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Upper-Eocene Fault-Controlled Deep Water Systems in the Talara Forearc Basin, Northwest Peru: Sand-Transport Paths, Sand-Body Geometry and Exploration and Development Opportunities

The Upper Eocene sedimentation in the forearc Talara Basin (Eocene, NW Perú) is interpreted as a series of northeast-southwest deep water systems, which were deposited mainly by high-density turbidity currents confined in canyons developed in troughs approximately 4 km wide. Trough development was controlled by sets of NE-SW normal faults, forming SW dipping graben morphologies. The eastern flank of the basin is defined by the Amotape Range and, to the west, by the subduccion complex. The internal sequence architecture show an overall retrogradational stacking pattern (fining and thinning-upward), which is also expressed in the sand body geometry. Each depositional sequence shows a vertical trend in reservoir architecture from (1) mass transport complexes at the base, to (2) confined, laterally amalgamated channels, to (3) weakly confined channels, to (4) channel-levee complexes at the top. Preliminary analysis of facies and facies associations allowed the characterization of the following elements related to the architecture described above: (1) slumps, slides and muddy debris flows; (2) very coarse-grained to conglomeratic sand deposits at the base grading to medium- to fine-grained sandstones at the top; (3) coarse- to very coarse sandstones; and (4) finer sediments (medium- to fine/very fine sand), generally intercalated with shales. The absence of compensational stacking and lateral migration between the depocenters of the sequences suggests that the rate of subsidence was greater than the sediment supply. The main petroleum accumulations are trapped in the flanks of the troughs.