

# **Seismic Sedimentology of Incised Valley, Lowstand Delta, and Slope fan Systems in the Eocene Wilcox Group, Central South Texas Coast**

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## **ABSTRACT**

Tectonic and stratigraphic architecture of the Wilcox Group along the central coastal plain of Texas defines a series of growth-fault-controlled subbasins similar to those in the Frio Formation in South Texas. A seismic sedimentologic study was performed to map fourth- and fifth-order systems tracts in a 2,500-km<sup>2</sup> 3D seismic survey in Bee and Goliad Counties. Guided by third-order sequence-stratigraphic correlations from seismic and sparse 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 lowstand subbasins.

The integration of core, wireline log, and seismic-geomorphologic patterns in stratal slices makes it possible to identify three types of depositional systems in a typical third-order lowstand systems tract: (1) incised valleys and associated fluvial systems on an exposed shelf; (2) lowstand prograding deltaic systems composed of strike-oriented and lobate deltaic sandstone bodies at the shelf edge; and (3) fault-controlled, off-shelf slope fans best characterized by point-sources, fan-like channel/levee systems or line-sourced, complex mudslide/gully systems. Sand-dispersal patterns are controlled primarily by accommodation resulting from rollover topography associated with growth faulting. Sandstone thickness and dispersal patterns can be predicted by integrating wireline-log measurements and seismic amplitude patterns.

The high-quality, large 3D seismic data set provides a rare opportunity to visually inspect spatial relationships between incised valleys, self-edge deltas, and slope fans in a high-resolution stratigraphic framework. A sequential display of stratal slices reveals how the depositional systems respond to accommodation controlled by gravity tectonics.