

## **A comparison of 1-D and 2-D Resistivity Techniques - A Case Study on Mahagama- Embilipitiya Vein Quartz Occurrences**

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### **ABSTRACT**

Application of DC resistivity technique to assess subsurface extension of mineral occurrences is a common practice in Sri Lanka. Application of conventional 1-D resistivity surveys for mineral exploration has been gradually substituted by 2-D resistivity method due to its high resolving power and rapidity of data acquisition. A survey that was conducted to quantify reserves of Mahagama Vein Quartz deposit provided an ample opportunity to compare and contrast the applicability of 1-D resistivity and 2-D resistivity techniques. For this comparison seventeen 1-D locations were selected where the spread of 1-D survey coincided with three 2-D profile lines.

1-D data were acquired by ABEM SAS 300C Tetrameter in Schlumberger configuration (Vertical Electrical Sounding -VES) with maximum electrode spread of 400m allowing depth of penetration deeper than 50m on average. Acquired raw data were processed both in RESIST free software and R1X1 licensed software packages with less than 5% RMS error margin to obtain true resistivity values from apparent readings. 2-D data were acquired along 28 multi-electrode spread and inverted in 2-D Earthimager software. For comparison, 1-D data sets were extracted from 2-D profiles at locations where 1-D VES coincide with the 2-D profile.

The comparison of two data sets revealed that the near-surface anomalies are enhanced by 1-D technique whereas the 2-D technique generalizes the near- surface lateral anomalies. However, below certain depth, the two methods agree with each other regardless of the near-surface dissimilarities. Therefore, it is concluded that if the target is highly resistive and beneath the inhomogeneous overburden, then both 1-D and 2-D resistivity techniques are reliably applicable and would provide almost similar results.

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