One-dimensional resistivity structure and the relocated hypocenter distribution of Iwo-yama, Kirishima Volcanoes

*Kaori Tsukamoto[1], Koki Aizawa[2], Wataru Kanda[3], Makoto Uyeshima[4], Kaori Seki[5], Takahiro Kishita[5], Mitsuru Utsugi[6], Takao Koyama[4]

1. Department of Earth and Planetary Sciences,Graduate School of Sciences,Kyushu University, 2. Institute of Seismology and Volcanology, Facurity of Sciences, Kyushu University, 3. Volcanic Fluid Research Center, School of Science, Tokyo Institute of Technology, 4. Earthquake Research Institute, University of Tokyo, 5. Department of Earth and Planetary Sciences, Tokyo Institute of Technology, 6. Aso Volcanological Lavolatory, Institute of Geothermal Sciences, Graduate School of Sciences, Kyoto University

Iwo-yama is the youngest volcano in the Kirishima volcanic group. Around Iwo-yama and Karakuni-dake, shallow (depth < 2km) tectonic earthquakes have increased since December 2013, and volcanic tremors have occasionally occurred since July 2015 (Japan Meteorological Agency, volcanic activity commentary document). Furthermore, the fumarolic gases appeared in December 2015 for the first time in 12 years. The leveling survey detected the ground uplift during June to December 2015, and its pressure source was estimated at a depth of 700 m, 150 m east of the crater (Matsushima et al.,2015). Therefore, it is reasonable to be concerned about the occurrence of hydrothermal eruptions.
In order to investigate the mechanism of these volcanic activities and possibility of future eruptions, we conducted broadband (0.005 to 3000s) magnetotelluric (MT) measurements around the Iwo-yama in April 2016. We recorded two components of electric fields at 20 observation sites and five components of electric and magnetic fields at 7 observation sites. One-dimensional inversion revealed that the shallow earthquakes occur beneath a shallow electric conductive layer, which is interpreted as a hydrothermal altered clay dominant zone. The pressure source by the leveling survey corresponds to the bottom of the conductive layer. These spatial relationships suggest that the supply of high temperature fluids has increased beneath Iwo-yama, and causes the increase in pore pressure beneath clay layer, resulting in the increase of earthquakes and ground inflation. In this presentation, we will further estimate the precise depth of earthquakes, and will investigate its relation to the shallow conductive layer.

