

## **How Fast can a Submarine Canyon Form? The Late Pleistocene Evolution of Mississippi Canyon**

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### **Abstract**

Submarine canyons act as conduits routing siliciclastic sediment and organic carbon from terrestrial/shallow marine environments into deep water. Mississippi Canyon is an important example of a large passive margin canyon that has not been recently studied.

The late Pleistocene Mississippi Canyon is a prominent bathymetric feature in the northern Gulf of Mexico. It is the most recent of a series of canyons that have routed sediment from the Mississippi River to Mississippi submarine fan through the Plio-Pleistocene. It began to form about 70,000 years ago when the Mississippi River entered the Gulf of Mexico west of its current location. Seismic reflection data indicate that during the Marine Isotope Stage 4 (MIS-4) low stand of sea level the Mississippi River extended across the continental shelf leading to excavating of the canyon. This earlier canyon was narrower than the canyon observed at the sea floor. Seismic reflection data show evidence of repeated episodes of erosion and deposition of sediment within the canyon fill. There is also evidence of sediment collapse from the canyon margins and from salt diapirs adjacent to the canyon. The relative sea level high stand at about 40,000 years before present (MIS-3) may have attenuated the connection of the Mississippi River with the canyon result in partial infilling with seismic facies that are interpreted as finer grained sediment. During the most recent low stand of sea level (MIS-2) at about 25,000 years before present the Mississippi River fed directly into the head of the canyon. Ocean Drilling Program cores from the lower reaches of the canyon encounter sand and gravel-size clasts indicating that the canyon fill has a coarser grained component. The canyon became inactive over that last 14,000 years as sea level rose during deglaciation. While no longer connected to the Mississippi River the Canyon appears to be widening due to collapse of its margins.