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Online Conference, April 6th | April 9th 2021

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Cover Eruptive plume from Mount Etna the night of February 23rd, 2021 | *In copertina Plume durante l'eruzione dell'Etna nella notte del 23 febbraio 2021* ©Marco Restivo and Giuseppe Di Stefano - Etna Walk

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The effect of three large Mw≥7.3 subduction earth-quakes (August-November 2012) on volcanic unrest in Central America

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"Was the volcanic eruption triggered by the earthquake?" The answer to this question usually is "maybe" or "a coincidence". A region like Central America, is an adequate area to find hints to answer this question because have the necessary ingredients: the frequent occurrence of large earthquakes (M5+) and dozens of active volcanoes. This research fo-cuses on whether the uncommon occurrence of three large earthquakes in the subduction zone of Central America, within a time span of ten weeks in 2012, promoted enhanced volcanic activity. The time window analyzed is from 2000 to 2019, which includes a total of 50 volcanic eruptions with a VEI≥2. Before the 2012 earthquakes, 22 eruptions oc-curred. The Monte Carlo statistical simulation method allowed to demonstrate that this increase in the number of volcanic eruptions after the three large earthquakes of 2012 it is not a temporal coincidence. We analyzed the characteristics of each earthquake and described how they could disturb the volcanic systems. Although Central America hosts 24 volcanoes with historical eruptions, only 11 of them erupted after the 2012 earthquakes. Why did only these volcanoes erupt? To answer this question, we calculated the dynamic and static stress in each volcano and the level of volcanic unrest (the change in volcanic activity beyond background behavior to worrisome levels) prior to the earthquakes. We found that volcanoes in a unrest stage before the earthquakes but, without experiencing explo-sive eruptions before, erupted after receiving the seismic shocks. This fact suggests that the earthquakes by themselves did not transfer enough energy to generate the volcanic eruptions when volcanoes were not ready to erupt. However, earthquakes could promote volcanic eruptions when volcanoes were already at unrest. This research offers a tool for forecasting volcanic activity when a large earthquake hits a region, if the volcanic activi-ty is previously monitored.