

Interaction system between tectonic earthquakes and volcanic activity increase with Talang volcano (Indonesia) as area of study

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The tectonic processes may cause an increase in volcanic activity due to stress accumulation. By calculating the magnitude of stress accumulation occurred in volcanic regions over periods of surrounding tectonic earthquakes will help to forecast an increase in volcanic activity. This paper focuses on comparative study between the strain caused by the earthquake and tectonic stress in volcanic areas around Talang volcano.

The research use earthquake data from USGS and GPS campaign data (2007-2009) around Talang volcano to analyze strain distribution caused by tectonic earthquakes, horizontal displacements, and possible interaction system between volcanic activity and regional tectonic.

Talang volcano is in the compression zone as consequence of co-seismic deformations caused by the Mentawai earthquakes of 10 April 2005 and 30 September 2009. In the co-seismic deformation of Singkarak earthquake 6 March 2007, Talang volcano is on the extension zone. These three seismic events lead to increase in volcanic activity, although there are might be also other factors that affect the activity of the Talang volcano. The 2007-2009 deformation which is analyzed as a time series showed inflation at the southern slope of Talang volcano, an increase in pressure in the body of Talang volcano. Fault model derived from horizontal displacement of July to August 2009 GPS measurement period shows an oblique fault (right reverse fault) shear zones that cut the top area of Talang volcano. The fault model is consistent with the pattern of epicenter distribution which have a southeast-northwest trend. Also the fault model has similar pattern to the focal mechanism of volcanic earthquakes recorded in Talang volcano in the period of 2007 to 2009. Those data show that the activity of seismicity and deformation in Talang volcano are dominated by the movement of local structures that are affected by regional tectonic movements of the right lateral Sumatran fault.

Keyword: stress accumulation, tectonic earthquake, volcanic activity, horizontal displacement, inflation, regional tectonic