

Resistivity Changes of Sakurajima Volcano by Magnetotelluric Continuous Observations

Koki Aizawa[1]; Wataru Kanda[2]; Yasuo Ogawa[3]; Akihiko Yokoo[4]; Masato Iguchi[5]

[1] Sakurajima Volcano Research Center, Kyoto University; [2] DPRI, Kyoto Univ; [3] TITECH, VFRC; [4] SVRC, DPRI, Kyoto Univ.; [5] SVO

Sakurajima is an active volcano, which is located at the southern Kyushu, Japan. The volcano is consisted at the southern part of the 20km x 20km wide Aira caldera, which emitted the erupted products on the order of 100 km³ 22,000 years ago. Sakurajima was formerly island located in Kagoshima bay, but the lava effusion in 1914 connected the southeastern part of the island to the caldera rim. Since 1914, the eruptions activities are characterized as Vulcanian (approximately 8000 explosions per 50 years), effusive eruption, and continuous ash emission at the summit crater called Minami-dake. Since June 2006, the Showa crater, which is located 500m east of the Minami-dake, start to erupt after 60 years dormancy.

In order to monitor the resistivity change at Sakurajima volcano, we started the magnetotelluric (MT) continuous measurements since May 1st, 2008. Two observation sites were set up at 3.3km east (Kurokami), and 3km WNW (Haruta-yama) of the Showa crater. Two components of electric potential difference (N-S and E-W), and three components (N-S, E-W, and vertical) of geomagnetic field are measured by using Phoenix MTU-5 system. Near the Kurokami MT site, there is a 120m depth borehole, in which the hot water exists. Recently, the CO₂ gas content at 40m depth of the borehole increased along with the reactivation of the Showa crater: the 2 percent in May 2007 gradually increased to around 20 percent in October 2007.

The preliminary analysis shows a dominant resistivity change in the frequency range between 300-100 Hz at the both observation sites. Phase tensor analysis (Caldwell et al., 2004 GJI) excluded the possibility of local distortion and confirmed the significance of this resistivity change. The start of these resistivity changes corresponds to the start of the uplift of the summit direction detected by the Arimura borehole tiltmeter, which is one of the most reliable indicators of the subsurface magma intrusion at Sakurajima volcano. In this study, we will carefully investigate the cause of the resistivity change of showing various data of volcano activities.