

3-D electrical conductivity structure in the mid mantle beneath Australia region

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The 3-D electrical conductivity in the mid and mostupper lower mantle beneath Australia was elucidated by inverting C response data at 8 observatories in Australia. We just used data obtained by Semenov and Kuvshinov (2012) estimating by using very long time series up to 51 years maximum. The period range used in this study is between 4 and 100 days by removing data with shorter period to avoid contamination of some irregular source effects such as auroral effects. By using this data under the assumption that the source is external dipole field in geomagnetic coordinate, the 3-D conductivity map beneath Australia is inverted.

To invert data, we used the 3-D inverse code developed by Koyama (2002), in which integral equation method with modified IDM pre-conditionor is applied for forward calculation and the misfit function is minimized by quasi-Newton iterative method. By conducting a hundred of numerical tests, we found that the conductivity in the depth between 510-900 km is well resolved.

Mainly we detected a highly conductive body in the mid-mantle beneath eastern Australia, which is almost 1.0 S/m. This might indicate the existance of fluid and/or melt in the mid-mantle.

Keywords: electrical conductivity, mid mantle, Australia, inversion, C response