

Sedimentary Facies, Sequence Stratigraphy of Mixed Carbonate-Siliciclastic Sediments, Early Middle Miocene Dam Formation, Eastern Saudi Arabia

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Abstract

The Dam Formation outcrops along a N-S transect in the Al-Lidam Escarpment area in Eastern Saudi Arabia and are studied to determine facies architecture and heterogeneity and to attempt correlation of the sequences in the formation. High resolution photo-mosaics and detailed sedimentological description and profiling were used to illustrate the distribution of rock facies on the outcrop face. In southeastern Lidam Area, facies identified range from skeletal banks facies (e.g. coated skeletal grainstone, Sandy peloids skeletal grainstone, foraminiferal peloids grainstone and bioclastic peloidal packstone), to intertidal facies (including oolitic grainstone, peloidal packstone). Paleosols, which suggest subaerial exposure and bioturbated sandstone/mudstone, representing channeling and erosion in an estuarine environment were also identified. The carbonate facies form small scale shallowing upward cycles with mud, ooids and peloids. The abundance of broken shells indicates tidal conditions influence during deposition.

Facies are generally continuous in close located outcrops such as the Outcrops 6, 7 and 10, but become while discontinuous when correlated with the distally located Outcrops 25 and 26. In the northwestern part of Lidam Area, the facies are thinly bedded, and comprise of tidal flats, estuarine sandstone, oolitic grainstone and peloidal packstone which are cyclic with erosive bases below the sequence boundaries. Several interbeddings of mud-cracked siltstone and mudstone facies with quartz sandstones indicate a terrigenous source. This is in agreement with the regional paleogeography, and implies that the sediments in this area are more proximal than from those to the north. Although these mixed carbonate-siliciclastic facies were deposited in different sub environments and paleogeographic areas, a high resolution stratigraphic model was made using beds cyclicity and sequence boundaries for correlations for the stratigraphic unit. The 1D Sequence constructed includes four Composite Sequences (CS1, CS2, CS3 and CS4). The composite sequences are divided on the basis sequence boundaries represented by estuarine sandstone overlying paleosols.