

DUFRENE, TRINITI A., Coastal Studies Institute, Louisiana State University, Baton Rouge, Louisiana 70803, SAMUEL J. BENTLEY, Coastal Studies Institute, Louisiana State University, Baton Rouge, Louisiana 70803 YVONNE C. ALLEN, Coastal Fisheries Institute, Louisiana State University, Baton Rouge, Louisiana 70803

Geologic and geoaoustic study of surficial deposits, North-Central Gulf of Mexico continental shelf

Sidescan SONAR and boxcores were collected on the north-central Gulf of Mexico continental shelf as part of an interdisciplinary study of juvenile red snapper habitat. Sidescan mosaics were created for four 8-km² blocks on the inner to middle shelf south of Biloxi, Mississippi, in water depths of 17-40 m. Boxcores were collected from specific features identified in sidescan data, and were navigated using digital sidescan mosaics overlain with real-time DGPS positioning. Boxcore sediments were analyzed for grain size and organic and CaCO₃ content. Cores from muddy substrates were X-radiographed and analyzed for the radioisotopes ²¹⁰Pb, ¹³⁷Cs, and ²³⁴Th.

Our geological observations have delineated three contrasting seabed types: linear to oblong shell ridges on the inner and middle shelf, muddy sand sheets on the middle shelf, and prodeltaic muds in the southwest of the study area, marking the eastern extent of recent shelf deposits from the modern Mississippi delta. The shell ridges are 1-3 m high and up to 200 m across. They are composed of > 50% CaCO₃, mostly oyster shell, contrasting sharply with adjacent muddy sands containing minor shell, and appear to be remnants of Holocene estuarine oyster reefs. AMS ¹⁴C dating of shell material is underway. Prior to our study, this region was assumed to be geologically similar to the transgressive Holocene Mississippi-Alabama-Florida Sand Sheet to the east, characterized by clean, homogeneous sands. The diversity of estuarine to marine deposits described here thus records a range of geological processes active from early-middle Holocene to recent time.