Shallow geophysical survey in Goshougake geothermal area.

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Mud volcanoes in Goshougake geothermal area are classified as high-temperature mud volcanoes, which related to magmatic volcanism of Akita Yakeyama volcano. There are various thermal features including fumaroles and hot spring in and around this area. The promenade in this place was broken by extruded mud and closed in fall 2017. For this reason, geophysical surveys were conducted to detect the pre-eruption mud volcanos.

In this field, ground penetrating radar survey has been performed and it has been reported that clear reflection groups appear locally on part of the survey line (Inoue et al., 2019). ERT and IP measurement by dipole-dipole arrangement were attempted several times in order to obtain the resistivity and the chargeability. However, there was a problem in data quality since enough potential difference could not be obtained. In this time, we performed ERT survey using a Wenner-Schramberger arrangement and obtained a higher-quality resistivity data. We used the ERT system of SYSCAL PRO with 48 electrodes at 2 m intervals. From this result, it was found that reflections of GPR became clear at a thick position of the high resistivity layer on the subsurface.

New survey lines were set along with the mud pots, which is located in a significant alteration zone in 2019. We used the ERT system of Handy-Arm with 32 electrodes at 0.75 m intervals to obtain data of the subsurface zone. From the results, it is clear that there is a low resistivity below 1 ohm m beneath this area, and it is inferred the relationship with the mud volcanoes.

In addition, Self-potential data were acquired along the promenade in the Goshougake Nature Research Road. Positive anomalies were found near Oname Motome and Oyunuma, while negative anomalies were found near Oodorokazan located on the east side, with a maximum potential difference of 85 mV. We are planning to measure more detail SP data again.

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