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One-dimensional resistivity model inferred by sea-effect-corrected magnetotelluric(MT) data obtained in and around the southern part of the Korean Peninsula

Junmo Yang
Korea Institute of Nuclear Safety, Dep. of Structural and Site Evaluation, Korea, Republic Of (jun95017@gmail.com)

This study presents a one-dimensional electrical resistivity structure reaching from the lower crust to the upper mantle of the Korean peninsula using broad-band magnetotelluric (MT) data obtained in the Korea Peninsula and Jeju Island. Since the observed MT data seem to be strongly affected by the surrounding seas, we need to correct their influence, so called "sea effect“, which make it difficult to obtain reliable information on the deep part of subsurface. In this study, we correct the distortions due to the sea effect using the iterative correction method of Yang et al. (2010). For the sea-effect-correct MT data, we perform a 1-D inversion and present the representative 1-D resistivity structures for three regions (Kyunggi Massif, Gyeongsang Basin and Jeju Island), averaging the inversion results of all the sites in the same region. The most remarkable feature is that there exists a distinct electrical discontinuity at a depth of about 17km for the Gyeongsang Basin and Jeju Island, 12km for the Gyeonggi Massif, which is thought of as transition zone separating the resistive upper crust and conductive lower crust. This discontinuity might be closely related to the Conrad discontinuity considering the previous geophysical studies, but no discontinuity related to the Moho discontinuity has not yet been identified in this study. In the case of Gyeongsang Basin where we can obtain information on deeper part of the subsurface due to its high resistivity value of the upper crust over 10,000 ohm-m, there exists another deeper electrical discontinuity at a depth of about 100 km. This can be considered to be the boundary between the lithosphere and the asthenosphere, commonly found in the stable continental crust, but a further study is needed to clearly figure out the existence and detectability of this deep boundary.