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Tsunami Scenarios of the 1946 event along the Northern Coast of Hispaniola

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The northeastern Caribbean island arc, which materializes the boundary between the North American and Caribbean plates, is particularly exposed to large earthquakes and tsunamis. The low level of preparedness of a large part of its population and the lack of risk reduction provisions in public policies in many countries of the region put their population and economy at high risk in case of large telluric events. The M8.1 earthquake of 1946, which occurred North of Dominican Republic, is one of the strongest events known in this area. The associated tsunami affected Dominican Republic but Haiti and Porto Rico as well. A field survey reports waves reaching 5 meters, particularly in Matancitas, the most affected city. Here we investigate this event by comparing the results of simulations with the observations. Source parameters are chosen to be consistent with the sismotectonic settings and the 8.1 magnitude. Several sets of values are tested (i.e. slip, fault surface, rake,...) to account for the source parameters uncertainties. An accurate numerical tsunami propagation and inundation modeling by using several nested bathymetric grids of increasingly fine resolution close to the shores is performed. We calculate run-up height along the North coast, the East coast and the West Coast of Dominican Republican. The values of amplitude obtained are compared with the one given by testimonies. The simulations show that the tsunami impacts the American coast as well, and the calculated amplitudes are compared with observations reported in Florida and New Jersey. Complementary simulations are also performed to estimate the impact of the tsunami down to San Juan in Porto Rico where a tide gauge record is available to confirm the model.