



## **Integrated protecting plan for beach erosion. A case study in Plaka beach, E. Crete, Greece**

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Coastal zones are among the most active areas on Earth, being subjected to extreme wind / wave conditions, thus vulnerable to erosion. In Greece and Crete in particular, beach zones are extremely important for the welfare of the inhabitants, since, apart for the important biological and archaeological value of the beach zones, the socio-economic value is critical since a great number of human activities are concentrated in such areas (touristic facilities, fishing harbors etc.). The present study investigates the erosional procedures observed in Plaka beach, E. Crete, Greece, a highly touristic developed area with great archaeological interest and proposes a cost-effective solution. The factors taken into consideration for the proposed solution in reducing the erosion of the beach were the study of the climatological, geological and geomorphological regime of the area, the recent (~70 years) shifting of the coastline through the study of topographic maps, aerial photographs and satellite images, the creation of detailed bathymetric and seabed classification maps of the area and finally, a risk analysis in terms of erosional phenomena. On the basis of the above, it is concluded that the area under investigation is subjected to an erosional rate of about 1 m/10 years and the total land-loss for the past 70 years is about 4600 m<sup>2</sup>. Through the simulation of the wave regime we studied 3 possible scenarios, the “do-nothing” scenario, the construction of a detached submerged breakwater at the depth of 3 meters and, finally, the armoring of the existing beach-wall through the placement of appropriate size and material boulders, forming an artificial slope for the reducing of the wave breaking energy and a small scale nourishment plan. As a result, through the modeling of the above, the most appropriate and cost-effective solution was found to be the third, armoring of the existing coastal wall and nourishment of the beach periodically, thus the further undermining of the beach will be reduced and part of the beach can be replaced, and providing aesthetic and economic value to the beach in order to maintain the coastal protection programme.

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