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Application of Time Lapse Electrical Resistivity Tomography to the Soil and Groundwater Contaminated Site: Case Studies
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Electrical Resistivity Tomography (ERT) is a useful geophysical tool for investigation of the soil and groundwater site. It could be applied in estimating the groundwater flow direction and contaminants space distribution. With these applications, we could establish monitoring or sampling wells in potential pollution areas. ERT survey could delineate the contaminated areas with high concentrations in relatively simple geological sites. Even in the seriously DNAPL leakage cases, it is possible to directly detect the DNAPL pool. However, when the site condition is complex (e.g. the electrical characteristic of contaminants and geological materials is similar), it is difficult to distinguish the differences between contaminants and geological materials in electrical resistivity profiles. Therefore, the Time Lapse-ERT (TL-ERT) can be applied to monitor the distribution of electrical characteristic changes underground and to indirectly indicate the flow direction of contamination. Furthermore, the TL-ERT is also an efficient approach to evaluate remediation effectiveness in remediation or post-remediation sites. When the lapse of time is short, TL-ERT is similar to real-time monitoring. It is more efficient to estimate the transportation direction of pollutant or medicament by using TL-ERT combined with Cross-Hole Electrical Resistivity Tomography (CHERT). It can not only get high resolution electrical resistivity images but also increases the benefit of new monitoring wells.

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