

Active monitoring at active Volcanoes -Monitoring temporal change of transfer function in Sakurajima volcano, Japan

Hiroki Miyamachi¹, Koshun Yamaoka², Masato Iguchi³, Hiroshi Yakiwara¹, Takahiro Kunitomo², Toshiki Watanabe², Ryoya Ikuta⁴

¹Faculty of Science, Kagoshima University, Japan, ²Graduate School of Environmental Studies, Nagoya University, Japan, ³Disaster Prevention Research Institute, Kyoto University, Japan, ⁴Faculty of Science, Shizuoka University, Japan

E-mail: kyamaoka@seis.nagoya-u.ac.jp

We have deployed an active seismic source at the northwestern flank of Sakurajima volcano to monitor the temporal variation of seismic propagation property on which the volcanic activity may influence. The source, named ACROSS (= Accurately Controlled Routinely Operated Signal System), started its routine operation from 18 September, 2012 and is still in operation at the moment of the abstract submission. We are operating two rotational vibrators in the site that is 3.6 km to the northwest of the Minamidake crater of Sakurajima. The sources are operated with a frequency modulation, in which the modulation period is 50 seconds and the frequency range is 5 to 10 Hz and 10 to 15 Hz for each of the sources, to produce broad frequency range of signal.

The vibrator produces a force with a rotation of an eccentric mass around an axis. The vibrator is designed to switch its rotation direction in every two hours, so that we can synthesize a linear vibration of any direction that is perpendicular to its rotational axis, which has two degrees of freedom. As each seismic station has three component signals, we can obtain 6 components of transfer function for each source-receiver pair.

The signal from the ACROSS source is routinely monitored with more than 20 permanent seismic stations in and around Sakurajima volcano. Four temporal seismic stations are also deployed to increase the spatial coverage of monitoring. The signals that are recorded at the seismic stations are deconvoluted with the source function to obtain the transfer function between the source and the receivers. The transfer function is clearly obtained even for the stations on the other side of the summit, which will enable us to monitor the temporal variation of the seismic propagation property beneath Sakurajima. The transfer function so obtained will be shown in the poster presentation to discuss the temporal variation of seismic characteristics beneath Sakurajima.