

### 3次元比抵抗構造を基にした

#### 九州地方の上部マントルの温度構造とメルト分布

## Thermal structure and melt fraction distribution of mantle from a 3-D electrical resistivity structure beneath Kyushu

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### Abstract

Examining how electrical-resistivity value in the field-derived underground structure corresponds to the physical properties, such as temperature and/or melt fraction, is important for us to understand the magma generation mechanism beneath each volcano. The Kyushu Island in the Southwest Japan Arc has many Quaternary active volcanoes, which exist along the volcanic front of N30°E-S30°W, in relation to the subduction of the Philippine Sea Plate (PSP). The volcanoes are located in northern and southern regions of the island, and no volcanoes are located in the central region between the two volcanic regions of the island. We performed three-dimensional (3-D) inversion analyses to obtain an electrical resistivity structure (model) of mantle beneath the entire Kyushu Island using the Network-Magnetotelluric (MT) data [Hata *et al.*, 2015]. We try to determine thermal structure and melt fraction distribution by using relation between electrical-resistivity and temperature inferred from laboratory-derived petrological results and the field-derived electrical-resistivity structure beneath the Kyushu Island. The laboratory-derived petrological results are relation between electrical-resistivity and temperature for four nominally anhydrous minerals (Olivine, Orthopyroxene, Clinopyroxene, and Garnet) and for hydrous basaltic melt under the condition of wet/dry mantle. In this presentation, we showed our approach to determine temperature and melt fraction as a function of the water contents among the four mantle minerals and the basaltic melt, which integrate laboratory-derived resistivity and field-derived resistivity, and show thermal structure profiles and melt fraction distribution profiles of the mantle beneath the one non-volcanic region and the two volcanic regions of the Kyushu Island [Hata and Uyeshima, 2015].

## References

Hata, M., N. Oshiman, R. Yoshimura, Y. Tanaka, and M. Uyeshima (2015), Three-dimensional electromagnetic imaging of upwelling fluids in the Kyushu subduction zone, Japan, *J. Geophys. Res.*, 120, doi: 10.1002/2014JB011336.

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