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Sequence Stratigraphy and Depositional Environment of the Lankahuasa Reservoirs, Offshore Veracruz, Mexico

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The Lankahuasa discovery offshore Veracruz, Mexico, is a series of gas accumulations contained in multiple Upper Miocene and Lower Pliocene sandstones. The characterization of these reservoirs requires a stratigraphic-sedimentological framework in order to understand the origin, geometry and internal architecture of the sand bodies and to guide an optimized development. Such a framework has been established by integrating 3D seismic, well logs, cores and biostratigraphic data. Six main depositional sequences can be recognized in the Upper Miocene and Lower Pliocene section of the Lankahuasa area. The highstand systems tract of the sequence containing the Upper Miocene producing sands can be subdivided into three progradational parasequence sets with the best reservoirs located at the top of these packages. High-resolution seismic data reveals small-scale clinoforms within some of the parasequences that prograde eastward over the shelf. Their geometry inferred from seismic data as well as the log and core characteristics indicate deposition in wave-dominated deltaic and coastal environments. Pervasive calcite cement apparently associated with depositional surfaces produce permeability barriers or baffles within the reservoirs that define potential flow units. Seismic attribute maps and the inferred sedimentary model suggest these flow units are NNE-SSW-trending bodies corresponding to the topsets of small-scale clinoforms. This internal architecture indicates preferential flow and drainage of the reservoirs in a NNE-SSW direction and suggests that infill wells may be required to reduce the E-W spacing and accelerate draining if interconnectivity between clinoforms is poor.