

CLIMATE CHANGE: IMPACT & ADAPTATION

COASTAL ARCHAEOLOGICAL AND NATURAL SITES OF TURKIYE THREATENED BY SEA LEVEL RISE

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INTRODUCTION

Throughout history, humanity preferred to live near the water. Therefore, the coasts have become the centers of trade and cultural exchange. Türkiye has numerous cultural heritage sites on the coast under the threat of sea level rise due to climate change. The Scientific and Technological Research Council of Türkiye (TUBITAK) funded project "Vulnerability of Coastal Cultural Heritage Areas to Sea Level Rise and Its Impacts" (No: 122M613) focuses on Turkish coastal cultural heritage sites protected by law. The project aims to quantify coastal vulnerability by using the Fuzzy Coastal Vulnerability Assessment Model (Ozyurt, 2010) and integrating this information into a specific module that will be developed for the cultural heritage context.

METHODOLOGY

Firstly, the heritage sites that will be analyzed are determined based on their proximity to the coast. In this project, the coastal area is defined as a zone below 10-m elevation and within 1 km distance from the shoreline using the DEM data of the Copernicus database. The archaeological and natural heritage sites of the 1st - 3rd degree of protection are considered among various cultural heritage sites with different protection levels classified by law. Most of the cultural heritage site information (location, area, and protection level) are obtained from mesoscale Environmental Order Plans of the coastal provinces accessed via WMS servers of the Ministry of Environment, Urbanization, and Climate Change. The missing information was retrieved as GIS layers from the Ministry's open-source ATLAS database (www.atlas.gov.tr) by manually drawing the polygons on the map. The coastal area layer and the cultural heritage information overlapped in the GIS environment to determine the sites to be analyzed by the project.

INITIAL RESULTS

Within the coastal area defined by the project, Türkiye has 1221 heritage sites (742 archeological and 479 natural heritage sites) located at the coast under possible risks of sea level rise. 22% of these heritage sites are located in the Mediterranean, 40% in the Aegean, 32% in the Marmara, and 6% in the Black Sea Region. First-degree heritage sites with the highest protection level constitute 33% of natural and 55% of the archeological

sites at the coast. Table 1 shows more sites close to the shoreline but probably have low vulnerability due to higher elevations. Still, %75 of the sites satisfy both the elevation and distance criteria indicating that these sites have higher risks considering the impacts of sea level rise.

Table 1: Classification of the collected heritage sites. (N: Natural, A: Archeological)

Site Type	N	A	Total
Satisfied Criteria			
Below 10 m Elevation	416	527	943
Within 1 km Distance from the Shoreline	470	714	1184
Both	407	499	906
Total	479	742	1221

It should be noted that these numbers are expected to increase significantly when the other areas protected by special laws and wildlife sanctuaries are included in the assessment within the project's scope at later stages.

The project's next steps include assessing various natural and social factors affecting the vulnerability of these sites. The most vulnerable sites will be determined based on vulnerability assessments to coastal erosion and flooding, which are the direct impacts of sea-level rise. Then, FCVAM model integrated with a separate module, which will be generated to assess the vulnerability of cultural heritage sites specifically, will be applied to each vulnerable site. The separate module will assess each heritage site's physical and social characteristics, enhancing the vulnerability. Ongoing research results of the vulnerability factors for these sites will also be presented during the conference.

REFERENCES

European Union, Copernicus Land Monitoring Service, (2016) European Environment Agency (EEA)
Ozyurt, Ergin. (2010): Improving coastal vulnerability assessments to sea-level rise: a new indicator-based methodology for decision-makers. Journal of Coastal Research, vol. 2. pp. 265-273.