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Sequence Stratigraphy of the Hamaca Development Area, Orinoco Heavy Oil Belt, Venezuela

The Hamaca project is a heavy oil development operated by Petrolera Ameriven, an operating company owned by Phillips Petroleum, ChevronTexaco, and Petroleros de Venezuela. The project area is approximately 260 square miles, and oil-bearing sands are spread throughout a stratigraphic interval of 650 ft. Most of the over 250 wells in the area were drilled since 2000. It is on the cratonic hingeline of the Eastern Venezuela Basin, an asymmetric foreland basin. Reservoirs are in Miocene strata that gently onlap the craton and gently dip into the basin to the north. Sands were deposited by fluvial and fluviotidal deltaic systems draining from the craton. Lignites, soil zones, and marginal marine shales are important correlation markers for reservoir development.

The sequence stratigraphy is dominated by backstepping fluviodeltaic systems in thick transgressive systems tracts, with very thin preserved highstands. Estimates of the degree of incision during lowstands and falling systems tracts are problematical and controversial. Major reservoir sands are the most fluvial-dominated systems in the basal transgressive systems tracts (or lowstands of some interpreters). Major sealing horizons are mudstones deposited in the late transgressive and the highstand tracts. The distribution of the most basal fluvial system was controlled by the geomorphology of the pre-Tertiary unconformity. Distributions of the overlying fluvial and fluviotidal deltaic axes were partly controlled by fault-related subsidence and partly controlled by compensatory infilling of compactional lows.