



## **The origin of islands in the Kandalaksha Gulf of the White Sea: joint work of internal and external geodynamic processes**

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The modern White Sea basin is a part of the encounter zone between the East European Platform and of the Fennoscandian Shield. The Kandalaksha Gulf in its northwest lies on the Mesoarchean-Paleoproterozoic structure known as the White Sea Shift Belt. In the Oligocene, it entered its neotectonic stage. Geologically, there are two structural storeys beneath the seafloor of the Kandalaksha Gulf: 1) crystalline bedrock of the Archean White Sea complex; 2) a cover of sediment consisting of three layers: Riphean sandstones, terrigenous Vendian deposits; a cloak of Pleistocene and Holocene deposits and sediments - glacial drifts, transitional glaciomarine sediments and purely marine sediments. The modern White Sea is a young basin formed just 10 to 12 ka. The geological and geomorphic history of the White Sea region was very complicated, with various and often conflicting tectonic movements. Besides the postglacial isostatic rise of Scandinavia amounted to some 100 meters in the White Sea area.

The White Sea has numerous islands that are very different in the geological–geomorphological and genetic senses because their origin is the result of interactions between various endogenous and exogenous processes. Large and detailed scale geological and morphological researches of the islands at the southern and northern coast of the Kandalaksha Gulf have been carried out. Landforms of the islands were produced by the joint effects of such processes as (1) glacial–tectonic effects and marine wave action, (2) tidal and surge effects; (3) glacial–tectonic, marine, and gravity effects, and (4) glacial–tectonic, marine, lake, and biogenic effects (Kosevich, 2015). The relief structure of the islands has the following regularities: 1) structures of the northern coast islands are more often landforms that are composed of loose deposits with small sites of structural denudation residual outcrops; 2) the structures of the southern coast islands are typically combinations of loose deposits and bedrock outcrops; structural denudation landforms dominate over the marine and biogenic landforms in this case, rocky surfaces of these islands predominate over others. The relief of islands is a combination of smoothed rounded top bedrock surfaces (massifs) with subhorizontal sites that are covered with loose marine deposits. Analysis of the spatial distribution of the genetic types of islands in the Kandalaksha Gulf has revealed that in the apical part of the gulf all genetic types of islands occur, while upon approaching the mouth, one type (tectonic–glacial–accumulative–denudation with marine reworking) becomes predominant. Thus, geological, structural, geomorphic features of Kandalaksha Gulf islands are the results of the complex interaction of the internal and external geodynamic processes.

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