Geophysical Research Abstracts
Vol. 21, EGU2019-18898, 2019
EGU General Assembly 2019

Anatomy of an exposed diapir-related carbonate minibasin (Jurassic, High Atlas, Morocco)

Antonio Teixell (1), Antonio Barnolas (2), Idoia Rosales (3), and María-Luisa Arboleya (1)

(1) Departament de Geologia, Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain , (2) Consultant, C/ Playa de Sangenjo 3, 28290 Las Rozas de Madrid, Spain, (3) Instituto Geológico y Minero de España, 28760 Tres Cantos, Madrid, Spain

We present the structural geometry and facies architecture of a small diapir-related carbonate-dominated basin from the Jurassic rift of the Moroccan High Atlas, based on surface exposure. The Azag minibasin is a lozenge-shaped depocenter, 9 km long and 4 km wide, completely enclosed by tectonic boundaries that we interpret as welds after former salt walls. The exposed ca. 3000 m-thick infill of the Azag minibasin is asymmetric; in an E-W profile, layers are tilted to the W defining an expulsion-like rollover geometry. A N-S (strike) profile shows a more symmetric bowl shape.

Sedimentary discontinuities, upturned layers and wedges of growth strata near the basin margins indicate sedimentation contemporaneous with diapiric rise of a Triassic ductile layer. Facies evolution reflects local accommodation by salt withdrawal and regional events in the High Atlas rift. The early basin infill in the Sinemurian to Aalenian shows thickness variations indicative of low-amplitude halokinetic movements, with reduced thickness compared to areas outside the basin, indicated it was a relatively inflated high. Subsidence increased dramatically in the Bajocian-early Bathonian (?), the main phase of downbuilding, when over 2600 m of carbonates and shales accumulated at a rate > 0.5 mm/a in the depocentral area of the minibasin governed by W-directed salt expulsion. The stratigraphic units distinguished often show maximum thicknesses and deeper facies in the depocentral area, and rapidly change to shallower facies at the basin margins. The Bajocian carbonate facies assemblage of the minibasin include: reservoir facies as microbialite-coral reefs in the basin margins (formed during periods of strong diapir inflation and bathymetric relief), basin-expansive oolite bars (formed during episodes of subdued relief), and organic-rich, dark lime mudstones and shales that show source-rock characteristics.

There is no record of activity of the Azag basin and flanking diapirs during the late Jurassic and the Cretaceous. During the latest Cretaceous to Cenozoic orogeny the Atlas region was submitted to regional N-S-oriented compression, accommodated in the Azag area primarily by diapir squeezing, leading to thrust welding and possibly bed oversteepening of the diapir flanks. The interior of Azag basin, which was already tilted to the west, was comparatively little deformed, although a N- to NNE-dipping transecting cleavage, parallel to the orogenic trend of the High Atlas, attests for a component of internal strain.