

based on comprehensive investigations of methane occurrence and distribution in various types of Quaternary sediments, and on the analysis of changing climatic conditions and other environmental and anthropogenic disturbances that may trigger such catastrophic events.

The existing data on methane occurrence mostly available from the permafrost formed in the terrestrial sedimentation environment, however permafrost sediments of the western sector of the Russian Arctic are primarily of marine genesis. Our initial investigations show that methane concentrations in frozen marine sediments is an order or two magnitude higher than in terrestrial counterparts. Abnormally high concentrations of methane are found in ice-wedges and massive tabular ground ice. The key profiles established in Bolvansky Cape (Pechora River mouth), Yamal Peninsula and Western Taymyr. All key profile sections have full representation of the characteristic sedimentation types of sediments formed in the Pleistocene and Holocene.

Hazardous areas with potentially high risks of natural disasters related to methane emissions were defined based on the highest observed and projected rate of climate change or temperature of the seabed, and on high methane content in frozen sediments on coasts and shelves.

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PERMAFROST COASTAL CONTRIBUTION TO THE CARBON FLUX TO KARA SEA, KHARASAVEY SETTLEMENT, WEST YAMAL

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Because of erosion along the Arctic coast, deposits of coastal bluffs previously preserved in the permafrost state erode into the shallow waters of the coastal zone. The organic carbon contained in these deposits can be degraded and converted to greenhouse gases, serve as a source of metabolic energy for primary production in marine ecosystems, be buried in marine sediments, or be transported out of the shallow water zone. Calculation of the volume of organic carbon entering the coastal zone during the erosion of the coasts is the basis for the quantitative and qualitative characterization of this part of the organic carbon cycle, which

is essential to determine pathways for further conversion of organic carbon.

Around the Kharasavey settlement on Western Yamal a monitoring network for coastal dynamics exists since the beginning of the 1980s. Abrasional coastal bluffs up to 12 m high between Kharasavey settlement in the north and Cape Kharasavey in the south (9.5 km) were studied to define the geocryological composition of the sediments exposed in cliffs. Various sediment strata were identified. Sediments of marine origin are predominant here. Total organic carbon (TOC) contents in sediments of various composition and origin were determined (34 samples). Based on a comparison of Corona (1961) and World View 2 (2016) remote sensing images, average coastal retreat rates over the past 55 years were obtained.

For the calculation of carbon flux, we used data on extent of various deposits, their ice content and density. Preliminary calculation of TOC input over the past half-century yielded values on the order of 50 t per year and km of coastline, which is lower than our previous estimates made for the period 1994-2008 (67 t / yr · km). The difference can be explained by the increase of Kara Sea coastline retreat rates in recent decades due to the increased influence of air temperature and wave energy. Over the last few years the rates of coastal retreat have remained high, as well as the mass of TOC transported to the sea.

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GEOCHEMICAL CHARACTERISTIC OF ALLUVIAL SEDIMENTS IN URBAN AREA OF YAKUSK

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Yakutsk is the most populous city of the world, situated in the permafrost zone. The thickness of the active layer in Yakutsk is 1.6-2.0 m (and up to 2.5 m in places) for sandy-loam, and 1.5-1.7 m (up to 2.0 m in places) for loam.