

Oral | Symbol A (Atmospheric, Ocean, and Environmental Sciences) | A-AS Atmospheric Sciences, Meteorology & Atmospheric Environment

[A-AS22_1PM2]Atmospheric Chemistry

Convener:*Nobuyuki Takegawa(Research Center for Advanced Science and Technology, University of Tokyo), Yousuke Sawa(Geochemical Research Department, Meteorological Research Institute), Yugo Kanaya(Research Institute for Global Change, Japan Agency for Marine-Earth Science and Technology), Kenshi Takahashi(Research Institute for Sustainable Humanosphere, Kyoto University), Hiroshi Tanimoto(National Institute for Environmental Studies), Chair:Nobuyuki Takegawa(Research Center for Advanced Science and Technology, University of Tokyo)

Thu. May 1, 2014 4:15 PM - 6:00 PM 511 (5F)

This session provides a forum for the presentation of the broad spectrum of tropospheric and stratospheric chemistry, including various research topics (air quality and climate), approaches (modeling, field measurements, satellite data analysis, and laboratory studies), and species (gas and aerosol). This session also provides an opportunity for discussing possible future collaboration with other research fields relevant to atmospheric chemistry.

4:15 PM - 4:30 PM

[AAS22-P09_PG]Ship-borne measurements of black carbon aerosols over northwestern Pacific and Bering Sea

3-min talk in an oral session

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Keywords:Black carbon, Mixing state, Laser Induced Incandescence, Ship-borne measurement, Marine atmosphere

Black carbon (BC) aerosol can strongly absorb the solar radiation and act as cloud condensation nuclei depending on the mixing state. Therefore, BC abundance and mixing state are key physicochemical properties to estimate the radiative impacts of BC aerosols [1]. Measurements of BC aerosols over the area where BC concentrations are very low are still limited because of the lack of high-sensitivity analytical methods. Single Particles Soot Photometer (SP2), which has been developed by Droplet Measurement, Inc., allows us to quantify the BC mass of single BC-containing particle and measure the BC number/mass concentration even in ultra-clean air [2]. Here we report the concentrations and mixing state of BC-containing particles observed using a SP2 on the research vessel *Mirai* during the research cruise over the northwestern Pacific and Bering Sea (MR13-05 cruise, 8/12-26, 2013). BC mass concentrations over the sea near Japan (OE) were elevated to $\sim 200 \text{ ng m}^{-3}$, whereas they were less than $\sim 40 \text{ ng m}^{-3}$ over the northwestern Pacific and Bering Sea. Mixing states as a function of BC-containing particles deduced from SP2 raw data were categorized into three types; bare/thinly coated (type1), thickly coated (type2), and non-core-shell (type3) BC. Over the northwestern Pacific and Bering Sea, the number fractions of type1-BC were ~ 0.13 , whereas those of type2-BC were as high as 0.8. We also found the minor but significant presence of type3-BC ($\sim 4\%$) over the remote ocean. References[1] Bond et al., J. Geophys. Res., 118, 5380-5552, doi:10.1002/jgrd.50171, 2013.[2] Schwarz et al., Geophys. Res. Lett., 37, L18812, doi:10.1029/2010GL044372, 2010.