Characterization of syn-diapiric Jurassic sedimentation in the Taghia and Tazoult areas, Central High-Atlas, Morocco

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In the central part of the High-Atlas (Morocco), the Amezrai syncline preserves several thousand metres (<6000 m) of Early to Middle Jurassic deposits. The syncline is developed between two diapiric ridges; the ENE-WSW oriented Taghia Ridge to the south, and the NE-SW oriented Tazoult Ridge to the north. At depth, the ridges are thought to be controlled by synsedimentary faults, that localized the diapiric rise of Triassic shales, basalts and locally of Dogger magmatic rocks.

Regionally, the Early to Middle Liassic sequences are formed by carbonate platform facies (<1000m thick), whereas the Late Liassic to Early Dogger sequences correspond to mixed carbonate/siliciclastic deposits (2500m thick or more). Carbonate platform sedimentation was re-established from Late Aalenian times.

The structures, depositional geometries and facies distribution in both the carbonate and mixed systems attest to the synsedimentary nature of diapiric processes along the ridges. The response of these two types of sedimentary systems presents distinctive features. In carbonate systems, diapiric movements have a major role on the location and morphology of bioconstructed (lithiotis) carbonate platform margins and associated mini-basins, dominated by either hemipelagic or gravity-flow deposits. Localized periodic exposure of the carbonate platforms on the crest of the diapiric ridges is marked by carbonate breccia deposits. In mixed systems, synsedimentary halokinetic deformation (progressive unconformities with wedge/hook geometries) occurs only very close to the diapirs (>100 m). Significant variations of sedimentary facies (development of reefs, conglomerates, etc…) are very localized by the diapiric activity.

Reactive diapirism initiated during a phase of extensional tectonic deformation in the Atlas Basin, and the development of Middle Liassic carbonate platform sedimentation. Subsequently, passive diapirs occurred during Late Liassic mixed carbonate-siliciclastic systems. The main phase of diapiric movements is sealed by Dogger (Late Aalenian-Bajocian) carbonate platform deposits in the study area.