The Mesozoic Structure of the Central Part of the South-Iberian Passive Margin and its Influence in the Cenozoic Contractional Deformation: Comparison between the Eastern Prebetic Zone (Betic Cordillera) and the Columbrets Basin (Southwest Valencia Trough)

Frederic Oriol Escosa[1], Eduard Roca[1], Mireia Butillé[1], Maria Roma[1], and Oriol Ferrer[1]

[1]Geomodels Research Institute, Universitat de Barcelona, Barcelona, Spain

Abstract

The Western Mediterranean structure results from the subduction of the Mesozoic Tethys and the inversion of the passive margins and rifts that surrounded this ocean. Nevertheless, the precise Mesozoic extensional structure of the area remains rather unknown. In most passive margins and rifts, it is reduced to the identification of extensional blocks with different series that were detached on Upper Triassic evaporites. This study aims precisely to provide a qualitative leap forward in the knowledge of this old structure and its subsequent inversion. To do this, two closer segments of the Mesozoic south-Iberian passive margin have been compared: one little deformed during the convergence between Africa and Eurasia, and other involved in a Cenozoic orogen. The first one is the SW part of the Valencia Trough and includes the Columbrets Mesozoic syncline basin which, flanked by salt ridges, formed from the motion of a lithospheric scale low-angle extensional fault. The second one, southwestwards, belongs to the external part of the Betic fold-and-thrust belt located near Jumilla (Murcia) where an extensionally faulted basement appears draped by a thrust system detached in the Upper Triassic evaporites. The comparison of both segments shows that the Mesozoic south-Iberian margin was characterized by lithospheric scale low-angle extensional faults that thinned the continental crust. These faults affected the Upper Triassic evaporites, which, decoupling the deformation generated the drape folding of the overlying cover. This one was cut by listric faults on the basement fault footwalls, and folded forming huge syncline basins in their hangingwalls. Also, it was pierced by salt ridges and diapirs that mainly grew above the basement faults and rollover hinges. The ongoing Cenozoic contractional deformations appear clearly controlled by the reactivation of the large basement faults and the propagation of their motion along the Upper Triassic evaporites. These act as a decollement level above which the pre-existent diapirs are squeezed and the listric faults reactivated or deformed by detachment folds. The foreland propagation of the deformation at the Upper Triassic evaporites is prevented when there are older basement extensional faults that sank or tilted them to the foreland.