

Relationships between colored dissolved organic matter (CDOM), dissolved organic carbon (DOC) and dissolved mineral substances in different surface waters of the Lena River Delta

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In order to understand the influence of surrounding catchment characteristics on the CDOM concentration different types of surface waters in the Lena river delta region were investigated regarding their geochemical composition. The Lena River Delta consists of three geomorphological main terraces that differ in their relief, hydrological and cryolithological characteristics, which possibly influences the content of dissolved substances in their associated water bodies and in the neighboring river branches.

During summer seasons of 2013-2014 water samples were collected from river branches as well as from lakes and melt-water streams on the first and the third main terraces and analyzed them for concentrations of colored dissolved organic matter (CDOM), dissolved organic carbon (DOC), and main and trace elements (Na, K, Mg, Ca, HCO₃, F, Cl, SO₄, Fe, Si, Sr). This type of research was carried out for surface waters in the Lena delta region for the first time. Statistical analysis revealed several correlations between CDOM, DOC and mineral ions. For example, R-squared (the coefficient of determination) for CDOM and Cl and for CDOM and Na in Lena River branches were 0.52 and 0.51, respectively. Correlation between CDOM

and F was also found for melt-water streams from the Ice Complex (third terrace) (R-squared = 0.5).

Analysis of the relationship between CDOM and DOC showed strong correlation of these parameters for lakes (R-squared = 0.98) and lower correlation for river branches (R-squared = 0.48). In streams formed by the thawing of Ice Complex deposits on the third terrace was found the highest values of CDOM and DOC, but a correlation between them was not observed. A clear dependency was found out between CDOM and DOC correlation and the location of lakes on different terraces with specific permafrost conditions. A stronger correlation was observed for the lakes located on the third terrace (Ice Complex) compared to lakes located on the first terrace (Samoylov Island). Usually, lakes on the first terrace get flooded by river waters during spring, whereas lakes of the third terrace are not affected by river water inflow and have more stable conditions. The Lena delta branches are influenced by differing surrounding conditions, therefore CDOM and DOC concentrations change during summer season and did not show strong correlations.