
Incised-Valley Fill of the Sabine and Calcasieu Fluvial Systems (Texas and Louisiana): A Comparison of Sediment Flux During Sea-Level Rise

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ABSTRACT

The Sabine/Neches river system, located on the border of Texas and Louisiana, and the Calcasieu River in western Louisiana, both terminate in coastal bays with little evidence of bay-head delta deposition occurring today. This study investigates the causal mechanisms of depositional change under constrained eustatic sea-level rise during the most recent transgression. The study of multiple fluvial systems provides the means to extract drainage basin effects, eustasy, antecedent topography, and subsidence effects.

High-resolution seismic integrated with core data shows present day bay mud overlying prominent deltaic deposits with distributary channels, delta plain, and prodelta deposits as young as three calendar kiloyears (cal kyr). Radiocarbon isotope measurements provide a chronostratigraphy and facilitate detailed sediment flux calculations. The rivers' ability to fill accommodation space diminished rapidly as evidenced by a series of sudden bay-head delta backstepping events associated with decreases in sediment flux. Sediment flux can be attributed to drainage basin climate conditions. These fluvial drainages provide valuable analogs to paleo-river systems in semi-arid/sub-humid/humid climatic settings.