Wide-band magnetotelluric observation in NE Japan arc to map geofluid: Sanzugawa and Mukaimachi caldera

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GEOFLUD program aims at understanding the nature and dynamics of fluids in the subduction zones. We have coordinated studies on geophysical observation (seismic tomography and MT imaging), material science of fluids including high-pressure experiments and molecular dynamics on chemistry and physical properties of fluids and microstructure of fluid-bearing rocks, and forward modeling coupled with geochemical inversion on fluid flow, magma genesis and ore formation.

We have been collecting wide-band MT data around Naruko region to image crustal resistivity distribution in three-dimensions. Interpretation of the resistivity by fluid content needs rock model (fluid geometry), and fluid resistivity (fluid chemistry). For rock model. recent petrological observation (Nakamura et al., 2012) found the fluid existence at the grain surface rather than along edges. This suggests fluid connectivity like fully connected HS. Recent geochemical studies using fluid inclusion found fluid salinity can be as high as ˜<10 times as that of sea water. Molecular dynamic simulation (Sakuma et al., 2012) showed that resistivity of the saline fluid does not change orders for lower crustal temperature and pressure conditions. These supports the interpretation of the resistivity model in terms of the HS fully connected model with ˜0.03 ohmm.

In the presentation we show recent data of 81 stations over the Sanzugawa and Mukaimachi caldera.