

Electrical conductivity structure beneath the Gomura Fault (Kyotango, Kyoto)

OUCHI, Yuhei^{1*} ; YAMAGUCHI, Satoru² ; MISHIMA, Toshiaki² ; ODA, Yusuke²

¹Department of Geosciences, Osaka City University, ²Department of Geosciences, Graduate School of Science, Osaka City University

Fault zone architecture and related permeability structures form primary controls on fluid flow in upper-crustal, brittle fault zone. As the electrical resistivity of rocks is sensitive to distributions of fluids, the magnetotelluric (MT) method can be a powerful tool in investigating the fault zone architecture.

The Yamada Fault is located in Kyoto, Japan. The Yamada Fault zone consists of the main part of the Yamada Fault zone and the Gomura Fault zone. The Gomura Fault zone extends over 34 km and can be grouped into the Gomura Fault, the Chuzenji Fault and so on. The Gomura Fault appeared as a result of 1927 Tango earthquake.

In order to delineate subsurface structure of the fault, we made an audio-frequency magnetotelluric survey at 12 stations along the transect (4 km) across the surface trace of the Gomura Fault. The MT response function was obtained at each station, using remote reference processing. After dimensionality analysis by Phase Tensor method (Caldwell et al., 2004; Bibby et al., 2005), two-dimensional inversions for TE and TM modes were carried out, using the code of Ogawa and Uchida (1996).

The model is characterized by two resistive zones and four conductive zones. The most significant conductive zone is recognized beneath the surface trace of Gomura Fault with a width of more than 650 m and located in a depth range of 0.45-1 km. It is noteworthy that the conductive zone beneath the Gomura Fault is comparable in width to the damage zone determined by geological survey.

Keywords: The Gomura Fault, electrical resistivity structure, Magnetotelluric(MT), Damage zone