阿蘇カルデラ地下のマグマシステム

- MT 法データおよび Network-MT 法データによる 3 次元比抵抗分布 -

Magma supply system beneath Aso caldera

- 3-D resistivity distribution by MT data and Network-MT data -

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Abstract

Aso caldera, with dimensions of 18×25 km, lies on Kyushu Island in the Southwest Japan subduction zone. The caldera was formed during 270–90 ka by a series of huge eruptions that produced hundreds of cubic kilometers of pyroclastic deposits with VEI-7. A post-caldera cone of Naka-dake in Aso caldera is a quite active volcano, at which magmatic and phreatomagmatic eruptions occurred during 2014–2016, ash emissions continued from July 2019 to June 2020, and a phreatic eruption occurred in October 2021. In and around Aso caldera, we carried out magnetotelluric (MT) and network-MT surveys during 2015–2016 and 2019–2022, respectively. Network-MT surveys/method based on MT method, whereas the electric potential differences of the ground are measured by using long metallic wires/dipoles (~10 km) of communication lines of the commercial telephone company. In addition, the other network-MT surveys were previously carried out in Aso caldera during 1993–1998 [e.g., *Hata et al.*, 2015]. For clarifying magma supply system beneath Aso caldera in a crustal depth scale, we determined three-dimensional (3-D) electrical resistivity models through inversion analysis of the respective MT and network-MT data sets. Here, period ranges of the MT and network-MT data sets were adopted for 0.005–2,380 s and 30–20,480 s, respectively. Moreover, we used a data-space inversion code, which can deal with the length and direction of each dipole [e.g., *Siripunvaraporn et al.*, 2004], in the inversion analysis of the network-MT data. Consequently, 3-D electrical resistivity models similarly imaged the following magma supply system as low resistivity anomalies beneath Aso caldera; a significant low resistivity anomaly of northward dipping in the upper crust and the absence of a large distinctive anomaly in the lower crust [e.g., *Hata et al.*, 2016; 2018]. The northward dipping anomaly is considered a magma pathway/reservoir which feeds magma to Naka-dake eruptions.

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