



Contractional reactivation of salt structures: the oblique Turbón-Serrado detachment folds system in the South-Central Pyrenees

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Salt-controlled fold-and-thrust belts commonly develop from the reactivation and contractional rejuvenation of early salt structures developed during rift to passive margin stages. Deformation and incorporation of these early salt structures and related minibasins in the thrust system commonly results in a high degree of geometric variability (i.e. different orientations and wavelengths, contacts omitting and/or repeating stratigraphy, overturned panels or flaps, changes in sedimentary facies and thicknesses adjacent to salt bodies, etc.). Comprehensive understanding of these elements requires conducting tridimensional structural analysis, applying structural geology know-how and modern salt tectonic concepts.

This study focuses on the Turbón-Serrado anticlines in the South-Central Pyrenees (Spain). This anticline pair system is characterized by involving a rather thin stratigraphy detached on Triassic salt that developed during uppermost Cretaceous times in between the salt-controlled depocenters of the Cotiella and Las Aras basins. The Turbón-Serrado area provides excellent outcrops to study the geometries and kinematics of contractionally rejuvenated salt structures. In detail, these anticlines run N-S, perpendicular to the major structural trend of the South-Central Pyrenees, and display comparatively shorter wavelengths and more tightening than surrounding structures.

Synthesis of geologic maps and integration of structural data collected in the field with subsurface data (i.e. well and 2D seismic) are used to produce a series of cross sections. Structural restorations allow better understanding of structural styles and kinematics of these structures. Preliminary findings indicate that the Turbón-Serrado anticlines likely developed from an area characterized by thinner stratigraphy, away from surrounding depocenters, probably on a major relay zone on the southern margin of the Pyrenean Rift System. Salt inflation and evacuation during rifting and passive margin stages restricted sediment deposition in the area. A thin stratigraphy on inflated salt in a relay area of the rift margin may have favored the development of a tight anticline pair during the subsequent contractional reactivation, in a rather unusual orientation at high angles to the regional structural trend. The deposition of a thick sequence of synfolding turbidites facilitated the development of the lift-off geometry of the Turbón anticline as well as the formation of the adjacent megaflap in the footwall of the reactivated Las Aras extensional fault.