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Sequence Stratigraphic Evolution of the Oficina Formation, Eastern Venezuela Basin: Depositional Systems and Sand Body Geometry in a Non-Marine to Estuarine Environment

This paper aims to relate variations in sand body geometry to base level changes in the distal zone of the Eastern Venezuela foreland basin during the late Oligocene to middle Miocene. The study of fluvial, estuarine, and shallow-marine deposits was based on log, core, and seismic data in a sequence stratigraphic framework. Five basic types of deposits were identified: (1) lowstand fluvial-dominated incised valley fills (FDIVF); (2) late lowstand/transgressive estuarine-dominated incised valley fills (EDIVF); (3) transgressive/highstand tidal-dominated sand-ridges (TDSR); (4) transgressive/highstand wavy-dominated sand-ridges (WDSR) and (5) highstand deltas. The lowstand FDIVF and EDIVF show a predominantly SSW-NNE orientation. These two systems differ in geometric and erosional character. While the FDIVF shows basal erosional surfaces up to 100 feet deep and a pronounced channelized geometry, the EDIVF is 10 to 40 feet thick, multi-branched and less channelized, with higher degree of internal heterogeneity. The transgressive TDSR and WDSR are predominantly E-W oriented, with less erosive to conformable bases, 10 to 50 feet thick. Deltaic sedimentation is more common in the upper part of the Oficina Formation. These deposits are interpreted as the result of the interaction of the foreland evolution with higher frequency sea level changes in a low-gradient basin (ramp). Due to the overall transgressive pattern, the FDIVF is the predominant deposit at the base, while EDIVF, TDSR and WDSR are more frequent at the top of the Oficina Formation.