

Monitoring of volcanic tremor using NIED Hi-net located near Aso

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NIED Hi-net (High sensitivity seismograph network) covers the Japan Islands with a spacing of 20 - 30 km. The high-density of the seismic network brings the improvement of detection capability for microearthquake. The discovery of the deep low-frequency seismic tremor [Obara,2002] is the one of the results. Hi-net stations were constructed with rather uniform distribution, geometrically, without considering locations of specified target such as volcano. However, the data might be available for the monitoring of the activity if the station happened to locate near the target. In this paper, the volcanic tremors recorded by Hi-net stations near Aso volcano are investigated.

Two Hi-net stations in the Aso caldera can detect isolated tremors. The tremor activity is characterized by the duration time of 20 - 60 seconds and the peak frequency is between 1 and 2 Hz. The observed continuous waveform data are operated by the band-pass filter with the cut off frequencies of 1 and 2Hz, then transformed to the RMS envelope. The isolated tremor, represented by the envelope peak is detected automatically. In order to remove the envelope peak of other earthquakes, the seismogram envelope of another station located out of the Aso caldera are also checked as a reference.

The monitoring started from July 2002. The isolated tremor becomes active gradually from August. The activity usually changes very smoothly with the time, however, sometimes become very quiet abruptly for a few hours. The peak frequency of 1.5Hz is independent from the amplitude. The distribution of the number versus the amplitude of the tremor does not obey to the Gutenberg-Richter's formula and has a specified peak. Moreover, the dominant amplitude value changes with the time.

We assume that the pre-existed source near the surface generates the tremor repeatedly and the amplitude of the tremor depends on the condition of pressure and/or temperature in the site. The dominant amplitude value of the tremor gradually increases when the pressure and/or temperature in the field increase homogeneously. When the field becomes inhomogeneous, the distribution of the amplitude has no peak. Of course, in order to monitor the tremor activity with high accuracy, it is very important to observe the phenomena as close as possible. Also the Hi-net data is available for monitoring of the volcanic activity.