

Three dimensional resistivity structure of volcanoes using grounded source AEM

Toru Mogi[1]; Mogi Toru Research Group for GREATEM[2]

[1] Inst. Seismol. Volcanol., Hokkaido Univ.; [2] -

The grounded electrical source airborne EM (GREATEM) to survey for deeper part, up to 1000m, has been developed. This method is similar to a ground survey of the long offset time domain EM (LOTEM). Magnetic field responses for the subsurface structure are characterized by transient curve depending on a resistivity structure, height as well as transmitter-receiver distance.

We have developed a three dimensional numerical modeling scheme for computing the responses based on the staggered grid finite difference method in frequency domain. The scheme is based on finite difference (FD) staggered rectangular non-uniform grid formulation for the secondary electric field with continuous components of tangential electric and normal magnetic fields. A special procedure was developed to improve the accuracy of magnetic and electrical fields at the Earth surface and at the interface with a large conductivity contrast. We use Fourier Transform to compute transient response.

We carried out the GREATEM survey at Aso Volcano, southwest Japan, to clarify three dimensional resistivity structure. The resistivity structure is generally composed of three layers up to 1000m depth, and low resistive dike like structures are seen in some places. These structures probably be alteration zones developed with geothermal water circulation. The field data used in this study were obtained in the project supported by Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan.