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Recent Reactivation of Neogene Structures in Haiti FTB (W. Hispaniola)

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Haiti (Western Hispaniola) is located along the North Caribbean plate boundary, which is marked by two major left-lateral strike-slip faults, the Enriquillo-Plantain Garden Fault Zone (EPGF) and the Oriente-Septentrional Fault Zone (OSF). A fold-and-thrust belt (FTB) affecting mostly the Tertiary carbonate platform has developed during the Tertiary between the two faults, and nowadays abuts the Southern Peninsula. The present day tectonic setting is dominated by the very active faults (12 January 2010 Haiti earthquake; M=7.2) and a component of North-South shortening. We made use of geomorphologic (DTM and swath bathymetry) and geologic data to explore how deformation is accommodated at present at a large scale.

We observe that the North of Haiti is affected by two shortening events: one short wavelength folding (3 km) with N130 to N150 trends sealed by late Miocene and a subsequent long wavelength folding (15-20 km), which is more N90 to N120 directed. In the NW of Haiti, rapid uplift of Pliocene to Quaternary sediments and terraces underline two broad folds of over 20 km in width. Around the Montagnes Noires in the Central part of Haiti and in the Matheux Range, a chain of narrow flatirons also underlines a long wavelength reactivation. To the South, in the Cul-de-Sac Range and the Sierra de Neiba (Dominican Republic), folds are also still active and only one single Pliocene-Quaternary event can be identified. Recent offshore multi-beam surveys reveal the continuation to the West of large and smooth antiform ridges (La Gonâve Island anticline).

We interpret the shift from short to long wavelength deformation as a transition from thin-skin to thick-skin tectonics, which is well illustrated in the North and poorly expressed in the South, where it is still active. This would mark the SW end of the FTB as it reaches the Southern Peninsula and the EPGF zone and would result in a broader folding affecting the whole wedge. The EW bend of both North and South extremities has to be further investigated but may be linked to a more pronounced drag effect of the main strike-slip fault-zones or to inherited preexisting basement heterogeneities.