13th Int. Workshop on Seismic Microzoning and Risk Reduction

13IWSMRR

19th century engraving showing the effects of the 1829 catastrophe on a map of Vega Baja, taken from Canales-Martinez et al., 1999, ISBN:94-606-2875-2)

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Seismic hazard assessment in the Ocoa bay area (southern Dominican Republic) based on probabilistic models and macroseismic data

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Abstract

The seismic hazard assessment is evaluated around the Ocoa bay area of the southern Dominican Republic. According to the Cornell-McGuire method, the peak ground acceleration (PGA) for an exceedance probability of 10% in 50 years, taking into account the hazard contribution of the main seismogenic fault zones of the area, modelled minimum and maximum PGA values are of 272 and 902 cm/s2, respectively. PGA iso-lines defines a triangular zone of maxima values constrained by the topological relationships between three active fault zones: N-BRFZ, O-BGFZ, and O-MT.

The existence of Holocene (ca. 2000 y.) gravel coastal deposits with large (>1m) convolute structures, related to liquefaction processes (megaseismites) in Tortuguero Beach (south of Azua) could indicate an event of the macroseismic intensity of VII (or VIII?). The PGA value obtained at Tortuguero Beach site is 798 cm/s2, one of the highest in the area. The seismic hazard modelling also allows discriminating the possible seismic source for such megaseismite among nearby seismotectonic structures, historical records of earthquakes and paleoseismological information. For instance, the exceedance probability for PGA values of 467 cm/s2 is 18.2% for the N-BRFZ, 13.7% for the O-MT and 6.5% for the O-OBGFZ, being near <1.0% for the remaining sources of the Hispaniola Island. Therefore, N-BRFZ and O-MT segments most likely produced the Tortuguero Beach megaseismite.

Keywords: probabilistic seismic hazard, active tectonics, megaseismites, Dominican Republic, Caribbean plate

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