

New regressing and transgressing Jurassic siliciclastic coastlines: Dhurma Fm., N. Central Arabia.

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ABSTRACT

The Middle Jurassic Dhurma Formation in Saudi Arabia has long been known as part of Saudi Arabia's carbonate, oil-producing succession. During the 1980-2000's, it was discovered that the carbonate rocks of the Dhurma are replaced laterally by siliciclastic deposits in northern and southern central Arabia. As yet, the sedimentology and stratigraphy of the Dhurma siliciclastic deposits are not well known.

Recently drilled shallow stratigraphic wells on and near the outcrops of the Dhurma Formation about 250 km northwest of Riyadh provide an extraordinary opportunity to analyze the sedimentological and stratigraphic characteristics of these siliciclastic sediments. In this study, around 4500 feet of cores from six shallow stratigraphic wells were described to understand the transgressive and regressive siliciclastic deposits of the Dhurma Formation, and how these fit with their better-known carbonate counterparts.

The transgressive facies associations comprise: (I) fluvial-tidal channel deposits in upward-fining units with erosional bases, cross stratification, as well as tidal indicators such as mud drapes and IHS; (II) estuarine central basin mud deposits with intersecting tidal creeks and washover fan; (III) tidal inlet/ barrier island deposits; (IV) chenier deposits (V) shelf ridge deposits; and (VI) shelf carbonates. The regressive facies associations are; (VII) supratidal mudstones, (VIII) tide- and fluvial-dominated delta front to prodelta deposits, (IX) shoreface with muddy shelf deposits. There are also facies associations, which can occur in both types of shoreline movement, namely; (X) intertidal flat and salt marsh deposits, (XI) fluvial-distributary channel deposits, and (XII) shelf mudstones.

This study is the first to document the sedimentology and stratigraphy of the Dhurma siliciclastic succession in northern central Arabia, and highlights a complex mixed system of deltaic and estuarine deposits that interfinger with carbonate deposits.

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