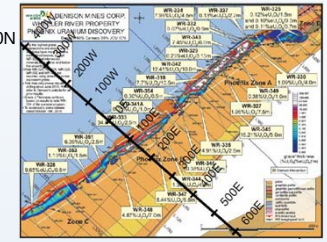
Multipole Resistivity Imaging "MRI"
Wheeler River Phoenix Uranium Discovery

♦ Introduction

Using a combination of enhanced resistivity arrays with a conventional IP/Resistivity system, Discovery Int'l Geophysics is able to produce high quality data with good productivity and survey economy. Over a period of about 4 hours, the 2.1 km of displayed data were collected with conventional IP/Resistivity equipment consisting of a pair of GDD 4800V transmitters and a GDD 8-32 IP receiver. Chargeability data were also collected during the course of the survey. A standard bi-polar waveform was used at a frequency of 0.25 Hz (1 sec on, 1 sec off).

In the Athabasca Basin, the objective of resistivity surveys are to detect an alteration halo or "chimney" in the lower sandstone associated with mineralizing hydrothermal fluids.

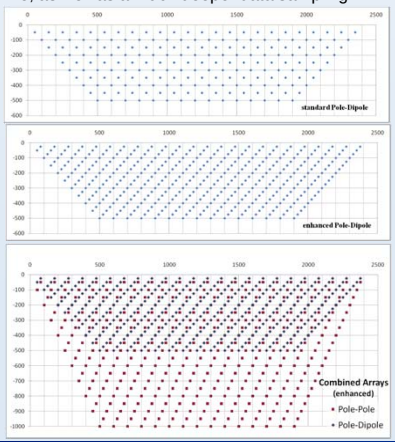
Line 4000N



♦ Arrays

Discovery Geophysics uses enhanced arrays with a higher data density. The enhanced arrays have an extra current injection for each receiver setup. ("n" values = 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5 & 10)

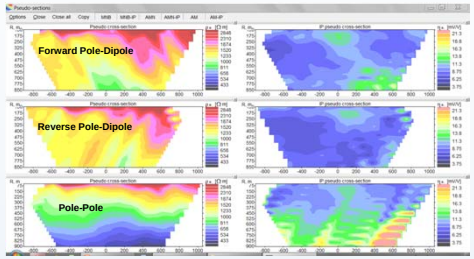
The PLPL array has less data loss at the start and end of each line, as well as a much deeper data sampling.



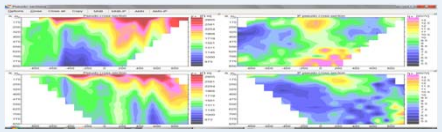
♦ Apparent Resistivity & Chargeability

The figure below shows the measured Apparent resistivity and Chargeability for the three simultaneously collected arrays: forward Pole-Dipole (PLDP), reverse Pole-Dipole (DPPL) and Pole-Pole (PLPL). A total of 798 discrete measurements were obtained (measurements are often repeated to ensure data quality) .

RAW (MEASURED) PSEUDO-SECTIONS

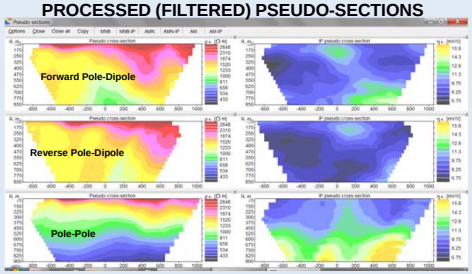


All resistivity and chargeability data contain some element of noise. The Pole-Dipole and Dipole-Dipole arrays are particularly susceptible to noise. The raw data below is plotted at the MN receiver electrodes.

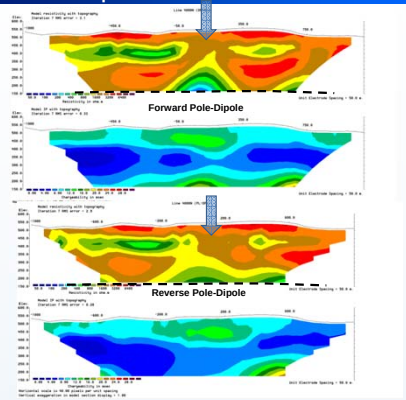


The X2IPI software package is used to process the data using minimum smoothing filters to remove current and potential electrode effects ("striping") and low level noise. The PLDP array seems particularly susceptible to electrode "striping" effects. The processed pseudo-sections shown below are used to invert the data.

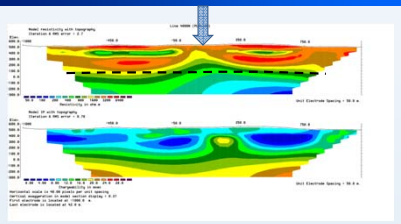
PROCESSED (FILTERED) PSEUDO-SECTIONS



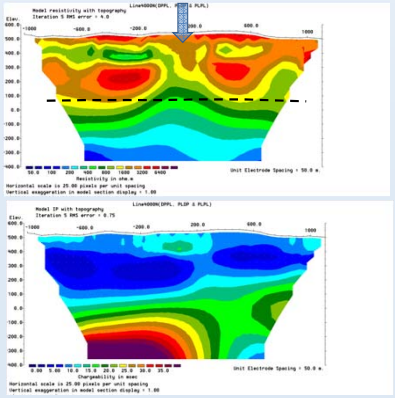
♦ Pole-Dipole Inversions



♦ Pole-Pole Inversion



♦ Combined Inversion



♦ Discussion

All of the arrays and combinations imaged the resistivity target with a high degree of confidence.

The Pole-Dipole data has a denser near surface data distribution than the Pole-Pole, but the Pole-Pole has much greater depth penetration with less data loss at the edges of the surveyed profile, and images the unconformity better.

The Pole-Dipole arrays each show distinct evidence of the array asymmetry when processed and inverted separately. This effect has been noted in literature and it is suggested to survey with both forward and reverse Pole-Dipole arrays to compensate for this phenomenon.

The Pole-Pole array data exhibits a clear anomaly and shows no array asymmetry in the measured data or inversion,

The PLDP and PLPL (combined) inversion has an extremely good data fit with an RMS error of 4.0%. The Multipole inversion appears to have as good , if not better resolution and the results can be viewed with a high degree of confidence.

The value of the chargeability data is uncertain. There is no clear chargeability response with the resistivity chimney, but there seems to be a relationship with an inferred basement geological contact in the Multipole inversion.

♦ Conclusions

Multipole Resistivity Imaging "MRI" has many advantages over standard surveys, including

- The best of both near surface and deep resolution with combined pole-dipole and pole-pole arrays.
- Compensation for pole-dipole array asymmetry.
- Better sampling through enhanced arrays.
- Fair to good chargeability data
- Better inversions with multiple arrays (low RMS errors)

Discovery Int'l Geophysics is pleased to design and carry out these surveys for their clients.

♦ Acknowledgements

Denison Mines Corp.
www.denisonmines.com

Discovery Int'l Geophysics Inc.
www.discogeo.com

Living Sky Geophysics Inc.
www.livingskygeophysics.ca