

Resistivity structure of Itoigawa-Shizuoka tectonic line active fault system around the Suwa lake (part 2)

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Itoigawa-Shizuoka Tectonic Line (ISTL) active fault system is known for having a potential of M8 earthquake, if its whole fault segments are activated. In addition to geographical and geological studies, geophysical studies are important to image the deep geometry and heterogeneity of the fault system. Magnetotelluric method (MT) can image resistivity structure at depth, which represents the distribution of fluids. The study area around the Suwa Lake is a boundary between the northern (Gofukiji) and southern (Chino) segments. These fault segments run parallel along the rim of the Suwa basin in NW-SE directions. Thus, the underlying structure of the Suwa basin may thus be complex.

In 2007, we have carried out wide-band (300Hz-0.01Hz) MT measurements at 10 stations on the 60km-long SW-NE profile crossing the Suwa Lake, in order to reveal deeper crustal structure than we had in 2006. These data were compiled together with the MT/AMT data obtained in 2006.

First, we decomposed the impedance tensors assuming that the regional two-dimensional strike follows the NW-SE direction. Then, the two-dimensional inversion was applied to obtain an optimal model. Newly found features are as follows.

(1) The SW-dipping conductor beneath the Suwa basin extends deeper and joins the horizontal conductor at the depth of 10km. A high-seismicity zone corresponds to this conductor. This suggests the involvement of the fluid in earthquake generation processes.

(2) Resistive basement in the mid-crust shallows beneath the Suwa basin, which is also supported by the seismic tomography.