R003-P06
ポスター 4 ：11/26　AM1/AM2 （9:00-12:00）

蔵王山 AMT 探査及び浅部伝導層と深部伝導体の比抵抗信頼区間推定

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An AMT exploration of Zao Volcano, NE Japan, and resistivity confidential interval assessment for the conductive characters

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Studies of the electrical resistivity structures beneath active volcanoes commonly reveal a shallow electrically conductive layer at a depth above sea level and a conductive body at 0 to 3 km depth below sea level (bsl) (e.g. Tsukamoto et al., 2018; Yoshimura et al., 2018; Tseng et al., 2020). The shallow conductive layer is considered a hydrothermal alteration layer and blocks or allows the upwelling of hydrothermal fluids. The deeper conductive body is interpreted as a magma and/or hydrothermal reservoir. Zao Volcano, NE Japan, is the nearest (about 40 km) active volcano to Sendai City and is concerned with erupting in the near future. This study aims to evaluate the resistivity structure down to a depth of 2 km bsl by expanding the audio-frequency magnetotelluric (AMT) observations at Zao Volcano to detect the shallow conductive layer and the deep conductive body. If detected, we assess the sensitivity of those conductive zones.

The AMT impedance and geomagnetic transfer functions in 1-10k Hz were acquired at 60 stations in a 1 km $\times$ 1 km area centered on the crater lake, Okama, Zao Volcano, and inverted into a three-dimensional resistivity model using WSINV3D-MT code (Siripunvaraporn & Egbert, 2009). The resultant three-dimensional resistivity model represents a conductive layer within $\pm$ 1 km from east to west, north to south, centered on Okama, down to 500 m depth above sea level. The model also shows a conductive body centered at a depth of 1.5 km bsl, with a diameter of about 500 m. The shallow conductive zone has a distinct low resistivity (1-10 Ohm-m), while the conductiveness of the deep conductive body assumes weak to moderate (10-100 Ohm-m). The confidence interval resistivity (CIR) with a 99 % level of the shallow conductive zone less than 3 Ohm-m was estimated to be 1.5-2.5 Ohm-m using Welch's t-test. On the other hand, we could not constrain the significant CIR of the deep conductive body. Regarding the shallow conductive layer, we will show an estimation of a smectite volume fraction in the presentation using the confidence interval of resistivity and the smectite surface conduction experimental data (Levy et al., 2018; Revil et al., 2019).