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Depositional architecture and sequence stratigraphy of the Upper Jurassic Hanifa Formation, central Saudi Arabia

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Abstract

To document the depositional architecture and sequence stratigraphy of the Upper Jurassic Hanifa Formation in central Saudi Arabia, three composite sections were examined, measured and thin section analyses at Al-Abakkayn, Sadous and Maashabah mountains. Fourteen microfacies types were identified, from wackestones to boundstones and permits recognition of five lithofacies associations in a carbonate platform. Lithofacies associations range from low energy, sponges, foraminifers and bioclastic burrowed offshoal deposits to moderate lithoclstic, peloidal and bioclastic foreshoal deposits in the lower part of the Hanifa while the upper part is dominated by corals, ooidal and peloidal high energy shoal deposits to moderate to low energy peloidal, stromatoporoids and other bioclastics back shoal deposits. The studied Hanifa Formation exhibits an obvious cyclicity, distinguishing from vertical variations in lithofacies types. These microfacies types are arranged in two third order sequences, the first sequence is equivalent to the lower part of the Hanifa Formation (Hawtah member) while the second one is equivalent to the upper part (Ulayyah member). Within these two sequences, there are three to six fourth-order high frequency sequences respectively in the studied sections.