Geologica Acta, Vol.11, Nº 1, March 2013, 59-73
DOI: 10.1344/105.000001755
Available online at www.geologica-acta.com

The influence of coastal processes on inner shelf sediment distribution: The Eastern Algarve Shelf (Southern Portugal)

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ABSTRACT

This study examines sediment distribution patterns in the Southeastern Algarve inner shelf (southern Portugal), an area characterized by marked variations in its coastal environment and low continental supply of sediments. The specific goals of this study were to identify the principal sediment sources and the factors influencing sediment transport paths and deposition. A total of 199 samples, collected along the shelf from the Guadiana River mouth to Olhos de Água, were analyzed. Grain-size distribution and parameters were measured for all the samples. Terrigenous and biogenic components of sand were identified in 38 samples, and results analyzed using multivariate non-linear multidimension scaling (MDS) and cluster analysis. Patterns of sediment distribution in this area of the inner shelf vary according to water depth and exhibit significant longshore variation, related mainly to coastal processes (littoral drift and storm currents) and to a lower degree to sediment sources. Sand is dominant at all depths, reflecting the influence of littoral drift in the supply and redistribution of shelf sediments. Fine and gravel-sized deposits are significant in specific areas and are usually associated with changes in sediment composition. Five sectors have been identified according to sedimentary dynamics. The results, based on geostatistical and multivariate analysis, have allowed detailed sediment distribution maps to be generated, which represent an update of the existing cartography and serve as a tool for the management of coastal and marine resources. They have been furthermore compared with inner shelf sediment dynamics in other regions worldwide, to distinguish between specific regional responses to forcing mechanisms and processes that are more generalized within this type of shelf environments. In this context, the results obtained results in the Algarve study area are of great interest for the understanding of sediment dynamics of sand dominated inner shelves with reduced continental supply.

KEYWORDS | **Inner shelf. Dynamics. Littoral zone. Sediment analysis. Geostatistics. Southeastern Algarve.**