Individual Particle Analysis of Marine Aerosols Collected over the North Pacific and its Marginal Seas

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Atmospheric aerosol particles can play a vital role in the climate change, because they can absorb and scatter solar radiation, and form clouds by working as cloud condensation nuclei. However, scientific understanding of atmospheric aerosol behavior is not sufficient (IPCC, 2013) due to the lack of knowledge. In this study, chemical compositions and morphology of marine aerosol particles were characterized based on individual particle analysis collected over the North Pacific and its marginal seas.

Samplings of atmospheric aerosol particles were carried out during KH-13-7 cruise (the Pacific Ocean: 2013/12/11-2014/2/12), KH-14-3 Leg2 cruise (the Pacific Ocean: 2014/7/17-8/11), KS-16-8 cruise (the sea near Japan: 2016/7/5-7/13) and MR16-06 (the Bering Sea and the Arctic Ocean: 2016/8/22-10/5). Individual particles were analyzed using a transmission electron microscope and an energy dispersive X-ray spectrometer.

Sea-salt particles without apparent reactions with other components accounted for more than 80% in the samples collected over the open seas. On the other hand, one sample out of the two samples collected near Hachijo-jima was accounted about 90% by modified sea-salt particles and sulfates. This result indicates that the pollutants from the Asian continent were transported to the observed area by the transition of the Baiu front. In the presentation, we are planning to report on the samples collected over the Arctic Ocean as well.

Keywords: Atmospheric aerosol, Sea-salt, Sulfate, Nitrate, TEM, EDX

