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**Anatomy of a Deep-Water Channel Avulsion—Example from the Basin Floor of the DeSoto Canyon Area, Gulf of Mexico**

A Pleistocene deep-water channel on the basin floor of the DeSoto Canyon area of the Gulf of Mexico is characterized by at least seven avulsion events. This channel, which originates near the mouth of the Mississippi Canyon, lies atop a "channel ridge" at a height of 65 m above the surrounding basin plain and within a larger channel belt bounded by levees. The channel itself is characterized by high-sinuosity and is bounded by smaller levees, suggesting a channel-within-channel configuration. Numerous avulsion channels are observed; each is preserved as an unfilled trough, in contrast with the initial channel which is preserved as a filled trough. In each instance knickpoints mark the transition from unfilled to filled trough, and record headward erosion likely initiated due to accelerated flow through the avulsion channel down the distal flanks of the levee. Headward migration of the knickpoints was ultimately aborted as avulsion events occurred farther up-system.

Aggradation above the basin plain and subsequent avulsion events are related back to events in the shelf-edge staging area as well as events farther up-river. Avulsions seem to have occurred after a prolonged period of channel aggradation and are related to changes in Mississippi River discharge at the latter stages of glaciation when significant shifts in glacial meltwater drainage from the Mississippi River to the St. Lawrence/Mohawk Valley systems and back again resulted in quantum changes in turbidity-flow discharge. This, coupled with the potential for catastrophic drainage of proglacial lakes, could account for an overfit situation and associated avulsion events.