



Long-term coastal dynamics monitoring at the Kharasavey area of Yamal Peninsula, Kara Sea

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During the last summer field season (2008) one more set of observations on coastal dynamics of the Yamal Peninsula was obtained near the Kharasavey settlement. Here stationary observations are conducted in the coastal section along a 21 km shoreline from Cape Kharasavey to Cape Burunniy. Observations are carried out using the method of repeated geodetic leveling from 33 constant benchmarks, which were set up in 1981. The common method of coastal dynamics observation is used. The main elements of this procedure are the measurements of the rate of bluff erosion (both in natural and human-induced conditions), and the study of beach morphometry dynamics. As a result deformation values are obtained for different types of coasts. The obligatory components of observations are the calculation of ice influence on coast and bottom and collecting of data on wind-wave regime as well as recurrence of extreme storm surges. As a result, valid data on coastal erosion have been obtained for quite extensive coastal section of Yamal Peninsula for long time period (1981-2008).

Obtained data allow estimating the scale of morpholithodynamic processes in the proper way. It is established that the most considerable factors for dynamics of the Western Yamal coasts which are not affected by industrial impacts, are (a) cryogenic-lithological composition of coastal bluff sediments, and (2) wind-wave regime (probability of extreme storm surges, exceeding beach levels in its rear part along the whole coastline). Average long-term rate of coastal erosion amounts from 0.2 to 2.8 m per year on different parts of the coast. As a result of coastal erosion 47 500 m³ of unconsolidated matter comes into the water area from Kharasavey coastal section per year. And up to 80% of eroded material is presented by fine-grained fractions.

Coastal systems in the areas with permafrost are characterized by low stability that is very appreciable in the areas of intensive resource development. Industrial disturbances lead to the activation of destructive coastal processes. A part of thermo-abrasion coast near the Kharasavey Cape is a good example of coastal erosion strengthening as a result of considerable intervention in natural processes of its evolution. Here in conditions of the deficit of beach forming sediments the sand nevertheless is periodically picked out for building purposes from in-shore shoal. As a result the rate of coastal erosion in some years reaches up to 5-7 m per year.