
310-02 - Inland water DOM characteristics trace terrestrial-aquatic connectivity in the northeast Siberian Arctic tundra.



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PRCC - Ballroom A (eLightning Theater)

Abstract

Dissolved organic matter (DOM) is a significant component of the global carbon cycle whereby carbon is transported from terrestrial environments to the oceans via inland waters. In addition, along this aquatic continuum DOM is subject to decomposition and mineralization which can result in carbon dioxide (CO₂) and methane (CH₄) emissions to the atmosphere. The fate of DOM in inland water systems is partly determined by its composition. Which, in turn, is affected by the DOM origin and natural processing it undergoes during transport. Inland water systems in the north-east Siberian lowlands (lakes, ponds and fluvial systems) are emitters of CO₂ and CH₄. Lakes, ponds and fluvial systems in Kytalyk, Indigirka were sampled in July and/or August of 2015, 2016 and 2017. Here, we aim to determine drivers of aquatic CO₂ and CH₄ super-saturation in these inland water systems using fluorescence, UV-visible spectroscopy, and a newly established method: Thermal Desorption – Proton Transfer Reaction – Mass Spectrometry (TD-PTR-MS). Multivariate statistical approaches are used to decipher DOM sources, its level of processing and how this varies between the different inland water systems.

Insights into DOM origin, and by extension water sources, across different inland water systems provide information on the variability of hydrological and biogeochemical connectivity with the surrounding landscape. This knowledge is crucial to work towards accurately including inland water greenhouse gas emissions in local and regional carbon budgets. These emissions may be further affected by global climate change warming the Arctic and causing permafrost to thaw. Increased understanding of current processes will allow for better predictions of resulting changes in terrestrial DOM mobilization and hydrological connectivity in the future.

First Author

[Melanie Martyn Rosco](#)

Vrije Universiteit Amsterdam

Authors

[Joshua Dean](#)

University of Liverpool

[Dusan Materic](#)

Utrecht University

[Alberto Vieira Borges](#)

University of Liège

[Rupert Holzinger](#)

Utrecht University

[Thibault Lambert](#)

University of Lausanne

[Steven Bouillon](#)

KU Leuven

[Trofim C Maximov](#)

Institute for Biological Problems of the Cryolithozone

[Ype Van der Velde](#)

Vrije Universiteit Amsterdam

[Jorien Vonk](#)

Vrije Universiteit Amsterdam

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