



Mesozoic and Cenozoic evolution of the SW Iberian margin

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The SW Iberian margin lies at the eastern termination of the Azores-Gibraltar Fracture Zone (AGFZ), the diffuse transform plate boundary between Africa and Iberia (Sartori et al., 1994). It comprises the Gulf of Cadiz and the Algarve Basin, which were developed under two main different regional stages of deformation.

During the Mesozoic, the SW Iberian margin evolution since the Late Triassic was dominated by the Pangea break-up and the Central Atlantic opening up to Early Jurassic, followed by the westernmost Tethyan opening up to Mid/Late Jurassic, and the North Atlantic rifting from Late Jurassic to Early Cretaceous (e.g., Schettino and Turco, 2010). This phase of extension led to the formation of E-W to NE-SW trending, basement-involved extensional faults, the triggering of salt tectonics and the uplifting of basement highs (e.g., Guadalquivir Bank). This extensional phase was responsible not only for the sedimentary depocenter distribution, but also for the crustal configuration of this passive margin, extending from continental crust in the proximal part, to oceanic crust in the distal and deepest portion of the margin.

Since the Late Cretaceous, the margin was inverted due to the N-S convergence between Africa and Iberia, being still undergoing collision given the dominance of reverse fault earthquake mechanisms (e.g., Zitellini et al., 2009). The shortening in the margin is mainly accommodated by the north-dipping foliation of the basin, expressed by south-directed blind thrusts affecting the present-day bathymetry, re-activating the basement highs and the salt tectonics, and controlling the Cenozoic depocenters. The emplacement of the Betics to the east led to the westward emplacement of the gravitational unit partially overlying the sedimentary basins, corresponding to the Allochthonous Unit of the Gulf of Cadiz (AUGC).

Our observations of the margin configuration have been based on the interpretation of 2D and 3D seismic reflection surveys throughout the SW Iberian margin, well calibrated, all together with grav-mag anomaly maps, and integrated with onshore data. We document the structural pattern and framework, through paleogeographic reconstructions and the geodynamic evolution of the margin in each episode of deformation, ranging from Mesozoic extension to Cenozoic compression.