

Evolution of the coastal Pitsunda Peninsula (Republic of Abkhazia) during Late Holocene

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ABSTRACT. The article presents the results of field research on the Pitsunda Peninsula in January-February 2022. Based on the data obtained, the scheme of coast development proposed by Balabanov (2009) is supplemented. The use of modern methods made it possible to clarify the topography, and drilling data formed the basis for reconstruction for the ancient period.

Keywords: palaeolagoon, Pitsunda Peninsula, marine terraces, palaeoreconstruction, Late Holocene

1. Introduction

Since 1970s the Holocene marine terraces of the Pitsunda Peninsula were introduced to intensive economic development and usage. But the fundamental studies, which focused on the palaeogeographic conditions of the coastal area, are needs to be supplemented. Therefore, our main goal is the adjustment of previously published reconstructions of the coasts on the southwestern part of the Pitsunda Peninsula, in particular correction age and morphology evolution of marine terraces. Balabanov (2009) describes the most fully history of the natural topography, however the published data have “gaps” in the current state-of-the-art. These “gaps” were filled up as a result of our research.

2. Materials and methods

Our research based on the previously published data (Balabanov, 2009) and our field materials. We used the UAV and orthophotos, taken from the remote sensing catalog in the public domain and in the field; open access topographic materials; deep coring data and maps of Quaternary deposits, geological, geophysical, magnetic exploration, etc. from the GEOLFOND database.

In the field we used the following methods:

- geomorphological mapping
- aerial photography (UAV)

- hand-coring and sampling. The hand-coring was taken along the supposed boundary of the palaeolagoon. The well material was selected for radiocarbon and diatom analyzes, which had processed in the Institute of Geography RAS.
- topographic and geomorphological profiling using a GNSS instrument (DGPS, RTK). Thus, we have marked the morphometry and boundaries of landforms and their exact location.

3. Results

The results of the work are:

- geomorphological map of the southwestern part of the Pitsunda Peninsula;
- map of the morphodynamics of the Pitsunda Peninsula shores in the Late Holocene;
- schemes (maps) of palaeolandforms of the southwestern Pitsunda Peninsula, including palaeolagoons.

We have described 2 beach-ridge systems. The first (more ancient) one consists of three largest shore shafts with NW-SE reach. These landforms predetermine the forming of Pitsunda Peninsula and its palaeolagoon. The second beach-ridge system consist of 15 shore shafts with SW-NE reach, which filled the palaeolagoon.

Drilling allowed us to estimate the intensity of

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transformation and filling of the palaeolagoon. We assume that in ancient times, when the city of Pitius existed on the shores of the peninsula, palaeolagoon could serve as a seaport. Thus, the drilling data allowed us to take another look at the controversial issue of shipping opportunities.

4. Discussion

The chosen palaeolagoon is not the only one on the Pitsunda coast. However, it is the largest such form in the area. Also, this palaeolagoon is located in the territory of intensive economic development, so it has enough good quality data (satellite images, topographic maps, etc.) for our study. We have used modern technologies, so our data is reliable for approving and correction of previously published one.

The authors' drilling data do not cover the entire and sufficient area of the palaeolagoon. The data are scattered and must be correlated; therefore, it is impossible to determine the discrepancies with the data of previous years with absolute accuracy, but it is enough to achieve the aim of the work.

However, the results allow us to fulfill 2 main objectives of the study:

- reconstruction of the spatial positions of the coastlines and comparison with those carried out by Balabanov (2009);
- reconstruction of the sea level changes.

5. Conclusions

- A variant of the palaeogeographical development of the coast of the Pitsunda Peninsula is proposed.
- The existing maps of the evolution of the coastal landforms of the Pitsunda Peninsula have been refined: ancient coastal ridges have been added, the boundaries of the palaeolagoon have been marked
- The boundaries of the palaeolagoon are clarified in the southwest of the Pitsunda Peninsula.
- The patterns of development of the Black Sea basin and its coasts during the transgressive and regressive epochs of the Holocene are confirmed.

Conflict of interest

Authors declare no conflict of interest.

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