

EM INDUCTION INVESTIGATION OF THE LITOSPHERE BASED ON NETWORK MAGNETOMETER DATA IN EUROPE

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Among other techniques, electromagnetic soundings provide a relevant contribution to the study of the deep interior of the Earth. They are based upon the determination of the impedance Z for frequencies down to 10^{-4} Hz and even less. Impedances are estimated from simultaneous variations of the horizontal magnetic and electric fields recorded at a station. We present here a new method for impedance derivation from a network of at least three 3-components magnetometers. Consider a network of three stations arranged in a triangular configuration with a separation distance allowing the description of magnetic variations associated to sources of regional or hemispheric extent. Assume further that the primary source field at the surface of Earth can be approximated as a superposition of independent plane waves. The magnetic data series will be analyzed using the method proposed by Pinçon and Lefevre (1991, 1992), and by Pinçon et al (2000). In this approach the determination of horizontal gradients of the magnetic field components is achieved by wave-vector identification. The resulting frequency wave vector spectrum of the magnetic field over the 3 stations network will be used to estimate the variation of the Earth inductive response as a function of frequency. In order to assess the performances with field data of the method, we use minute values from Earth geomagnetic observatories (INTERMAGNET data). Statistical post processing of the results obtained from data of three stations is also presented. We introduce results from study done for Europe. In the future works we plan to modify the method to consider the curvature of the surface and to apply more relevant statistical algorithms to process the obtained rare data.

induction

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