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大陸上部マントルの標準電気伝導度構造―オーストラリアの MT データから
A reference electrical conductivity model of continental upper mantle estimated from the MT data in central Australia

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To investigate the one-dimensional reference electrical conductivity profile beneath continents, we conducted a magnetotelluric (MT) observation with long dipole span near Alice Springs, central Australia. We utilized geomagnetic data acquired at the Alice Springs geomagnetic observatory operated by Geoscience Australia. Using the BIRRP processing code (Chave and Thomson, 2004), we estimated the MT response functions for periods from 100 to 10 to 5 sec. The phase tensor analysis revealed that the shallower uppermantle (up to several thousand seconds in period) is two-dimensional, while the deeper upper mantle is three-dimensional. We focused the two-dimensional part, from which we can extract one-dimensional model. The pioneering work demonstrated by Agarwal et al.(1993) suggests that we should use Berdichevsky average, determinant or TE-mode response to model one-dimensional conductivity structure in two-dimensional environments. From the view point of galvanic distortion in regional two-dimensional structures supposed that Groom-Bailey decomposition would be performed, Berdichevsky average response involves phase mixing as well as static shift, while determinant and TE-mode responses involve only static shift. Adopting Faraday's law, we can correct static shift of TE-mode using geomagnetic transfer function (Ledo et al.,2002), while such a procedure for correcting static shift of determinant responses has not yet been developed. Following the procedure of Ledo et al.(2002), we estimated TE-mode responses with static-shift free. We inverted the TE-mode MT responses into a one-dimensional conductivity profile using Occam inversion (Constable et al.,1987), and plan to compare the one-dimensional structure with electrical conductivity profiles predicted from compositional models of the earth's upper mantle by calculating phase diagrams in the CFMAS (CaO-FeO-MgO-Al2O3-SiO2) system.