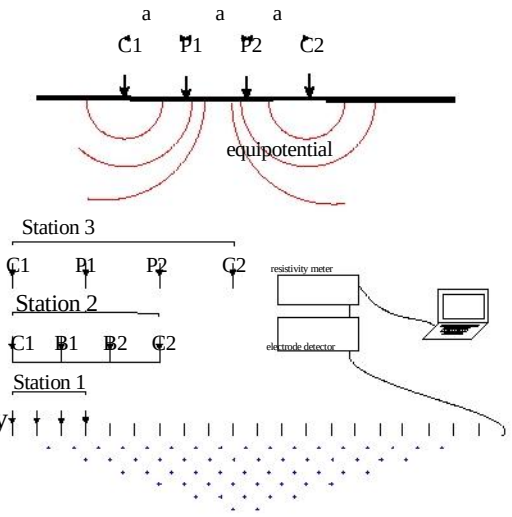
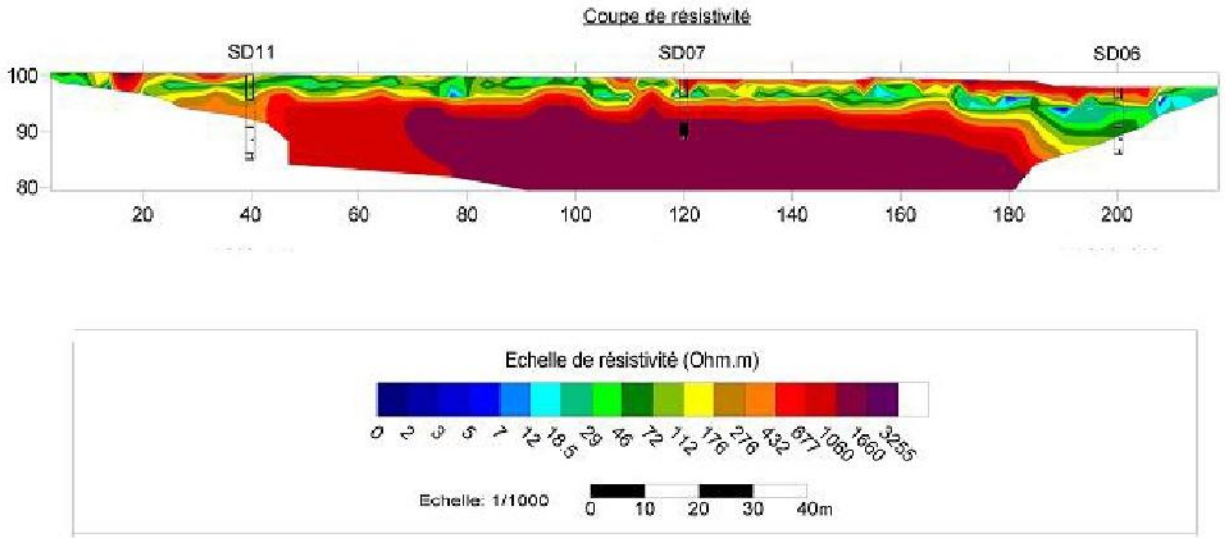
ELECTRICAL RESISTIVITY TOMOGRAPHY



Electrical resistivity tomography, or electrical resistivity imaging, is based on the measure of sub-surface apparent resistivities along a straight line of n electrodes. The goal is to have a great number of positions and spacing of electrodes of current and potential injection (figure 1). In practice, electrodes are placed in line, at a specific distance from each other depending on the investigation depth and the wanted definition. ERT procedure consists in measuring, for each electrode spacing, apparent resistivity for all possible groups of 4 electrodes.

Transfert of resistivity values at a pseudo-depth (figure 2), that depends on the electrode spacing, gives a pseudo-section of apparent resistivities in trapezoid shape. The actual resistivity section is obtained by combined reversal of all of the measures, based on a subsoil modelling by finite elements or difference. On figure 2 below, low resistivity values, below a hundred or so ohm.metre, represent cover material. Higher resistivity values represent the bedrock with an anomaly at the center. The method allows for a good discrimination between slimy or argillaceous material of low resistivity and bedrocks of high resistivity. It also allows for the visualisation of vertical and lateral variations.



There are inherent limitations to the method and the reversal process: definition decreases with depth. It is important to keep this in mind when comparing resistivity imaging results to geotechnical data. Moreover, a clear boundaries between two materials are not manifest enough on ERT images.

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