

Temporal geomagnetic field changes on Sakurajima volcano, Kyushu Japan, obtained by repeated aeromagnetic survey.

Mitsuru Utsugi¹, Wataru Kanda², Takeshi Hashimoto³, Naoto Inoue⁴, Shogo Komori⁵, Hiroyuki Inoue¹, Masato Iguchi⁶

¹Graduate School of Science, Kyoto University, Japan, ²Volcanic Fluid Research Center, Tokyo Institute of Technology, Japan, ³Graduate School of Science, Hokkaido University, Japan, ⁴Geo-Research Institute, Japan, ⁵Institute of Earth Sciences, Academia Sinica, Taiwan, ⁶Disaster Prevention Research Institute, Kyoto University, Japan

E-mail: utsugi@aso.vgs.kyoto-u.ac.jp

Sakurajima volcano in southern Kyushu, Japan, is one of the most active volcanoes in the world. The volcano is located in the Aira Caldera which formed as a result of a massive eruption approximately 22,000 years ago.

On June 7, 2006, a small eruption was occurred in the vicinity of the Showa crater, and later, the number of explosions began to increase again centered on the Showa crater. The total number of explosive eruptions reaches 548 times in 2009, 896 times in 2010, 996 times in 2011 and 885 times in 2012. In now, due to these recent intense activities, the size of Showa crater grew about 2.5 times than that on Nov. 2006.

It is expected that the geomagnetic field is changed around Sakurajima volcano due to this subsurface temperature change associated with these recent activities on Showa crater. To detect the temporal change of the geomagnetic field associated with these recent volcanic activities on Sakurajima volcano, we conducted helicopter-borne aeromagnetic survey around Sakurajima volcano on Oct. 24 to 26, 2011. The survey was conducted on 22 N-E (2-8km) and 15 E-W (5-12km) lines inside the Sakurajima Island. The spacing of each survey line is about 500 m, the altitude of flight was about 150-200 m from the ground. The total flight time was about 6 hours. On this volcano, dense aeromagnetic survey was made on Nov. 2007. Using this data as a reference field, we tried to detect the temporal geomagnetic field changes during 2007 to 2011 periods. On this analysis, we applied the equivalent anomaly method to calculate the upward continuation of the observed geomagnetic field (Nakatsuka and Okuma, 2002). As the result, a remarkable dipoler temporal change was detected around the eastern part of Sakurajima volcano. On this area, active volcanic eruptions occurred in a new crater, Showa-crater, repeatedly. It is possible that the temporal geomagnetic field change detected in this area is related with the activities of the Showa crater. In our presentation, we will show the detail of the result of our data analysis and its interpretation.