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The influence of storm wave climate and sediment availability in the evolution of the southwestern Spanish coast.

T.A. Plomaritis (1), L. Del Río (1), J. Benavente (1), P. Ribera (2), and G. Anfuso (1)

(1) Earth Sciences Dept., Faculty of Marine Science and Environment, Univeof Cadiz. Av. Republica Saharaui s/n, 11510 Puerto Real, Cadiz, Spain, (2) Physical, Chemical and Natural Systems Dept., University Pablo de Olavide. Ctra. Utrera km. 1, 41013 Sevilla, Spain.

The character and configuration of the coastline can be understood in terms of the dynamic balance existing between the physical forcing and the resistance of the coastline. Hence variations in terrestrial, atmospheric and oceanographic extreme conditions have to be evaluated when assessing shoreline changes that can lead to coastal geo-hazards. In the present work the wave record of the last 44 years was analysed for the Spanish gulf of Cadiz (SW Iberian Peninsula) in order to identify changes in the duration, frequency, chronology and direction of approach of the Atlantic storms. Various wave parameters influencing coastal morphology were analysed including maximum wave height, total energy per storm and storm groupiness. The obtained time-series are compared with the NAO index in order to establish a correlation between large-scale atmospheric phenomena and the wave energy arriving to the Gulf of Cadiz. On the other hand, dam construction data on river basins in the area are used to estimate variations in sediment supply to the coast in the last 70 years. Furthermore, medium-term shoreline changes along the study area, for coastlines with variable river influence, are calculated by means of GIS tools on several sets of aerial photographs spanning the period 1956-2002. Finally, the results about variations in terrestrial and oceanographic parameters are compared with the obtained shoreline changes in order to assess their relative influence on coastline evolution.