Shale Tectonics Controlled Depositional History, Eocene Wilcox Group, Central South Texas Coast

Hongliu Zeng¹, William A. Ambrose¹, Zhijun Yin², and Wenlong Xu³

 ¹Bureau of Economic Geology, Jackson School of Geosciences, University of Texas at Austin, University Station, Box X, Austin, Texas 78713–8924
²China University of Petroleum, No.18 Xuefulu Changping District, Beijing, China
³Excellong, 5524 Palm Royale Blvd., Sugar Land, Texas 77479

ABSTRACT

Tectonic and stratigraphic architecture of the Wilcox Group along the central coastal plain of Texas (Bee/Goliad region) defines a series of growth fault-controlled subbasins similar to those in the Frio Formation in the Corpus Christi region, South Texas. A seismic sedimentologic study was performed to map higher-order (fourth- and fifth-order) systems tracts in a 2500-km² 3D seismic survey. Guided by third-order sequence-stratigraphic correlations from seismic and sparse core and wireline-log data, we prepared stratal-slice maps to reveal high-resolution (10-m scale) sediment-dispersal patterns and associated systems tracts in a relative geologic-time domain, particularly in third-order lowstand subbasins. Recognized depositional systems include (1) incised valleys and relict on-shelf deltas on an exposed shelf; (2) lowstand prograding deltaic systems composed of lobate deltaic sandstone bodies at the shelf edge; and (3) faultcontrolled, off-shelf slope fans best characterized by point-source, fanlike channel/levee systems. Sand-dispersal patterns are controlled primarily by accommodation resulting from rollover topography associated with growth faulting initiated by shale-ridge movement. A sequential display of stratal slices reveals how the depositional systems responded to accommodation controlled by shale tectonics.