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Numerical tsunami hazard assessment of the submarine volcano Kick 'em Jenny in high resolution are

Frédéric Dondin (1), Jean-Francois Marc Dorville (2), and Richard E.A Robertson (1)

(1) Seismic Research Centre, The University of the West Indies, Trinidad and Tobago, WI., St Augustine, Trinidad And Tobago (fredericdondin@gmail.com), (2) MF-DIRAG, Météo France Direction Inter-Régional , Antilles-Guyane, BP 645, 97262 Fort-de-France cedex, FWI

Landslide-generated tsunami are infrequent phenomena that can be potentially highly hazardous for population located in the near-field domain of the source.
The Lesser Antilles volcanic arc is a curved 800 km chain of volcanic islands. At least 53 flank collapse episodes have been recognized along the arc. Several of these collapses have been associated with underwater voluminous deposits (volume > 1 km3). Due to their momentum these events were likely capable of generating regional tsunami. However no clear field evidence of tsunami associated with these voluminous events have been reported but the occurrence of such an episode nowadays would certainly have catastrophic consequences.

Kick 'em Jenny (KeJ) is the only active submarine volcano of the Lesser Antilles Arc (LAA), with a current edifice volume estimated to 1.5 km3. It is the southernmost edifice of the LAA with recognized associated volcanic landslide deposits. The volcano appears to have undergone three episodes of flank failure. Numerical simulations of one of these episodes associated with a collapse volume of ca. 4.4 km3 and considering a single pulse collapse revealed that this episode would have produced a regional tsunami with amplitude of 30 m.

In the present study we applied a detailed hazard assessment on KeJ submarine volcano (KeJ) form its collapse to its waves impact on high resolution coastal area of selected island of the LAA in order to highlight needs to improve alert system and risk mitigation.

We present the assessment process of tsunami hazard related to shoreline surface elevation (i.e. run-up) and flood dynamic (i.e. duration, height, speed...) at the coast of LAA island in the case of a potential flank collapse scenario at KeJ.
After quantification of potential initial volumes of collapse material using relative slope instability analysis (RSIA, VolcanoFit 2.0 & SSAP 4.5) based on seven geomechanical models, the tsunami source have been simulate by St-Venant equations-based code (VolcFlow-Matlab). The wave have been propagated on the coastal area of two island with high resolution bathymetry (Litto3D).

Keywords — Volcano edifice stability, Collapse volume estimate, Tsunami impact, Kick 'em Jenny, wave propagation, Lesser Antilles, High resolution bathymetry