# High-Resolution 3D Imaging of Quaternary Channelization: Offshore San Luis Pass, Texas

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## ABSTRACT

**The proliferation of high-quality marine seismic data as well as advanced interpretation and computing workflows have been key drivers for the dramatic gains in hydrocarbon recovery over the previous two decades. The lateral extent of seismic data and ability to image subtle variations in rock properties greatly expand our knowledge of the stratigraphic record and understanding of depositional processes. While aerially-extensive seismic imaging has been enormously successful, it typically is focused on targets at depth and subsequently lacks the vertical resolution needed to characterize fully the structure and morphology of buried geologic elements, which could affect fluid flow.**

**A newly-acquired marine high-resolution 3D acquisition system first deployed in 2012 and again in 2013 targeted the sediments in the uppermost 2 s (two-way travel time) to investigate better the structural and stratigraphic controls on pathways for hydrocarbon migration. The 2012 survey collected approximately 50 sq. km of seismic data 12 km to the southeast of San Luis Pass, Texas. The survey is located on the southern flank of a known shallowly-buried salt diaper. The 2013 survey produced an additional 50 sq. km of data fully encompassing the salt dome and surrounding stratigraphic section. The acquisition source produced a seismic signal with frequencies of typically 100–150 Hz and a dominant frequency of near 130 Hz capable of resolving vertical features near 2–3 m in thickness. The resulting datasets are sampled at 0.5 ms and have an inline spacing of 12.5 m and crossline spacing at 25 m.**

**The seismic data's high-vertical resolution in conjunction with user-applied imaging technologies such as spectral decomposition and stratal slicing highlighted a rich diversity of Quaternary lowstand channelization and the subsequent transgression. Channels range from nearly 40-m-thick single-threaded features to as large as 1.2-km-wide meanders with crevasses on the outer bends showing small distributary channels. Channel styles vary greatly temporally with small-scale highly-meandering channels contained within larger low-sinuosity valleys transitioning rapidly to an interconnected drainage network.**