

Dissolved organic matter in swamp waters of Western Siberia

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Swamps of Western Siberia are largest formations on our planet, accumulated a huge amount of carbon which in case of global warming may be a source of considerable volumes of CO₂ and CH₄. In this regard, swamp waters are object of extensive studying. Nevertheless, there are still many unsolved problems. In particular, the composition of dissolved organic matter which dominate in such waters, is studied while insufficiently.

The wetland waters of the region are ultrafresh and show total salinities of 20–130 ppm and pH values from 3.5 to 6.7. Such waters are conspicuous in very high concentrations of Fe, K, NO₃, PO₄, and NH₄ and some trace elements (Zn, Pb, Cu, Mn). The wetland waters are very rich in dissolved organic matter (DOC), its total content is much higher than the total salinity values. The concentrations of DOC vary considerably from 25 to 165 ppm and control to a large extent the pH values of waters: the higher the concentration of DOC, the more acidic the water. This correlation explains the reason for the abundance of organic compounds in wetland waters: their maximum concentrations are confined to the regions of the most stagnant conditions.

In addition to humic substances, bitumen and particular groups of hydrocarbons (HC) were investigated in the wetland waters. Bitumen components were extracted from water with chloroform, and HC were concentrated from the extracts by column chromatography with aluminum oxide of level IV activity and elution with hexane. The composition of HC was determined using a NERMAG R_10_10C quadrupole mass spectrometer and a Finnigan DFS chromatography–mass spectrometer.

The fraction of bituminous components relative to Corg (bitumen coefficient) ranged from 3 to 67% averaging 24.5%. The highest bitumen contents were characteristic of waters from raised acid bogs, and the lowest contents were detected in lowland bogs. There is a rather distinct correlation between the bitumen content as well as bitumen coefficient and water pH.