

New Induction Sounding Tested in Central Europe

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Abstract

The hourly data of nine geomagnetic observatories situated in Central Europe have been analyzed using the generalized magnetovariation (GMV) method designed recently for induction soundings of inhomogeneous media. In this method, impedance is one of transfer functions in the differential relation between spectra of the magnetic components and their derivatives. The peculiarity of this impedance is its correspondence to the magnetotelluric one estimated from the linear relations. Three transfer functions have been estimated simultaneously for data of geomagnetic observatories, using three different routines working in the period range from three hours up to two days. Noises in the source field components have been compared with noise in the estimated plane field divergence. The multivariate errors-in-variables method was used to extract spatially and temporally coherent geomagnetic field structure from the partially incoherent geomagnetic variations. This method allows estimating reliably impedances and gradient tippers for each observatory, taking into consideration the Earth's sphericity. The obtained responses have been used for induction soundings and for detecting a deep inhomogeneity in the region.

Key words: magnetovariation soundings, lithosphere structure, Central Europe.