

Influence of Tidal Currents on the Holocene Sedimentation Processes in the Continental Shelf of the Gulf of Cadiz

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The analysis of seafloor geomorphologic features in a sector of the Gulf of Cadiz continental shelf with high-resolution seismic reflection profiles and surficial sediment samples reveals a well defined distribution pattern of bedforms controlled by the hydrodynamics of the area. Almost all of those bedforms are distributed over a shallow physiographic feature known as the Barbate High, and three distribution zones are distinguished according to the orientation pattern of submarine dunes. These bedforms are considered to be modern features of Holocene age, and therefore they provide useful information about the circulatory patterns established over the continental shelf during that period. The current flows that generate the bedform fields are attributed to a complex interaction of several hydrodynamic processes. Eastsoutheastward migrating sand waves located in inshore zones are generated by the interaction of the southeastward moving Atlantic inflow with the sea-floor. The most noticeable characteristic is the presence of westnorthwestwards moving bedforms over the continental shelf, because in this area the general circulation is southeastward directed. This bedform field is attributed to the existence of northwestward directed flows over the Barbate High in relation to ebb tidal currents in the Strait of Gibraltar, when current direction is reversed over the Barbate High and probably deflected to the outer zone of this shallow geomorphologic feature. As a result of this complex flow pattern, a clockwise sand transport pattern over the Barbate High is established during the present highstand interval, resulting in an activity of bedforms evidenced by the presence of superimposed bedforms.