

An Investigation of a River-Dominated Delta in a Pull-Apart Basin, Lake Izabal, Guatemala: Exploring a Unique Example with Sediment Cores and Shallow Seismic Data

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ABSTRACT

End-member river-dominated deltas form by river processes and display unique sedimentation and facies distribution patterns. This end-member delta system is rare because most deltas in the world are governed by a combination of river, tidal, and wave processes. Many models have been proposed to understand the sedimentary processes and the facies characteristics and distribution in deltas. However, there are only a few cases where delta formation is mainly controlled by rivers (e.g., MacKenzie River Delta, Canada).

Observations from preliminary shallow cores drilled near the Polochic delta, Lake Izabal, Guatemala, reveal a sandy river-dominated delta that is highly progradational. This delta opens an opportunity to study a modern system to provide a better understanding of the mechanisms that drive delta growth and progradation. This will be accomplished through detailed sedimentological and stratigraphic analyses using textural, compositional, structural and paleontological description of shallow cores and seismic stratigraphic analysis using shallow seismic data. Their integration will be used to identify individual lithofacies, facies distribution, and lateral and vertical stacking patterns of facies to establish a stratigraphic facies model.

Furthermore, there is significant scientific interest in understanding facies and facies distributions in deltas because of the presence of substantial hydrocarbon resources in this type of distributary system. Therefore, a detailed sedimentological and stratigraphic analysis and a better understanding of the factors that control the facies distribution is required to aid in hydrocarbon exploration and exploitation.