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A case study of granite exploration using 2D ERI technique in Palapathirama Puram, Tirunelveli District, Tamilnadu

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ABSTRACT

The aim of study is to identify the granite intrusion in the Palapathirama Puram, Tirunelveli District, Tamilnadu. 2D Electrical Resistivity Imaging technique was used to infer the structural fault zone, subsurface condition, quality of granite rock investigated in the study area. The following technique was conducted with the help of resistivity meter, Multicore cable, wire spool and rods in three profiles with Wenner Configuration. The collected resistivity data was converted in to the apparent resistivity data converted in to 2D pseudosection with the use of Res2DINV software. The pseudosection is cover the part the study area horizontal and vertical change of the geological and faulted zone in the study area. The pseudosection pictures were used for the quality and quantity of the granite rocks, weathered zone (range of apparent resistivity 20-100 Ohm.m), faulted zones (range of resistivity 100-600 Ohm.m) and high quality granite rock (range of resistivity 600-6000 Ohm.m) for mining activity.

Key Words: Granite intrusion, apparent resistivity, Palapathirama Puram, pseudosection, 2D ERI.

INTRODUCTION

The study to image the distribution of compact granitic rocks from weathered over burden, fault zone identified using two-dimensional (2D) electrical resistivity imaging profiling technique is applied in the study area in Palapathirama Puram, Tirunelveli District, Tamilnadu. In these area granitic rocks, weathered gneissic rocks and fault zone are observed (Fig.1). The charnockite and banded gneissic rocks reported in this area were formed by the process of migmatization [9],[12],[3],[2],[4],[8][5],[10],[11] studied the relationship of resistivity and charnockite rock. The increase and decrease of resistivity relationship of permeability in the granites rock was studied by [7]. The 2D ERI technique is for shallow subsurface geological condition [1],[6].

DATA INTERPRETATION

Profile 1 - 2D Electrical Resistivity Imaging

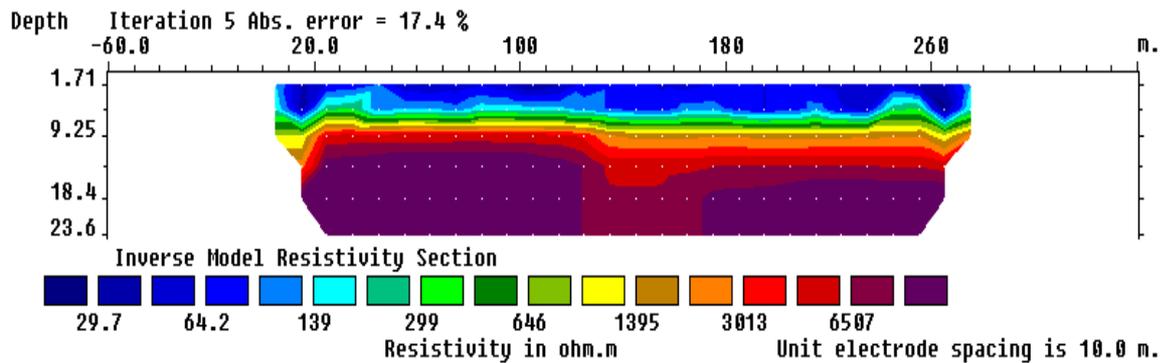


Fig.3.1 2D Electrical Resistivity imaging surveys carried out for the exploration of Granite deposits at Palapathirampuram – Profile 1.

The profile (Fig.3.1) trends NE-SW direction to a length of 270m. The inversion displays the ranges of resistivity values from 10 Ohm.m to 50 Ohm.m indicating that weathered soil up to a depth of 6.79m. The intermediate second layer exhibits resistivity values that ranges are obtained from 65 ohm.m to 100 ohm.m represents the weathered Gneiss including fault zone. The high resistively zone of pseudo section with range of resistivity value is obtained from 100-6527 ohm.m at a depth of 6.79m to 28.6m indicating the hard and compact Granite rock.

Profile 2 - 2D Electrical Resistivity Imaging N –S

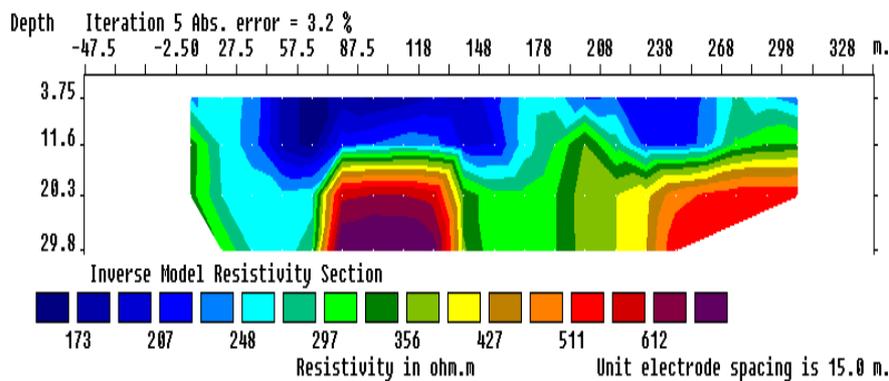


Fig.3.2 2D Electrical Resistivity imaging surveys carried out for the exploration of Granite deposits at Palapathirampuram – Profile 2.

The profile 2 trends NW-SE and to a length of 300m (Fig3.2). The inversion resistivity pseudosection displays the upper as Granite deposits identified with the resistivity that ranges obtained from 100- 612 ohm.m. The weathered granite shows the range of resistively values from 1- 50 Ohm.m.

Granite deposits at Palapathiramapuram – Profile 3.

The profile 3 trends NW-SE direction to a length of 120m (Fig3.3). The upper part of the layer is reveal as weathered soil. While the resistivity range of less than 100 Ohm.m and more than 150 Ohm.m are representing the highly weathered granite. The lower part of the layer represents basement granite indicates from high resistivity values that ranges from 150 to 500 ohm.m.

Profile 3 - 2D Electrical Resistivity Imaging NW – SE

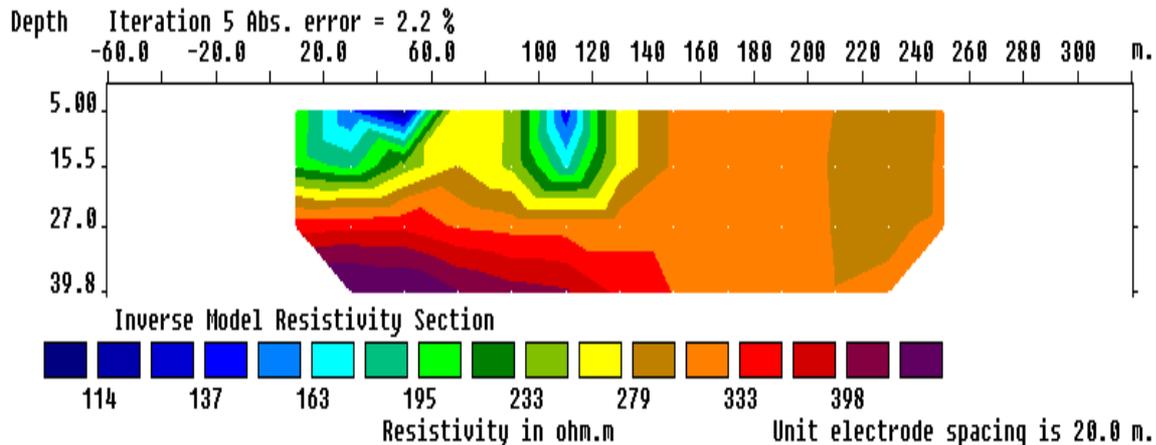


Fig.3.3. 2D Electrical Resistivity imaging surveys carried out for the exploration of granite in Palapathiramapuram profile 3.

CONCLUSION

The 2D Electrical resistivity imaging study are determined the granite trends NW- SE trend in the Palapathiramapuram, Tirunelveli District, Tamilndu.

The apparent resistivity pseudosection were described that quality of granite in profile1- (Weathered soil 10%, weathered granite 20%, granite 70%), profile 2 (Weathered soil 6% , weathered granite 19%, granite 90 %) and profile 3 (Weathered soil 5%, weathered granite 20%, granite 75%). The investigation have revealed that he faulted intrusion of granite were identified from the 2D Electrical Resistivity Imaging pseudosection range of resistivity 100-150 ohm.m represents the productive fracture zone in the granite. While the high resistivity in the three profiles were indicates range from 100-6000 Ohm.m the granite in the study area.

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