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An integrated multi-parameter monitoring approach for the quantification and mitigation of the climate change impact on the coasts of Eastern Crete, S. Aegean Sea (Project AKTAIA)

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The AKTAIA project aims at the production of new knowledge regarding the forms of manifestation of the climate change and its influence on the stability and evolution of the coastal landforms along the shoreline of eastern Crete (approximate length: 757 km), taking into account the various aspects of human intervention.
Aerial photographs, satellite images and orthophotomaps have been used to produce a detailed coastline map and to study the morphological characteristics of the coastal zone of Eastern Crete. More than 100 beach zones have been visited during three field campaigns, which included geomorphological and human intervention mapping, topographic, meteorological and oceanographic measurements and sedimentological sampling and observations. In addition, two pilot sites (one in the north and one in the south part of Crete) are being monitored, via the installation of coastal video monitoring systems, shore-based meteorological stations and wave-tide recorders installed in the nearshore zone.
Detailed seafloor mapping with the use of side scan sonar and scuba diving and bathymetric surveys were conducted in the two pilot sites.
Meteorological and oceanographic data from all existing land-based meteorological stations, oceanographic buoys and the ERA-interim dataset are used to determine the wind and wave climate of each beach.
The collected climatic, sedimentological and coastal environmental data are being integrated in a GIS database that will be used to forecast the climatic trends in the area of Crete for the next decades and to model the impact of the climatic change on the future evolution of the coastal zone. New methodologies for the continuous monitoring of land-sea interaction and for the quantification of the loss of sensitive coastal zones due to sea-level rise and a modified Coastal Vulnerability Index for a comparative evaluation of the vulnerability of the coasts are being developed. Numerical modelling of the nearshore hydrodynamics and the associated sediment transport and beach morphodynamics, calibrated with in situ data, is used to predict beach response and vulnerability to different climate change scenarios. Finally, the socio-economic impact of the climate change on the coastal zone will be assessed and a management protocol for the coastal zone and for the mitigation of the climate change impact will be developed. The ultimate scope of the project is to benefit the society by providing current and high quality information on the consequences of the climate change, especially those related to sea-level rise, and on the available protection and mitigation measures. In addition, the technological product will help in the proper planning of the required actions and technical interventions, reducing the need for costly, incomplete and frequently redundant localized studies and the risk of unsuccessful interventions.

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