

SEISMIC STRATIGRAPHY AND DEPOSITIONAL HISTORY OF HOLOCENE SEDIMENTS ON THE CENTRAL TEXAS GULF COAST

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ABSTRACT

Application of seismic stratigraphic analysis to high-resolution sparker profiles from five bays on the central Texas Gulf coast provides a three-dimensional model of Holocene sedimentation in the study area. To establish a time-stratigraphic framework for the seismic sequence, a regional basal unconformity was picked as the lower sequence boundary and the sediment/water interface was defined as the uppermost boundary.

The seismic sequence is subdivided into discrete seismic facies based on reflector configuration, geometry and bounding relationships. Facies delineation allows the development of a model seismic facies tract: a lower-most complex/chaotic fill facies, bounded by the subjacent regional unconformity, grades upwards into an onlap fill facies, which in turn grades into an overlying parallel/subparallel/divergent facies.

Based on lithologic and textural data from bore-hole logs, a correlative sedimentary facies tract is found to consist of: a fluvial/channel-fill facies, unconformably overlying a subjacent erosional surface and grading upwards into a deltaic facies, which in turn grades into the uppermost bay-estuarine facies.

Chronostratigraphically, the lower, bounding unconformity is correlative with the last Pleistocene (late Wisconsin) low stand of sealevel. At approximately 10,000 years B. P., rising sealevel associated with the Holocene transgression began to flood the erosional valleys, causing a gradual flux from fluvial to deltaic deposition. With continued sealevel rise, the deltaic environment shifted landward (moving up the back-filling valley) and bay-estuarine conditions began to dominate as sea level approached stillstand, about 3500 years B. P. Aggradational bay fill has been the dominant mode of sedimentation since that time.

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