study, we conducted the ship-based measurements of marine aerosol particles (size distribution, black carbon (BC), fluorescent property, and PM2.5 composition) and trace gases (ozone and carbon monoxide) using R/V Mirai during a cruise across the Arctic Ocean and Bering Sea (23 August –4 October 2016). The measured BC mass concentration over the Arctic Ocean in the latitudinal region > 70˚N was an overall mean value of 1.0 ±2.0 ng/m^3. This value was similar to the levels (~1.0ng/m^3) recorded during our previous observations in the Arctic during 2014 and 2015. We captured relatively high BC mass concentration and/or CO mixing ratio events at 17 and 26 September 2016. To estimate the transport pathways of these BC and CO, we have also conducted model simulations during the periods using a regional transport model, indicating the biomass burning at Siberia should be possible source. We will present further analysis on the size distribution, BC mixing state, fluorescent property and PM2.5 composition during the cruise in the presentation.

Keywords: Arctic Ocean, aerosols, ship-based observation

