

## **Recent Wrench Tectonics at the Alboran-Ridge and Yusuf Fault Zones: Unraveling Evidences from Seismic Images**

**Pedro Martinez-Garcia, Menchu Comas, and Juan-Ignacio Soto**

Instituto Andaluz de Ciencias de la Tierra (CSIC and University of Granada). Campus Fuentenueva, University of Granada, Spain

The recent tectonic evolution of the Gibraltar Arc System, the Betic-Rif chains and the enclosed Alboran Basin, is clearly depicted in the basin' realm. Regional MCS profiles (reprocessed until 7 s.t.w.t.) provide a comprehensive view on the structural framework in the Alboran Basin. The actual crustal structure in Alboran results from the aftermath of extension and compression in basin evolution: Extensional tectonics, resulting in block-faulting and low-angle normal detachments, occurred from early Miocene (about 18 Ma) to late Miocene (about 9- 8Ma); and subsequent contractive tectonics, producing folding, high-angle faults and basin inversion, happened from late-Miocene till now days.

Recent deformation is mainly conditioned by post- Messinian wrench tectonics. Conjugated, NE-SW and NW-SE directed, strike-slip fault systems and associated folding deform Pliocene to Holocene sequences.

The major bathymetric high along the basin, the Alboran Ridge-Xauen Bank lineament, represent a giant complex antiform bounded by strike-slip to reverse fault zones. This structure, from the sinistral NE-SW fault system, encompasses significant uplift and basin inversions.

The Yusuf Fault Zone, fitting in the dextral NE-SW fault system, includes two master faults that condition local transtension given way to the Yusuf pull-part basin.

Multibeam side-scan sonar and ultra-high resolution seismic data of both the Alboran Ridge and the Yusuf Fault- Zone, show how the wrench tectonics affects the seafloor. Active tectonics there is proved by slumps and mass wasting structures, probably derived from the earthquakes reported at these lineaments.

Seismic images from the Alboran Basin are expressive of significant crustal deformation in the Gibraltar Arc System drove by post-Messinian tectonics, which in turn is responsible of the actual roughly-meridian shortening and substantial WSW-ENE elongation of the basin.

Key words: Alboran Basin. Wrench tectonics. Seismic profiles.