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From Frontal Subduction to a Compressional Transform System: New Geophysical Data on the Structure of the South-East Caribbean

The hinge between the East Caribbean active margin and the El Pilar dextral transpressive system occurs mostly offshore, east of Trinidad, at the southern edge of the Barbados accretionary prism. The CARAMBA marine survey conducted in this area in January 2002 onboard the O/V l'Atalante, provided about 60 000 km² of multibeam data acquired together with about 5000 km of high resolution seismic data, 3.5 kHz profiles, gravimetric and magnetic data. The south of the Barbados Ridge constitutes a huge mature accretionary prism where Cretaceous oceanic crust and probably late Jurassic oceanic crust to the South is being subducted below the Caribbean plate. The relative plate motion between South America and the Caribbean plate occurs at a rate of about 2 cm/year in an E-W direction. When approaching the South America continental margin, the Orinoco River and delta clastics influxes develop on both the flexured continental margin and the compressional accretionary complex. The multibeam and seismic data show linear ramp anticlines developing at the leading edge of the prism, while a more complex arrangement of shorter, discontinuous folds is apparent at the southern lateral border of the prism. The fold system of the accretionary prism vanished out toward the south with en-echelon geometry. Normal listric faults as well as (re-activated) normal or strike-slip basement faults are obvious to the south at the vicinity of the South America Margin. Also, the survey spectacularly evidences that a large active belt of mud volcanoes and shale diapirs is widely developed in the area and extends SW, in the onshore Trinidad. Mud volcanoes are well developed along ramp anticlines and on top of sigmoid rises of mud diapirs.