



Source parameters of the Mw 7.4 Martinique intermediate-depth earthquake (Leeward islands) of November 29, 2007: A slab-pull event with horizontal fault plane

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Compared to other well studied seismic subduction zones (i.e. Japan, Chile), the Lesser Antilles area has experienced very few large recorded earthquakes. A large (Mw=7.4) intermediate-depth earthquake occurred on 29 November 2007 north of Martinique.

Intraplate intermediate-depth earthquakes occur in the subducted plate, at some distance down-dip from the strongly coupled interplate interface. They are often very destructive because hypocenters are usually below the islands, thus below large population centers. Nevertheless, rupture mechanism of those earthquakes is poorly understood.

Source parameters of the Martinique earthquake are inferred from strong motion data recorded by the French Accelerometric Network and precise aftershocks relocation. The strongest aftershocks are relocated using a double difference earthquake location algorithm based on absolute travel time measurements. The aftershocks distribution pattern, after relocation, indicates a sub-horizontal fault plane. Strong motion data inversion shows a slab-pull down dip extension mechanism on a nearly horizontal plane. Downdip extension mechanism and sub-horizontal fault plane are common characters between the Martinique intermediate-depth earthquake and the two well studied intermediate-depth earthquakes in Japan and in Chile. We believe that these characteristics could constitute major features of intermediate-depth subduction earthquakes. We discuss the meaning of the Martinique earthquake occurrence within the framework of the poorly known seismic cycle in the Lesser Antilles.