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Using the fluvial-tidal transition zone (FTTZ) in sequence stratigraphic interpretation (Plio-Pleistocene Talparo and Erin Formations, Trinidad)

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The fluvial-tidal transition zone (FTTZ) marks a lateral boundary between terrestrial and coastal dominant processes, however its deposits are not commonly recognised in the rock record. As a result, facies analysis does not often include the FTTZ as a sub-environment. Sand members of the Talparo Formation and an almost continuous coastal exposure of the Erin Formation, in the onshore Northern and Southern Basins of Trinidad respectively, show evidence of the FTTZ. Previous interpretations include genetically related deposition from the Palaeo-Orinoco River delta, with mainly fluvial and tidally-influenced fluvial deposits for the Talparo Formation and estuarine palaeoenvironments for the Erin Formation. These formations are considered to be time equivalent, however, their stratigraphic relationship and the internal stratigraphy of the Talparo Formation are uncertain. This study uses the recognition of FTTZ deposits to provide a sequence stratigraphic interpretation from outcrop data. Facies associations include the inner and outer FTTZ and tidally modulated fluvial channel together with fluvial and estuarine channels. Stacked parasequences were interpreted in the Erin Formation, with flooding surfaces inferred where outer estuary facies associations overlie floodplain deposits. The tidally modulated channel facies association among fluvial channels was inferred as backstepping of facies and the terrestrial upstream expression of marine flooding. From palaeogeographical interpretations relative sea level changes were deduced, with the deposition of the tidally-dominated Erin Formation occurring during transgressions that precede, follow or separate the regressive fluvial sands of the Talparo Formation. Autocyclic channel abandonment or lobe switching within the Palaeo-Orinoco Delta can be inferred as the driver for cyclicity in deposition. This sequence stratigraphic interpretation helps in the understanding of deposition during the Plio-Pleistocene in the Trinidad area. It also provides a possible analogue for recognising ancient FTTZ deposits, and shows their usefulness in sequence stratigraphic interpretations.