A Crustal Electrical Conductivity Distribution Model beneath around Azuma and Adatara Volcanoes, Northeastern Japan

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Magnetotelluric (MT) and geomagnetic depth sounding (GDS) observation was carried out to explore electrical conductivity distribution in the crust beneath around Azuma and Adatara volcanoes, northeastern Japan. We expanded 21 observation sites in 20 x 20 km^2 area of which the center locates at Oana-Crater. Electromagnetic field variation during 3-7 days with 32 Hz sampling and in 10-30 hours with 1024 Hz sampling was acquired at each site. MT and GDS response function has been calculated using BIRRP method (Chave & Thomson, 2004 GJI). To obtain three-dimensional conductivity model, we employed WSINV3DMT method (e.g. Siripunvaraporn & Egbert, 2009 PEPI).

The inverted model shows a triaxial ellipsoidal conductor over 0.03 S/m (TEC) lies beneath Oana-Crator. The center of the TEC locates at 5 km depth below sea level (b.s.l.) beneath Oana-Crator, and the longest, middle and shortest diameter is 25 km in NS direction, 15 km in EW direction and 10 km in vertical direction, respectively. Two conduit-shape-conductors elongate from the TEC to Oana-Crator and to Mt. Minowa (3 km northwards from Mt. Adatara). Two maximal conductive regions over 0.3 S/m are imaged at 4 km depth b.s.l. inside the TEC. The subsurface beneath eastern region than Azuma-Kofuji indicates entirely resistive less than 0.003 S/m.

The TEC region is finely consistent with the low viscoelastic region obtained by Takada & Fukushima (2013 Nat. Geo.). The two maximal conductive regions inside the TEC imply the cores of hydrothermal and/or magma reservoirs of Azuma and Adatara volcanoes. Provided that the TEC shows a hydrothermal and/or magma reservoirs, the reservoir of Azuma and Adatara volcanoes is common. While deep low-frequency seismicity is found deeper than 20 km depth beneath eastern region from Azuma-Kofuji, the deep low-frequency events lie entirely in an electrically resistive region.

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