

The North-Western Part of the Black Sea Coasts Changes

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Abstract

Coastal abrasion, as the result of which big volumes of suspended matter enter coastal waters, decrease transparency and cause siltation, which damages a lot coastal algal and seagrass communities and completely destroys natural processes of their reproduction. In line with the EU Marine Strategy Framework Directive coastal abrasion has been chosen one of indicators of impact on coastal ecosystems including the Black Sea.

Aim of the work has been study of abrasion and accumulation processes in the coastal zone of the North-Western Black Sea (NWBS) and coastal zone dynamics under the influence of natural and anthropogenic factors for the past 50 years.

Results of the studies performed in the NWBS in 1945-2013, as well as the authors' own studies using space imagery and air photography together with field surveys and instrumental measurements have been used in the work.

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It has been shown that the current geomorphologic state of coastline was formed during neotectonic stage of development and continues its formation. Maps of the NWBS coasts destruction intensity have been presented. Analysis of the maps has shown that abrasion processes intensity is different in different NWBS areas and depends on geological structure and lithological composition of the material exposing on coastal cliffs; sea level, direction and intensity of waves; composition, direction and rate of sediments flow; and human economic activities.

Peculiarities of 14 NWBS coastal areas have been analysed. Special attention has been paid to description of depositional types of coast, such as river deltas (Danube < Dnister, Dnipro), as well as bay-bars of practically all the Black Sea limans. It has been shown that velocity of coastline retreat as the result of abrasion is not uniform. Coastline segments of high speed of changes have been revealed in the NWBS: area between cape Burnas and the Budakskiy Liman – up to 6-7 m per year; between mouth of the Baraboy River and the Sukhoy Liman – up to 3.8 m per year and other areas. It has been shown that during some stormy periods coastal abrasion speed practically on all the NWBS coastline segments grow an order of magnitude, from 0.1-0.5 m to 3-5 m per year. The lowest velocities of natural coastal abrasion have been registered in the areas of port Ilyichevsk, port Odessa, in the coastline segments between the Bolshoy and Maliy Adzhalyksky Limans and from the mouth of the Berezanskiy Liman to cape Ochakovskiy, where average velocities of cliffs retrieval change from 0.1 to 0.3 m per year.

Discussed are peculiarities of coastline changes in the deltaic areas of the Dnipro, the Dnister and the Danube and in the area of the city of Odessa, where natural and anthropogenic displacement of coast towards the sea – formation of new land areas. Programme of complex (coastal and marine) studies of influence of abrasion of different types of coasts on the state of the NWBS coastal waters has been proposed: changes of transparency, flows of nutrients and toxicants into the coastal waters as the result of coastal abrasion.

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