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The distribution of atmospheric black carbon in the marine boundary layer over the North Atlantic and the Russian Arctic Seas in July – October 2015

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Black carbon (BC) particles are highly efficient at absorbing visible light, which has a large potential impact on Arctic climate. However, measurement data on the distribution of BC in the atmosphere over the North Atlantic and the Russian Arctic Seas are scarce.
We present measurement data on the distribution of atmospheric BC in the marine boundary layer of the North Atlantic and Baltic, North, Norwegian, Barents, White, Kara and Laptev Seas from research cruises during July 23 to October 6, 2015. During the 62nd and 63rd cruises of the RV “Akademik Mstislav Keldysh” air was filtered through Hahnemuhle fineart quarz-microfibre filters. The mass of BC on the filter was determined by measurement of the attenuation of a beam of light transmitted through the filter. Source areas were estimated by backwards trajectories of air masses calculated using NOAA’s HYSPLIT model (http://www.arl.noaa.gov/ready.html) and FLEXPART model (http://www.flexpart.eu).
During some parts of the cruises, air masses arrived from background areas of high latitudes, and the measured BC concentrations were low. During other parts of the cruise, air masses arrived from industrially developed areas with strong BC sources, and this led to substantially enhanced measured BC concentrations. Model-supported analyses are currently performed to use the measurement data for constraining the emission strength in these areas.