geoconvention
Calgary • Canada • May 13-17 2019

Tectono-eustatic effects on siliciclastic-rich to siliciclastic-poor outer-to-inner ramp carbonate transition: Albian to early Turonian Dhalqut Formation, Dhofar, Southern Oman

Osman Salad Hersi[1], Iftikhar A. Abbasi[2], Abdulrahman Al-Harthy[3], [1]Department of Geology, University of Regina, [2]Department of Earth Sciences, Sultan Qaboos University, [3]Petroleum Development of Oman

Summary

The Dhalqut Formation is an upper Albian to lower Turonian carbonate-dominated succession preserved in the Jeza-Qamar Basin of the Dhofar Region of southern Oman. The formation thickens from about 200m in the eastern outcrops (e.g., Jamal Samhan) to about 800m in the vicinity of the Oman-Yemen border (Jabal Qamar). The formation consists of three members that are Umbaraaf, Khadrafi and Sarfait, in ascending order. It is conformably underlain by Albian Kharfot Formation and unconformably overlain by Campanian Samhan Formation or Maastrichtian Sharwayn Formation. The Umbaraaf Member is dominated by fine siliciclastic-rich *Orbitolina*-rich marls interbedded with bioclastic wackestone lithofacies. Subordinate rudist- and oyster-bearing biostromes with marly matrix are also present. The marls are rich in clays and silt-size quartz grains. The marls are commonly nodular with horizontal burrows but also show horizontal laminations. The uppermost part of the member is defined by rusty, cross-laminated, normally-grading, sandy, intraclastic, bioclastic and oolitic grainstones. The Khadrafi Member consists of m-scale rhythmic units of nodular, rudist- and *Orbitolina*-bearing marls that grade to medium- to thickly-bedded, nodular, bioclastic mudstones to wackestones and capped by thickly-bedded, massive rudistic rudstones and grainstones that locally reach more than 10 meters thick. Other diagnostic fossils in the member include ammonites, intact echinoids, mollusks and foraminifera (*Praealveolina* sp. among others). The member ends with about 50-m thick bioclastic mudstone / wackestone lithofaces with calcareous shale interbeds. These beds contain calcispheres and radiolarian elements. These beds are interpreted to indicate the deepest depositional environment (“maximum flooding facies”) of the formation. This is followed by the Sarfait Member which consists of cliff-forming carbonate rocks dominated by interbeds of clean, coarse-grained rudistic rudstones to grainstones and mudstone to wackestone lithofacies. A distally-deepening carbonate ramp setting has been envisaged for the deposition of the formation. The basin received relatively high siliciclastic input during deposition of the Umbaraaf Member. The clastic flux subsided gradually and pure carbonates became the depositional norm during the later stages of sedimentation. Tectonically-induced regional paleogeographic configuration suggests that most of the siliciclastic influx originated from the western side of the basin (Fartaq High of Yemen) rather than the basin’s apparently subdued eastern margin (Marbat High). Latest Cenomanian – early Turonian sea level drop produced progradation of the carbonate platform followed by complete exposure, shut down of the carbonate factory and development of the unconformity separating the Dhalqut Formation from the Samhan Formation.