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Coastal Vulnerability and risk assessment of infrastructures, natural and cultural heritage sites in Greece.

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The majority of human activities are concentrated around coastal areas, making coastline retreat, a significant threat to coastal infrastructure, thus increasing protection cost and investment revenue losses. In this study the management of coastal areas in terms of protecting coastal infrastructures, cultural and environmental heritage sites, through risk assessment analysis is been made. The scope is to provide data for spatial planning for future developments in the coastal zone and the protection of existing ones. Also to determine the impact of coastal changes related to the loss of natural resources, agricultural land and beaches. The analysis is based on a multidisciplinary approach, combining environmental, spatial and economic data. This can be implemented by integrating the assessment of vulnerability of coasts, the spatial distribution and structural elements of coastal infrastructure (transport, tourism, and energy) and financial data by region, in a spatial database. The approach is based on coastal vulnerability estimations, considering sea level rise, land loss, extreme events, safety, adaptability and resilience of infrastructure and natural sites. It is based on coupling of environmental indicators and econometric models to determine the socio-economic impact in coastal infrastructure, cultural and environmental heritage sites. The indicators include variables like the coastal geomorphology; coastal slope; relative sea-level rise rate; shoreline erosion/accretion rate; mean tidal range and mean wave height. The anthropogenic factors include variables like settlements, sites of cultural heritage, transport networks, land uses, significance of infrastructure (e.g. military, power plans) and economic activities. The analysis in performed by a GIS application. The forcing variables are determined with the use of sub-indices related to coastal geomorphology, climate and wave variables and the socioeconomics of the coastal zone. The Greek coastline in considered as a case study, where the majority of the coastline appears to be undergoing erosion, with approximately 25% of the Aegean coastline, consisting mainly of beach zones and low-lying coastal (including deltaic) plains. In terms of economic activates coastal tourism is most effected, as beach zones are very high vulnerable to erosion. Also, small ports in remote islands are also found to be highly vulnerable.

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