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Shipborne observations of atmospheric black carbon aerosol from Shanghai to the Arctic Ocean during the 7th Chinese Arctic Research Expedition

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Abstract

Observational black carbon (BC) data are needed at high resolution in vast areas to better study the climatic and environmental effect of BC aerosols. The BC concentration from Shanghai to Arctic Ocean was measured with an aethalometer (AE31) by the 7th Chinese National Arctic Research Expedition (CHINARE) during July to September 2016. A generally decreasing distribution of BC was shown from mid to high latitudes. The average BC concentration of the 7th CHINARE was higher than previous expeditions, at 22.77 ng m^{-3} in the Arctic Ocean. Moreover, we found heavy BC aerosols appearing occasionally during the CHINARE navigation. Therefore the impact of terrestrial transport was discussed based on the Arctic Transport Potential model. It was found that air pollution sources such as fires in the Arctic Circle of Eurasia could lead to BC transport to the high Arctic, inducing a high BC concentration of 95.62 ng m^{-3} .

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