Ecological Consequences of the Sea-Level Rise in the Black Sea

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One of the most important aspects of the problem of climate change with respect to the World Ocean and coastal zones is the predicted sea-level rise and its impact on coastal and marine ecosystems. The intent of this paper is to examine the ecological impact of global warming on the coastal marine environment by addressing the potential implications of relative sea-level rise in the Black Sea. One of the most densely populated and developed coastal areas, the Black Sea coasts would be significantly affected by sea-level rise.

Sea-level rise will affect the ecosystems of many coastal zones of the Black Sea. The ecological situation will change, the life cycles of many organisms will be disturbed, a decrease in the habitats of sea animals and their redistribution will occur. These changes will affect all elements of the marine ecosystem: plankton, benthic fauna, algae, fish and sea birds. The submergence of vast areas and increase of river flow will contribute supplementary terrigenous organic matter and biogenic elements. That will further increase the bioproductivity of the Black Sea ecosystems, decreasing transparency and diminishing some benthic photosynthesis in coastal areas because of reduction of light in the euphotic zone. However, phytoplankton photosynthesis may increase in the upper water column. During spring, essential changes in photosynthesis intensity are not expected. In summer, intensification of photosynthesis will increase organic loading in the water column

Sea-level rise can affect the fishes of the Black Sea. Intensification of productivity may be followed by a rise in fish productivity. However, sea-level rise will cause changes to natural habitat, areas of fattening and fish breeding, and migration. The fishes of the coastal zone will be affected most.

A critical ecological situation, formed recently in the Black Sea ecosystem, can be seriously complicated by the effects of sea-level rise on the coastal marine ecosystems. However, environmental consequences of sea-level rise will be different in various areas of the Black Sea. It depends on the structure and morphology of coasts, availability and development of coastal infrastructure, and anthropogenic impact on the coastal ecosystem. Our task includes the identification and examination of the coastal ecosystem elements which will be significantly damaged by sea-level rise. The most serious consequences of sea-level rise will manifest themselves in places of accumulations of marine organisms, and where there is predisposition to a strong erosion of the shoreline. The combinations of these two factors enables us to isolate the critical ecological zones and vulnerable zones in the Black Sea.