

**3D HIGH RESOLUTION SEISMIC IMAGING OF  
MIDDLE – LATE QUATERNARY DEPOSITIONAL  
SYSTEMS, SOUTHEAST GREEN CANYON, SIGSBEE  
ESCARPMENT, GULF OF MEXICO**

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By

Oluwayomi Oyedele

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## **ABSTRACT**

My study describes the architecture and facies distribution of Middle-Late Quaternary depositional systems along the Sigsbee escarpment, Southeast Green Canyon, Gulf of Mexico. The Sigsbee escarpment defines the seafloor expression of the down-slope limit of the mobile allochthonous shallow salt. My study area is located within the lower continental slope in water depths of approximately 4500' (1370m), and is focused largely on the upper 500ms (approximately 400m) of sediment.

Previous work in the area delineated several fan systems landward of the escarpment. My objective was to perform a more detailed analysis of the depositional systems, including their age, lithofacies, seismic reflections, and architectural elements. Most of my work was based on interpreting 3D HR seismic data covering an area of 48 sq km. The seismic data were supplemented with four electric well logs, each with both gamma ray (GR) and resistivity logs, and one well boring from which five biostratigraphic age dates had been obtained.

The depositional systems I studied include a channel-lobe complex, channel-like features, and mass transport complexes (MTCs). The oldest of these systems was a channel-lobe complex that accumulated within a minibasin; it is composed of at least four distinct channel-lobe systems. It formed between 500 and 550 Ka, perhaps during an early rise in sea level. Numerous curvi-linear channels (best imaged using seismic attributes) are probably glide tracks, however a turbiditic origin for some is possible.

The MTCs studied are characterized on seismic by chaotic reflections, failure scars, scoured bases (basal shear surfaces), and mounded and lobate external geometry.

MTC A and MTC B were likely formed during major drops in sea level (~ 470Ka and ~ 370Ka respectively). MTC C and MTC D were probably triggered by salt-driven uplift; however two younger, widespread MTCs (not studied in detail) appear to coincide with sea-level drops at ~290 Ka and ~75 Ka.

The slope depositional systems were mainly controlled by the interplay of sea-level changes and salt tectonics. The changes in sea level dictated the volume of sediment supplied and also accommodation space for deposition. Salt movement affected the slope's depositional gradient and slope stability, as well as created localized accommodation space in the form of intraslope basins.