Late Quaternary Avulsion Events Preserved in Mobile Bay, Alabama

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Abstract

Mobile Bay is a wave-dominated estuary located in the northeastern Gulf of Mexico, in coastal Alabama. It is recognized as the fourth largest estuary in the United States, extending 53 km from the Mobile Delta in the north, to Main Pass, a tidal inlet connecting the Bay to the Gulf of Mexico, in the south. Previous studies indicate that during the last lowstand in sea level the Mobile/Tensaw fluvial system incised a 25-45 meter-deep valley on the eastern side of Mobile Bay, which formed during the subsequent transgression. To further characterize the valley-fill architecture and the timing of the Mobile Bay formation, 100 km of high-resolution seismic (chirp) data and 6 rotary drill cores were collected from Mobile Bay. Core MD-02-2 was collected from the upper bay, over the previously mapped incised valley. This core penetrated an exposure surface at about 5-m below the sediment-water interface at the base of the estuarine sediments. This surface was correlated with a high-amplitude seismic reflector and mapped into the western portion of the bay and forms the bounding surface for a 20 meter-deep channel, which we interpret as the result of an avulsion event that occurred during the last transgression. A radiocarbon age acquired directly above the exposure surface in MD-02-2 indicates this event occurred prior to 5,180 BP and Mobile Bay formation. This is an ongoing study and future work will concentrate on constraining the timing of the avulsion event and the formation of Mobile Bay.