



Refraction reflection seismic reconnaissance of the Lesser Antilles subduction zone (Guadeloupe and Martinique Islands)

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The Lesser Antilles is an active subduction zone that has experienced in 1843 a $M > 7.5$ probably mega-thrust earthquake that destroyed Pointe-a-Pitre city on Guadeloupe Island. But the location in depth of the mega-thrust subduction fault (the interplate boundary) and its geometry along the arc were unknown until recently. A first reconnaissance of the seismic structure and activity has been undertaken by the SISMAN-TILLES project carried out at a regional scale from northern Guadeloupe to Martinique islands. The project focused more particularly on the detection, mapping and characterisation of the potentially seismogenic part of the interplate subduction fault. For this purpose, wide angle reflection and refraction (WARR) data have been collected by a broad but sparse array of 37 3-components Ocean Bottom Seismometers (OBS) that were deployed offshore Guadeloupe and Martinique Islands over several weeks and recorded continuously the MCS shots from the french N/O Nadir vessel. The imaged seismic structure of the upper crustal part of both the oceanic and forearc crust by the 2500 km of MCS profiles have been used as an input for the forward modeling of WARR data. Thanks to these data, we can identify on 3 transects to the arc, within the 300 km wide region lying between the deformation front and the volcanic arc, the part where the forearc deep crust is in contact with the subducting oceanic plate. The latter is considered as a proxy for the seismogenic part, and thus the possible rupture area of a future big subduction shake. The most striking feature is that its location with respect to the deformation front and the volcanic arc and its downdip size appears significantly variable along the arc. Local earthquakes P & S tomography as well as receiver functions analysis will bring more constraints on the deeper structure beneath the arc crust and thus on the downdip limit of the seismogenic portion of

the subduction interplate.