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Late Holocene Patterns of Estuarine Sedimentation in the Mississippi Sound, Northern Gulf of Mexico

A gravity core study was conducted in the Mississippi Sound to determine patterns of estuarine sedimentation during the late Holocene. The Mississippi Sound is a large (~2100 square mile) bar-built estuary that parallels the Mississippi Coast. It is bounded on the west by the St. Bernard lobe of the Mississippi River delta, by Mobile Bay to the east, and by the Gulf Coast barrier islands to the south. Presently, major sources of sediment include the Pearl River, Mobile River, and transgressive barrier island sands. Cores have been analyzed using radioisotope geochronology (¹³⁷Cs and ²¹⁰Pb), x-radiography, granulometry, and a multi-sensor core logger (MSCL).

The upper ~3m of sediment in the deepest regions of the Sound (6-7 m) are bioturbated sandy muds. Major storm events are recorded as a layer of muddy sand (>50% sand) ranging from 5 – 10 cm thick. Historical data on the isopach thickness reveals a sediment accumulation rate of ~0.024 cm y⁻¹ for the past 6,000 years. Our ²¹⁰Pb/¹³⁷Cs observations indicate accumulation rates of 0.3 – 0.5 cm y⁻¹ for the past 40 – 60 years. MSCL data reveal 5 – 8 event layers in ~3 meter gravity cores. Thus, intense storms that create preservable event layers in the Mississippi Sound have return periods of 150 – 1000 years, and represent 8-26% of the sediment column. Sediments composing the other 74 – 92 % of the sediment column are deposited by lesser events and estuarine processes.