SHORELINE DEPOSITIONAL ENVIRONMENTS OF THE GLEN ROSE FORMATION (LOWER CRETACEOUS) IN THE TYPE AREA, SOMERVELL AND HOOD COUNTIES, TEXAS

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ABSTRACT

The Comanchean Series in north-central Texas was deposited along the margin of a shallow sea as it transgressed northwestward across the Central Texas platform during early Cretaceous time. A lithologic and paleontologic study of the Glen Rose Formation (uppermost Trinity Division) in its type area was undertaken to define the shoreline sediments deposited during Aptian-Albian time. The studied interval was subdivided into informal units A, B, and C based on lithology and fossil content. The primary focus was on the lowermost Unit A for purposes of facies analysis.

Unit A comprises a clastic-to-carbonate transition deposited in a seaward-fining tidal-flat salt-marsh complex. Eight distinct facies were identified, including the calcareous sandstone, calcareous shale, bivalve shale, oyster shale, transitional terrigenous-carbonate, dolomite, bioclastic packstone-grainstone, and shell fragment wackestone facies. These facies were deposited in sand flats; small fluvial creeks; an ecologically complex, mud-dominated intertidal flat; and an subtidal, nearshore lagoon. Thin bioclastic packstone-grainstones and dolomites of the high energy intertidal and supratidal environments regularly interrupt the terrigenous clastic facies. The microfossils are severely restricted to absent, and the macrofossils are dominated by euryhaline bivalves (including *Corbula martinae*), gastropods, serpulid worm colonies, and dasycladacean algae. Other abundant nearshore features include salt-tolerant land plants, dinosaur tracks, desiccation cracks, and localized concentrations of gypsum and barite.

This tidal flat-salt marsh complex received sediments from both terrestrial and marine sources. A broad intertidal zone of vegetated sand and mud flats was dissected landward by small fluvial creeks and seaward by storm beaches and marine inlets. The fine size of the terrigenous clastics indicates a low energy flat with a very gently seaward-dipping substrate. A warm, semiarid to arid climate favored the development of salt marshes and the precipitation of evaporites. The faunal restriction also suggests the abnormal salinities of tidal marshes. This sequence is considered comparable to the Holocene salt marshes on Sapelo Island, Georgia, based on similar seaward-fining substrates, sedimentary structures, and biological components.

Unit B (the Thorp Spring Member) consists of a peloidal, molluscan packstone-wackestone facies. The fossil assemblage (including *Orbitolina texana*) suggests slightly brackish to near normal marine salinities in a shallow, restricted platform lagoon. Thorough bioturbation indicates deposition in the well aerated subtidal zone. Unit C is characterized by coarsening-upward limestones capped with thin intertidal-supratidal deposits, indicated a transitional nearshore lagoon-tidal flat environment. Repeated inundation with marine waters produced stacked, shallowing-upward sequences. The entire studied interval reflects fluctuating sea levels along a line of section nearly normal to the paleoshoreline, and represents the final waning of Glen Rose seas.

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