

Holocene Carbonates and Evaporites and Their Ancient Analogous Assemblages Throughout Permo-Triassic and Jurassic Reservoirs of the Arabian Basin

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The Holocene shallow-water carbonate and supratidal evaporite tract of Abu Dhabi consists of seaward reefs, barrier islands and tidal flats. As with similar sedimentary sequences in the subsurface of the Arabian Gulf, and elsewhere, the sediments of this coastal region pass landward into continental facies and seaward into basinal facies. In eastern Abu Dhabi ooids collect on inter-island tidal deltas while coral reefs are restricted to small patches along channels and just seaward of the centers of the islands. To the west, coral reefs grow along the northern edges of most of the offshore banks north of the Khor al Bazam. Eastward protected lagoons are the site of carbonate mud and pellet accumulation, whereas to the west of Al Dhabaiya peninsula, carbonate muds accumulate only in a narrow belt south of the offshore bank, while grapestones and skeletal debris are the dominant components. South of this bank supratidal flats encroach on the lagoons as beach ridges and cyano-bacterial flats.

A similar relationship of sedimentary facies is exhibited by some Upper Jurassic and Late Permian sediments of the subsurface of the Central Arabian Gulf with the characteristics of typical cyclic carbonate-evaporite sequences from supratidal (sabkha), lagoon, shoal and shallow shelf settings. It is proposed that the current Abu Dhabi's coastal area be used as a comparative model for these ancient carbonate/evaporite depositional and diagenetic processes. In the Late Jurassic facies relationships at the pinch out between the Hith Anhydrite and the Asab Oolite in Central Abu Dhabi indicate that these sediments accumulated in a nearshore to sabkha setting. Eastward of this margin the Hith changes its character and appears to have accumulated in a standing body of water. The Late Permian Khuff Formation is formed of a series of cyclic units, each of which commences with dolomitic subtidal grainstones to packstones and passes upwards into lagoonal/intertidal dolomites to be capped by subtidal, supratidal anhydrite, or dolomitic anhydrite.