

Resistivity structure of Beppu-Haneyama fault zone

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By using the broad-band magnetotelluric (MT) data acquisition system (Metronix ADU-07 system) and the recently developed telluric loggers (NT System Design ELOG1K), we measured electromagnetic fields in the eastern part of the Beppu-Haneyama fault zone, Kyushu island, Japan. At 53 telluric measurement sites, the MT impedances were calculated by using the magnetic fields recorded at other sites. Total number of Broad-band (200~0.0003 Hz) MT and telluric sites amounted up 73. Preliminary 3-D inversion shows the following features of the resistivity structure; (1) sub-vertical conductors are imaged at a shallow level beneath the faults; (2) the deep resistivity structure is approximately trending NE-SW direction that is not consistent with the EW-trending directions of the fault zone. The studied area is known not only as the faults but also as geothermal activities with famous hot-springs (Beppu and Yufuin) and three active volcanoes (Tsurumi, Garan, and Yufu). Therefore, it is likely that the geothermal fluids supplied beneath the volcanoes flows along NE trending faults, then discharges out in hot springs. However, the preliminary result shows that the deep trend of the resistivity structure is not consistent with the surface trace of faults, which may imply the faults are not extended to the deep level. It should be noticed that the hypocenters of earthquake swarms around Beppu City in 2007 (Maeda et al., 2010) are distributed NE-SW horizontally, which is consistent with the trend of deep resistivity structure. This may suggest that the fluids movement was not guided by the faults but by the deep resistivity structure, subsequently triggered the earthquake swarms in around Beppu City.

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