Resistivity and induced polarisation for mapping of buried waste and contaminated ground - examples from Sweden and South Africa

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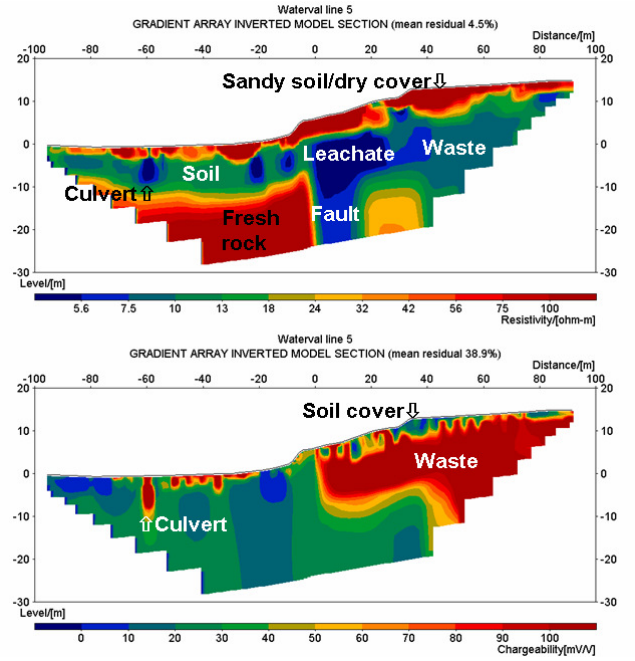
Resistivity investigation is well established for detection and mapping of contaminated ground and groundwater. Such investigations are often carried out on and in direct connection with buried waste, and in order to plan remediation efforts it is important to know the extent of the waste. A common problem is that the extent and composition of the buried waste is unknown due to poor or lacking documentation. Resistivity investigation alone can often not delineate the waste due to large variations in resistivity due to variation in water content.

Time domain induced polarization (IP) can be used to measure the chargeability of the ground together with resistivity in a time and cost efficient way with adequate data acquisition equipment. It has been shown at many waste disposal sites that buried waste produces strong IP effects, and thus chargeability can be used to delineate and possibly to some extent characterize the buried waste.

Investigations with combined resistivity and IP at a number of landfills have consistently shown very high chargeability that correlates well with the extent of the buried waste. Low resistive zones around the landfills correlate with high ion contents in groundwater samples indicating leachate from the waste. Examples from Sweden and South Africa will be shown in the paper.

By combining resistivity and IP investigation it is possible to delineate the extent of the buried waste as well as mapping contaminant leakage. It is thus a powerful tool in hydrogeological investigations at and around landfill sites.



Example of resistivity and IP results with interpretation from Waterval waste deposit in Johannesburg, South Africa

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