

THE ROLE OF SHEARING ON THE SEDIMENTARY AND MORPHOSTRUCTURAL EVOLUTION OF THE SOUTHERN PART OF THE BARBADOS RIDGE, AT THE LATITUDE OF TRINIDAD

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ABSTRACT

New studies have recently been carried out on the South Barbados accretionary prism (DIAPICAR Cruise, Oct-Nov. 1987), (Fig. 1). A few limited sectors have been mapped by Seabeam processes (Orinoco and El Pilar sites) and allow for very detailed studies supported by high resolution seismic data, time lapse and video cameras, geochemical and sedimentological analyses and numerous piston and gravity cores. The presence of indurated sea-bottoms on which deep-sea communities are scattered, is emphasized.

The interpretation of some seismic profiles acquired in the part of the sector nearest Trinidad (profiles ED, FG and HI) and completed by one of the CRV 105 and 107 profiles of C.E.P.M. (Comite Francais Etudes Petrolieres Marines), revealed the importance of incidents of dextral shearing in this region. The tectonic activity along these discontinuities is closely associated with the presence at depth of dysharmonic levels, which obviously control the morphosedimentary and morphostructural evolution of this environment (Fig. 2).

This is the result of both the structural location of the southern part of the prism, which is located at the junction of the Caribbean, Atlantic and South American plates, which are animated by different movements, and of paleogeographical and sedimentation changes since Neogene time. In addition, the whole region received considerable terrigenous supplies, transported by the Orinoco and Amazon rivers from the South American continent. Important variations are responsible for the alternation of deposits with very different rheological properties which result in the disharmonic levels observed.

Based on these results we concluded that two systems were interacting - the first is related to the deep tectonics and is accountable for the basement's subvertical discontinuities and also the migration of depositional areas, the second is related to climatic and/or eustatic variations, which induces the slipping and decollement between overlying and basement formations.

The regional morphological anomalies show up in the sketch of the submarine canyons as sigmoid ridge axes, and in alignment of mud-volcanoes (superficial manifestations of argilokinesis, according to analogical models for a thick cover sticking out of its substratum). These permit the analysis of this slipping, and the geometry of "en echelon" folds and Riedel shears associated with shearing zones. These slipping regions help the upwelling and escape of interstitial fluids from deep levels, through fractures zones, and result in the appearance of observed diagenetical and biological processes.

In conclusion, the detailed and direct observation of the surface events should improve the kinematic and geodynamic models.

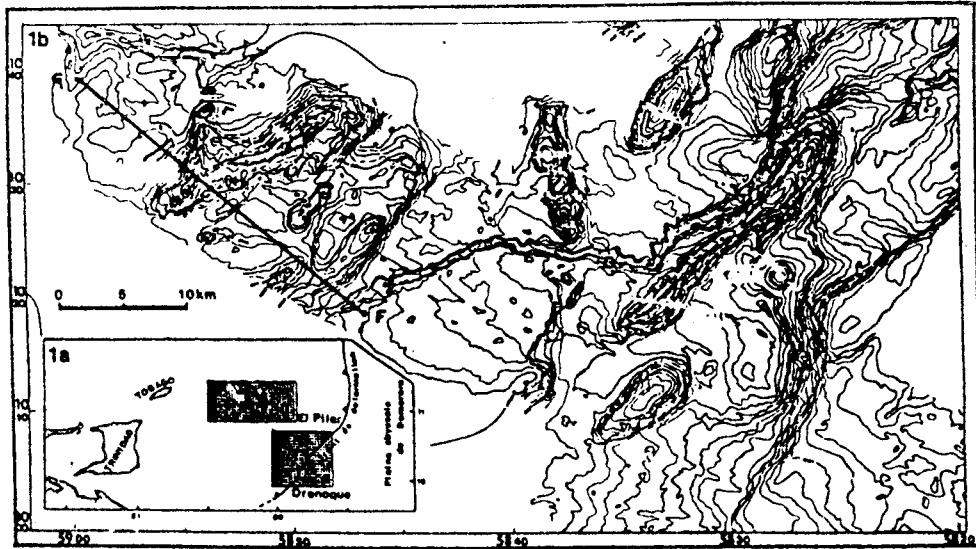


Fig. 1

