

Magnetotelluric method and the source field with finite wave number

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Magnetotelluric method is now widely used for mapping the crustal and upper mantle structure in three-dimensions. In magnetotelluric method, we normally assume the source field as a plane wave. However, if the source field has a finite wave length, the impedances (apparent resistivity, and impedance phase) and the geomagnetic transfer functions will be affected. In a simple case with uniform earth where the source field has a wave number is considered. The apparent resistivity inferred from the impedance (ratio of horizontal electric field to the orthogonal horizontal magnetic field), by assuming a plane wave source will be biased downward and impedance phase will be biased upward. Also the geomagnetic transfer function will have phase of $\pi/4$, even without any lateral heterogeneity.

Some magnetotelluric studies at the high latitude and under the magnetic equator will be reviewed.

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