

Microfacies, sedimentary environment, sequence stratigraphy of Dariyan Formation in one of the Persian Gulf fields

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Abstract

The Dariyan formation (Shuaiba equivalent) with aptian-albian in age is one of significant reservoirs in the Zagros and the Persian Gulf. This formation in the study field (western Persian Gulf) include sequence of 185 orbitolinoid shallow and deep carbonate facies. The Dariyan formation in this area is divisible into four zones: Lower Dariyan with gray Limestone and dissolution cavities, Kazhdumi Tongue with dark gray Marl and without structure, Upper Dariyan dark to light clean Limestone and Upper clastics with Sandy Siltstone and Shale. Microfacies study of the Dariyan led to recognition of 8 microfacies and 3 petrofacies in 5 facies belt inclusive Delta, Inner ramp, Mid-ramp, Outer ramp and Basin. Microfacies interpretation which is done based on the fauna mainly indicates shallow marine environment. Also uniform variation of microfacies and absence of rim and buildup faunas, and replacement of corals and rudists by the Lithocodium-Bacinella is coeval with the Oceanic Anoxic Event 1a, that Lithocodium-Bacinella had fewer abilities to build huge reefs so this depositional environment predicted as carbonate ramp with patch reefs and mounds. The three sequences were recognized in the study field. These sequences belong to Early, Middle and Late Aptian, respectively. In the first and third sequences, the sequence boundaries were identified by the unconformities and their related features, while in the second sequence, the retrogradation and alteration of the intrashelf basin facies (Kazhdumi) to shallower facies were recognized. The maximum flooding surface was also identified by the maximum transgression and deep outer ramp and basin facies in addition to rather increase in oxygen and carbon isotope values. Finally, a siliciclastic sequence, due to the entrance of siliciclastic sediments to the basin, was recognized.

Keywords: aptian-albian, carbonate ramp, sequence stratigraphy, Zagros