

Model analysis of long-range transport of black carbon from Asian continent into the high-latitude regions during MIRAI Arctic research cruise, MR15-03

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Long-range transport of black carbon(BC) from Asian continent into the high-latitude regions, ex. the Arctic ocean is one of the most notable issues in terms of global warming and local air quality. On-board measurements of BC over from Japan to the Arctic Ocean north of Alaska began with the JAMSTEC's MIRAI Arctic research cruise from the summer of 2014. The BC concentrations in cleaner air-mass over the Arctic Ocean succeeded to be obtained with high accuracy (Taketani et al.,2016). Additionally, Taketani et al. (2016) detected relatively high BC and suggested impacts from long-range transport of BC into the Arctic Ocean.

In this study, we investigated causes of the observed relatively high BC during the MIRAI Arctic research cruise by using the atmospheric chemical transport model, WRF/CMAQ. The target is Arctic research cruise of 2015, MR15-03(from 23, Aug to 21, Oct). Model could capture observed BC variability, though model tended to overestimate observations. Our model analysis explained that observed relatively high BC during across the Bering sea on 10 - 13, Oct was transported from Asian continent involved by the northwestward of the low pressure. Emission sensitivity analysis suggested that this high BC event was affected by long-range transport of BC emitted from Asian anthropogenic sources. We will also introduce model analysis for observed relatively high BC over the Arctic Ocean.

Keywords: black carbon, long-range transport, CTM, Arctic Ocean