

## **Magnetotelluric Images of Volcanic Zones in NE Japan Arc and Co-seismic Deformations during the 2011 Tohoku M9 Earthquake**

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We have compiled wide-band magnetotelluric data collected at 590 sites over the last 30 years in NE-Japan. The period ranges are from 3ms to 2000s. Previous studies have focused on specific volcanic or seismic zones and had restrictions such as two-dimensional modeling methodology or three-dimensional modeling with 20kmx20km scale limitations. After compiling all the datasets, we have found strong current-channeling due to the elongated distributions of thick sedimentary layers, which introduce high three-dimensionality data around them. We identified such strong channeling by the induced electric field distribution and induction vectors for hypothetical event analyses using H<sub>x</sub> and H<sub>y</sub> inducing fields. This nature of the dataset requires complete three-dimensional modeling incorporating a large survey area with a 100 km x 100km scale.

We have used 410 sites in the central part of the survey area and inverted the resistivity structure from the full impedances and induction vectors in 8 periods using WSINV3DMT code. The most significant feature is the distribution of electrical conductors below 20 km along the volcanic arc, which runs in the SSW-NNE directions with a 10 km width. Its extension to the uppermost upper mantle depth shows resistivity of less than ten ohmm. These conductors get shallower toward Quaternary volcanoes as plume-like conduits, implying magmatic melt with potentially saline fluids in their upper part.

The distribution of those anomalous conductors at the volcanic zones has good spatial correlations to the co-seismic crustal depressions of the M9 Tohoku earthquake in 2011 inferred by InSAR (Takada and Fukushima, 2013).

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