



The Impact of Regime and Tectonics on the Orinoco's Second Clastic Wedge's Architecture, Trinidad

Author: Ariana Osman

ariana.osman@gmail.com presenter, The University of the West Indies

Co-Authors : Ron Steel**, Ryan Ramsook* *The Petroleum Geosciences Unit, Department of Chemical Engineering, The University of the West Indies **The Jackson School of Geoscience, The University of Texas at Austin

Theme: CG: Stratigraphic and sedimentological principles

Keywords: Orinoco, Clinoform, Growth Faults, Regime Change

The Pliocene aged, 3rd order, second clastic wedge (the Forest/ Moruga/ Mayaro formations) records the first entrant of Orinoco sands into the Columbus Basin. Linking these formations' strata across Trinidad and offshore is challenging as it is strongly segmented by both syn-depositional growth faults, and syn- and post- transpressional events associated with the eastward migration of the Caribbean plate. 130 wells and outcrop exposures were integrated to define 11, 4th order, clinoform topsets (F10 - F110) and reconstruct a sub-regional dip correlation across the shelf margin of the Southern and Columbus basins. The oldest sub-wedge (Forest-Gros Morne sands: F10 – F40) shows the development of at least four topset clinoforms and records some of the fastest progradation rates for the Trinidad Orinoco wedges (up to 25 m/ ky), that were likely driven by tectonic uplift, reduced dynamic subsidence, basin geometry and eustatic sea-level fall. On the outer shelf, this sub-wedge shows an overall fluvial dominance of the delta, identified by coarsening upward successions of well-developed mouth bar sands and hyperpycnal flows. Its strong fluvial character may have been controlled by the active southward growing thrust on the margin, which created an embayment and hindered reworking by waves. However, the fluvial nature of the deltas created focused sedimentation on the outer-shelf, that initiated growth faults resulting in impressive over-thickening of these topsets across the margin, from 600 to 1500 ft on the inner- to mid-shelf, and > 7,500 ft towards the shelf edge. The younger topsets (F50-F110) show a mixed fluvial-wave influence and the development of double clinoforms on the mid-shelf. However, as the delta lobes prograded across active growth faults on the shelf margin, the increased accommodation not only resulted in a reduction of their forward growth but also led to a longer period of wave reworking on the delta.