

Middle Jurassic unsteady sedimentation in the High Atlas Basin (Imilchil area, Morocco) controlled by halokinetic and regional vertical movements

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The central High Atlas around Imilchil is characterized by NE- to ENE-trending, elongated anticlinal ridges cored by disordered Triassic rocks (gypsum argillites, altered basalts) and Jurassic intrusives alternating with wide, flat synclines involving thick Jurassic deposits. The Middle Jurassic formations correspond to a regressive megasequence with, from bottom to top, shallow marine platform carbonates (Aalenian-Bajocian), transitional deposits (Bajocian-Bathonian), and continental redbeds (Bathonian-?Callovian). Numerous criteria of synsedimentary tectonic activity are observed in the area such as slump folds, debris flows, fanned bedding, migration of reef mounds, shallow-angle intraformational unconformities or even deep unconformity of the Bathonian redbeds on top of the Aalenian-Bajocian carbonates. Some of these structures delineate N-S alignments, but most of them are located along the flanks of the anticlinal ridges, suggesting a synsedimentary formation of the ridges. The ridge upheaval seems particularly strong at the intersection of the NE-SW and N-S structural trends. We consider halokinesis and argillokinesis within the Upper Triassic synrift sequence beneath the Jurassic basin as the dominant tectonic mechanisms during Middle Jurassic times in the area. The formation of the diapiric walls (likely controlled by basement faults and initiated as early as the Middle Liassic) was accompanied by thick sedimentation in the adjoining rim synclines. The diapir breakout up to the surface was favoured by the intrusion of gabbroic magmas during the Middle-Upper Jurassic, coeval with the regional uplift and initiation of subaerial conditions in the whole area. Erosion of the ridges lagged up to or resumed before the Paleocene, being followed by the accumulation of Thanetian-?Ypresian continental redbeds, lacustrine limestones and basalts only preserved on top of some of the Imilchil ridges (syncline-topped anticlinal ridges, STARS).