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Influence of Paleogradients on Deepwater Reservoir Architecture: Miocene and Pliocene of the Veracruz Basin, Southeastern Mexico

A regional study of the Veracruz Basin provided a rare view of long-term deepwater sedimentation patterns from an evolving foreland-type basin. An accurate reconstruction of slope and basin-floor depositional patterns, lithologic compositions, and paleogradients is possible from the continuous succession of bathyal strata that span the Miocene to the lower Pliocene. Variations in Miocene and Pliocene deepwater reservoirs can be linked to prevailing slope characteristics. The Miocene basin had a high-gradient tectonic slope. Gradual infilling produced a low-gradient, constructional slope by the early Pliocene. The relatively steep Miocene margin was inherited from the stacking of early Tertiary, Laramide-age thrust sheets and shed a mixture of coarse clastic sediments (sands, gravels, and cobbles) and fines (silts and clays) as turbidity currents and debris flows. In contrast, the latest Miocene to early Pliocene basin development was dominated by a strongly prograding wedge of shelf and slope deposits that was related to a volcanogenic uplift and increased sediment supply. During this phase, turbidite reservoirs are limited to narrow and sinuous deepwater channels that reside at the toe of the constructional clinoforms. Smaller and thinner fans sit basinward of these channels. The two styles of margins have significantly different exploration play types.