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The sea effect in 3D magnetotelluric data obtained in Jeju Island, Korea

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The sea effect in Jeju Dataset has been investigated. The Jeju Dataset consists of 88 measurements along five lines that cover the island. The island is located at South Sea of Korea, 31 km long along the minor axis and 73 km long along the major axis of direction N70E. Because the island is surrounded by electrically conductive sea and of a steep topographic variation, measured MT data in terms of impedance are seriously biased by distortion of electric fields. To see how the surrounding sea affects the MT data and eventually the deep resistivity model from 3D inversion, in this study, we conducted a 3D modeling including the bathymetry of surrounding sea and assuming 1D layered earth deduced from 1D inversion results of MT data with sea effect correction. Inversion of numerical data clearly showed the sea effects smeared the boundaries at depth. An iterative sea-effect correction scheme has been applied to measured MT data. Then a 3D MT inversion incorporating the static shift parameterization is utilized to produce a reliable resistivity model. Reasonable reconstructed images are obtained through the 3D inversion including sea-effect correction.