

## Inversion of Electrical Resistivity Data: A Review

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**Abstract :** High density electrical prospecting has been widely used in groundwater investigation, civil engineering and environmental survey. For efficient inversion, the forward modeling routine, sensitivity calculation, and inversion algorithm must be efficient. This paper attempts to provide a brief summary of the past and ongoing developments of the method. It includes reviews of the procedures used for data acquisition, processing and inversion of electrical resistivity data based on compilation of academic literature. In recent times there had been a significant evolution in field survey designs and data inversion techniques for the resistivity method. In general 2-D inversion for resistivity data is carried out using the linearized least-square method with the local optimization technique. Multi-electrode and multi-channel systems have made it possible to conduct large 2-D, 3-D and even 4-D surveys efficiently to resolve complex geological structures that were not possible with traditional 1-D surveys. 3-D surveys play an increasingly important role in very complex areas where 2-D models suffer from artifacts due to off-line structures. Continued developments in computation technology, as well as fast data inversion techniques and software, have made it possible to use optimization techniques to obtain model parameters to a higher accuracy. A brief discussion on the limitations of the electrical resistivity method has also been presented.

**Keywords :** inversion, limitations, optimization, resistivity

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