NEAR-SURFACE HIGH RESOLUTION GEOELECTRIC MEASUREMENTS

Mihály Varga and Andreas Kovács
KBFI-TRIAS Ltd., Budapest, Hungary

ABSTRACT

In the problems occurring in environmental and engineering geophysics the inhomogeneities (contamination, fractures, cavities, etc.) are generally small and three-dimensional. To detect these, measurements are needed with high resolution in both the horizontal and vertical directions, and it is necessary to measure very efficiently and exactly and to apply multi-dimensional interpretation.

In the KBFI-TRIAS Ltd., Hungary, three multi-electrode geoelectrical systems have been developed for this purpose: one DC instrument and two instruments working at a low frequency. Many different shallow-depth geophysical problems have been solved with these equipments: detection of fractured zones in dams, delineation of landfill contamination plumes, determination of the direction and velocity of ground water flow as a forecast for the migration of contaminant plumes, site selection of planned waste disposal, and determination of the location and the dimensions of the minable gravel deposits under water.

We emphasize the importance of topographical correction, especially if the measurements are made in the dip direction.

In some cases analog modeling has been carried out to determine the measuring parameters for the given problem, e.g. electrode configuration, and to assess the necessity and efficiency of two-dimensional inversion of the measured data.