

Structural Restoration of the Jasmine Complex and Implications for Pleistocene Depositional Environment within the Paria Sub-Basin

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Abstract

The North Coast Marine Area is best known for its prolific biogenic gas fields. These producing fields, along with most discoveries in the Paria Sub-Basin, target Upper Miocene-Pliocene sandstone reservoirs, which drape over the Patao High. Some 18 km due north of Tobago's Buccoo Reef, the LL9-1 well discovered Pleistocene gas charged sandstones, currently referred to as the Iris gas discovery of NCMA-4. Similar Pleistocene gas charged sandstones were encountered in the HH6-1 well to the south west in NCMA-3. These Pleistocene reservoirs are now formally called the UP5 sands of the NC120 sequence stratigraphic unit. Acquisition and interpretation of 3D seismic data over NCMA-4 and Block-22 revealed a number of low impedance amplitude anomalies at this stratigraphic level. These WSW-ENE trending amplitude anomalies are aerially extensive and form what is termed as the Jasmine complex. This series of undrilled exploration prospects are stratigraphic traps that appear to be structurally related to NE-SW trending reverse faults associated with the right lateral restraining bend between the North Coast Fault Zone and the North Tobago Fault. Structural restorations of key seismic cross-sections throughout the complex were used to define the depositional relationship between the Jasmine complex and the cored basin floor fans of Iris. The integration of regional well data, seismic impedance volumes, field analogues, present-day drainage and ocean current models established a gross depositional map for the Pleistocene NC120 UP5 sands.