

Deep Exploration with Spartan 24 and Titan 24 Technologies

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Simexmin 2010



Why explore deeply?

- Some of the most prospective ground is around and under our current mines.
- That same prospective ground is near mine infrastructure, mining people and mining permits.
- Even away distant from current mines, the next new discovery will probably occur in which has already been explored once, or may have a long history of exploration.
- New prospective ground is increasingly limited.

What is deep exploration?

- Traditional mining in Latin America, deeper than 500m.
- Traditional geophysics, deeper than 300m.

How to explore effectively at great depth?

- Define geologic models, economic target size and depth;
- Define the geophysical target in terms of physical properties and contrasts;
- Evaluate viable methods, plan exploration objectives and approach
- Apply deep seeking, sensitive and high resolution technologies, well suited to the target
- Where drill data and mapping exists, apply quantifiable interpretation methods: constrained modeling.
- This presentation will demonstrate these concepts in practice.

Presentation Technologies

- Magneto Telluric Resistivity (MT)
- Distributed acquisition MT, Electrical Resistivity and Induced Polarization (DCIP)



Spartan MT Overview

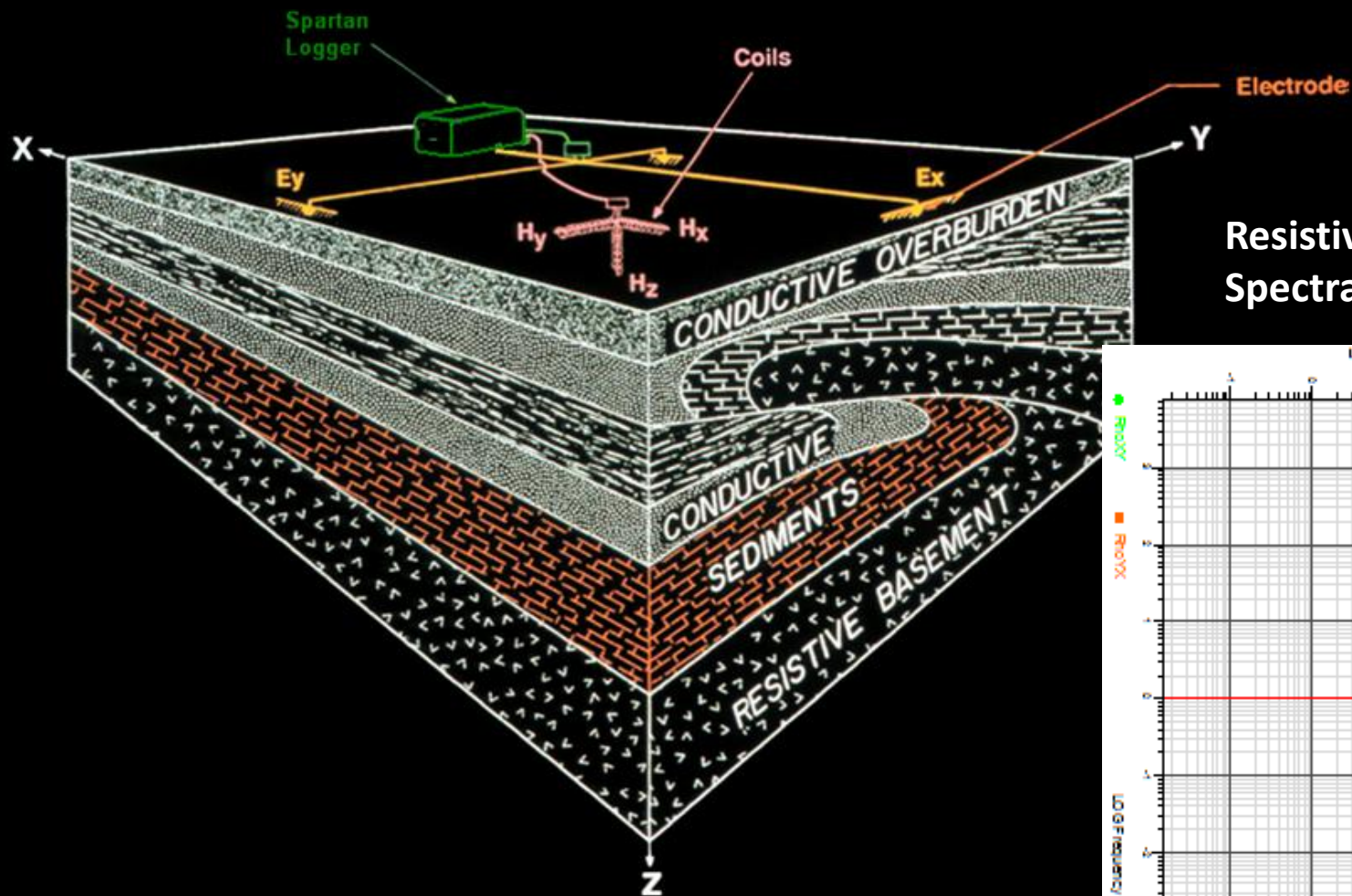
Magnetotelluric data acquisition employs natural energy sources for unobtrusive data acquisition at any depth in the crust. Quantec's Spartan MT technology employs lightweight, robust instrumentation suitable for deployment as isolated sites, or in 2D or 3D imaging applications (linear or 3D arrays).

Spartan is designed for extremely high sensitivity and automatic operation once deployed. Excellent noise rejection is achieved by using remote reference technology and near-site time-series data processing.

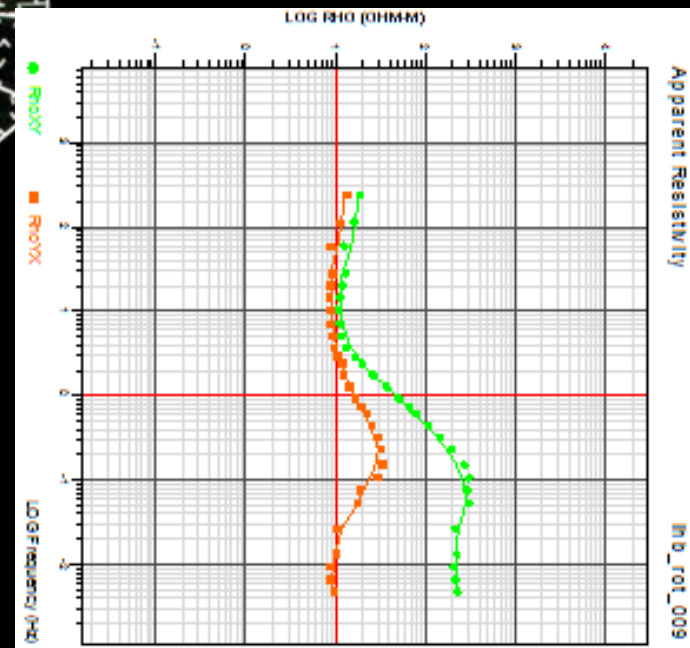
Quantec can deploy many Spartan units on any project so that high production rates can be achieved without sacrificing data quality.

The Spartan MT system will produce electrical resistivity imaging to any depth in the earth's crust, in any onshore environment, with a station density that can be adjusted and/or augmented to suit the resolution requirements of the target. Spartan is designed so that that these data can be acquired in remote and environmentally sensitive areas without compromising data quality or station density.

Schematic of a Single Tensor MT Site



Resistivity vs Frequency Spectra XY and YX



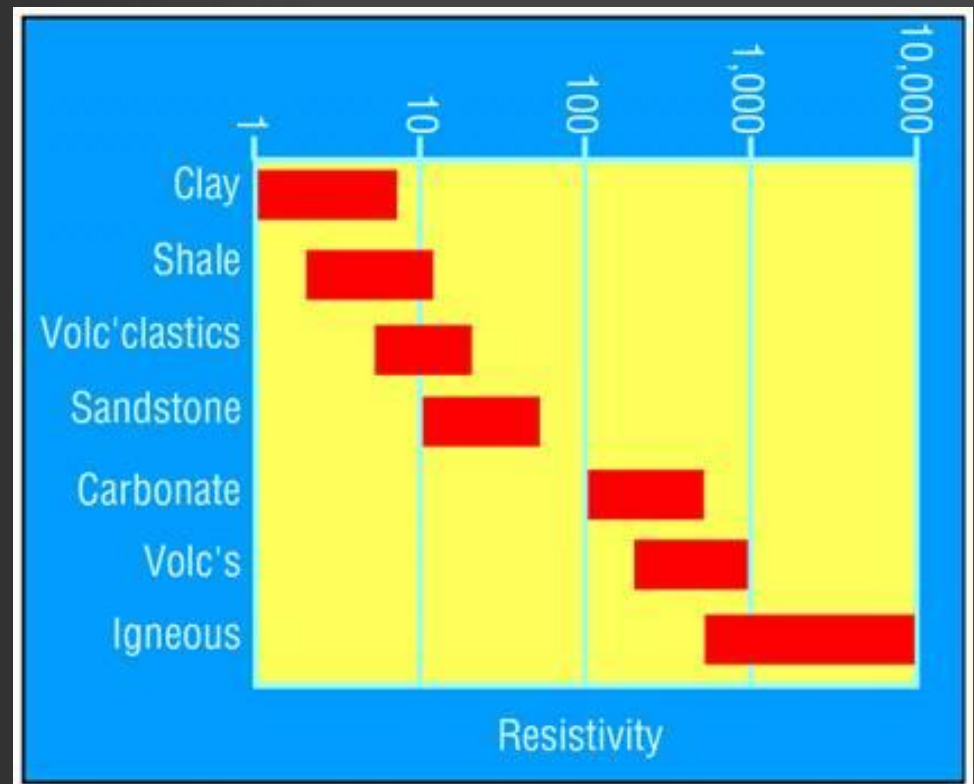
Spartan MT – Field Operation



Identification of Lithology with Resistivity Data

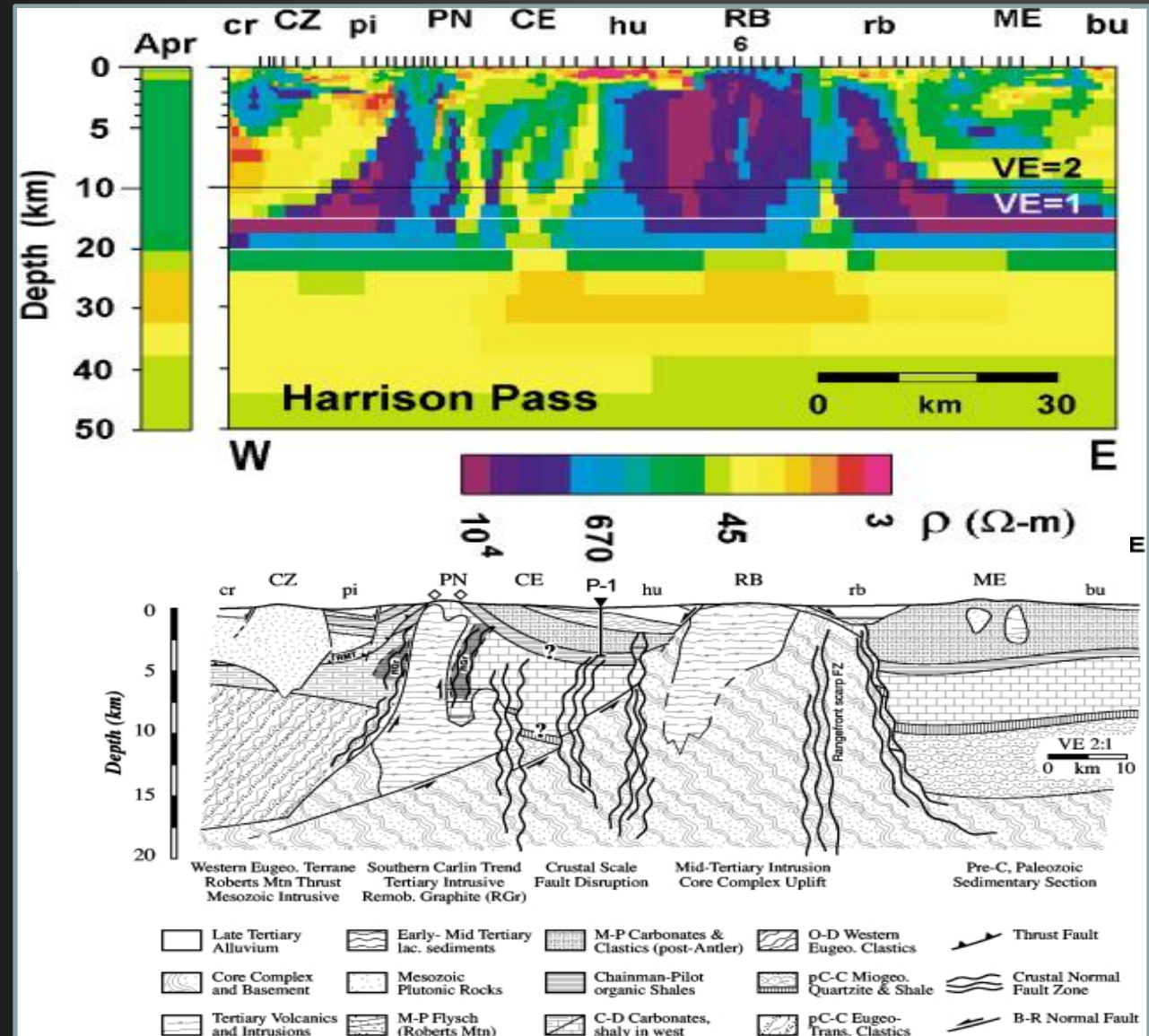
Spartan MT produces images of the ground in units of electrical resistivity (Ohm-m), which can be correlated to well log data.

The table at right shows the typical ranges of electrical resistivity from common formation lithologies.

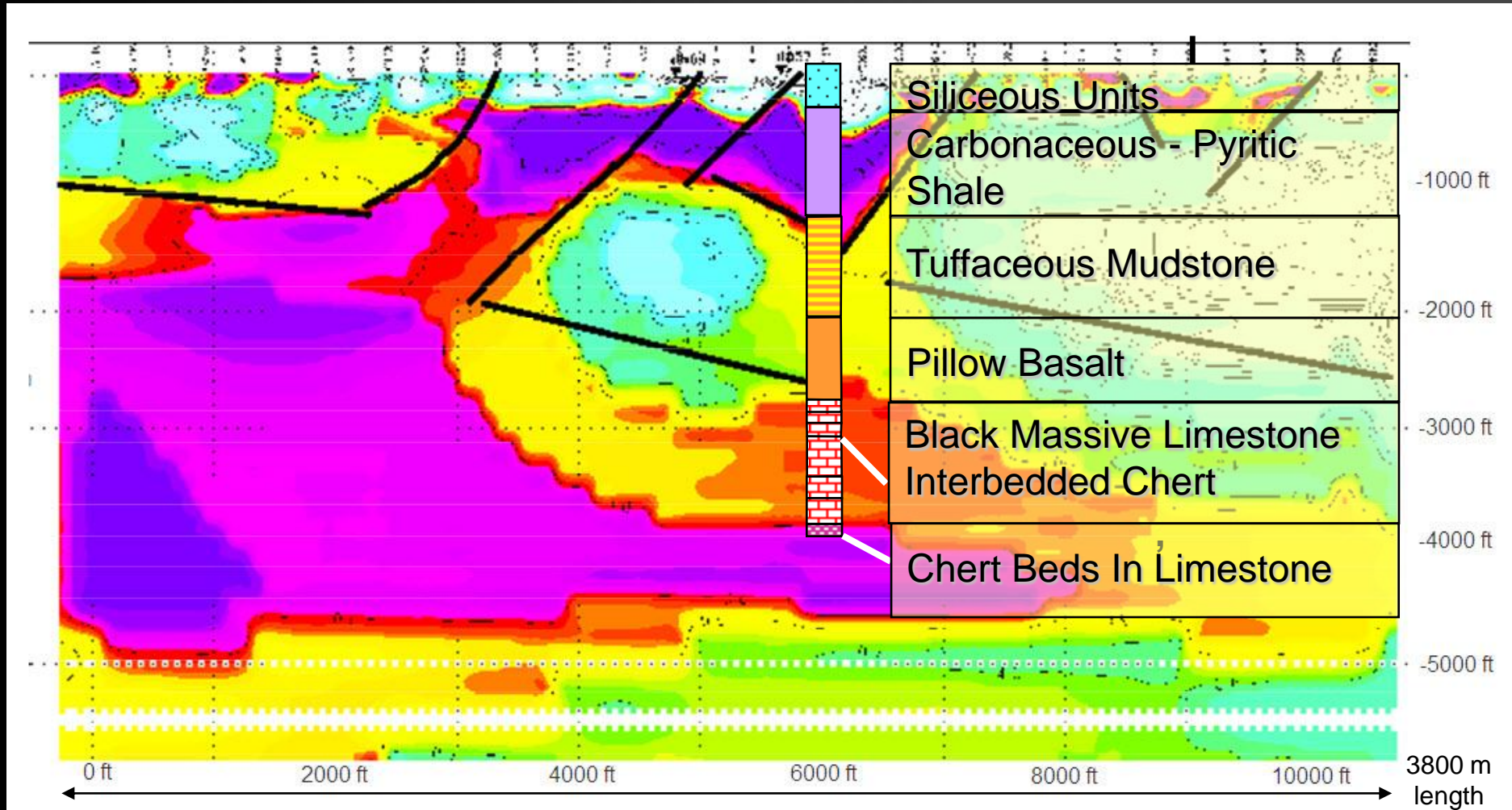


SPARTAN MT Regional case from Great Basin, Nevada

A 120 km transect was surveyed with 58 Spartan MT stations at +/- 2 km intervals. The 2D modeling reveals the entire thickness of the crust. The geologic interpretation was possible to 20 km. Three basins delineated including major strata, flexures and major structures.



TITAN-24 Turquoise Ridge MT, Nevada

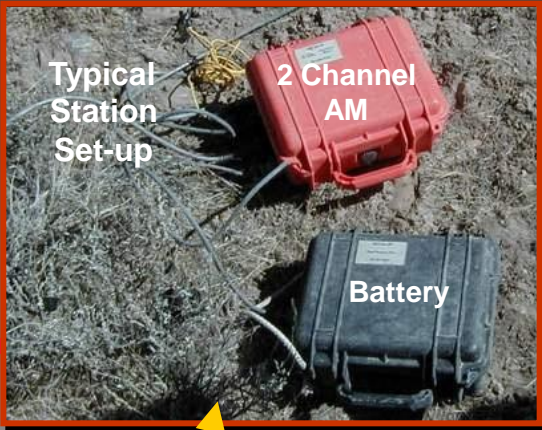


High resolution MT 2D model plotted to 2000m depth with seismic interpretation and drilled geology

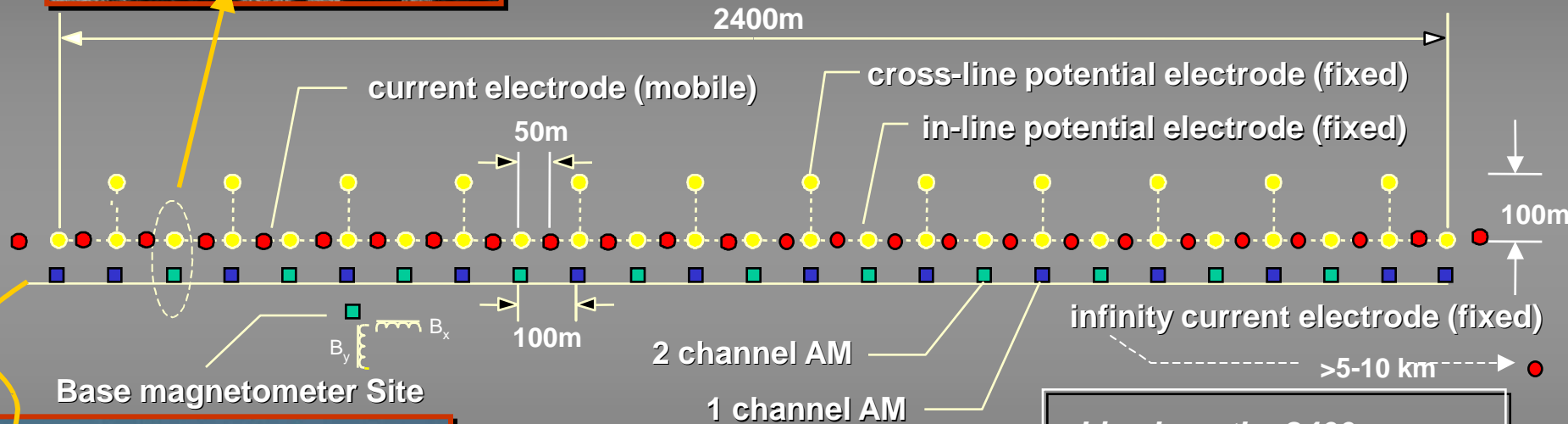
Titan 24 DCIP & MT

- Distributed Acquisition System (DAS)
- Combination of large array size, multiple sensors, precise 24-bit digital sampling, full waveform processing and 2D-3D inversions
- Penetrates deeper than conventional geophysics
- Three independent datasets capable of accurately measuring DC resistivity and IP chargeability to 750 m (and beyond) with MT resistivity to 1.5 km

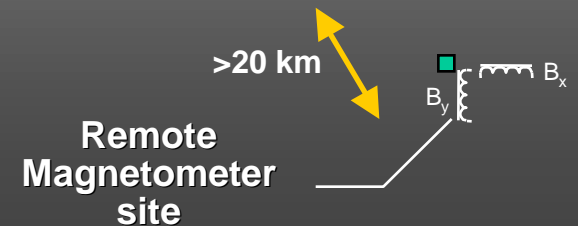




Titan-24 Distributed Acquisition System



Line Length - 2400 m
 24 E_x 100m dipoles
 12 E_y 100m dipoles
 25 current stations
 2 B_x/B_y magnetometer sites

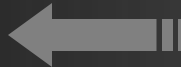


Titan 24 Field Operation

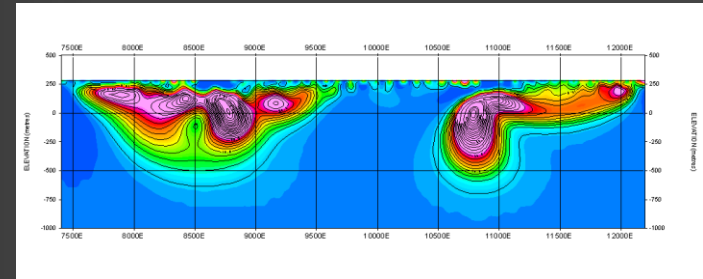


Typical Data Products from a single Titan line 2.4 km long

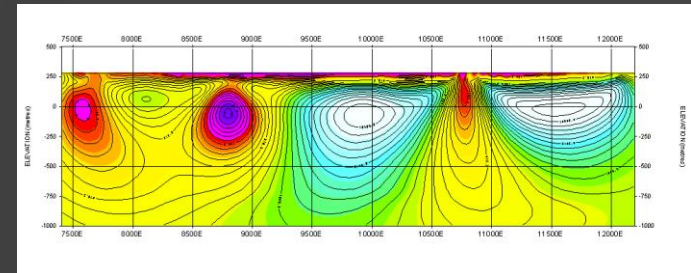
DC resistivity & IP (chargeability) inversion sections are presented from 0 to approx. 750m (depending on environment)



750 meters

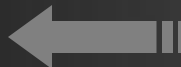


IP Chargeability

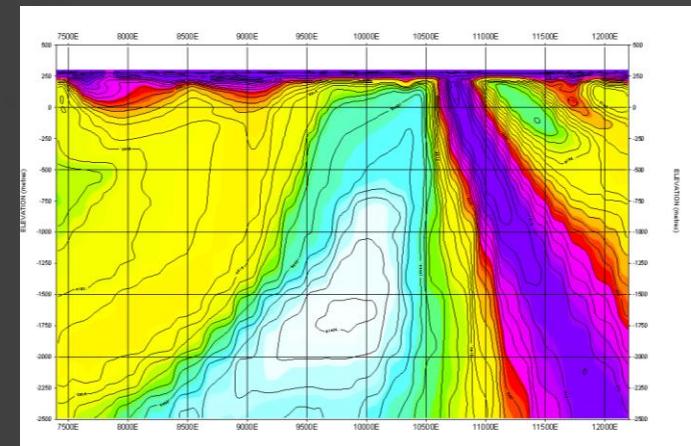


DC Resistivity

MT Resistivity inversion sections are presented to depths of 1500 meters and greater (depending on line length)



Typically 1500 meters



PW Model 2D MT Resistivity

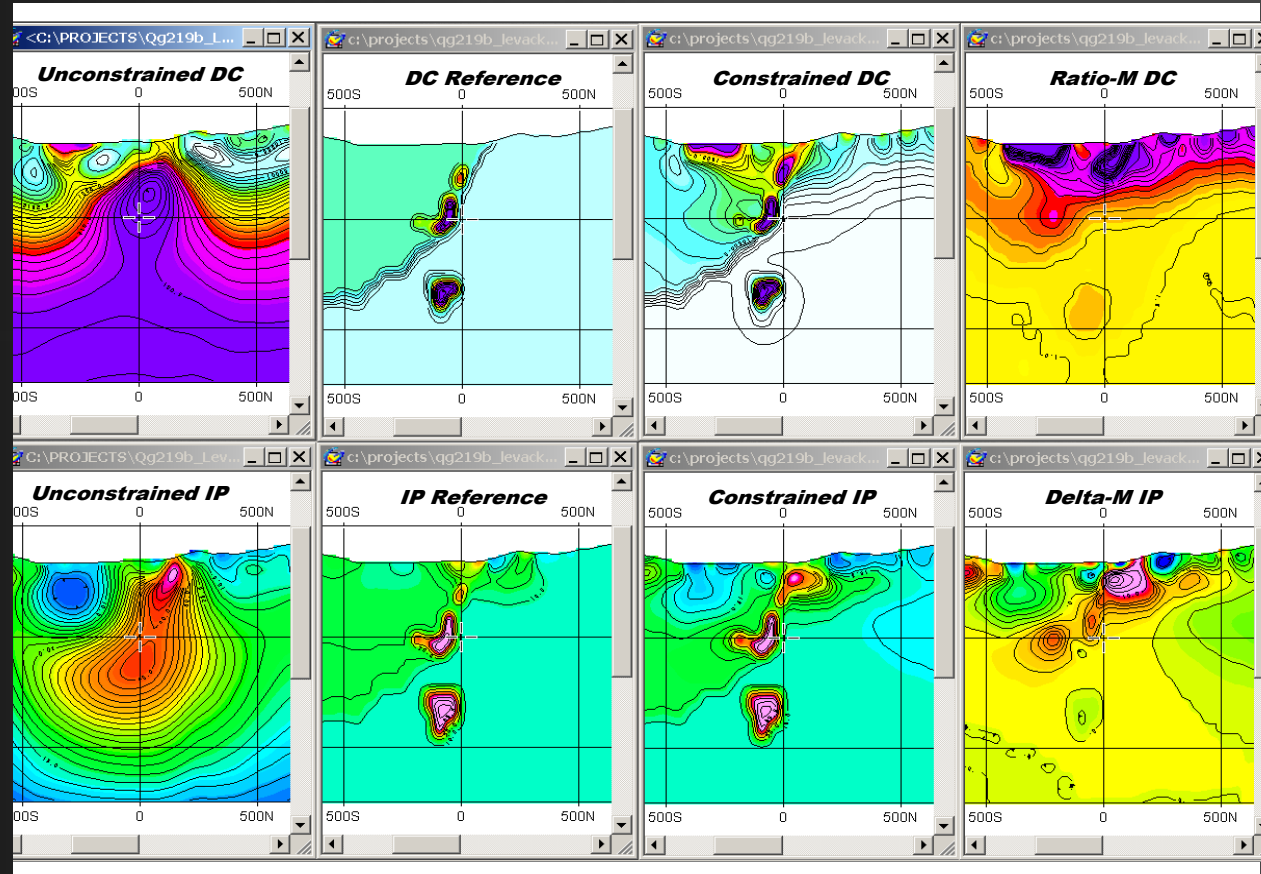


Geologically
Constrained
Inversion

FNX Mining

Levack Project

Sudbury

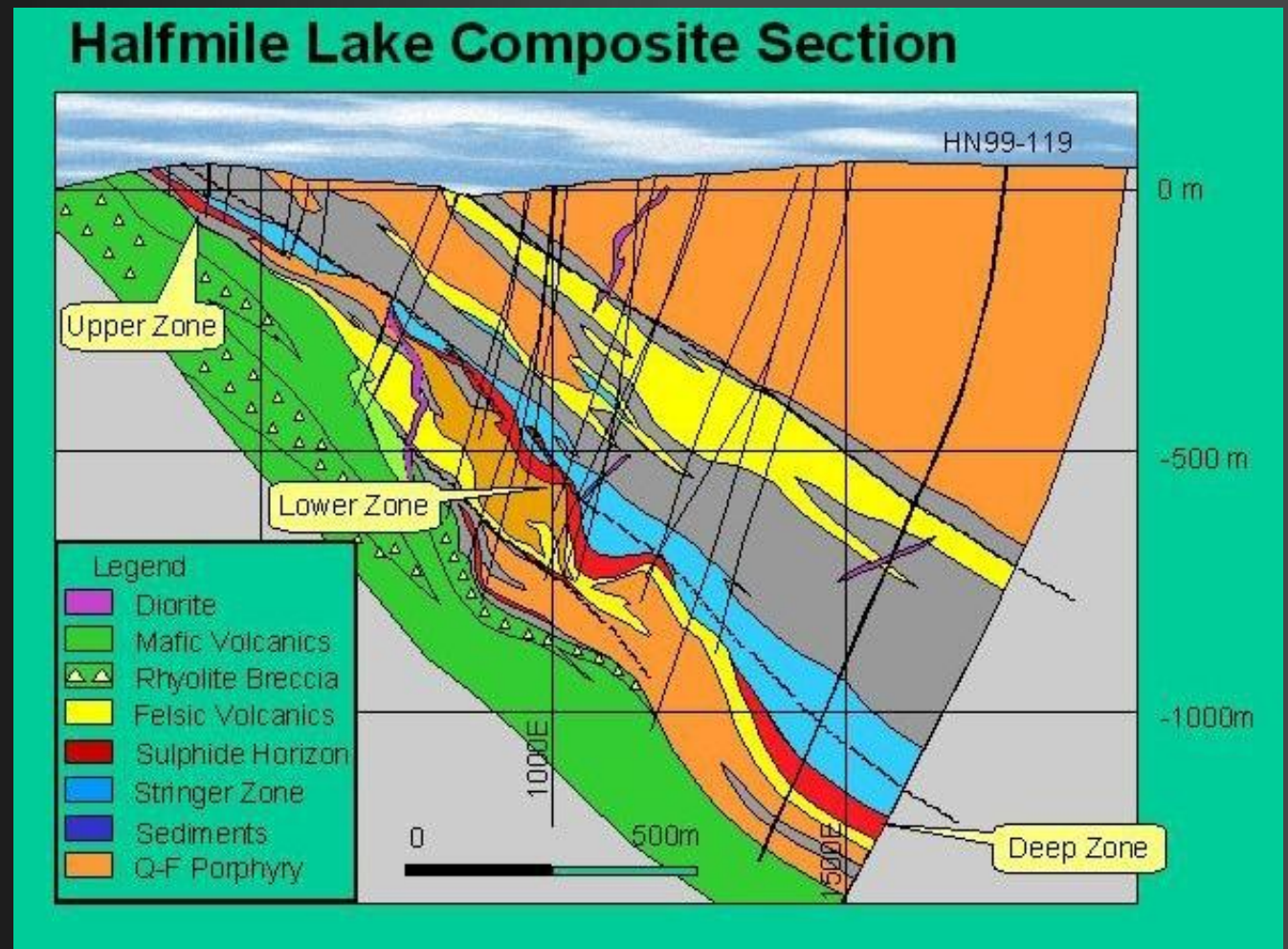


What can Titan map?

- Mineralization
 - Alteration
 - Fault structures
 - Lithology and contacts
-
- Massive sulfide (Cu, Zn, Ni, PGE)
 - IOCG
 - Porphyry Cu Mo
 - Epithermal
 - Diamonds

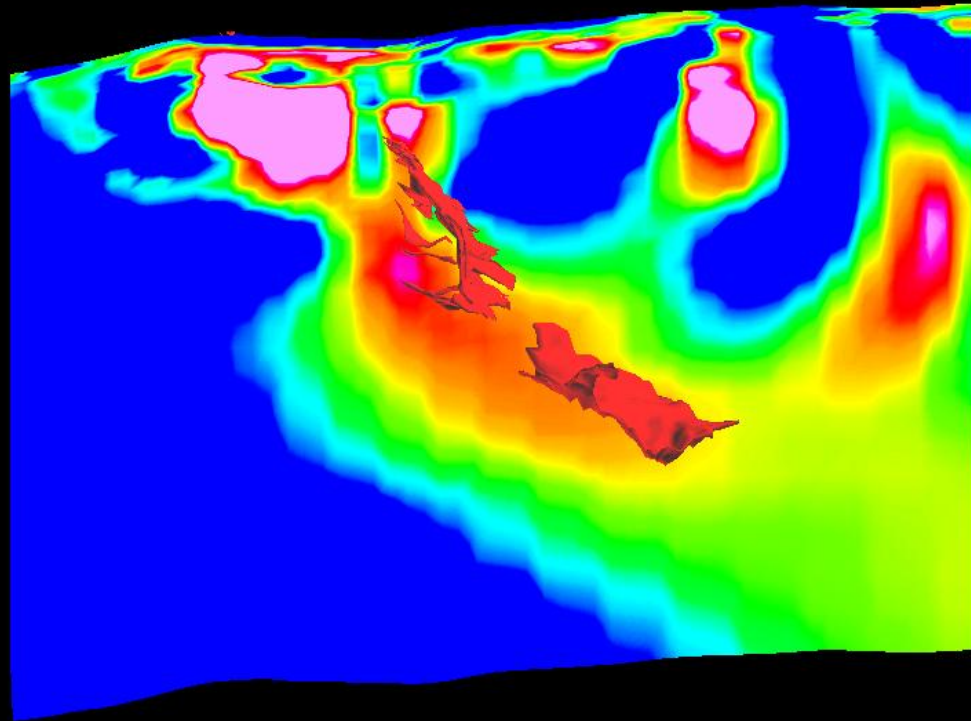
Volcanic hosted Massive Sulfide Deposits

Half Mile Lake Zn/Cu Deposit New Brunswick



**MT
Resistivity**

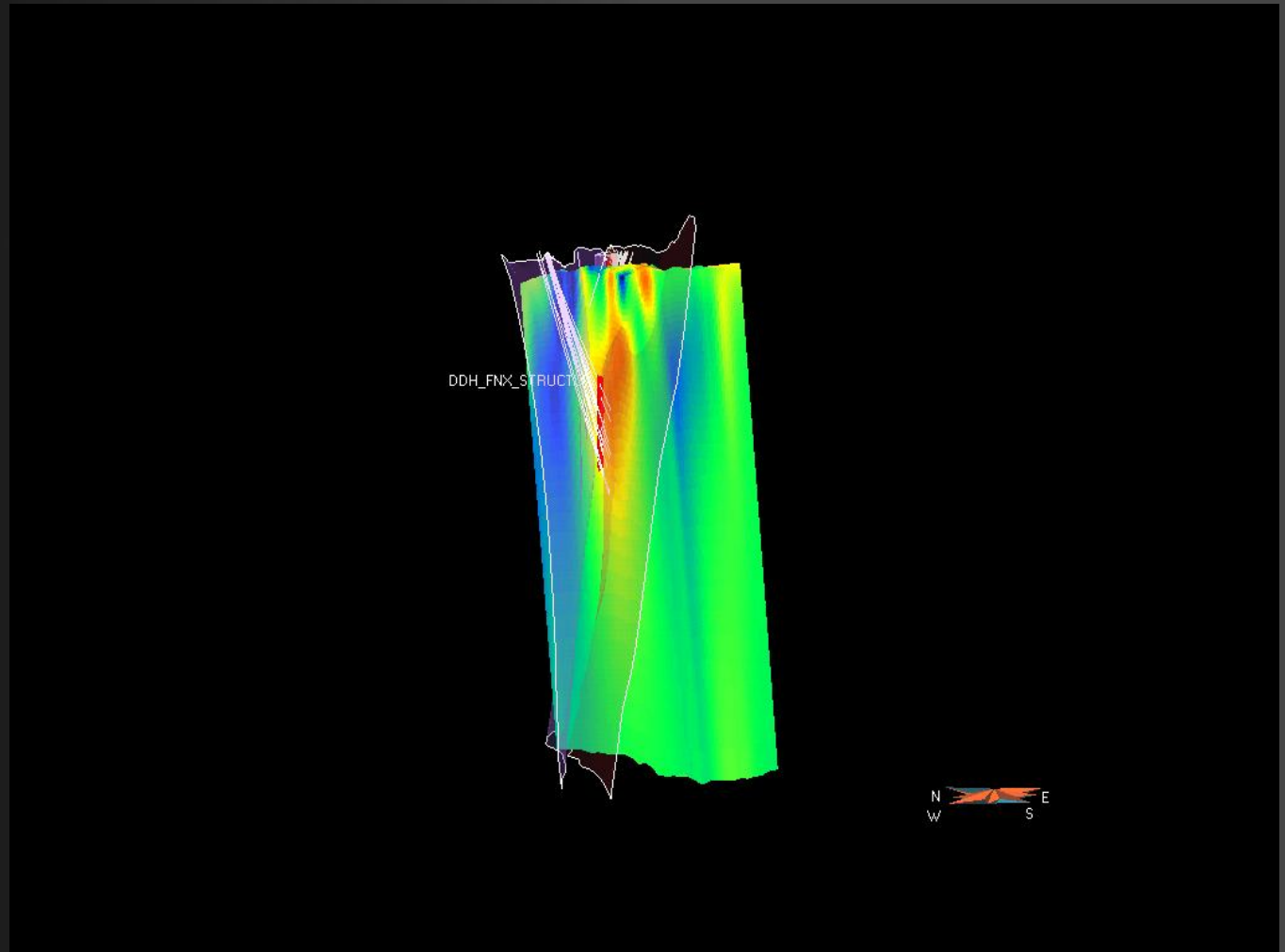
2km



Nickel Massive Sulfide Deposits

Podolsky (Norman) Nickel Deposit Sudbury Ontario

2 Km



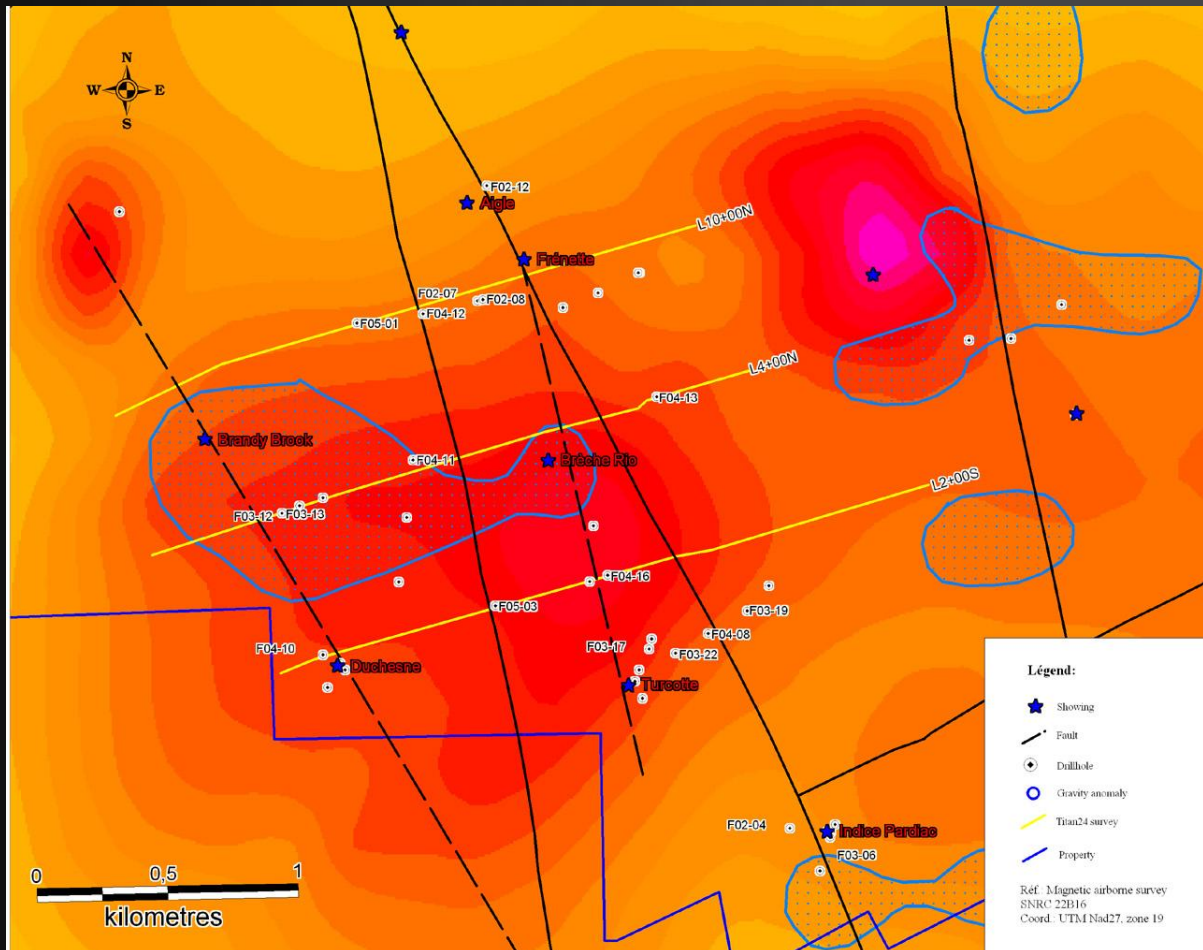
IOCG Deposits

Mont-de-l'Aigle IOCG Deposit

Gaspe Peninsula, Quebec

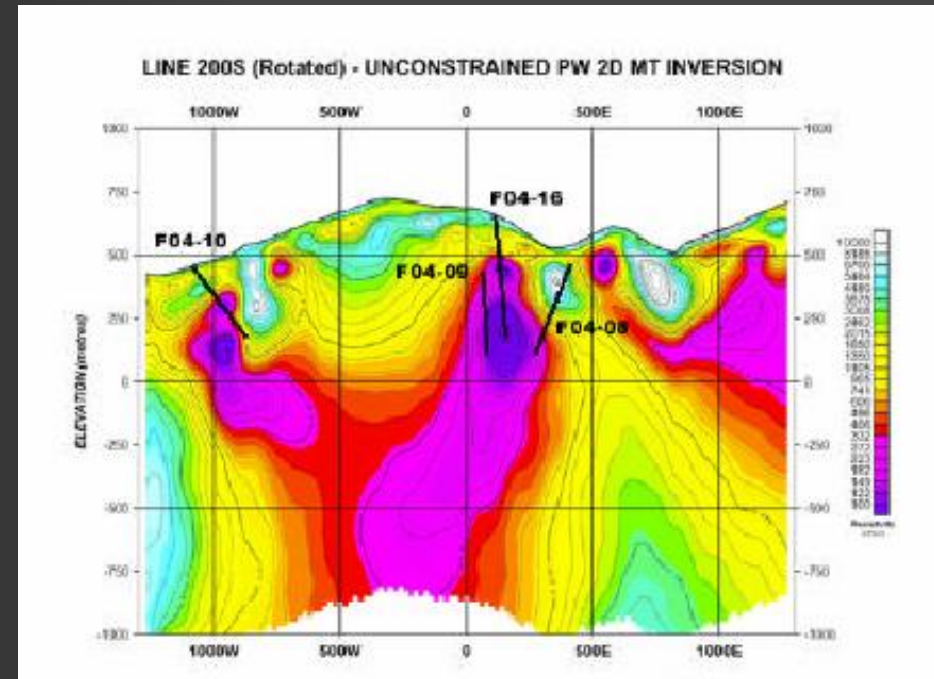
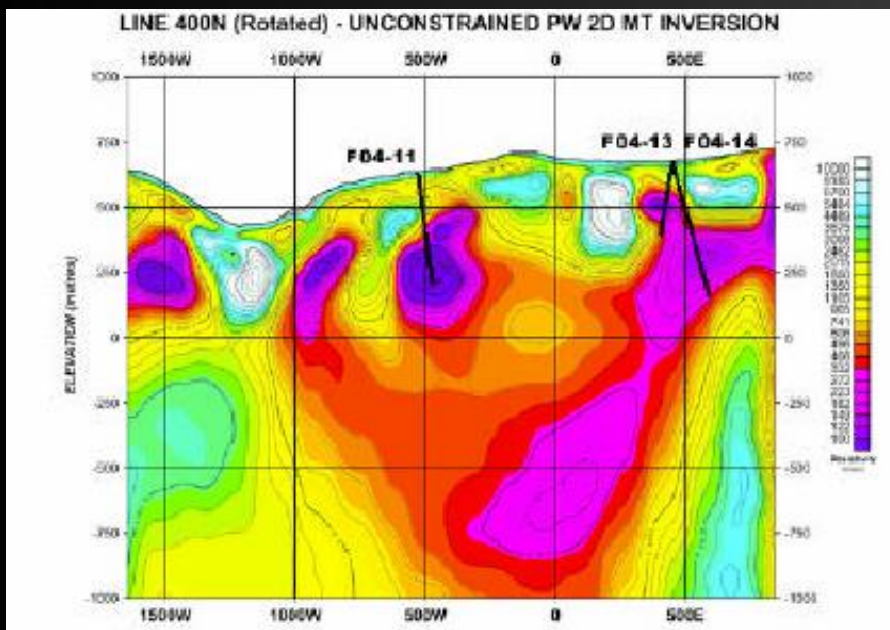


Mont-de-l'Aigle Aero-magnetic anomalies, with gravity targets and Titan lines super imposed,



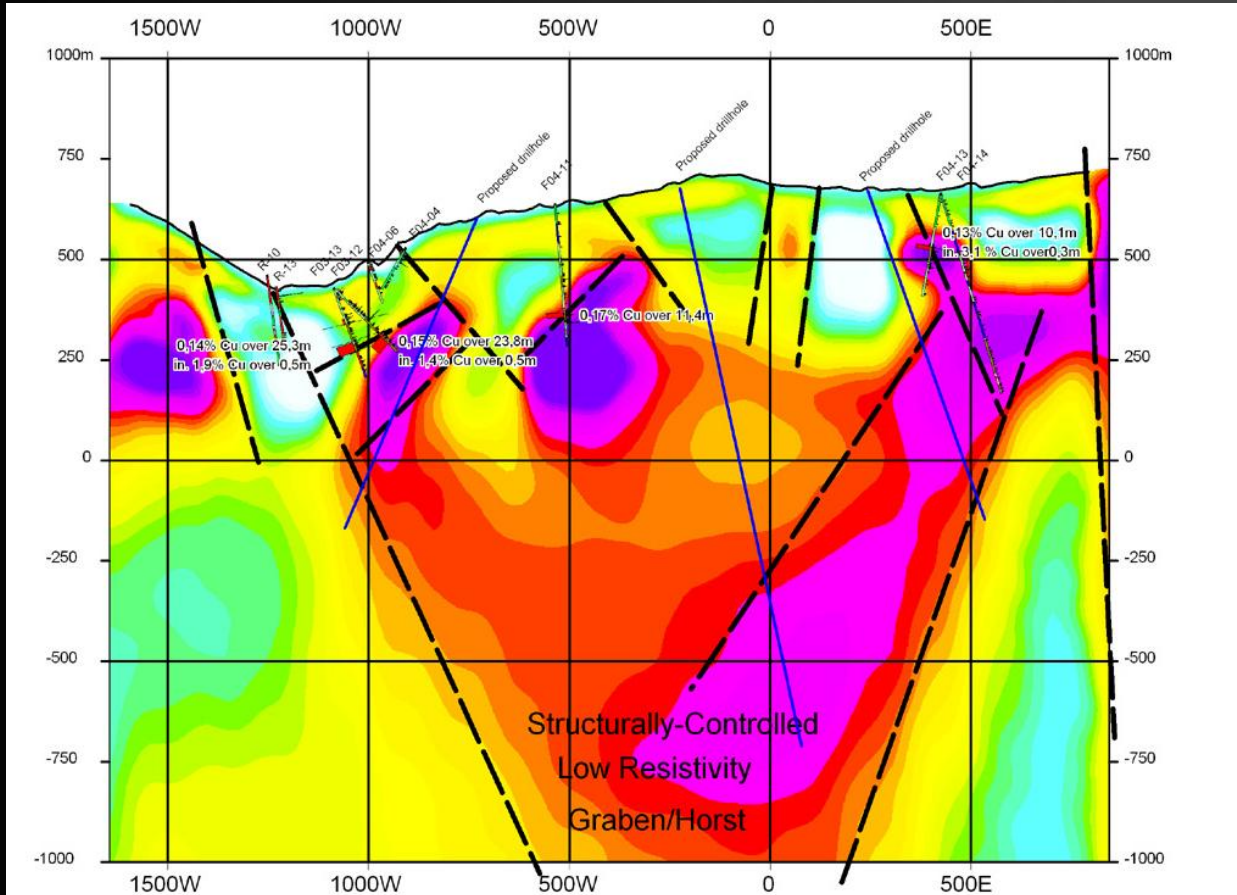
Titan 24 Drill Targeting - Mont-de-l'Aigle

10 anomalies of 22 detected
have were tested in first-round
drilling.



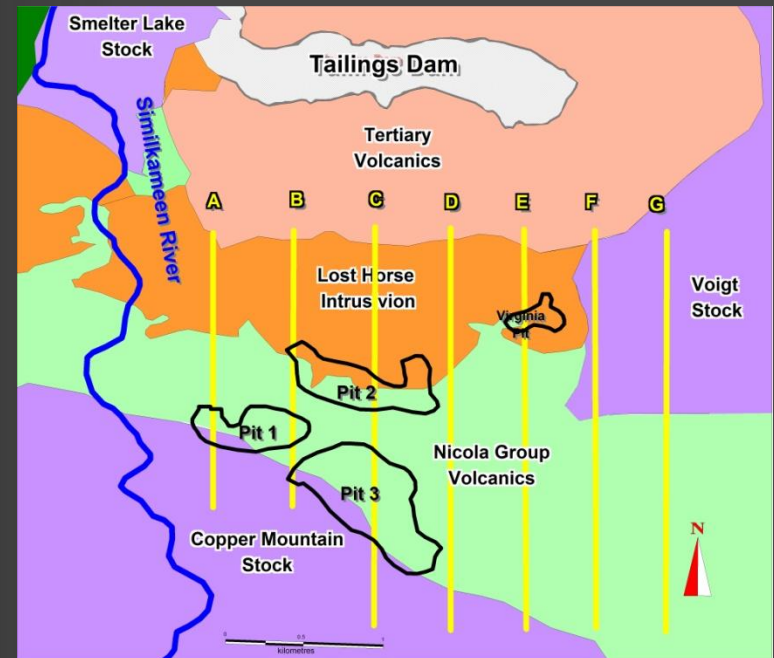
All these targets produced
IOCG mineralization.

Interpretation and results of TITAN 24



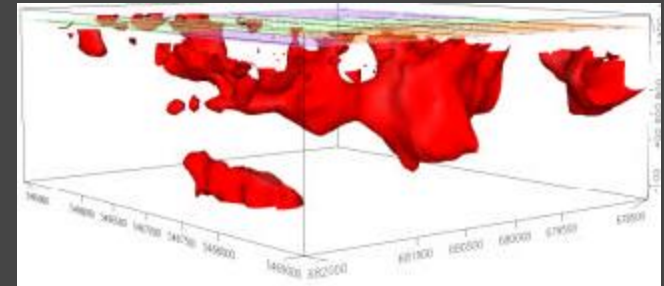
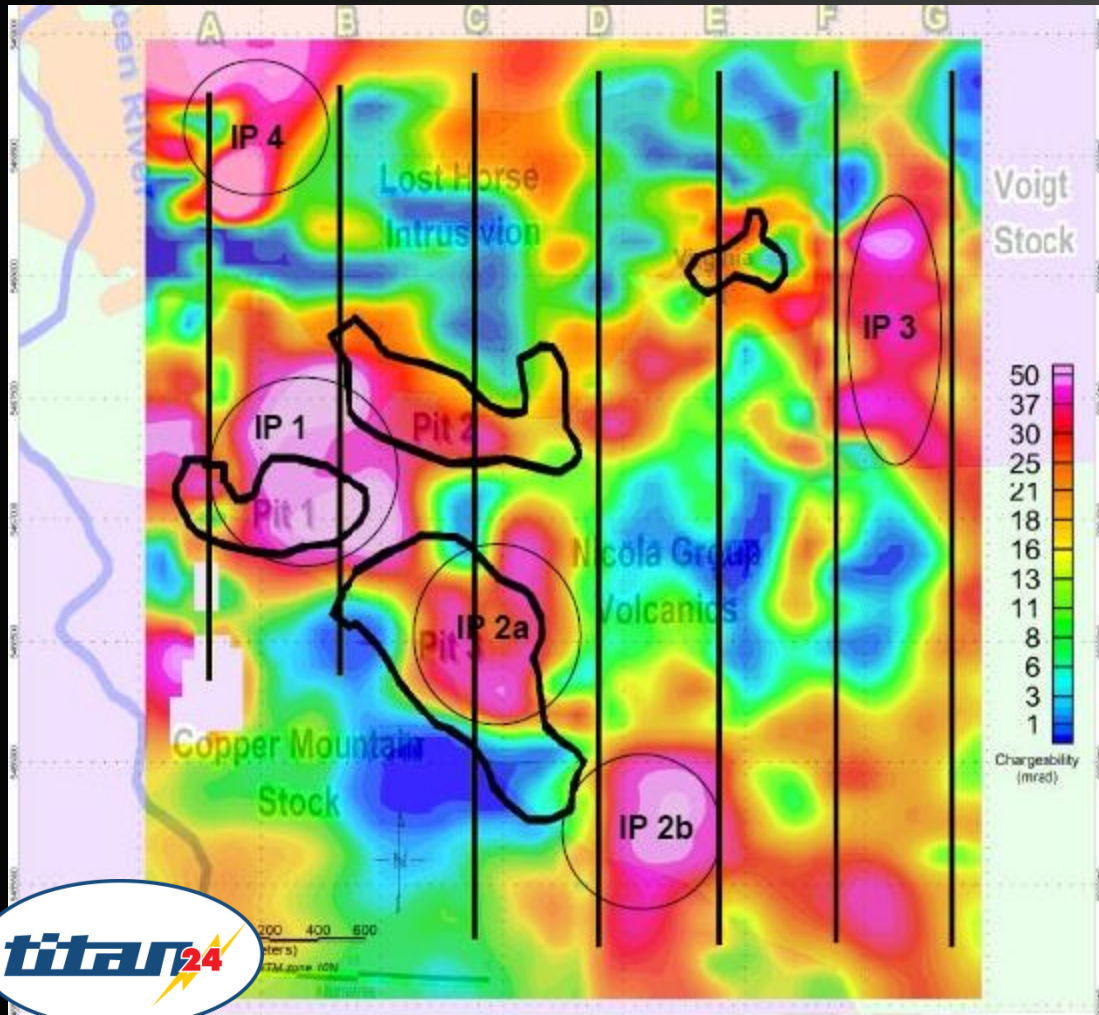
Porphyry Deposits

Copper Mountain – British Columbia



Images of Historic Pits and Geology with Titan 24 Line Locations

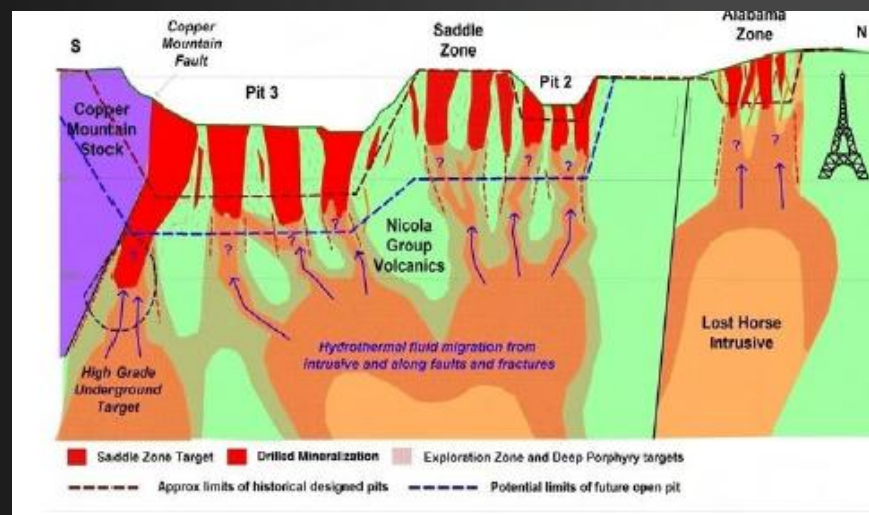
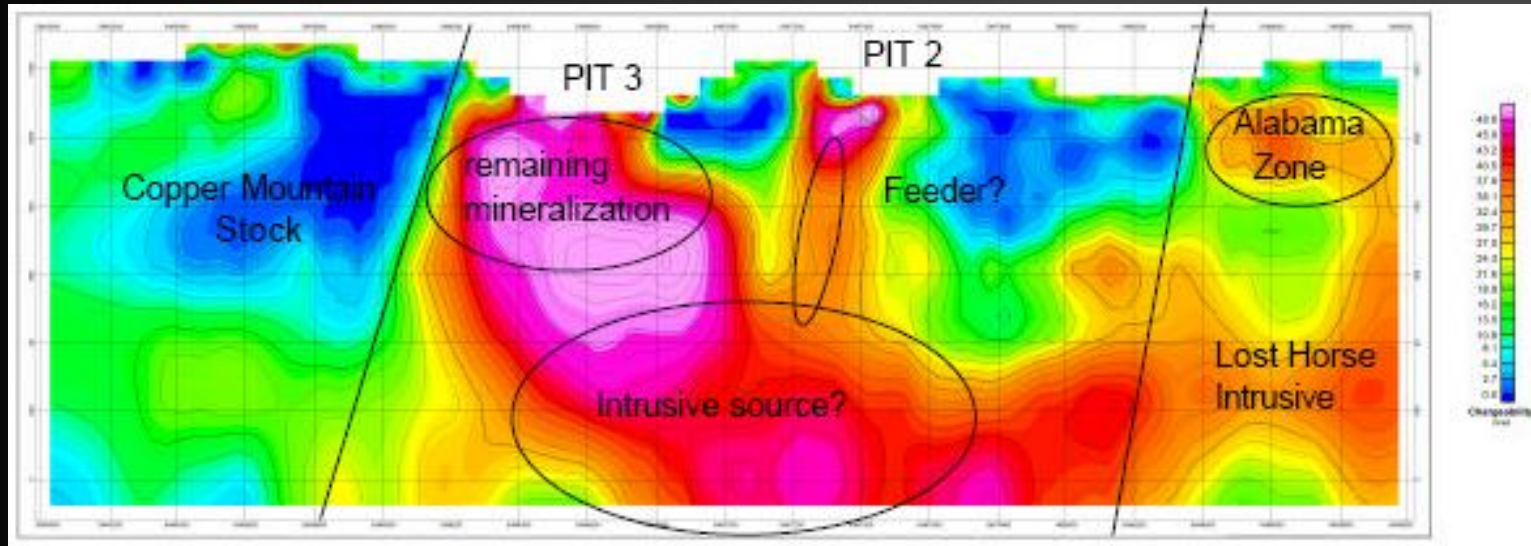
IP Plan (200 m) and 3D Image



IP anomalies centred over current pits

3D image shows continuity of chargeability to depth

Integrated 3D IP and Geology



Summary

The highest value exploration properties may present extreme problems to the conventional exploration approach:

- Great depth
- Geologic complexity
- Mine infrastructure
- Poor access

State of the art technology is revolutionizing deep exploration with:

- Deployment of modern, modular high sensitivity instruments
- Multi-parameter measurement
- Great depth of investigation
- Advanced modeling including the incorporation of historic geological data.

Thank You

- SIMEXMIN
- Barrick Gold Corporation
- FNX Mining
- Xstrata Resources
- OMET
- Ressources Appalaches
- Copper Mountain Mining Corporation

