

Tectonic earthquakes triggering volcanic activity? Preliminar study case: Central American Pacific coast, 2012.

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Three large earthquakes with $M_w > 7$, occurred in the Central American Pacific coast during a period of only 72 days. On 27 August 2012, the first earthquake (Q_1) occurred on the SW coast of El Salvador ($M_w = 7.3$). The second earthquake (Q_2) struck 9 days after, on the NW coast of Costa Rica, with $M_w = 7.6$. On 7 November, a third earthquake (Q_3) with $M_w = 7.4$ hit the the NW coast of Guatemala.

With this, the first question of the volcanologist was: could these earthquakes trigger volcanic unrest?

We try to analyze the relationship between these seismic events and the observed volcanic unrest during and after the seismic crisis, by recording: a) the name of the volcano in unrest after the earthquakes; b) the time lapsed in days between and the onset of the volcanic unrest; c) the distance in kilometers between the volcano and the epicenters of the earthquakes; d) the type of change or level of the unrest of the volcano, indexed on 1) an increase in seismic activity, 2) a combination of increased seismic activity, temperature and output rate of degassing and/or the occurrence of small eruptions, 3) large eruptions with ash fall. We observed that 13 volcanoes in Costa Rica, Nicaragua, El Salvador and Guatemala were in a state of volcanic unrest and/or eruptions. Of those, 6 volcanoes only showed changes of type 1, 4 volcanoes with changes of type 2 and 3 volcanoes with changes of type 3. To explain what could have happened in the crust, we simulated the crustal deformation associated with these 3 earthquakes based on the Okada's 1992) formula, and calculated the ΔCFF , strain, horizontal and vertical displacement. We found some apparent correlation between the observed volcanic unrest and the earthquakes, suggesting that tectonic earthquakes are able to change the state of volcanic systems.