



Sedimentary processes at submarine canyons in the Palomares Margin: Approach from swath bathymetry and high resolution side-scan sonar images.

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The continental slope of the Palomares Margin (South Iberian Margin, Western Mediterranean) is dissected by submarine canyons. Previous works on the Palomares Margin have been focused mainly on structural studies related to the Gibraltar Arc geodynamics, but the understanding of sedimentary and erosive processes shaping the margin and their control factors have received few attention till now.

We present here morphologic features of the two major canyons in the Palomares Margin: the Gata and the Alías-Almanzora canyons, and interpret these characteristics in terms of sedimentary processes. Our study is built on swath bathymetry (Simrad EM-120), and deep-towed side-scan sonar (MAK-1M) data. Both canyons incise from the continental shelf of the Palomares Margin conducting sediment transfer by down-canyon gravity flows to the continental rise. The Gata Canyon is 64 km long, and headed by three tributary canyons. The Alías-Almanzora Canyon, which locates about 50 km to the north of the Gata Canyon, is 73 km long and headed by four tributary canyons facing rivers. The side-scan sonar images reveal erosion, transport and sedimentation processes along both canyon-valleys. Erosive bedforms are reliable evidence for the persistence of bottom currents (speed > 1 m s⁻¹) along the thalwegs.

The V-shaped of the Gata Canyon, confined by basement seamounts, suggests that turbidity currents have been the most important erosive mechanism and mass-wasting could be the dominant process to favour retrogressive sediment failures. Gullies with a herringbone pattern have been observed at the Alías-Almanzora valley; these forms are interpreted as derived from river-flooding events and/or from water-currents development at the continental shelf. Sediment waves observed at the Alías-Almanzora canyon-mouth can be related to events of contour bottom currents at the base of slope.

Relative sea-level variations induced either by tectonic processes (Palomares margin uplift) or Mediterranean eustatic sea-level changes, or both, are considered significant control factors on the evolution of these canyons. Considering the tectonic setting of the studied region, we favour that the Pliocene-to-Present tectonic uplift recognized in the Palomares Margin is the major cause driving the development of these canyons.

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