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Changes in the evolution rhythm of a coastal cliff area. Processes and triggering factors

M. Neves

Centro de Estudos Geograficos

Universidade de Lisboa
PORTUGAL
(marioneves@ceg.ul.pt / Fax: +351217938690 / Phone: +351217940218

"Rocha do Gronho" is a stretch of the west coast of Portugal with a beach-cliff system that marks the south limit of a coastal lagoon – The Obidos lagoon. The 35 m high cliff is cut in Cretaceous sandstones and conglomerates with a noticeable presence of quartz elements consolidated either by a siliceous or by a kaoliniferous cement. These materials have a 11º to 14ºN245º dip almost parallel with the ENE-WSW coastline orientation. The elongated beach is generally narrow being almost submerged in the spring tides. In the majority of the period corresponding to the second half of the twentieth century, there has been equilibrium at the beach-cliff system because the abundance of sediments proceeding from the lagoon and carried out south by the longshore current (predominantly N-S) provided a covering of the cliff base that protect it from the assailing force of the waves. The cliff face evolved mainly by small magnitude rockfall events. Between 1958 and 1995, a rate of retreat of 0,15m ($\pm$0,02m) ano^{-1} was obtained. Afterwards, the frequency and, particularly, the magnitude of the mass movement occurrences had changed. Five events leading to a 33,6m retreat of the cliff top have been recorded. The type of movement, the affected length of the cliff top, the maximum retreat, the lost cliff top area and the volume of material dislocated were estimated for each event. The identification of the processes involved as well as the evaluation of the potential triggering factors allowed us to assess the influence of human intervention in the lagoon - changing the main draining paths and particularly the patterns of sediment transport – in the modifications of "Rocha do Gronho" evolution rhythm.