

Attempt of exploration and monitoring of the electric conductivity by means of the tensor transfer function

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We have developed and tested the electromagnetic sounding method, called EM-ACROSS (ElectroMagnetic – Accurately Controlled Routinely Operated Signal System). We use electrical current dipole for the transmitting electromagnetic field. We prepared two horizontal current dipole sources for two independent vector components of signal, in order to obtain essential information for clarifying the anisotropy and lateral heterogeneity through the dependence of signal propagation on azimuth and polarization. We carried out a trial observation in the frequency range 2-300Hz, and in the area up to 8km from the transmitter. We obtained a set of reliable components of the tensor transfer function by the continuous operation. Although the amplitude of the observed signal are reasonable values with the computed values using the averaged conductivity structure around this area, but the tensor properties show the heterogeneity near the observation site. Concerning the temporal variation, we found a correlation between the measured value and the rainfalls at the station near from the transmitter. Although the results by the trial observation is rather small scale, we have demonstrated that the EM-ACROSS is a potential methodology for the temporal variations of the underground structures.