Shallow magmatic source inferred from seismic and deformation observation at Galunggung Volcano, West Java

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Galunggung is a strato volcano as part of southern Jawa volcanoes group that consist of several active volcanoes. Latest eruption of Galunggung volcano occurred in 1982-1983. It was explosive magmatic eruption with Plinian to Strombolian type that produced rock fall, mud and pyroclastic flow. Cinder cone formed at the end of the phase. Eruption history of Galunggung volcano noted that it has short repose period of 24 years and the longest period is 72 years.

Changes on volcanic activity of Galunggung volcano observed during the period of May-July 2011 when the seismicity increased significantly followed by the changes of crater lake color. This changes continue till February 2012 along with the increase of crater lake temperature and extend of gas bubble distribution. These brought the upgrade of Galunggung volcano alert level from NORMAL (Level I) into WASPADA (Level II) till the end of May 2012.

This research focused on the recent volcanic activity of Galunggung volcano after it last increases in February-May 2012 and interpreted the source and mechanism of magmatic system beneath it. This research applied seismic, GPS (Global Positioning System), and TLS (Terrestrial Laser Scanner) methods. Seismic method applied to understand type, characteristic and source of earthquakes while GPS and TLS to detect ground deformation. TLS is the new method for volcano monitoring in Indonesia. This research also introduce and asses the contribution of TLS method for volcanic deformation monitoring.

Seismic observation noted domination of volcanic-hybrid and low frequency type that assumed as implication from shallow fluid injection. While GPS and TLS showed minor inflation trend. This result supported by geochemistry analysis that indicate injection of some non magmatic elements.