

## Observation of Seismicity and Eruptive Activity at Semeru Volcano, East Java, Indonesia

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Semeru volcano (3676 m above sea level) is andesitic stratovolcano located in East Java, Indonesia. Summit explosions have occurred continuously since 1967. During this period, Strombolian and Vulcanian type explosions have occurred, producing explosion plumes rising 400-1000 m above the summit. Since April 2009, the eruptive activity of Semeru volcano was slightly changed from the previous. In order to monitor the volcano, Center of Volcanology and Geological Hazard Mitigation have installed four permanent seismic stations i.e. Kepolo (KEP), Leker (LEK), Tretes (TRS) and Besuk Bang (BES). In this study, we observed some of volcano earthquakes recorded at Semeru volcano in 2009 and 2010. We analyzed the deep volcano earthquakes known as VA and also investigated the explosion earthquakes in relation with the kinds of their visual appearances. The sources distribution of VA showed that the epicenter was dominant in the northwest direction, relative to the central volcano, with a depth between 1-13 km. The hypocenter distribution, supported by past research as well as geological information around, gave initial estimates that there was a column of magma flow that leads from the northwest to the center of the crater. VA study of earthquake focal mechanism illustrate that the dominant type of normal fault occurs at the peak of eruption, and would change to reverse fault after the activity dropped to normal. From the research, VA earthquake in Semeru volcano could be classified into two types: deep VA (VAD) with a depth range of more than 6 km and the shallow VA (VAS), with a depth of 1-6 km. The frequency of eruption earthquakes ranged from 0,78 to 4,09 Hz. Correlation between visual appearances and frequency are as follow; the eruption earthquakes that is manifested by visual grayish white eruption in January-February has 0,87 to 3,8 Hz; the eruption earthquakes that is manifested by the eruption of white visual show ,87-2,64 Hz. Whereas lava dome growth at the end of 2009, the eruption of earthquake frequency content of 1.06 to 2.73 Hz. Eruption earthquake hypocenters located at a depth of less than 1km below the crater.