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Monitoring and assessing the destruction of archaeological sites from Kuibyshev reservoir coastline, Tatarstan Republic, Russian Federation: a case study

Artur Gafurov (1), Bulat Usmanov (1), and Iskander Gainullin (2)

(1) Kazan Federal University, Institute of Ecology and Environmental Sciences, Landscape Ecology, Kazan, Russian Federation (gafurov.kfu@gmail.com), (2) Institute of Archeology of Tatarstan Academy of Sciences, Kazan, Russian Federation

The work presents the research undertaken in the coastal area of Kuibyshev Reservoir from Republic of Tatarstan, Russia. The aim of the research is to assess the erosion rate of the coastline, to identify the most dynamic parts, and to improve the predictions of the future archaeological sites being under threat from coastal erosion. As a baseline, Soviet aerial images and topographic surveys were combined in a GIS to create a database and a 3D model of the coastline, which will serve as a base for future surveys. The most dynamic part is in the North-western part, from 1958 until 1980 (22 years), 150 m from the coastline being eroded (6.81 m/year), leading to the complete disappearance of the hillfort, only the South-eastern bastion remaining. The coastline is very dynamic, with an increasing erosion rate from 2012, when the first topographic surveys were undertaken. There have been proposed mitigation measures, the most significant one is to eliminate the exploitation road along the coastline.
The value of cultural heritage goes beyond conservation, monitoring and protection; it can offer significant data that cannot be recovered in the future and insights into human evolution, cultural evolution, the evolution of culture, people's behavior. Given the high number of sites located in prone areas of coastline, it is important to have an up-to-date situation regarding the natural and human-induced elements; saving as much spatial data as possible, integrate it with the help of GIS, generate 3D models, will lead to a better understanding of local authorities and stakeholders to plan economic activities, minimize the damages costs, improve environmental protection, and the most important aspect, cultural heritage protection. 3D visualization helps us to have a better understanding of the temporal and spatial geographic phenomena and enables better decision- making through different scenarios. Also, the public will have a better understanding and visual memory of the environment characteristics.
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