

Sedimentologic and Sequence-Stratigraphic Characterization of Salt-Related Basins and Megaflaps at the Aulet and Adons Diapirs, Spanish Pyrenees

C. Evelyn Gannaway Dalton¹, Katherine Giles², Josep Munoz³, Mark Rowan⁴

¹New Mexico State University; ²University of Texas at El Paso; ³University of Barcelona; ⁴Rowan Consulting Inc

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Abstract

The Aulet and Adons diapirs in the south-central Pyrenees have been interpreted as either salt rollers or passive diapirs derived from Triassic Keuper evaporites. They are flanked by upper Albian to lower Santonian synrift to postrift strata in three tectonostratigraphic domains (Sopeira, Faiada, Sant Gervàs) variously interpreted as extensional-rollover subbasins or salt-withdrawal minibasins. Pyrenean shortening resulted in contractional megaflaps in at least the Sopeira and Sant Gervàs domains. We use sedimentologic and sequence-stratigraphic analysis to resolve the origin of Aulet and Adons diapirs and establish a more constrained basin framework for interpreting the kinematics of megaflap rotation. The Sopeira domain, south of the Aulet diapir, contains subvertical Aulet Fm., which is an expanded upper Albian to lower Cenomanian succession of shoreface bioclastic limestones that shallow, thin, and onlap eastward, but show no evidence of passive diapirism. However, large blocks of lower Aulet Fm. are preserved within upper Aulet Fm. on the eastern lateral margin of the basin and interpreted as slump blocks from an elevated salt ridge (Llastarri fault zone), which was flooded as regional postrift transgression began. These data suggest the Sopeira domain evolved primarily by gravity-driven extension. The Sant Gervàs domain, south of the Adons diapir, contains completely overturned reefal to basinal facies as a thin upper Cenomanian to Turonian interval, but an expanded Coniacian to lower Santonian succession. The subsurface geometry is uncertain, but an extensional-

rollover origin of the Sant Gervàs domain best explains the evolving salt-sediment relationship and most realistically allows for later rotation to completely overturned. The Llastarri fault zone, between the Sopeira and Sant Gervàs domains, was first part of the N-S trending eastern margin of the older Sopeira basin with numerous slump blocks, then the western footwall of the younger Sant Gervàs basin. Finally, the Faiada domain, west of the Adons diapir, comprises an expanded upper Cenomanian to Turonian succession of inner platform to basinal facies with diapir-derived detritus and halokinetic sequences, which indicate it has at least some component of salt withdrawal adjacent to a passive diapir. The increased accommodation from passive salt movement of Adons diapir preserved a more continuous sequence-stratigraphic record of postrift transgression than recognized regionally. By resolving the origin and early extensional history of these domains and salt bodies and constraining the three-dimensional basin framework through sedimentologic and sequence-stratigraphic analysis, structural analysis can be applied to determine the kinematics of contractional salt tectonics and megafault rotation during the Pyrenean Orogeny.