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3D Reconstruction of the Extensional and Contractual Structure in a Region of the Eastern Iberian Chain (Iberian Peninsula)

The Iberian Chain developed by inversion of Mesozoic rifts during the Paleogene. The Maestrat Mesozoic basin forms part of this chain. Both basement and cover involved areas can be recognized inside the Iberian Chain during the Mesozoic extension and the Tertiary contraction. This paper addresses the 3D structure of the passage between the cover and basement involved areas in the Maestrat basin. Ninety seismic profiles, 4 oil wells and field data are used. Two Mesozoic rifting episodes can be recognized. The first one, Late Permian-Middle Triassic in age, created high-angle normal faults, which deformed the Paleozoic basement, the Buntsandstein and lower-middle Muschelkalk facies. Upper Muschelkalk and later units are not affected by these faults. The second rifting episode, late Jurassic-early Cretaceous in age, resulted in the stretching of the Paleozoic basement by the reactivation of the faults created during the first rift episode whereas a listric extensional fault system developed in the younger rocks. The detachment level of this fault system is located in the Middle Muschelkalk shales and salt, which exceeds 1000 m in thickness. A Tertiary contraction resulted in the inversion of some of the Mesozoic extensional faults as part of North-vergent fold and thrust system. The detachment of this system is located in the Middle Muschelkalk rocks in the cover-involved areas, and extends into the Paleozoic basement to the South.