



Thermohaline structure and hydrochemical characteristics under the fast ice in the south-eastern Laptev Sea coastal zone (the Buor-Khaya Bay)

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The Lena River input in the Laptev Sea creates specific oceanographic conditions, which in turn play a key role in ice formation and heat exchange in the Arctic Basin. The summertime thermohaline conditions in the Lena-Laptev sea system were studied well, but the reliable wintertime data are absent. Thus we focus our attention on the Buor-Khaya Gulf where processes of interaction between the Lena River and adjacent part of the Laptev Sea are most pronounced.

Observations in the estuarine zone of the Lena River have been carried out in April, 2007. CTD profiles (temperature, salinity, turbidity) and hydrochemistry sampling (silica, phosphate, nitrite, nitrate) were fulfilled under the fast ice at 53 oceanographic stations.

Winter oceanographic conditions in the Buor-Khaya Bay are characterized by significant spatial variability. Below ice-cover in the central part of the Bay frontal zone are revealed. It crossed the Bay in north-south direction.

Two general type of water masses are recognized: (1) surface water mass, which formed as a result of mixing river and coastal water of the Laptev Sea with high turbidity, high concentration of nutrients, low oxygen saturation; (2) near bottom water mass with negative temperature high salinity and low turbidity and less concentration of nutrients. The latter is subdivided on two modifications due to the nutrients content and oxygen saturation.

Two-layer structure observed in the deeper eastern part of the Bay. The surface layer is ~ 6 m thickness (temperature $0 \text{ }^{\circ}\text{C} \div -0.3 \text{ }^{\circ}\text{C}$ and salinity $S < 10$ psu). The bottom layer has been separated by the halocline and had temperature $T < -0.3 \text{ }^{\circ}\text{C}$ and salinity $S > 20$ psu. Vertical gradients of temperature and salinity in the pycnocline are $0.01\text{-}0.54 \text{ }^{\circ}\text{C} / \text{m}$ and up to 12.9 psu/m, respectively. At shallow (depth < 6 m) stations waters are vertical homogeneous.

Daily observations in the central part of the Bay have shown temperature and salinity fluctuation in range of $0.04\text{-}0.08 \text{ }^{\circ}\text{C}$ and $0.17\text{-}1.04$ psu, respectively, being the highest at 5 m depth, weaker at 10 m and the weakest near the bottom. Daily records of current measurements have revealed a change in direction from south-east to north-north-west. Maximum variability of current speed ($0\text{-}0.04$ m/s) is obtained in the bottom layer and more likely related to the water exchange between coastal and shelf waters due to the synoptic processes over the Laptev Sea.

Oceanographic conditions under the fast ice in the 2007 have been compared with the situation in the April-May, 2002 to illustrate the interannual variability.