



Shallow sediment deformation, sediment sliding and mud volcanoes in the SW Balearic continental margin and abyssal plain (SBAL-DEEP cruise)

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We report on the results of the SBAL-DEEP cruise (Deep Sedimentary Environment of the South Balearic Margin) onboard R/V OGS Explora. The objective of the cruise was to identify the pathways of sediment transfer from the conjugate margins of Algeria and the Balearic Promontory to the Algerian Basin from the Early Pliocene flooding of the Mediterranean to the Present.

The survey methods included: i) hull-mounted Reson SeaBat 8150 full ocean depth multibeam system; ii) hull-mounted Benthos Chirp-II, 2-7 kHz chirp profiler; and iii) intermediate resolution multichannel seismic reflection system (600 m streamer, 48 channels, 2xGI Guns).

The abyssal plain reveals the presence, only poorly imaged in old pre-existing surveys, of several hills indirectly related to the movement of deeply-seated Messinian salt diapirs. The abyssal hills range in elevation from 10 to 50 m. Their shapes in plain view vary from sub-rounded to elongated, mostly in a SW-NE direction. Some of the hills have a curved shape. The length and width of the elongated hills are about 10 km and 1-2 km respectively. The surface sediments are affected by active faulting and folding likely in response to differential compaction and fluid expulsion. Based on diagnostic morphology, at least two abyssal hills are the product of extrusions of sediment and fluids (mud volcanoes). They are rounded, asymmetric in cross section, with a radius of about 1 km and a flat top. Their elevations over the surrounding

abyssal plain exceed 100 m.

On the South Formentera continental slope there are evidences of mass sediment transfer from the shelf to the abyssal plain. There, a large recent debris flow deposit has been discovered, with a total length of at least 30 km, and a thickness likely exceeding 25 m. This landslide most probably extends further up-slope out of the surveyed area.

The survey provided evidences on how the tectonic structure of the margin and the presence of newly discovered volcanic edifices affect the path of sediment transport to the abyssal plain.