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P.O. Box 3524, La Romaine, Trinidad and Tobago, W.I. or UTT Building, Esperanza Road, Brechin Castle, Couva, Trinidad W.I. Website: www.the gstt.org Email: thegstt@gmail.com

Accessing the Pre-Neogene Play Potential of the Tobago Trough

Author: [1]Thomas Hansen & Yermek Balabekov
[1] thomas.hansen@pgs.com- presenter, PGS, Trinidad and Tobago

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The Tobago Trough is a fore-arc basin related to the Lesser Antilles Arc, which divides the Caribbean Sea and Atlantic Ocean. Although a frontier basin, existing discoveries adjacent to the Tobago Trough have targeted shallow biogenic/thermogenic gas and condensate accumulations. Extrapolating the trend of these Tertiary discoveries into the Tobago Trough and comparing AVO responses, has helped to determine the potential of deeper, untested plays in the pre-Neogene.

The study was performed on 2,448km of broadband multisensor PGS GeoStreamer™ MC2D depth data comprising sub-surface interpretation and amplitude analysis. Areas of interest for the AVO analysis were identified through seismic interpretation where favorable clastic and carbonate facies were delineated as potential exploration targets. The AVO signatures were validated using existing nearby dry wells and gas discoveries (Orchid, Iris and Sancoche) to improve the accuracy of the results and de-risk the leads. The identified leads within the Tobago Trough are estimated to range from Late Cretaceous – Pliocene, displaying similar responses to the nearby gas discoveries. Additionally, some AVO results below the Mid Miocene unconformity show a different signature to the typical local gas response, further supporting the model for a Cretaceous oil-prone source rock – a realistic scenario when considering source rock analogues in the neighboring basins of Barbados, Trinidad, Venezuela and Guyana.

Sharing a number of petroleum system elements with neighboring basins that have experienced recent exploration success, puts the Tobago Trough in a favorable position. The leads and features identified are characteristic of hydrocarbon accumulations within clastic units, visibly constrained to stratigraphic sequences and often brightening up-dip. The untested stratigraphic-structural combination traps in the pre-Neogene provide a host of exciting leads to pursue in the upcoming license round.