SEISMIC FACIES AND DEPOSITIONAL PROCESSES ON THE LOWER CONTINENTAL SLOPE, IN THE MISSISSIPPI CANYON AREA, GULF OF MEXICO

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ABSTRACT

Approximately 1,400 miles of 32-fold, migrated seismic profiles (courtesy of CGG) and data from nine wells were used to interpret Plio-Pleistocene seismic facies and depositional processes on the lower continental slope of southeast offshore Louisiana.

From *Lenticulina 1* to present, we have identified eight seismic sequences (A to H, with A the oldest sequence) and four seismic facies. The four prevailing seismic facies are parallel reflector (PR), divergent wedge (DW), mounded reflector (MR), and chaotic (CH). PR shows sheet drapes external form which is interpreted as hemipelagic/pelagic sediments or turbidites overlying a filled basin. DW suggests lateral variations in the rate of deposition, subsidence, or progressive depositional surface uplift caused by salt intrusion. MR with a hummocky or chaotic internal configuration is interpreted as mass transport deposits such as slump masses and debris flow. Disordered reflectors (CH) usually indicate strata deformed by salt movements or faulting.

The sedimentation rates derived from horizon thicknesses and time spans suggest low rates between horizons A-C and high rates from C-present. The low depositional rate produced the dominant DW facies from horizons A-C. The high sedimentation rate from horizons C-present resulted in MR dominated facies, although local salt impeding generated DW also occurs. PR occurs only in sequences F and above. This suggests very active and recent salt movement. Salt disturbance of sediments is also indicated by CH facies in horizons A-E. Isochrons pinch out toward the northeast between horizons C-D and F-H, which indicates significant lowstand deposition. Numerous channels in sequences F and G, which occur in the northeast two strike lines and near the canyon axis, coincide with these lowstands in horizons F-H. Sediment transport pathways inferred from isochrons and facies maps show a shift from northeast of the study area between horizons A-C to near the canyon axis from D-present. Depositional units inferred from seismic records appear to be mainly lowstand deposits, although in areas close to the canyon axis, highstand mass transport deposits are inferred.

Major factors controlling seismic facies and sediment distribution are sediment flux, salt activity, and sea level fluctuation. The slope gradient is considered an insignificant factor, as it ranges only from $\sim 0.5°$, near the canyon axis to $\sim 0.9°$, in the northeastern part of the study area.

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