



Calibrated Seismic Stratigraphic Analysis of the Lavaca/Yoakum Canyon Complex, South Texas, U.S.A.

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ABSTRACT

The Lavaca/Yoakum Canyon Complex (LYCC) is comprised of two ancient submarine canyons located in Lavaca, Dewitt, and Gonzales counties of Texas. Previous studies have provided conflicting theories regarding the origin of such large erosional features within an overall progradational setting during deposition of the Wilcox Group. This study utilizes wireline log, sidewall core, biostratigraphic, and 2D seismic reflection datasets to provide insight into the processes responsible for the incision and fill of these canyons as well as generate a revised plan view morphology. The results show that the original morphologic maps of the Yoakum and Lavaca canyons which were interpreted as two separate canyons adjacent from one another is inaccurate. The relatively narrow Yoakum Canyon overlies the older, but broader Lavaca Canyon comprising a single canyon complex. We suggest that the older Lavaca Canyon was initiated during a phase of margin failure and slumping following shelf edge loading during Lower Wilcox deposition. Following this initial phase of incision, throughgoing upper slope turbidity currents contributed to further modification and retrogradational failure of the canyon. We suggest that the younger Yoakum Canyon was initially incised by high density turbidity currents and then subsequently filled uniformly by low density turbidites. The results from our observations on the LYCC evolution have important implications for the regional paleoclimatic conditions during the Paleocene-Eocene Thermal Maximum (PETM). Advocates for the Gulf of Mexico drawdown hypothesis suggest that during the <1 Myr duration of the PETM, the Gulf of Mexico experienced isolation and subsequent evaporative drawdown as the Cuban block docked against the Florida Straits. Development of the LYCC under subaerial conditions is thought to be linked to that basin scale drawdown of sea level.

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Our results show the development of the LYCC occurred entirely under subaqueous conditions indicating that at least this part of the drawdown hypothesis is an invalid model to explain the presence of the LYCC as well as other roughly coeval canyons along the Gulf Coast.

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