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Dissolved organic matter as a tracer in the Arctic Ocean

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During past studies we investigated the distribution and composition of dissolved organic matter (DOM) in two Arctic river estuaries, Yenisei and Ob, the Eurasian Shelf, the Beaufort Shelf, the Bering and Fram Straits, as well as the open Arctic Ocean. Terrestrial derived DOM was characterized by high C/N ratios (34 - 49), depleted delta13C values (less than -26.5 per mill), depleted delta15N values (1.8 - 4.2 per mill). Consistent with previous reports, we found the terrestrial fraction of river DOM to be largely conservative in the estuaries underscoring the potential of terrestrial DOM as a tracer in the Arctic Ocean. The riverine signal can be found throughout Arctic Ocean surface waters ($<$ 400 m) as well as in Denmark Strait overflow water directly linking Arctic river discharge to North Atlantic Deep Water formation. Our previous studies also indicate that fluorescence can be used as a proxy for terrestrial derived DOM, at least in the Eurasian Basin. In the Canadian Arctic the relationship between fluorescence and terrestrial derived DOM is not as straight forward and there seem to be additional sources of fluorescence present. In this study we present new fluorescence data from CTD casts on the Beaufort-Chuckchi shelf, the Eurasian Shelf, and across the Arctic Ocean and give initial insights in the usefulness of DOM as additional water mass tracer along with standard hydrographic information in the Arctic Ocean and what we can learn from it about Arctic halocline formation and water mass exchanges.