

Long Time Operation of the EM-ACROSS and Derived 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). The essential points of this method are use of very accurately controlled periodic electromagnetic waves and acquisition of the transfer function with a high S/N in frequency domain by means of a long period stacking.

A prototype system has been tested at Tono area for more than one year. We transmitted a set of line spectrum below 500Hz as the source signal from the grounded wire (dipole length : 100m). The magnetic and electric fields at the site 700m apart from the source are recorded to obtain the transfer function with high S/N (about 10^3) after the stacking for 1 week. The information of the underground structure is extracted out from the frequency dependence of the transfer function. The propagation velocity of the electromagnetic field is determined as 3.2 m/micro-sec at around 130Hz. We also noted the difference in the temporal variations of the transfer function at different frequency, indicating the presence of spatial and temporal variations of conductivity in this area.

We have demonstrated that EM-ACROSS is a potential methodology for the temporal variations of the underground structures.