

## COASTAL EROSION: CAUSES AND EXAMPLES FROM GREECE

PETRAKIS S.<sup>(1)</sup>, KARDITSA A.<sup>(1)</sup>, ALEXANDRAKIS G.<sup>(2)</sup>, MONIOUDI I.<sup>(3)</sup> AND ANREAD-  
IS O.<sup>(3)</sup>

<sup>(1)</sup> UoA, Faculty of Geology & Geoenvironment, Greece, [spetrakis@geol.uoa.gr](mailto:spetrakis@geol.uoa.gr)/  
[kkarditsa@geol.uoa.gr](mailto:kkarditsa@geol.uoa.gr)

<sup>(2)</sup> Foundation for Research and Technology, Hellas, Institute of Applied and Computational Mathematics, Heraklion, Greece, [alexandrakis@iacm.forth.gr](mailto:alexandrakis@iacm.forth.gr)

<sup>(3)</sup> University of the Aegean, Department of Marine Sciences, Greece, [imonioudi@marine.aegean.gr](mailto:imonioudi@marine.aegean.gr) / [olympos@marine.aegean.gr](mailto:olympos@marine.aegean.gr)

### ABSTRACT

Coastal erosion is a global phenomenon coming as the result of multiple processes and environmental factors acting together in the morphologically dynamic coastal environment. Coastal erosion affects a growing number of coastal sites and constitutes the major threat for coastal zones. The most significant natural factor inducing the phenomenon are; sea level rise, storms, winds, nearshore currents and the slope of the beach face, whereas it is greatly intended through human presence and intervention in coastal areas (habitat, coastal engineering, river regulations and dams, dredging etc). The phenomenon is likely to increase in the near-future, due to the mean sea level rise, and associated changes in the wind/wave regimes and coastal sediment supply (Velegrakis et al. 2013).

Considering its significant ecological importance, several models have been developed to estimate beach vulnerability (eg. Mendoza, 2008; Alexandrakis, 2011; Monioudi, 2011), whilst, coastal erosion management and socio-economic analysis are of high interest for the private and municipal stakeholders. In addition, coastal area is assumed of significant concern taking into account that one third of human population worldwide live within 100kilometres of the sea (GESAMP, 2001; El-Sabh et al., 1998). Costanza et al. (1997) have calculated that every hectare of coastline has been estimated to worth around 4,000\$/year, globally, whereas according to Alexandrakis (2014), in a typical tourist destination (Crete), the average value of a beach is estimated at 18.5 €/m<sup>2</sup>/day.

Greece is one of the most vulnerable countries in Europe, regarding the erosion of its coastal areas. This is due to various factors, such as the coastal geomorphology, the coastal slopes, the mean wave heights, the mean tide ranges and the relative sea-level rise. Almost, 28% of the coastal area in Greece is under retreat and more specifically, 6.1% in Thrace and East Macedonia, 10.3% in Central Macedonia, 2.3% in Thessaly, 14.7% in the North Aegean Islands, 10.8% in Attica, 25.9% in the Cyclades and the Dodecanese islands, 3.8% in Peloponnesus and 6.1% in the northern coast of Crete (Alexandrakis et al., 2010). The higher percentages are associated with the increased presence of beach zones and low-lying coastal (including deltaic) plains. Taking into consideration that about 40% of the total population in Greece lives within a zone of a few kilometers from the coastline (Pranzini et al., 2013) and about 90% of the touristic activities are connected to the coastal areas, the study of the past, present and future trends of coastal erosion is essential for the socio-economic growth of involving communities.

**Coastal Landscapes, Mining Activities & Preservation of Cultural Heritage  
17-20 September 2014, Milos Island**

In this article, specific case studies of extended coastal erosion are investigated, examining the causes of this extended coastal retreat and covering the main land coastline erosion and the erosion of the insular coasts.

*(Text up to 2 pages, plus 1page for images and tables)*

**Keywords:** *Coastal vulnerability, coastal erosion, coastal management, socioeconomic analysis*

#### **ACKNOWLEDGMENTS**

The project is supported by the Action "Cooperation 2007-2013" (11SYN-8-1466 "SYNERGY FOR THE SUSTAINABLE DEVELOPMENT AND SAFETY OF THE HELLENIC TOURIST BEACHES - BEACHTOUR") of the Operational Program "Competitiveness and Entrepreneurship" co-funded by the European Regional Development Fund (ERDF) and the General Secretariat for Research and Technology (Hellenic Ministry of Education).

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