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ABSTRACT

STRUCTURAL FRAMEWORK, STRATIGRAPHIC FILL AND HYDROCARBON PROSPECTIVITY OF THE SOUTHERN BARBADOS ACCRETIONARY PRISM REGIONS (TOBAGO AND BARBADOS BASINS), BARBADOS, WEST INDIES.

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Recent hydrocarbon exploration activity in offshore Barbados has resulted in the acquisition of significant 2D seismic data, which combined with extensive field work onshore Barbados and well log data from the Woodbourne oilfield has been used to interpret the evolution of the Tobago Forearc Basin (TFB) and assess the hydrocarbon potential of the southern Barbados Accretionary Prism (BAP) region.

The Barbados Basin (BB) is the largest of the BAP piggyback basins that lie to the east-southeast of the island of Barbados. Several four-way structural closures also exist on the eastern margin of the TFB. Normal, down-to-the-northeast faults just north of Barbados provide trap potential as well. The BB has been drilled and gas shows have been reported in Neogene-age sands. Migration pathways are thought to be along the deep-seated thrust faults that form several four-way closures along the eastern flank of the BB. Numerous oil seeps and mud volcanoes observed on the island of Barbados and in the surrounding offshore region appear to be migrating along these faults. These hydrocarbon seeps and production have been by shown by geochemistry to be originating from a high quality Cretaceous-age source rock and they indicate the presence of a viable hydrocarbon system. Within the Woodbourne oilfield, trap types are both structural and stratigraphic As a result of the tectonic overprint of the convergent margin setting and the deposition of complexly channelized coarse-grained turbidites, traps both onshore and offshore are stratigraphic and structural in character.

The Tiburon Rise acted as a northern limit to coarse grained, Tertiary-age sediments delivered from the South American continent into these basins. Eocene-age clastic turbidites form known reservoirs onshore and younger deposits of similar character are defined by drilling offshore. Ongoing work in the reservoir architecture of the outcropping Scotland Fm. turbidites will lend insights into fluid flow paths and aid significantly in production and development planning in these complex deposits.