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Stratal and Eustatic Constraints on Deposition and Paleobathymetry, Late Pleistocene Lagniappe Delta Complex, Northeastern Gulf of Mexico

Limited accommodation space on the shelf in the northeastern Gulf of Mexico during low sea level portions of the glacioeustatic cycle creates a stratigraphic framework within which the thickest deltaic and open marine section is confined to a narrow zone at the shelf edge. Studies of delta lobes of the ancestral Mobile River (Lagniappe) deposystem in the Main Pass and Viosca Knoll lease areas provide insight into the complex depositional architecture of this zone. Key to understanding the Late Pleistocene Lagniappe delta lobes is establishment of an oxygen isotope, ^{14}C , and biostratigraphically calibrated chronostratigraphy. The chronologically adjusted $\text{‰}^{18}\text{O}$ records of outer shelf and upper slope coreholes contains normal glacial and interglacial values related to isotope stages 1-13 as well as evidence of an abbreviated stage 1-2 transition meltwater spike related to the most recent deglaciation. Relative sea levels during deposition of the Lagniappe system, important to the development of deltaic morphology, benthic foraminiferal assemblages, and depositional structures, are related to glacio-eustatic sea level variations, to seafloor subsidence resulting from compaction, and to seafloor movements related to isostatic loading. Graphical stratal history analysis of four Lagniappe coreholes facilitates detailed evaluation of the complex interrelated factors controlling shelf margin deposition during the last glacial maximum to interglacial transition. Temporal backtracking of cored strata in the interval 0-450 ka BP reveals a continental margin that is progradational at the fourth-order scale of individual lowstand deltas and retrogradational at the third-order scale of shelf margin evolution, sequence stratigraphy and exploration geophysics.