TRACING THE COMPOSITION OF DOM IN THE ARCTIC OCEAN WITH FLUORESCENCE SPECTROSCOPY

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The Arctic Ocean consists of a large pool of dissolved organic matter (DOM), receiving considerable input of terrigenous carbon mobilized from high latitude carbon-rich soils and peatlands. This study aims at characterizing the DOM fluorescent components in two Arctic environments: the Lena River delta region (September 2013) and the Polar (Arctic) waters in the Fram Strait (June 2014). In addition, optical indices of DOM modification were evaluated together with the amount of DOM (expressed as the absorption at 350nm; a_{350}). The colored and fluorescent fractions of DOM (CDOM and FDOM, respectively) were analyzed using fluorescence spectroscopy and PARAFAC modeling. The amount of DOM (a_{350}) decreased with increasing salinity (varying from 15.7m^{-1} in the Lena delta to 0.34m^{-1} in the Fram strait), with strong removal at low salinity. Six fluorescent components were identified in the Lena delta region and three of those components were validated in the Fram Strait. The allochthonous humic-like signal was the dominant fraction of DOM within both sampled regions, with the highest relative contributions to total FDOM associated to low salinity. Conversely, autochthonous signal (e.g. protein- and/or marine humic-like) presented higher contribution in relation to total FDOM at high salinity. All the components were inversely related to salinity with the highest removal rates observed at low salinity. Optical indices of DOM modification (CDOM absorption slope, SUVA, fluorescence index, humification index and biological activity index) showed decrease on the humification degree and aromaticity of DOM towards high salinity. Strong removal at low salinity in the Lena delta region is presumed to be driven mostly by photodegradation and flocculation. The lower a_{350} values observed in the Fram strait indicates low removal through the Arctic Ocean. Further analyses will be conducted to evaluate the main drivers of the DOM removal through the open Arctic Ocean.