

Source Mechanism of Quasi-monotonic Earthquakes at Papandayan Volcano, Indonesia

Triastuty Hetty[1]; Masato Iguchi[2]

[1] SVRC, DPRI, Kyoto Univ; [2] SVO

Papandayan volcano located in West Jawa province, Indonesia is a large composite volcano with numerous small vents within the craters and many others with solfataras emitting hot fumes. In historical record, the activities of Papandayan volcano were dominated by phreatic eruptions. The most violent and devastating outburst occurred on August 11 and 12, 1772, and the northeast part of the mountain collapsed destroying 40 villages and killing 2957 people. The last eruption occurred in October 2002.

Associated with an increase in seismicity of Low-frequency (LF) earthquakes during the period of June-July 1998, some Quasi-monotonic earthquakes with slowly decreasing amplitude in coda part were recorded at 8 seismic stations at Papandayan volcano, and in this study three quasi-monotonic events are analyzed to understand the source mechanism of these events.

The hypocenters of quasi-monotonic events are concentrated at depths of 1 to 2 km beneath the active crater, Kawah Mas. Spectra of quasi-monotonic events show peak frequency ranges 1.1 to 1.81 Hz and the sub-peaks with the frequency range 1.05 to 8.01 Hz.

Moment acceleration tensor was obtained by using inversion method with amplitude of P wave first motions at 7 stations. In addition to double couple component, non-double component was detected. Moment acceleration tensor was decomposed into isotropic, CLVD and double couple components.

An event on June 30, at 00:37, is dominated by DC component (57%), while CLVD (29%) and isotropic parts (14%) are also presents. The domination of DC component it is probably cause by the location of the event is quite far from Kawah Mas. Determination of focal mechanism shows a direction fault plane is 9 degree NE with dip of 74degree and rake of ± 132 degree.

While the other 2 events (June 30, at 17:59 and July 3, at 05:51) that located close to Kawah Mas, are dominated by CLVD (43-46%), isotropic parts are implosive (28-30%) and DC components are 25-27%. As Kawah Mas is a hydrothermal area, it is suggested that hydrothermal system plays an important role in these source mechanism, which is the presence of CLVD component is dominant. Even though the presence of isotropic and DC components are still significantly important. Determined focal mechanism for both these events resulted strike of 10-15 degree NE with dip of about 72-80 degree and rake between -104 and -119 degree.