The final round of the repeating seismic experiment in Sakurajima Volcano, Japan. The experiment 2016.

*Tomoki Tsutsui[1], Masato Iguchi[2], Haruhisa Nakamichi[2], Takeshi Tameguri[2], Hiromitsu Oshima[3], Hiroshi Aoyama[3], Mare Yamamoto[4], Kenji Nogami[5], Takao Ohminato[6], Yuta Maeda[7], Takahiro Ohkura[2], Hiroshi Shimizu[8], Takeshi Matsushima[8], Hiroshi Yakiwara[9], Hiroki Miyamachi[9], Reiji Kobayashi[9], Satoshi Hirahara[4], Hiroshi Tsuji[6], Atsushi Watanabe[6], Shinichiro Horikawa[7], Tadaomi Sonoda[2], Shin Yoshikawa[2], Yusuke Takenaka[2], Shuichiro Hirano[9], Hiroaki Yanagisawa[10], Akira Sugai[10], Kazuhiko Ide[10], Hiroaki Nagayama[10], Daisuke Mitsunaga[10], Norio Kokubo[10], Yuzo Shigenobu[10], Shigeru Watanabe[10], Yasunori Hatakeyama[10]

1. Akita University, 2. Kyoto University, 3. Hokkaido University, 4. Tohoku University, 5. Tokyo Institute of Technology, 6. University of Tokyo, 7. Nagoya University, 8. Kyushu University, 9. Kagoshima University, 10. Japan Meteorological Agency

The final round of the repeating seismic reflection experiments in Sakurajima Volcano and their summary are presented. The experiment series aims detection of structural evolution associated with underground magma movement in Sakurajima Volcano, which is a project included in the national project "the Earthquake and Volcano Hazards Observation and Research Program". The experiment is the first seismic experiment after the 2015 intrusion event, which was carried out after two years of the previous round. Seismic experiments have been performed every Decembers since 2009 with the identical geometry in the northern and eastern part of Sakurajima. Two major lines are routinely included and comprise 14 shot points and 225 stations in these experiments. Another line were also deployed in 2016 in the east foot of Minamidake with additional 20 stations for the purpose of detection of change in seismic response around the 2015 intrusion area. Uniform instruments, LS-8200SD by Hakusan Industry and Vertical motion 4.5Hz sensor, and 20kg size chemical explosions are used. The detonations for the final round experiment was done on 8th December 2016. 98.4% of all stations were completed schedule and seismograms up to 13 Gbytes were obtained through the experiment.
Tsutsui et al. (2016, JVGR) compiled seismic sections through six years, and presented that there is a reflector which changes associating with volcanic activity at depth of 5.8km below sea level. The reflector, Alpha, located beneath northeast Sakurajima, in the north of the known pressure source presented by Iguchi (2013, BVSJ). Tsutsui et al. (2016, JVGR) presented that the reflectivity of Alpha built up as the intrusion event in 2009 - 2010, and was fading after. The reflector did not respond the second intrusion from 2011 through 2012.
Further considerations on data in cross-line observations for seven rounds revealed three more clear later phases. Those were presented by Tsutsui et al. (2016, JpGU meeting).
1) A clear PS conversion from 5.8 km depth appears in 2012,
2) A clear PP reflection from 4.7 km depth appears in 2009,
3) A clear PP overcritical reflection from 2.4 km depth appears in 2012.
All of these are located in two kilometer south of reflector Alpha and their locations are coincident with the known pressure source by Iguchi et al. (2013).
Data of 2016's experiment suggest that intensity of several reflectors has changed after the previous round as followings ;
1) The reflector at 5.8 km depth has faded.
2) No PS conversion from the reflector at 5.8 km is detected.
3) Enhanced reflection from 4.7 km depth.

4) Enhanced reflection from 2.4 km depth.
The facts suggest there was structural evolution possibly associated with the 2015 intrusion beneath Sakurajima Volcano.

This study was supported by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan, under its Earthquake and Volcano Hazards Observation and Research Program, also supported by Japan meteorological Agency and DPRI, Kyoto University. The instruments for routine experiment are provided by Earthquake Research Institute, University of Tokyo.

Keywords: Sakurajima Volcano, Reflection seismology, Magma

