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Impedances for Induction Soundings of the Earth's Mantle

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Abstract

Determination of impedances is necessary in order to eliminate some shortcoming of our knowledge about structures of the exciting source fields and their fickleness. The experimental impedances for induction soundings result from the impedance boundary conditions or heuristic models. The simplified models give just a rough idea of their domain of applicability. Impedances can depend on many factors, including the exciting field structures of several source types which are present in the period range of the mantle soundings (10^4–4×10^8 s). The problem in the mantle investigations arises if impedances measured by different methods have to be jointly inverted in order to essentially prolongate the analyzed period range and hence to increase the reliability and depth of induction soundings on land. The subject of our work is an analysis of the known magnetotelluric and magnetovariation impedances to suggest a physically substantiated approach for their joint inversions.

Key words: impedances, magnetotelluric sounding, magnetovariation sounding, induction sounding.