

Anatomy of Plio/Pleistocene Shelf Delta Depositional Systems in a World Class Productive Basin, Trinidad

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The Plio/Pleistocene sediments from the Columbus Basin offshore Trinidad have been the most prolific gas reservoirs in the Basin for over thirty years. Earlier exploration success focused on the anticlinal structures generated by post Miocene overprinting of transpressional and transtensional structures associated with over 40,000 ft. of sediment. Sub-regionally, large listric faults define wider productive fault blocks that glide along major counter regional faults and may have contributed to hydrocarbon migration. The sedimentary record reveals periods of major delta deposition and voluminous sedimentation affected by either sea level rise and fall and/or structural accommodation due to counter regional activity.

The result is a complex sediment record with the Flamboyant producing area showing a preferred lateral "shaling" of parasequence sets both in a basinward direction and also towards pre-existing structural highs generated by regional transpression. Recent application of 3D seismic facies analysis utilizing neural network technology supported by attribute analysis techniques, suggests a complex interaction of delta deposition with associated fault accommodation. Shelf edge settings at several parasequence set intervals reveal different delta progradational stages. West-east aligned channel systems dominate the facies classes and the associated reservoirs are the main productive units. Petrophysical analysis supports the existence of smaller scale reservoir heterogeneities defined by the complex delta systems. Use of Pleistocene delta gross depositional models and associated facies associations from an adjacent counter regional fault block at a distal shelf position provided an analogue for defining gross depositional elements for the producing field area
