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Pliocene to Pleistocene carbonate systems of the Guadeloupe archipelago, French Lesser Antilles: a land and sea study (the KaShallow project).

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This work presents a synthesis of the present-day knowledge on both emerged and submerged carbonate platforms of the Guadeloupe archipelago. Onshore and offshore data acquired during the KaShallow project are presented. The KaShallow project is based on onshore works and on three marine cruises with high resolution seismic investigations and core samplings (2006, 2008 and 2009).
The whole Guadeloupe archipelago did not evolved in a single way since the onset of the isolated carbonate platforms development and it suffered repeated extensional tectonic episodes since the late Miocene.
Marie-Galante and Grande Terre platforms (including the southern Grande-Terre offshore platform) underwent a similar and synchronous sedimentological evolution from early Zanclean to early Calabrian (Cala 2 cycle). Noticeable is a change from red algae domination to coral domination by the late Gelasian-early Calabrian transition and the presence of a major erosional surface SB2 during early Calabrian. The reef platforms reached their maximum development during the early Calabrian. Their final emersion dates from late Calabrian and after this event carbonate platform developed solely on the Colombie Bank and on the Les Saintes shelf.
La Désirade underwent a general sedimentological evolution close to that of the two other islands but much earlier, during early Pliocene. Indeed the red algal dominated platform locally changed into a reef platform during early Piacenzian. This platform emerged as soon as late Piacenzian. In relation with local tectonic subsidence, the westernmost part of the island was also reached by the early Calabrian reef platform of Grande-Terre. The Flandre Bank remained emerged during the late Piacenzian¬–Tarantian interval and parareef sedimentation resumed there only in Holocene times.
Four extensional tectonic episodes have been identified in the late Miocene-Recent interval. Their effects depend on the location of the platforms within the fore-arc.
A first tectonic event, marked by the reactivation of basement structures as N130-150° trending normal faults on La Désirade , occurred during the late Miocene – early Zanclean period and originated the initial palaeotopography on which carbonate platforms started to develop. A second tectonic event led to the emersion of La Désirade and Flandre Bank platforms in late Piacenzian times. A third tectonic event, marked by a regional uplift, led to the final emersion of the western reef platforms in late Calabrian times. Uplift remained active until the Ionian as exemplified by emerged marine terraces. During the Ionian, the uplift was accompanied by the westward tilting of Marie-Galante and Colombie Bank only. A fourth tectonic event corresponds to the Recent arc parallel extension and the development of the Marie-Galante graben over a pre-existing depression.