

## Linkages between the circulation and distribution of dissolved organic matter in the White Sea, Arctic Ocean - DTU Orbit (08/11/2017)

### Linkages between the circulation and distribution of dissolved organic matter in the White Sea, Arctic Ocean

The White Sea is a semi-enclosed Arctic marginal sea receiving a significant loading of freshwater (225-231 km<sup>3</sup> yr<sup>-1</sup> equaling an annual runoff yield of 2.5 m) and dissolved organic matter (DOM) from river run-off. We report discharge weighed values of stable oxygen isotope ratios ( $\delta^{18}\text{O}$ ) of -14.0‰ in Northern Dvina river for the period 10 May-12 October 2012. We found a significant linear relationship between salinity (S) and  $\delta^{18}\text{O}$  ( $\delta^{18}\text{O} = -17.66 \pm 0.58 + 0.52 \pm 0.02 \times S$ ;  $R^2 = 0.96$ ,  $N = 162$ ), which indicates a dominant contribution of river water to the freshwater budget and little influence of sea ice formation or melt. No apparent brine additions from sea-ice formation is evident in the White Sea deep waters as seen from a joint analysis of temperature (T), S,  $\delta^{18}\text{O}$  and aCDOM(350) data, confirming previous suggestions about strong tidal induced vertical mixing in winter being the likely source of the deep waters. We investigated properties and distribution of colored dissolved organic matter (CDOM) and dissolved organic carbon (DOC) in the White Sea basin and coastal areas in summer. We found contrasting DOM properties in the inflowing Barents Sea waters and White Sea waters influenced by terrestrial runoff. Values of absorption by CDOM at 350 nm (aCDOM(350)) and DOC (exceeding 10 m<sup>-1</sup> and 550  $\mu\text{mol l}^{-1}$ , respectively) in surface waters of the White Sea basin are higher compared to other river-influenced coastal Arctic domains. Linear relationship between S and CDOM absorption, and S and DOC ( $\text{DOC} = 959.21 \pm 52.99 - 25.80 \pm 1.79 \times S$ ;  $R^2 = 0.85$ ;  $N = 154$ ) concentrations suggests conservative mixing of DOM in the White Sea. The strongest linear correlation between CDOM absorption and DOC was found in the ultraviolet ( $\text{DOC} = 56.31 \pm 2.76 + 9.13 \pm 0.15 \times \text{aCDOM}(254)$ ;  $R^2 = 0.99$ ;  $N = 155$ ), which provides an easy and robust tool to trace DOC using CDOM absorption measurements as well as remote sensing algorithms. Deviations from this linear relationship in surface waters likely indicate contribution from different rivers along the coast of the White Sea. Characteristics of CDOM further indicate that there is limited removal or change in the DOM pool before it exits to the Barents Sea.

### General information

State: Published

Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Norwegian Polar Institute, Tallinn University, Arctic and Antarctic Research Institute, Polish Academy of Sciences, Knipovich Polar Research Institute of Marine Fisheries and Oceanography

Authors: Pavlov, A. K. (Ekstern), Stedmon, C. A. (Intern), Semushin, A. V. (Ekstern), Martma, T. (Ekstern), Ivanov, B. V. (Ekstern), Kowalczyk, P. (Ekstern), Granskog, M. A. (Ekstern)

Pages: 1-13

Publication date: 2016

Main Research Area: Technical/natural sciences

### Publication information

Journal: Continental Shelf Research

Volume: 119

ISSN (Print): 0278-4343

Ratings:

BFI (2017): BFI-level 1

Web of Science (2017): Indexed Yes

BFI (2016): BFI-level 1

Scopus rating (2016): SJR 1.051 SNIP 1.15 CiteScore 2.27

Web of Science (2016): Indexed yes

BFI (2015): BFI-level 1

Scopus rating (2015): SJR 1.002 SNIP 1.117 CiteScore 2.07

Web of Science (2015): Indexed yes

BFI (2014): BFI-level 1

Scopus rating (2014): SJR 1.109 SNIP 1.218 CiteScore 2.08

BFI (2013): BFI-level 1

Scopus rating (2013): SJR 1.21 SNIP 1.448 CiteScore 2.28

ISI indexed (2013): ISI indexed yes

BFI (2012): BFI-level 1

Scopus rating (2012): SJR 1.137 SNIP 1.207 CiteScore 2.02

ISI indexed (2012): ISI indexed yes

BFI (2011): BFI-level 1

Scopus rating (2011): SJR 1.409 SNIP 1.438 CiteScore 2.31

ISI indexed (2011): ISI indexed yes

Web of Science (2011): Indexed yes

BFI (2010): BFI-level 1

Scopus rating (2010): SJR 1.352 SNIP 1.312

Web of Science (2010): Indexed yes

BFI (2009): BFI-level 1

Scopus rating (2009): SJR 1.305 SNIP 1.307

Web of Science (2009): Indexed yes

BFI (2008): BFI-level 2

Scopus rating (2008): SJR 1.176 SNIP 1.33

Scopus rating (2007): SJR 1.376 SNIP 1.56

Scopus rating (2006): SJR 1.473 SNIP 1.445

Web of Science (2006): Indexed yes

Scopus rating (2005): SJR 0.922 SNIP 1.28

Scopus rating (2004): SJR 0.975 SNIP 1.246

Web of Science (2004): Indexed yes

Scopus rating (2003): SJR 1.285 SNIP 1.397

Web of Science (2003): Indexed yes

Scopus rating (2002): SJR 1.102 SNIP 1.195

Scopus rating (2001): SJR 1.127 SNIP 1.083

Web of Science (2001): Indexed yes

Scopus rating (2000): SJR 0.989 SNIP 1.074

Scopus rating (1999): SJR 1.242 SNIP 1.361

Original language: English

Aquatic Science, Geology, Oceanography, Arctic Ocean, Colored dissolved organic matter, Dissolved organic carbon, Terrestrial runoff, White Sea

Electronic versions:

Publishers version

DOIs:

10.1016/j.csr.2016.03.004

Source: FindIt

Source-ID: 2298488225

Publication: Research - peer-review › Journal article – Annual report year: 2016