# Development of the 3-D inversion code of electrical conductivity structures in the flat Earth by the EM sounding methods

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The EM sounding method is useful to elucidate the structure in the Earth's interior, as well as the seismological methods. Especially, because the EM field variations are very sensitive to existence of fluid and hot regions which have high conductivity, it can be a powerful tool to estimate the structure beneath volcanic regions and to monitor the volcanic activity. The distribution of fluid and/or magma beneath volcanoes, however, depend roughly on the positions of cracks and locally stress-weak area, and it may be very complex in practice. It means that the conventional 1-D and 2-D MT analyses might mislead us to understanding of the volcanic structure.

In this paper, we develop the 3-D full inversion code to estimate the electrical conductivity structure beneath the flat Earth. The forward code is based on the MIDM developed by Munekane (2000). The nonlinear inversion is based on the steepest descent and quasi-Newton method (Koyama, 2001). Simple synthetic inverse problems can be solved well by using this code, and we plan to apply it to experimental data.