



Discovery of Lower Cretaceous syn-metamorphic thrust tectonics in French Lesser Antilles (La Désirade Island, Guadeloupe): Implications for Caribbean geodynamics

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Located east of Guadeloupe, the island of La Désirade exhibits the oldest rocks of the Lesser Antilles arc and the eastern Caribbean plate. An old magmatic basement is composed of (i) late Jurassic ophiolitic complex with meta-basaltic pillow-lavas and interbedded radiolarites, (ii) acid igneous complex comprising meta-quartz-diorite and meta-rhyolitic lavas flows and (iii) meta-diabasic/microdioritic dyke swarm complex. We present and discuss the discovery of syn-metamorphic thrust tectonics in this island. Based on detailed structural analysis we evidenced two main compressive events. The first event (D1) is characterized by pervasive folding associated with thrust development. In the northeastern part of the island, a major thrust fault, the Grand Abaque Thrust, has been discovered which displaces for several kilometers the acid igneous complex onto the ophiolitic unit. The second deformation event (D2) is featured by a main pervasive cleavage S2 observed at the regional scale associated with upright folding (F2) and by the development of two sets of conjugated steeply dipping strike-slip shear zones, respectively dextral N130° and sinistral N20° striking. Micro structural observations indicate that Greenschist facies metamorphism is clearly contemporaneous with the development of D1 and D2 superimposed tectonic structures. Ar/Ar geochronology was performed on two bulk of adularia minerals sampled in the northeast volcanic complex within a deformed zone related to D2 event. These analyses yield well defined and concordant plateau ages at 106.2 ± 1.7 My and 107.2 ± 1.8 My. Thus, shortening and thickening tectonics occurred during Lower Cretaceous (Albian). In the available framework of Caribbean geodynamics, the syn-metamorphic thrust tectonics we discovered in the French Lesser Antilles is related to the collision between an Aptian-Albian oceanic plateau and the Andean/Cordilleran east-dipping subduction zone. Our results support subduction polarity reversal during Lower Cretaceous.