

Southwest Iberian and Northwest Moroccan Onshore Basins - Mesozoic Evolution and Geodynamic Framework

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The upper Triassic - lower Cretaceous infill of the west Iberian and northwest Moroccan on-shore basins presents a strong signature of both the Central Atlantic and the Alpine Tethys Mesozoic evolution. This fact can be better understood by comparing the Lusitanian Basin (Central Portugal, N of Lisbon) with other nearby basins to the South, such as the Portuguese Alentejo (50 km S) and Algarve Basins (200 km S), and the Moroccan Atlas (700 km SE) and Agadir Basins (800 km S).

A late Triassic rifting episode is recorded in every basin in relation to the atlasic and west Morocco penetrating branches of the Alpine Tethys and the continental fragmentation between the Grand Banks and Iberia. In early Jurassic times, a major marine invasion occurred in all the increasingly subsiding areas, formerly with intra-continental to evaporitic environments. East of the atlasic areas, the tethyan influence is intense and opened to deep marine conditions. The same facies are recorded in the Lusitanian Basin, probably opened to a boreal Tethys branch, but not in the southern Iberian basins, neither on the West Moroccan basins. From the Toarcian on, a strong uplift occurred in atlasic areas, and a separation of an Atlantic oceanic domain has been established in Morocco. This event is also recorded, at a decreasing scale northwards, in the Algarve, the Alentejo and the Lusitanian basins, with minor unconformities, instability signatures and subsidence attenuation. The middle to late Jurassic boundary is a critical moment in all these basins. Important changes in sedimentary environments, depositional hiatus, uplift and even angular unconformities, followed by increased subsidence, underline this critical moment, related to the alignment between the Iberia – North America crustal separation and the ongoing Central Atlantic drifting more to the South. Lower Cretaceous evolution is controlled mainly by the North Atlantic opening and passive margins being gradually installed northwards. Coeval facies changes, siliciclastic inputs and unconformities, may be identified in the sedimentary record of all the basins, related with successive rift-segments and break-ups.

The analysis and correlation of all these basins allows a better understanding of the Mesozoic evolution of both the Alpine Tethys and the Central-North Atlantic, by identifying contemporaneous but distinct signatures in the sedimentary record of the nearby outcropping basins.