Recent tectonics (post Messinian Salinity Crisis) in the Central Mallorca Depression, Balearic Promontory:

Land–sea correlation.

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The Balearic Promontory underwent a complex tectonic evolution during the Neogene, as it was affected by extensional deformation linked to the back-arc opening of the northwestern Mediterranean and also by compressional Betic deformation. In addition, some significant post-orogenic extension developed within that area, mainly observed on the island of Mallorca, which exposes a large NE-SW-directed Graben that is segmented in a series of aligned sub-basins filled with syn- to post-extensional sediments, from Serravallian to Quaternary in age. Offshore between Mallorca and Ibiza Islands, a large basin named the Central Mallorca Depression recorded also some significant recent deformation. The area appears to be still tectonically active as evidenced by seafloor morphology and by several minor to moderate earthquakes registered in the past centuries.

Thanks to a widespread dataset of 2D seismic reflection profiles we could observe, between Ibiza and Mallorca Islands, a series of depocenters filled with Plio-Quaternary deposits forming mini-basins perfectly aligned with the sub-basins that constitute the Mallorca Graben. We identified complex and non-cylindrical deformation within the Plio-Quaternary unit and an intra-PQ unconformity that we interpret as the marker of a transition from extensional to strike-slip tectonic regime during the Pliocene. The strike-slip motion along faulted corridors is responsible for a succession of transpressional and transtensional structures respectively, interpreted as restraining/releasing bends and step overs along the faults. We show that the faults identified offshore from seismic data overlap well the epicenters of registered seismic events and underline some major active N070° trending strike-slip corridors running onshore/offshore from the eastern Mallorca shelf to the southwestern Ibiza margin through the Central Mallorca Depression. We propose an integrated offshore/onland sketch of the Neogene tectonic evolution of the area and try to interpret it with regard to the western Mediterranean geodynamics, the corridors running parallel to the Balearic Promontory margins such as the Emile Baudot Escarpement which interpretation remains unclear.

Keywords : Balearic Promontory, Central Mallorca Depression, Strike-slip deformation, Evaporites.

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