Contribution ID: **12** Type: **not specified**

Development of a D.C. Resistivity Modelling Laboratory for the Simulation of Wenner, Schlumberger and Dipole-dipole Configurations

Thursday, 2 October 2014 16:45 (15 minutes)

D.C. resistivity is an active geophysical method that employs the measurement of electrical potential associated with subsurface current flow, generated by a D.C. source. The purpose of any D.C. resistivity survey is to determine the vertical and lateral subsurface resistivity distribution through measurements on the ground surface.

D.C. resistivity is one of the principal electrical methods that have been used for many decades in geohydrological, geotechnical and mining exploration. Due to time constraints for students to go to the field and gain practical experience, a scale modelling tank was designed and developed to simulate the field geology and D.C. Resistivity field operations in a laboratory. This improves the student's study and understanding of the D.C. Resistivity techniques by the means of simulating the field D.C. Resistivity survey within a laboratory.

One modelling tank represents a normal fault and the second tank represents normal layering. The Wenner and Dipole-dipole configurations are simulated to detect the fault and the normal layering. The Schlumberger configuration is used to simulate D.C. Resistivity soundings. The results are processed and interpreted using sounding curves, inversion software and resistivity maps.

Keywords: D.C. resistivity, Wenner Configuration, Schlumberger Configuration, Dipole-dipole Configuration

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Session Classification: Rocks

Track Classification: Oral and Poster Presentation