



The carbonate platform of the Karukera spur (Lesser Antilles fore-arc) records large Neogene-Quaternary forearc vertical movements

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The Caribbean facing the west verging Lesser Antilles subduction interacts with the downgoing lithosphere leading to large amplitude deformations. Located 50km west of the subduction front, the carbonate platform of the NNW/SSE-trending Karukera spur recorded these deformations during Neogene - Quaternary time. We use high-resolution multichannel seismic reflection and HR multibeam bathymetric data together with core samples from the KaShallow 2 cruise.

We distinguish four major normal fault systems. N040°-N060° trending faults correspond to basement inherited structures and the northern edge of the spur along the 4500m high La Desirade scarp. They defined a central basin in the spur but are poorly expressed through the platform. N120°-N150° SW dipping faults are the main structures. They overprint the N40-60° systems and defined large steps down to the south. N090° trending faults are located in the central part of the spur where they define a graben. N170-180° west dipping faults bound the spur to the west. North, they intersect the N90° faults and connect with the N150° ones. South, they are offset to the East along a N120° fault and are diffuse at the southern tip of the spur.

The platform architecture reveals five sedimentary sequences (S1 to S5) thickening southeastward and separated by five erosive unconformities. S1 rests unconformably onto the basement and is only preserved in local troughs. S2 retrogrades northwestward over the spur and appears to be syntectonic along major N120-N150° trending faults. The top of S2 is a major erosional surface (SB2). Middle Miocene dredged limestone (Andreieff et al., 1979) suggest a Middle-Late Miocene age for SB2. S3 exhibit a northwestward retrograding-aggrading pattern. Cored samples reveal reefal facies to the north and pelagic facies to the south suggesting a gently SE deeping ramp. S3 yields an early Pliocene age. S3 is topped by an erosional surface (SB3) to the North. S4 rests unconformably onto SB3 and dates late Pliocene - early Pleistocene. S4 appears to be syntectonic mainly along major N120-150° trending faults and locally along N90° faults. S5 Pleistocene - Holocene sedimentation corresponds to an isolated platform at the Flandre Bank and is restricted to small half-graben to the South.

We conclude that first order tilting of the Karukera spur appears controlled by the huge La Desirade fault scarp. Normal activation of N120-150° and N170° faults, major sequence boundaries, large subsidence with Pliocene reefs at 2000m bsl and SW tilting may result from deep subduction processes not from subducting ridges. The North-South fore-arc extension attributed to plate motion partitioning (Feuillet et al 2002) responsible for the N90° faults appears to be a minor event at the scale of the spur. No compressive structures develop in the fore-arc suggesting a continuous extensive tectonic regime since the Neogene. However present day basins west of the spur show evidence for recent uplift above a subducting ridge.