

## **Quartz REEF and mineral exploration study using W-4 2D ERI system at Varasanadu, Theni District, Tamilnadu**

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### **ABSTRACT**

*Quartz reef is used for several applications in industrial purpose. 2D Electrical Resistivity Imaging (ERI) investigation is suitable method to determine the geotechnical problems and it is used for the high quality of quartz reef bed thickness estimation. 2D Electrical Resistivity Imaging with Wenner array was conducted within the Quartz reef area in Varasanadu, Theni district, Tamilnadu. The geology of the study area contains red soil, quartz reef and weathered gneissic rock which signify good target for 2D electrical resistivity imaging techniques. The interpretation of the resistivity data along the profile shows the model resistivity pseudosection in quartz reef area. The highly resistivity zone of pseudosection with range of resistivity is 103 – 407 ohm.m at a depth of 4.06 m to 5.96m indicating the hard quartz reef rock.*

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### **INTRODUCTION**

The quartz reef is a metamorphic rock. The study area is occupied an 10.64 acre along the northern margin of the Varasanadu, Theni district, Tamilnadu, (Fig. 1). In and around the quartz reef of hills quartz reef occur as a large folded elongated bands and the general trend of the quartz reef from NNW-SSE to NW-SE pyroxene to granulites are associated with quartz reef. Quartz reef is a decorative stone and may be used to produce ferrosilicon, industrial silica sand, silicon and silicon carbide.

### **MATERIALS AND METHODS**

2D electrical resistivity imaging study involves measuring a series of constant separation traverse with the increase of electrode spacing with each successive traverse. The increase of electrode spacing increases the depth of penetration, so that apparent resistivity measured at various depths is used to construct a vertical contoured section, displaying the variation of resistivities both laterally and vertically over the section, Antony ravindran and Ramanujam,2012. [1] [2],[3], [4],[5],[6],[7],[8] For the present study adopting wenner method multicore cables with 48 terminals for the electrode connection, W-4 2D ERI Imaging are utilized, (Fig.1).

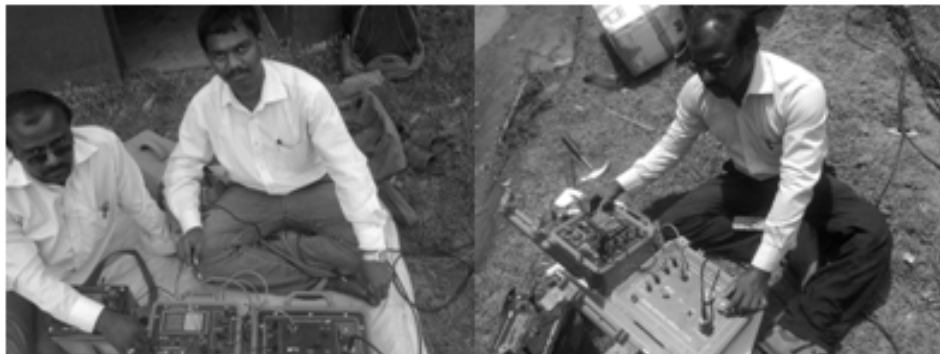
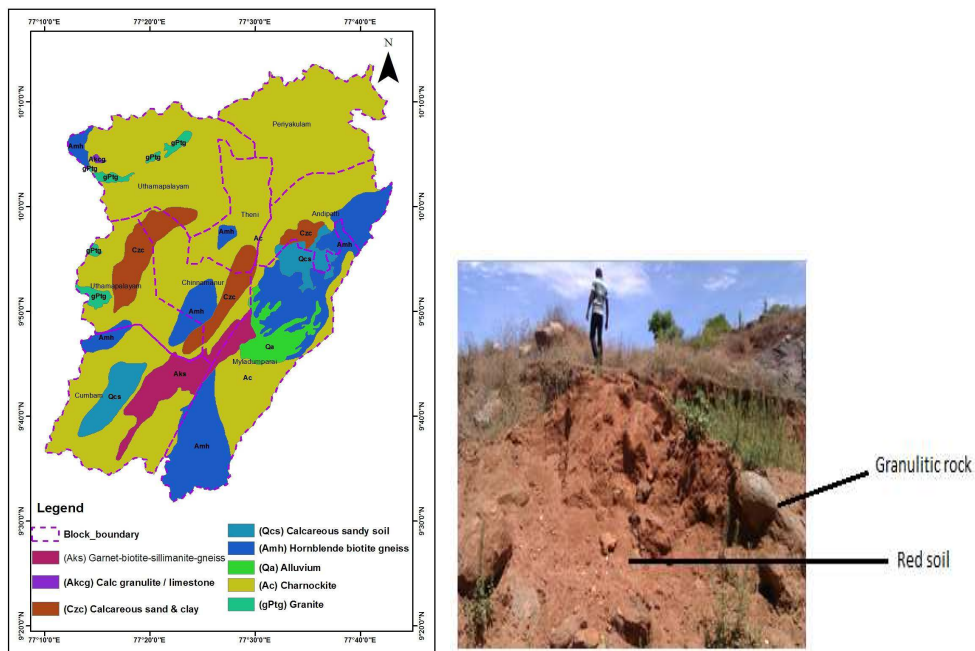


Fig.1. Field work data collection site covered by red soil and granulitic terrain.



Fig.2. Quartz reef reef in the study area.



Fig.4. Quartz reef in the study area

RESULT AND CONCLUSION

2D ELECTRICAL RESISTIVITY IMAGING PSEUDOSECTION

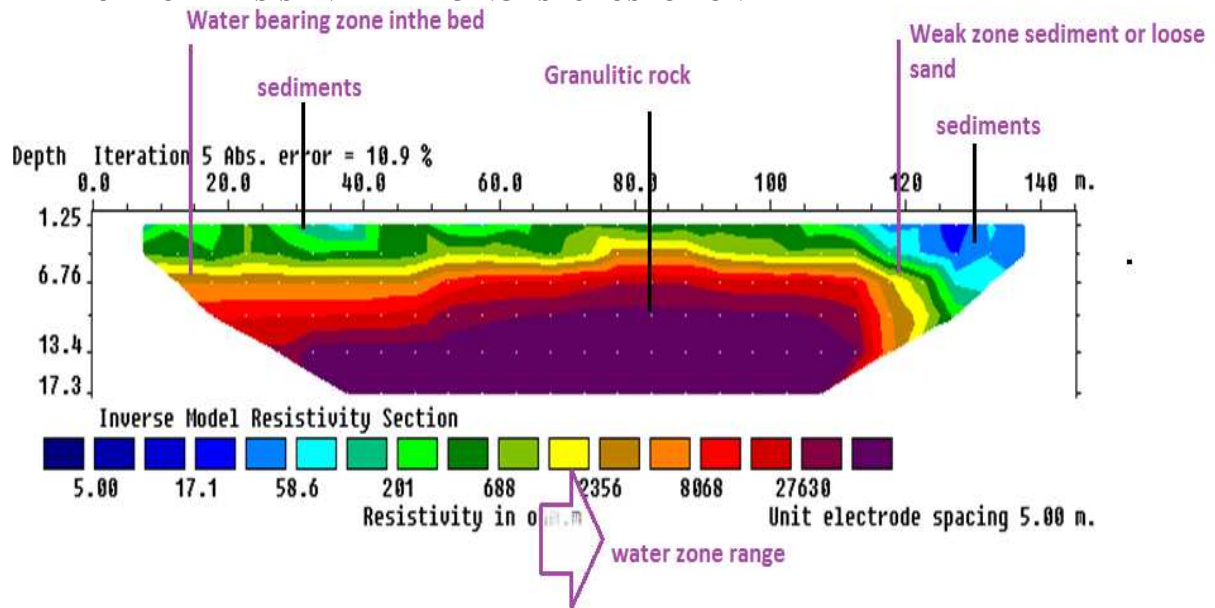


Fig.5. 2Delectrical resistivity imaging profile 1, pseudo section depicts the distribution of quartz reef and granulitic terrain in field of Varasanau using Wenner Configuration.

The profile (Fig.5) trends NW-SE direction to a length of 120 m. The upper part of the layer reveal as Quart reef deposits. The inversion resistivity values for these bed rock that ranges from 201 ohm.m to 27630 ohm.m. The resistivity values for intermediate layer of weathered Quart reef ranges from 28- 73.2 ohm.m. The lower part of the layer represents weathered composite gneiss with freshwater indicates low resistivity values that ranges from 0.6979 to 11.3 ohm.m indicates alluvium deposit [1] due to the palaeo river channel.

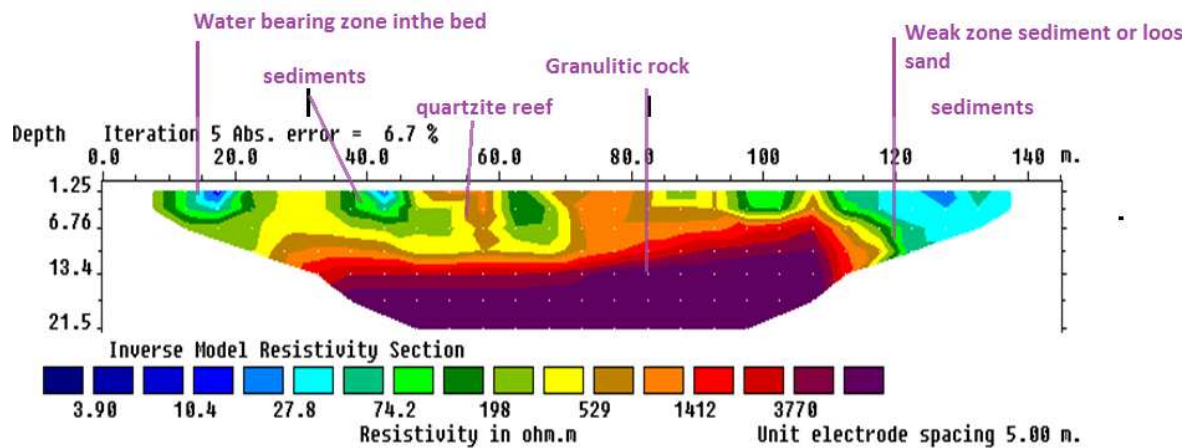


Fig.6. 2Delectrical resistivity imaging pseudosection depicts the distribution of quartz reef and granulitic terrain in the field of Varasanau using Wenner-Schlumberger Configuration.

#### Quartz reef deposits in granulitic terrain at Varasanadu – Profile 1 .

The profile (Fig.6) is trends to a length of 120m. The inversion displays the ranges by resistivity values from 7.45 Ohm.m to 27.4 Ohm.m indicating that weathered soil up to a depth of 6m. The intermediate second layer exhibits resistivity values that ranges from 41.4 ohm.m to 130 ohm.m represents the weathered Quartz reef reef. The high resistivity zone of pseudosection with range of resistivity is 200 to 10000 ohm.m at a depth 21.5m indicating the quartz reef rock intrusion in the granulitic terrain.

#### CONCLUSION

The ranges of resistivity values were identified in the field condition as rocky ridge greater than 250 Ohm.m; freshwater zone from 25 to 100 Ohm.m. The Continuous Vertical Electrical Sounding investigations held within the premises of Theni district point out fairly the uniform subsurface geological conditions. The 2D electrical resistivity imaging psuedoseciton gives the details of subsurface variations at Quartz reef mining area. The electrical pseudosection along the profiles in the study shows three types of resistivity zones such as high quality quartz reef, intermediate or weathered quartz reef and low or gnessic rock 55%. From this 2D ERI study Quartz reef trends NW-SE trend in the study area.

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#### REFERENCES

- [1] Antony Ravindran.A. Aand N. Ramanujam, *Advances in Applied Science Research*, **2012**, 3 (4):2518-2522.
- [2] Antony Ravindran A , *Archives of Applied Science Research*, **2012**, 4 (1):669-674.
- [3] Aigbogun and J.C. Egbai, *Advances in Applied Science Research* 3(2),**2012** pp.625-633.
- [4] Antony Ravindran.A and Ramanujam N, 2012, *Archives of Applied Science Research*, **2012**, 4 (1):280-284.
- [5] Maureen B. Nkamare, 2Anttoniette N. Ofili and 3Afolayan J. Adeleke.*Advances in Applied Science Research*, **2012**, 3 (5):2549-2552.
- [6] Yadav S.S. and Kumar *Advances in Applied Science Research*, **2011**, 2 (2): 197-201
- [7] Debashri Mondal, Joydeb Pal, Tarun Kanti Ghosh and Arun Kanti Biswas, *Advances in Applied Science Research*, 3(3), **2012** pp. 1335-1345.
- [8] Loke, M.H.“ unpublished short training course notes, Penang, Malaysia, Universiti Sains Malaysia. **1997**,3(1),544-553.