Dose crustal heterogeneity constrain seismic activities? -An approach from electrical resistivity imaging in the southeast flank of Mt. Ontake Volcano, central Japan-

*Hiroshi Ichihara[1], Junna Kanahiro[2], Toru Mogi[2], Koshun Yamaoka[1], Mamoru Adachi[1], Noriko Tada[3]

1. Graduate school of Environmental studies, Nagoya University, 2. Graduate school of Engineering, Hokkaido University, 3. Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

Seismic swarm areas in the southeast flank of Mt. Ontake Volcano, central Japan, is one of the most important field to study interactions among seismic acitivities, volcanic activities and crustal fluid (e.g. Terakawa et al., 2017; Doi et al., 2013; Sano et al., 2015). On June 25th 2017, a M5.6 earthquake occurred in the swarm areas where studies on isotope ratio of spring water indicate transportation of aqueous water from lower crust and mantle and effects of volcanic fluid (Nishio et al., 2010; Takahata et al., 2003). Imaging of resistivity electrical distribution gives fundamental information to these studies because resistivity in the crust usually reflect pore fluids, altered sediments, and temperature. Thus we carried out audio-frequency and wideband magnetotelluric observations at 35 sites around the aftershock area of the earthquake to clarify resistivity distribution in this study. Based on estimation of magnetotelluric impedances and 3-D inversion procedures, we obtained a resistivity model that shows following features: (1) two conductive zones lied beneath springs that the isotope studies indicate mantle or lower crust origin fluid (C-1 and C-2), (2) the aftershock area is distributed in a resistive area and surrounded by the conductive zones (C-1 and C-2). The (C-1 and C-2) can be interpreted as fluid-rich basement rock and/or altered sediments. Therefore, because of crustal fluid or altered rocks, the fault rupture zone is located in the strong structural heterogeneity in elastic property where strain can be concentrated. In addition, the C-1 and C-2 might limit the fault rupture because they may show ductile behavior in deformation. If this feature is generally observed in seismic areas, survey for structural heterogeneity will contribute to estimate magnitude of earthquakes and evaluation of earthquake risks.

Keywords: resistivity distribution, crustal fluid, seismicity, Ontake volcano, earthquake swarm, magnetotelluric

