

R003-04

D会場：11/25 PM1 (13:15-14:45)

14:00~14:15

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Magnetotelluric explorations of the three-dimensional electrical resistivity structure under the Nikko-Ashio area

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The Nikko-Ashi area is one of the best areas in the world for elucidating the mechanisms of volcanic and seismic activities and the link between them. There exist a number of quaternary volcanoes (e.g., Nikko-Shirane and Nantai volcanoes) in the Nikko-Ashio area. Swarm earthquakes have been occurring in the area. Moreover, M6- and M7-class inland earthquakes have occurred to the east of the area. Some previous studies have suggested that the existence of volcanoes may have a bearing on those seismic activities. Both volcanic and seismic activities are associated with crustal fluids, and the magnetotelluric method is one of the most effective methods to reveal the distribution of the crust fluids. Ogawa et al. (1997) conducted magnetotelluric measurements around the Nikko-Ashio area and estimated the two-dimensional electrical resistivity structure under the Nikko area. Because, however, the subsurface structure under this area is considered to be three-dimensional, the elucidation of the three-dimensional structure is essential to investigate the mechanisms of seismic and volcanic activities. Therefore, we conducted new wideband magnetotelluric measurements around the Nikko-Ashio area in 2021, 2023, and 2024. From the newly measured time-series data, we estimated the impedance tensor, the vertical magnetic transfer function (tipper), and the inter-station horizontal magnetic transfer function using a robust data processing method. Because the geomagnetic field activity is relatively high during the measurement periods, particularly in 2024, we obtained reliable response functions up to several thousand seconds. We combined those new data and the data measured by Ogawa et al. (1997) to reveal the three-dimensional electrical resistivity structure down to the deep crust under the Nikko-Ashio area. The combined station array is composed of over 40 stations and covers the Nikko-Ashio area and the epicenter area of large historical earthquakes to the east of it. In this presentation, we show the characteristic features of the response functions of the combined dataset and discuss their implications for the subsurface structure.

List of Authors

Many people joined the MT measurements in 2021, 2023, and 2024, in addition to the researchers on the main author list. The names and institutes of these participants are listed below by University and Institute.

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