

Deformation Monitoring of Kelud and Batur Volcanoes, Indonesia Using GPS, Leveling, and EDM Surveys

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GPS measurements, EDM ranging and leveling net work were made at the Kelut and Batur Volcano in Indonesia few years ago. In 2001, we repeat the measurements to detect the volcano deformation in these volcanoes. The last eruptions are in 1990 at Kelut and 1995 at Batur. The preliminary results from GPS and leveling surveys in Kelut volcano indicate the contraction of the baselines around the crater. The more detail and comprehensive results obtained from these GPS, Leveling, and EDM surveys would be presented, along with their related aspects. The results would include the deformation analysis results and the estimated pressure source location based on Mogi model. The paper will be sum up with some conclusions, recommendations, and future plan.

Kelut and Batur are two from 129 active volcanoes in Indonesia. Kelut Volcano(1731m) is an active strato andesite volcano located in Kediri, East Java. The volcano has a crater lake at the summit with the water volume of about of 36 million cubic meters at 32-35 centigrade and PH of 5.1 before the last eruption in 1990. Batur is an active strato volcano within the Batur caldera, located in eastern part of Bali Island. The caldera with size of about 13.8 by 10 kilometers also contains the Lake of Batur., and the caldera rim varies in height from 1267 to 2152 meters. Batur volcano has erupted at least 22 times since the 1800's, generally with strombolian eruptions and lava flows, with the last eruption in 1995.

For deformation monitoring of those volcano, GPS, Leveling and EDM networks have been established. In Kelut volcano, Leveling surveys were conducted in July 1998, Nov. 1998, June 1999, and Jan. 2001; GPS surveys were conducted in May 1999 and Feb. 2001, and EDM surveys were conducted in Jan. And Feb. 2001. In Batur volcano, Leveling survey was done in June 1998; GPS surveys were conducted in May 1999 and Feb. 2001, and EDM surveys were conducted in June 1995 and May 1999. In Kelut volcano, GPS network has 8 points, where 6 points are located inside and on the western side of the crater. In Batur volcano, GPS network has 11 points, where 6 points are located inside the caldera and 5 points are on the rim of caldera. Several leveling and EDM points in Kelut are also GPS points; while in Batur all EDM points are GPS points and a few leveling points are also GPS points.

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