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New seismic sources parameterization in El Salvador. Implications to seismic hazard.

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El Salvador is located at the pacific active margin of Central America, here, the subduction of the Cocos Plate under the Caribbean Plate at a rate of ∼80 mm/yr is the main seismic source. Although the seismic sources located in the Central American Volcanic Arc have been responsible for some of the most damaging earthquakes in El Salvador. The El Salvador Fault Zone is the main geological structure in El Salvador and accommodates 14 mm/yr of horizontal displacement between the Caribbean Plate and the forearc sliver.

The ESFZ is a right lateral strike-slip fault zone c. 150 km long and 20 km wide .This shear band distributes the deformation among strike-slip faults trending N90º-100ºE and secondary normal faults trending N120º- N170º. The ESFZ is relieved westward by the Jalpatagua Fault and becomes less clear eastward disappearing at Golfo de Fonseca. Five sections have been proposed for the whole fault zone. These fault sections are (from west to east): ESFZ Western Section, San Vicente Section, Lempa Section, Berlin Section and San Miguel Section. Paleoseismic studies carried out in the Berlin and San Vicente Segments reveal an important amount of quaternary deformation and paleoearthquakes up to Mw 7.6.

In this study we present 45 capable seismic sources in El Salvador and their preliminary slip-rate from geological and GPS data. The GPS data detailled results are presented by Staller et al., 2014 in a complimentary communication. The calculated preliminary slip-rates range from 0.5 to 8 mm/yr for individualized faults within the ESFZ. We calculated maximum magnitudes from the mapped lengths and paleoseismic observations.We propose different earthquakes scenario including the potential combined rupture of different fault sections of the ESFZ, resulting in maximum earthquake magnitudes of Mw 7.6. We used deterministic models to calculate acceleration distribution related with maximum earthquakes of the different proposed scenario. The spatial distribution of seismic accelerations are compared and calibrated using the February 13, 2001 earthquake, as control earthquake. To explore the sources of historical earthquakes we compare synthetic acceleration maps with the historical earthquakes of March 6, 1719 and June 8, 1917. control earthquake. To explore the sources of historical earthquakes we compare synthetic acceleration maps with the historical earthquakes of March 6, 1719 and June 8, 1917.