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Morphology of a submerged insular shelves in the West Alboran Basin.

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The dynamic of the seafloor in the Western Mediterranean Sea reflects the variety of the natural processes shaping it. Each of the sub-surface features is the result of tectonic, sedimentary and oceanic processes and eustatic sea-level variations. This study is focused on the morphology of three flat bathymetric highs and on the continental shelf in the Alboran Sea that show a variety of detailed seabed features that we attribute to a combination of present-day Mediterranean water mass flows, Quaternary active folding and faulting, differential erosion linked to relative-sea-level variation and local hydrodynamic. Swath bathymetry and reflectivity data, 2D seismic lines of multiple resolutions (12 channels, SPARKER source, and TOPAS seismic lines) have been acquired during three successive cruises: the MARLBORO-1 (2011), the MARLBORO-2 (2012) and the SARAS (2012) surveys. Our study deciphers the seabed structure of the banks with morphometric measurements (slope gradient, plan curvature, and topographic index) and correlates these structures to the stratigraphy of surrounding shelf. We show that the competition between active folding of the Miocene units and the erosion linked to the late Quaternary lowstands is creates the topography of the banks. The elevations of the flat surfaces measured on the banks are close to -110m and -80m. They are interpreted as submerged depositional surfaces linked to glacial and post-glacial deposit and wave-ravinement erosional surfaces as observed in other Mediterranean continental shelves. The analysis of the altitudinal spacing of these marine terraces indicates a spatial pattern with varying uplift rates. Furthermore, the characterization of sub-aqueous dune patterns locally linked to potential cold carbonate seamount could reflect the influence of water-masses current on the stratigraphic organization.