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Submarine dunes superimposed on sand banks and other large-scale sedimentary bodies on the Gulf of Cadiz shelf near the Strait of Gibraltar

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Previous studies in the Gulf of Cadiz (NE Atlantic shelf) have reported several fields of submarine bedforms off Cape Trafalgar, near the Strait of Gibraltar (Nelson et al., 1999; Lobo et al., 2000). A recent oceanographical survey has revealed the existence of previously undocumented larger-scale sedimentary bodies with dimensions equivalent to sand banks/ridges. The description and classification of this previously unknown field of large-scale sedimentary bodies is presented here, with particular emphasis on the relationship between large-scale sediment bodies and the superimposed bedforms.

For this study we have analyzed a grid of 975 km of high-resolution seismic profiles collected during 1-15 June 2006 off Cape Trafalgar at water depths ranging between 15 and 60 m. The total length of the seismic grid is 975 km. Seismic signal was acquired with an Octopus 360™ system based on Uniboom sound source. Recorded SEG-Y files were post-processed with Radexpro™ software.

Major sediment bodies were classified as: a) banks, showing internal structures indicative of a long-term migration toward SSW to SW; b) shoals, developed in shallower water and exhibiting a net component of N to NW sediment transport; c) sheets, laterally associated with banks; d) topographically-controlled sedimentary bodies that

are either confined in local depressions or cover gently inclined surfaces; e) lenticular sedimentary bodies, with geomorphological and stratigraphic characters indicative of relict origin; f) other types of sedimentary bodies.

The high variability of large-scale sedimentary bodies is attributed to the complex interaction of hydrodynamic agents. The most prominent features indicate southwestward and southward sediment transport patterns, possibly as a result of combined influence of both westward and southward-directed currents. Relationships between superimposed bedforms (mostly very large dunes) and underlying sediment bodies are variable across the study area. Most superimposed bedforms occur over the complex mosaic of sediment banks and sheets, suggesting that this area is hydrodynamically highly complex, due to the interaction of several high-energy currents with different directions.

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