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Soft sediment deformation in northern Gulf of Cadiz (offshore SW Iberia): new insights from analogue modelling experiments

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Multi-beam bathymetry mapping of the sea floor of the northern Gulf of Cadiz (offshore SW Iberia) shows, at different scales, various types of soft sediment deformation features controlled by tectonics and gravity. Experimental results of analogue modelling, focusing on the reproduction of several of the observed tectonic structures, were compared with bathymetric data (natural analogue), allowing a new insight in both the local scale interpretation of these structures, and the general tectonic implications for the large scale evolution of the Gulf of Cadiz area. Taking into account the interpretation of several MCS lines (multi channel seismic reflection lines) crosscutting the studied tectonic structures in the area, our experiments aimed at testing two main different hypothesis raised by such interpretation for the origin of those structures: (1) Pure strike-slip basement faulting and resulting deformation in the overlying soft sedimentary cover or (2) Transpression (with dominant strike-slip component) affecting the same sedimentary cover. The comparison of the obtained results with the natural example at different scales points to a general tectonic evolution characterized by space-time frame of strain partitioning and deformation migration which in the Gulf of Cadiz area could be responsible for accommodating the large scale compression characterizing the Africa (Nubia)/Iberia diffuse plate boundary.