

Carbon isotope and biogeochemical studies of the Kara Sea – Yenisei and Ob river systems.

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The Kara Sea is distinguished by the strong influence of continental river discharge. The studied samples were collected during expeditions to Kara Sea on board of R/V «Academik Boris Petrov» in 1995-2003. Hydrochemical parameters, content and isotopic composition of organic and carbonate carbon, and hydrocarbons (HC), phytoplankton and particulate (suspended) organic matter (POM) in waters were studied at the more than 200 stations throughout the Sea. The $\delta^{13}\text{C}_{\text{org}}$ in sediments varied from -23 to -28‰, and the phytoplankton was 1-4‰ isotopically lighter. Relative enrichment of plankton in Kara Sea in the light carbon isotope is due to the low temperature and deep invasion of the river CO_2 into the sea. Isotope composition of the dissolved CO_2 in the surface seawater was studied and the $\delta^{13}\text{C}_{\text{CO}_2}$ map was plotted. By study of the river-estuary-sea water profiles we deduced from the $\delta^{13}\text{C}$ of plankton and POM that the river water bears ~70% of detritic-humic material and ~30% of planktonogeneous, while the coastal marine water - ~20% and 80% respectively.

Gas hydrocarbons (HC) were extracted from water and sediments. The peculiarity of the geochemistry of the HC-gases in the surface conditions is a comparable content of methane (0,3-5 $\mu\text{L/L}$) and the $\text{C}_2\text{-C}_5$ HC (0,1-0,5 $\mu\text{L/L}$), including unsaturated HC. Microbial methane with $\delta^{13}\text{C}$ -105 to -90‰ appears at the sediment depths between 40 and 200cm. Frequently the evidences are observed of the methane oxidation, detected by its depletion in the light carbon isotope, and appearance of the isotopically light autigenic carbonates, including ikaite. Ikaite with $\delta^{13}\text{C}$ -25 to -60‰ were found out in many localities of the Kara Sea.

The sediments are highly oxygenated along the Novaya Zemlya trough, and biochemical activity is significantly suppressed in those sediments.

The obtained data are important for gas-oil exploration in the Kara Sea and provide a background for ecological control.