

Submarine mass movements affecting the Almanzora-Alías-Garrucha canyon system (SW Mediterranean) (SKT)

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The Almanzora-Alías-Garrucha canyon system incises the narrow (5 km wide) continental shelf of the Palomares continental margin (SW Mediterranean Sea). The canyon is 74 km long running from west to east almost from the coastline down to 2500 meters water depth (mwd). The canyon system is constituted by several tributary canyons such as the Almanzora, the Garrucha, the Cabrera and the Alías (from N to S) merging at 1820 mwd and resulting in a single canyon body 4 km wide, following a strait direction for 46 km. Different multibeam echosounder datasets were merged to study the canyon system. A base map belonging to the Spanish Secretary-General for Fisheries (SGP) was recently improved with data recorded in the framework of Fauces project in order to produce 10 to 2 m grid size maps of the Almanzora-Alías-Garrucha canyon. Extensive network of high-resolution seismic and parametric profiles visual observations along with ROV system were also recorded. This integration has allowed mapping the morphological variability of the mass-movement features and brings new insights about the processes that shaped the canyon system. Two main areas have been differentiated: (i) the canyon head and upper course (from 7 to up 1400 mwd), where erosion and mass-movements have resulted in dense networks of dendritic gullies, minor scars and falls affecting the canyon walls. These processes have produced a progressive incision and retrogradation of the canyon heads up to almost reach the coastline; (ii) the middle and distal courses (from 1400 to up 2500 mwd), where turbidity flows and related flows have contributed to the progressive incision of the thalweg, floored by bedforms and scars affect the canyon walls. The seafloor of the southern margin of the canyon is highly irregular defining an area of about 262 km that extends from 600 to 2240 mwd affected by a composite mass flow deposits. In contrast, the northern margin presents a set of nested concave-downward scars, with a W-E trend, lengths of 2 to 8 km and slope gradients up to 17°. These recurrent mass-movements have resulted in the enlargement of the canyon and in an asymmetric bathymetric profile. By zooming over the seafloor, through the ROV observations, the canyon walls appear as near-vertical outcrops flaking by instability features. Mass flows deposits, topples/falls and metric isolated blocks are observed along the canyon floor. Although the occurrence of mass-movements is affecting the present-day seafloor, the presence of muddy sediments draping and smoothing the seafloor inside and outside of the canyon may inform about a sub-recent instability activity.