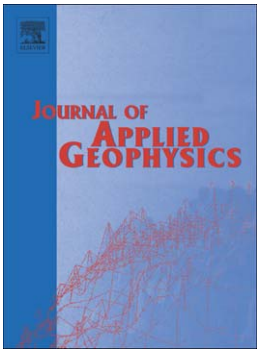

Prediction of permeability of cement-admixed soft clay using resistivity and time-domain IP measurements

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Prediction of Permeability of Cement-admixed Soft Clay using Resistivity and Time-domain IP Measurements

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ABSTRACT

Permeability is one of the most important petrophysical parameters, which unfortunately is quite difficult to be tested and estimated, particularly for the fine-grained soils and mixed soils. Prediction of permeability based on geophysical measurements is currently one of the most challenging issues in petrophysics. There have been recently reported some empirical relationships between permeability, resistivity and spectral induced polarization (SIP) parameters for a porous medium. However, the disadvantage of this approach is the very scarcity of SIP data as most of practical measurements are time-domain IP. In this study, a detailed overview of permeability prediction models using resistivity and spectral IP data was made. More than that, an innovative approach using resistivity and time-domain IP measurements to predict permeability of cement-admixed Bangkok clay was proposed and successfully applied for tested samples based on measurements of resistivity and time-domain IP data. A good amount of geotechnical and geophysical tests was conducted to investigate the time-dependent development of strength, porosity, and permeability of cement-mixed Bangkok soft clay samples during a 28-day curing process. The permeability predicted by resistivity and chargeability model matched well with