雌阿寒岳山麓における広帯域 MT 法探査（続報）

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Broadband magnetotelluric survey at Mt. Meakandake volcano (Part 2)

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Abstract

We, following our previous surveys, performed extra broadband MT (BBMT) measurements in the summit area and western foot of Mt. Meakandake, one of the active volcanoes in eastern Hokkaido. On the northeastern foot of Mt. Meakandake, a remarkable ground inflation was observed during the period from 2016 to 2017 (Geospatial Information Authority of Japan, 2018). We modeled the resistivity structure based on the BBMT data in 2018 and 2019 (Inoue et al., 2020) that focused on the inflation source, as well as on the AMT/BBMT data in 2010 recorded on the south shore of Lake Akan (Mogi et al., 2011). Our previous resistivity model has imaged a low resistivity anomaly C1 (about 1-10 Ωm) extending from 0.5 km BSL just below the summit to a deeper part of Mt. Meakandake. However, the geometry or spatial extent of C1 has not been well constrained by the lack of MT observation sites. Therefore, in the fall of 2020, we deployed six additional BBMT sites in the summit area and the western foot of Mt. Meakandake to achieve a better constraint on C1 (Fig 1).

We acquired the time series of five components (2E+3H) for about seven days using the ADU07e system (Metronix Ltd.) for the three sites in the western foot of Mt. Meakandake. On the summit area, we measured only 2E using the Elog-dual recorder (NT System Design Ltd.). In calculating the response functions, we used the BIRRP (Chave and Thomson, 2004) and applied the remote reference processing (Gamble et al., 1997) using the data at the continuous station in Yamagata Prefecture (about 700 km southwest from our study area) that was provided by Geothermal Energy Research & Development Co., Ltd.

The overall characteristics of the apparent resistivity and phase curves suggested the structure of roughly middle–low–high resistivity from the surface toward deeper part. Some of the additional sites showed anomalous phases in Zyx component in a period range over 1000 s. The induction vectors at the western

sites directed roughly to the northeast, in constant to those at the sites in the northern to eastern foot of the volcano, pointing to an opposite direction.

As a next step, we plan to revise the 3D resistivity inversion modeling with the additional MT data incorporated to discuss the subvolcanic resistivity structure of Mt. Meakandake and its magma plumbing system.

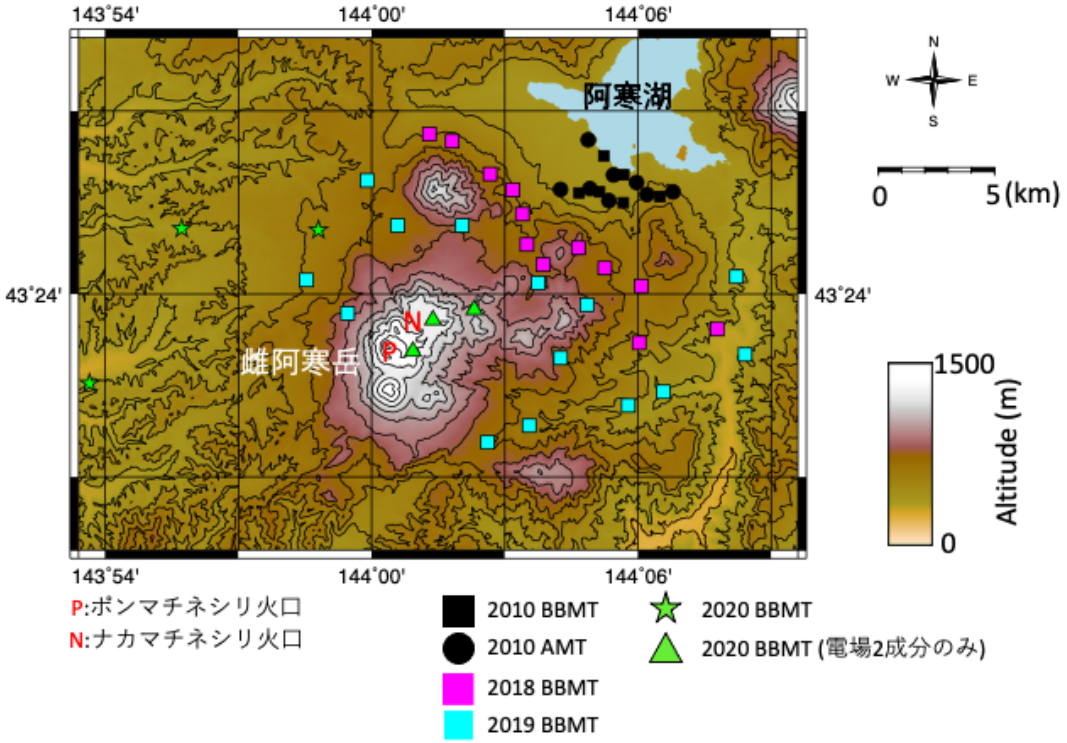

Fig 1: Location map of the MT sites in this study and the previous studies.

Acknowledgments

We are grateful to Prof. M. Uyeshima of the University of Tokyo and Prof. W. Kanda of Tokyo Institute of Technology for the instrumental supports. This study is supported by ERI JURP 2020-F2-04 Prof. H. Ichihara of Nagoya University are thanked for his supports in the fieldwork and helpful advice. Y. Matsunaga of Tokyo Institute of Technology are also thanked for helpful advice for data processing.

We express our thanks to Prof. K. Suzuki, K. Aoyama, T. Ugo, K. Kojima, T. Tashiro and R. Watatani of Faculty of Engineering, Hokkaido University for their supports in the fieldwork. We also acknowledge the fieldwork of M. Takada, R. Ito, Y. Iwama, K. Shibuya and A. Narita for their supports in the fieldwork.

We are grateful to Geothermal Energy Research & Development Co., Ltd for the reference data to remote reference processing.

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