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Miocene Valley-Fill, Slope, and Submarine-Canyon Systems in the Laguna Madre-Tuxpan Area, Mexico

The Bureau of Economic Geology and Pemex Exploración y Producción conducted a joint study of Neogene sequences and depositional systems in the Laguna Madre-Tuxpan continental shelf between the Veracruz and Burgos Basins. On the basis of a data set containing six 3-D surveys, >16,000 linear km of 2-D seismic lines, and >60 wells, this study documents a major system of sediment bypass on a narrow (10- to 15-km) Miocene shelf, with hundreds of meters of section dissected by valley-fill and submarine canyon systems genetically linked to sandy basin-floor-fan systems. Valley-fill and incised-shelf deposits, inferred from down-cutting, lenticular seismic facies on the shelf, are narrow (<5 km across), and many are shale filled. In contrast, canyon systems linked to these valley fills are 5 to 8 km across and contain a variety of internal architectures. Although some canyons are shale filled, others are filled with offlapping, progradational delta-front deposits of highstand origin. The Oligocene Hackberry trend of southeastern Texas and southwestern Louisiana is an analog for shale-filled submarine canyons and sandy basin-floor fans in the Laguna Madre-Tuxpan area. The Hackberry trend is associated with sandy, productive, toe-of-slope fans that were fed from updip canyon systems notched into the shelf. Isochron maps of the upper Miocene east of the Tuxpan Platform suggest the presence of thick, potentially sandy deposits having a similar depositional origin.