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Human impact on dynamics of Barents and Kara Seas Coasts

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The coasts of Barents and Kara Seas which are composed of unconsolidated deposits have poor erosion resistance qualities. In natural conditions such coasts may retreat with a rate of 1 to 2 m a year. Under the influence of human activities this rate can double and even triple.
Over the last twenty years the human impact on the natural coastal geosystems has noticeably increased due to the latest oil and gas developments on the sea shelf and coasts of the Russian North. A range of facilities – oil custody terminals for drilling and production platforms, submerged pipelines, ports and other industrial features and residential infrastructure – are currently being operated in the coastal and shelf zones. In most of the cases no morphodynamic or lithodynamic features of the coastal zone had been taken into account during the construction or operation of these facilities. This results in a disturbance of the sediment transport in the coastal zone, which triggers active erosion of both the shore itself and the coastal slope beneath. The operated facilities themselves are then threatened as their destruction is possible and often no new facilities can be constructed in the disturbed area. The operating companies have to bear forced nonmanufacturing expenses to protect or move their facilities of oil and gas industry to new areas.
We may cite here three instances for Barents and Kara Seas where human impact has already brought in negative effects.
One of the examples is Varandey Coast of the Barents Sea. From 1979 to 2012 a deliberate destruction of the dune chain of the barrier beach by vehicle traffic and a removal of the beach material for construction needs led to a quick intensification of the coastal retreat here. And now, storm surges without hindrance penetrate inland for several kilometers.
Let's move further east to the Kara Sea: on to Kharasavey Coast to the Yamal Peninsula. A large-scale extraction of sediments from the coastal slope has resulted in a depletion of the material on the beaches and triggered violent thermoabrasion of the coast in 1982-1985 and 2006-2008.
Third example of the negative impacts of human activities takes place at the sites of entrance underwater gas to the Coast of Baydarata Bay Kara Sea. Here also designers and builders are not taken into account negative experience of management and sediment removal, as it was at Varandey and Harasavey industrial areas. Construction of the pipeline, accompanied by numerous technogenic effects and removal of sediment from the beach and tide-flat, in period from 2007 to 2012 led to multiple increases in the rate of coastal erosion.
A truly responsible decision making towards the strategy of developing the northern coasts of Russia and constructing new facilities is to be based upon an integrated knowledge of the ongoing environmental processes, in particular coastal dynamics. The ignoring of this issue may cause irreversible damage to both the coastal geosystems and the facilities themselves, which, once they are destructed, may drag in enormous environmental implications.