A REVISED 1-D ELECTRICAL CONDUCTIVITY REFERENCE STRUCTURE BENEATH NORTH PACIFIC OBTAINED BY SEMI-GLOBAL INDUCTION STUDY

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One dimensional (1-D) electrical conductivity structure in the mid-mantle beneath the northern Pacific is revised in order to discuss the mean state of the mantle and to obtain a credible starting model for 3-D inversions. Semi-global geomagnetic depth sounding (GDS) responses obtained at 13 stations and submarine cable magnetoterullic (MT) responses for 8 cables in the period range 1.7 to 113 days were used to obtain the revised structure. We employed an iterative scheme combining surface layer correction to remove the effect of ocean-land heterogeneity in the responses and 1-D inversion to obtain the revised structure. The validity of the scheme is examined by making synthetic tests: We confirmed that the structure obtained using this scheme not only represents the model which explains the corrected response the best but also reflects the actual mean conductivity structure in the mid-mantle depths. The obtained 1-D conductivity in the transition zone by supposing jumps at 400 and 650 km depths (2-jump model) is higher than that of dry Wadsleyite and Ringwoodite measured experimentally by Yoshino et al. (2008). If the high conductivity is entirely due to the effect of water in the transition zone, the region contains 0.5 wt% of water. However, if an additional discontinuity of electrical conductivity is allowed at 500 km depth in the 1-D inversion, the obtained model has lower conductivity than the 2-jump model in the upper 100 km of the transition zone. In this case, the conductivity in the layer is rather close to that of dry Wadsleyite.

electrical conductivity, mantle transition zone, semi-global induction

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