

Compressional salt tectonics in the early stages of the South Pyrenean foreland basin

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Salt tectonics in the Pyrenees has been widely documented for the Cretaceous extensional episode, defining the existence of salt walls and minibasins along the northern and southern Pyrenean paleomargins. The original geometry of these salt structures was heavily overprinted by shortening during the Alpine orogeny, but restored models have been documented. Other features explored regarding salt tectonics are the big domical or equidimensional diapirs that evolved during the Late Tertiary and still retain their shape in the southern Pyrenees. In either case, the Triassic Keuper evaporite layer is the source layer for the diapiric structures, which is also traditionally recognized as the main detachment level for the external Pyrenean thrust belts.

In this work we focus on the role played by salt during the early stages of Alpine compression, which has been comparatively much less investigated. The Late Cretaceous to Eocene early foreland basin of the Southern Pyrenees shows evidence of salt movement that is often overlooked due to the most evident imprint of thrusts and associated fault-related folds. In this preliminary study we report field examples that shed some light on the interplay between halokinesis and buckling in the low-strain compressional regime during the early stages of the Pyrenean orogeny. Also we discuss how the growing salt structures control the local subsidence and the sediment dispersal patterns within the basin.

We describe cases of salt-related geometries in the Eocene basins of the southern Pyrenees in areas as the footwall of the Montsec thrust -the Ager basin-, the External Sierras south of the Jaca basin, and the Pobla de Segur and Senterada intramontane conglomerate deposits on the Boixols and Noguères thrust sheets. The examples are separate, but they offer a wide range of geometries such as tight synclines, vertical and overturned fold limbs, growth strata, and fault boundaries that can be interpreted as thrust welds. These serve as a basis to develop preliminary models addressing the relative role of compressional and drape folding by salt withdrawal and the effect of sediment progradation and retrogradation, evidencing the significance of salt-assisted deformation in the early stages of the South Pyrenean foreland basin.