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★ Abstract title:

Formation Methane in Freezing Sediments in Tidal Area of the Kara Sea

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A problem of impact of climatic changes on the state and properties of the permafrost region is widely discussed in the literature. Along with the permafrost degradation under continental conditions, the processes of permafrost aggradation have been observed in the modern deposits of the Arctic seas. Modern low accumulative surfaces (i.e. tidal flats) are relatively widespread along the Kara Sea coast. Modern marine accumulative landforms, accumulative alluvial-marine lowlands are also widespread at the river estuaries. The borehole (69°36', N 66°49' E) was drilled from the surface of tidal flats near Marre-Sale weather station in the area of modern marine sedimentation; 2.5-m-deep borehole was equipped with metallic pipe 76 mm in diameter. The surface of tidal flats is covered with water during tides, surge waves, and storms. The boreholes were drilled and soil samples were collected to determine concentration and isotopic composition of methane using a "head space" method. Concentration of methane in soil samples was determined in the Institute of Physical, Chemical, and Biological Problems in Soil Science RAS using a gas chromatograph ХПМ 4 with flame ionization detector. Based on distribution of methane concentration with depth, we can conclude that the soil temperature of -3.5 to -4.0°C is a threshold for bacterial methane production in conditions of tidal flats of Western Yamal. Methane cannot be produced in frozen saline soils when the temperatures are below this threshold. Frozen soils contain only preserved methane which was produced before the freezing.

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tidal flats

permafrost

methane in soil

temperature