



## **Tectono-sedimentary architecture of Marie-Galante basin (Lesser Antilles fore arc)**

Jean-Frédéric Lebrun (1), Jean-Jacques Cornée (2), Philippe Münch (3), Pol Guennoc (4), and the Kashallow Cruises Team

(1) Université des Antilles et de la Guyane - Point a Pitre - Guadeloupe (jflebrun@univ-ag.fr 05 90 48 30 94), (2) Université Montpellier 2 (jean-jacques.cornee@gm.univ-montp2.fr - 04 67 14 36 35), (3) Université de Montpellier 2 (munch@gm.univ-montp2.fr - 04 91 10 63 43), (4) BRGM

Marie-Galante basin in the Lesser Antilles fore arc has experienced high amplitude (up to several thousand meters) vertical movements in response to both local tectonic in the fore-arc (trench perpendicular extensional tectonic) and geodynamical events at the plate interface, such as, long term interplate coupling changes, or ridges subduction or alternating period of under-plating/basal erosion...

During the KaShallow cruises, we acquired ca. 3500km of high-resolution multichannel seismic reflection data (sparker and miniGI airgun sources), together with HR multibeam bathymetric (50m gridspacing DTM with  $\pm 2$ m depth precision) in the basin and over the shallow-water carbonate platforms surrounding the fore-arc islands. This geophysical dataset completes already existing seismic reflection data of lower resolution but deeper penetration. A systematic rock sampling using piston and rock corers and 2 ROV dives along remarkable cliffs, together with old dredge samples, provided petrological and sedimentary facies description, and datation (radiochronology and Micro/Nanno fossils) of the main stratigraphic series identified in seismic reflection through the basin.

The basin divides into 3 sedimentary environments. We identify the architecture of the offshore carbonate platforms around the fore arc island and between them. Seismic profiles reveal the platforms prograding systems at their boundaries. This allows attempting a correlation between all the onshore/offshore archipelago platforms. Particularly, we evidence that the early Pleistocene upper series outcropping onshore extends offshore, and late Pleistocene/Holocene erosional surfaces are revealed.

The "deep bassin", gently deepens southeastward from the volcanic arc islands of Basse-Terre and Dominica to the deep (5000m bsl) forearc basin at the accretionary prism. Seismic profiles reveal the turbiditic infill of the basin. ROV dives permit to sample early Miocene pelagic sediments, and cores sample the late Miocene and Pliocene calcareous sand and marls. The new bathymetric data in the basin more accurate than that from previous cruises (Feuillet et al 2002, 2004) provides details about the geometry and segmentation of the Morne Piton Fault and the other faults, striking N160°, N40°, N90° N130°. Migration of depot centres through the basin and along faults will provide constrains about faults present and past activity.

The Karukera spur limits the Marie-Galante basin to the east. It extends North/South and deepens southward. To the north the fore-arc magmatic crust is covered by 0 to 0.1s (twtt) thick reefal carbonate platform that rests at shallow depth (20m bsl). To the south seismic profiles revealed wellstratified highly reflective series, up to 1s (twtt) thick. Limestone sediments over the spur alternates between pelagic and reefal facies. The deepest shallow water reefal limestone sampled, rested at 2100m bsl revealing such a subsidence at the southern tip of the Spur. Tectonic structures in the northern half are dominated by 10km long, up to 100-200m high, N160°-N130° trending scarps, where as the southern half is cut by smoother but clear N40° trending scarps. parting the center, the spur is cut by is a N90° trending graben composed by a large number of short and anastomosed fault segments.