

Volcanic eruptions and moderate earthquakes

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It is well known that seismic activities increase around volcanoes before eruptions a (e.g., Benoit and McNutt, 1996). These activities of earthquakes, which have been well investigated at each volcano, are considered to be caused by magma migration, activation of hot water beneath volcanoes. The present study systematically researches the changes in seismicity around volcanoes using reliable recent data catalog of earthquakes and volcanic eruptions. CMT solutions and Smithsonian records of volcanic eruptions are used. Earthquakes with a magnitude larger than or equal to 5 for the period from 1976 to 2015 are analyzed. Eruptions with a VEI larger than or equal to 2 for the period from 1981-2010 are examined. The results show that the earthquakes with a magnitude ranging from 5 to 6 likely occur on the same day or for a few tens of days after eruptions locating within 50 km from the volcanoes while the seismicity more than 50 km far from the volcanoes does not significantly change. For the eruption continuing more than about a month, the number of earthquakes increases for about three years after the end of eruption. Also, the seismicity seems to be activated from about 1 year before eruptions. Since large earthquakes trigger eruptions at nearby volcanoes (Nishimura, 2017), these results strongly suggest interactions between earthquakes and eruptions.

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