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 a revised structure. It has been well recognized that the surface conductivity heterogeneity due to ocean-land conductivity contrast has large influence on the responses. Corrections to remove the effect of surface heterogeneity are made using 3-D modeling while obtaining the 1-D structure. It is confirmed by synthetic tests that the structure obtained in this way not only represent the model which explain the response the best but also reflect the actual mean structure in the mantle. The obtained 1-D conductivity in the transition zone by supposing jumps at 400 and 650 km depths is higher than that dry Wadsleyite and Ringwoodite measured experimentally by Yoshino et al. (2008). If the difference is entirely due to the effect of water in the transition zone, the conductivity is consistent with if the region has 0.5 wt% of water. However, if additional discontinuity of electrical conductivity is allowed at 500 km depth, the obtained conductivity for the upper 100 km of the transition zone is lower. In this case, the conductivity is rather close to that of dry Wadsleyite.