

STRATIGRAPHIC PATTERN OF PIGGY-BACK BASINS WITHIN THE AREA OF THE SOUTHERN BARBADOS WEDGE

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ABSTRACT

Stratigraphic pattern study of piggy-back basins in the southern part of the Barbados Wedge was performed using original oceanographic data. These consist of seismic reflection profiles (water gun and 3.5 kHz) and side scan sonar (SAR) images. Three sites with different structural location within the accretionary complex were surveyed. In the frontal areas, both the migration of depocenters of piggy-back basins and geometrical relationships between thrust faults and syntectonic deposits show that during the deformation front seaward propagation, out-off sequence reactivations occur backward. Deformation locally induces tilting of beds at a rate of about 1° - 2° /40,000 years. In the inner site survey, superposition of accretion and argilokinesis structures and of structures related to the transcurrent context lead to a complex morphology characterised by steep topographic features. Strike-slip and extension are observed. They may be due to the structural complexity of the adjacent triple junction localised between the North Atlantic, Caribbean and South American plates. According to the Coulomb wedge model, extension could also result from local sedimentary accumulation that thickens the inner area of the prism.

This study shows that the stratal pattern of piggy-back basins varies with : (1) depth of tectonic decollement; (2) rate of deposits; (3) geometries of thrust system; and (4) inner or frontal location within the accretionary complex. Evolution of the southern Barbados Wedge follows the predictions of numerical and analogical models : (1) new imbricates are accreted at the front; and (2) out-off sequence reactivations occur along the nearest thrusts backward. The inner areas of the wedge which suffered stronger displacement show complex tectonic and morphological features related to superimposed tectonics.