

## Study on Volcano-tectonic Earthquakes and Magma Supply System at Guntur Volcano, West Java Indonesia with Long-term Dormant Period

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Guntur volcano was one of the most active volcanoes in Java, Indonesia in 19th century and explosive eruptions frequently occurred at the Guntur crater. However, the eruptive activity has been dormant since the last eruption in 1847. In contrast, seismicity of volcano-tectonic (VT) earthquakes has been active and the monthly number of VT earthquakes exceeded 100 in October 1997, May 1999, November 2002 and June 2005. At first, hypocenter locations and focal mechanisms of VT earthquakes were determined. The hypocenters were distributed in 3 regions. (1) The most dense cluster was found along the NW-SE alignment of younger volcanic cones from Mt. Masigit to Guntur crater at depths 0 – 2 km. (2) VT earthquakes occurred aligning in NW-SE direction along geological fault striking from older volcanoes, Gandapura caldera to Mt. Gadja at depths 0 – 3 km. Between the two alignments, an aseismic zone was detected. (3) Hypocenters of VT earthquakes were dispersed around Kamojang geothermal field at depths of 2 – 8 km. Focal mechanisms were mostly normal fault type at depths shallower than 3 km, whereas the mechanisms at deeper part were strike-slip fault type. Normal fault VT earthquakes at shallow part in Kamojang area are related with subsidence of ground due to depression of hydrothermal reservoir. On the other hand, deep VT earthquakes of strike-slip type are caused by tectonic stress. The seismicity in Kamojang is not directly related with activity of Guntur volcano. Strike direction of the normal fault events are different between the two

alignments; striking NE-SW in the area from Mt. Masigit to Guntur crater and NW-SE direction in the area of Gandapura caldera to Mt. Gadja. The VT earthquakes from Mt. Masigit to Guntur crater were related with NW-SE aligning group of the small faults striking in NE-SW direction. The VT earthquakes in the area of Gandapura caldera to Mt. Gadja were directly caused by slip of the normal fault striking in the direction of NW-SE. The aseismic zone between is not an attenuation zone of seismic wave but a scatterer. An old crater beside Mt. Masigit is located in the aseismic zone. The aseismic zone is interpreted to be an old conduit formed by pre-historic eruption of the volcano. The increase in seismicity of the two alignments of hypocenters was associated with inflation of the ground around the summit crater. The pressure source causing the ground deformation was probably located beneath the aseismic zone at a depth of 5 km and inflation of the pressure source may be related with storing of magma. Cumulative seismic energy released in 1997, 1999, 2000 and 2005 activities did not exceed the level at which large magmatic eruption occurs as Yokoyama (1988) pointed out. However, the cumulative seismic energy attained the level empirically estimated from recent smaller scale eruptions. Magma stored beneath the aseismic zone maybe stayed at the depth because no significant changes of hypocenter locations and focal mechanism were detected and the aseismic zone was not filled with magma.