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Geophysical Response of the Atlántida Porphyry Cu-Au Deposit: An Undercover Case History

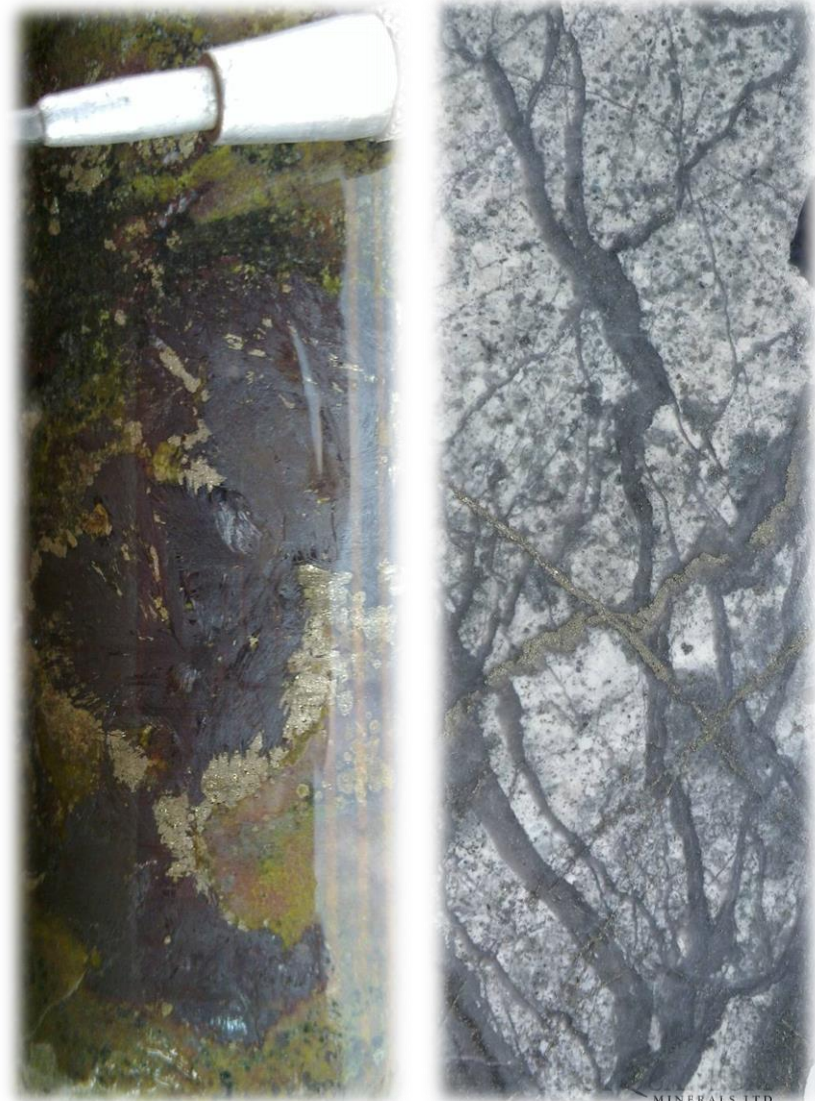
Matthew Hope, MAG21



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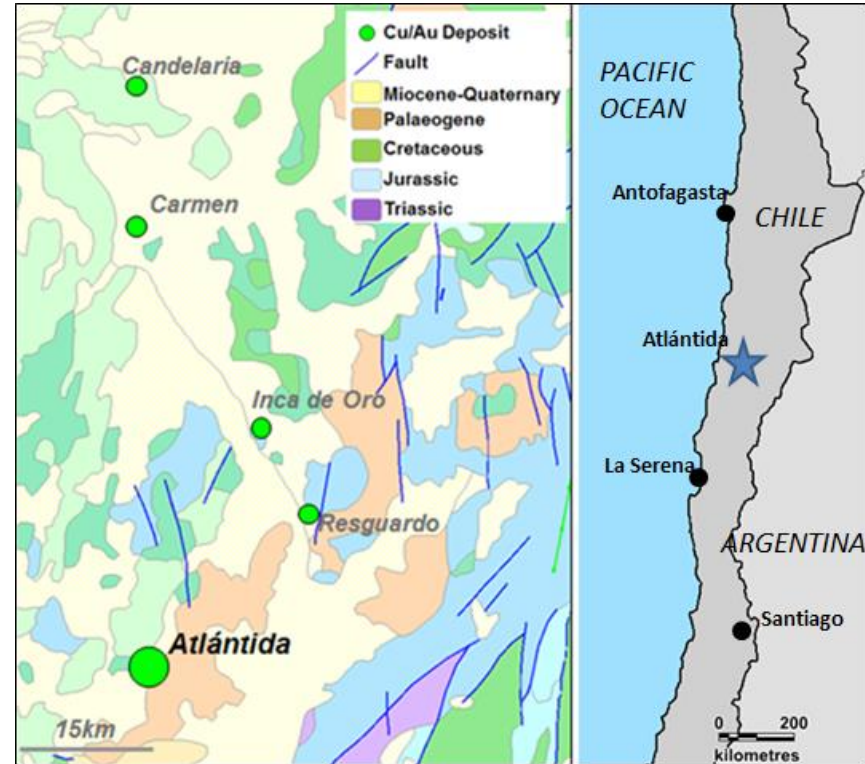
Talk Outline

- Set the scene
- History
- Geology
- Geophysical Response
 - Petrophysics
 - Potential Fields
 - Electrical Properties
- Summary Comments



Overview of Atlántida

- Located in Region III of Northern Chile
- Entirely “blind” discovery by Inmet Chile
- Cu-Au porphyry mineralisation with important skarn contribution
- Depth to mineralisation (>200m) and low grade make for marginal economics
- Area believed to have high exploration maturity
- Important test-site for undercover exploration techniques

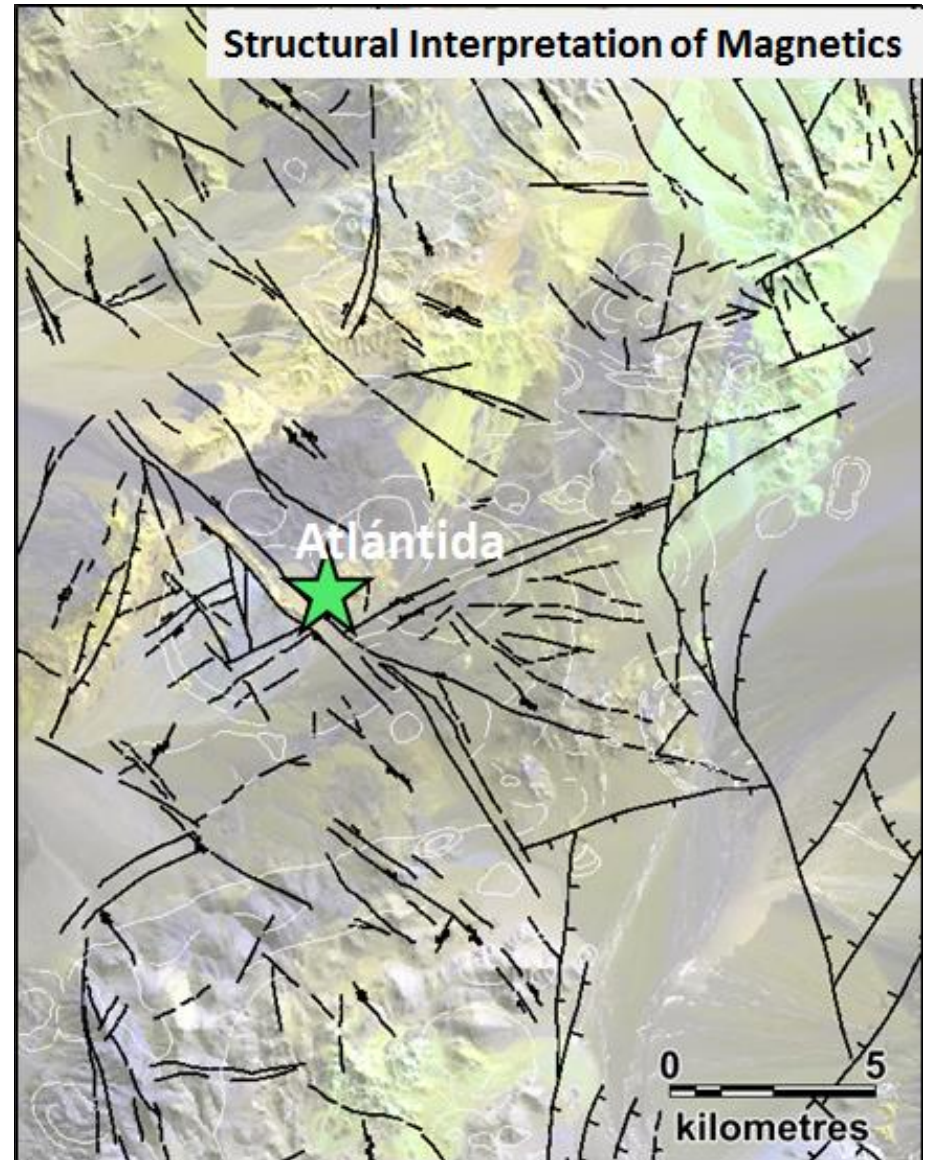


Type	M Tonnes	Cu %	Au g/t
Porphyry Cu-Au	257.5	0.25	0.21
Porphyry Au	130.5	0.06	0.53
Skarn	39.1	0.3	0.62
TOTALS	427.1	0.2	0.34

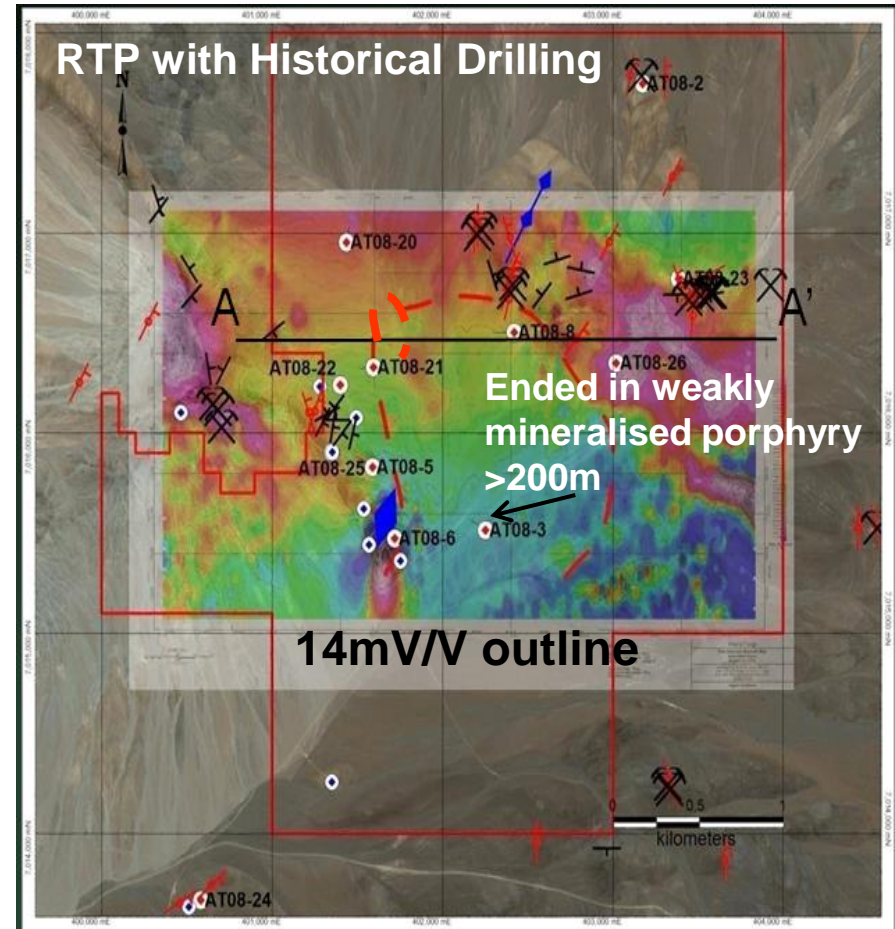
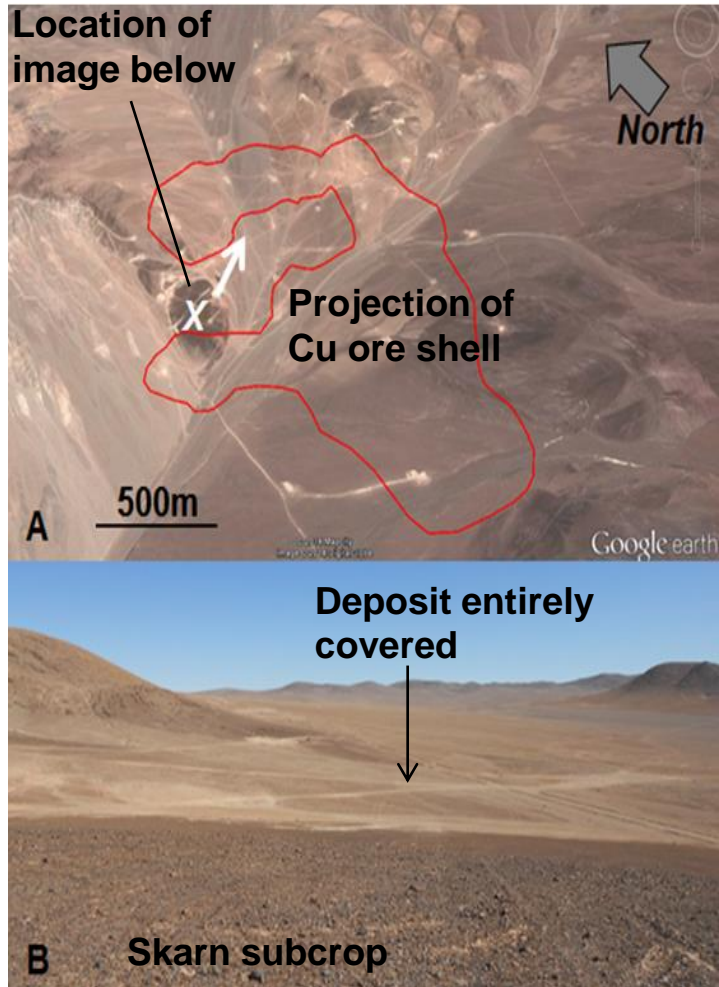
* Potential mineral inventory only, not compliant with resource reporting standards

Geological Setting

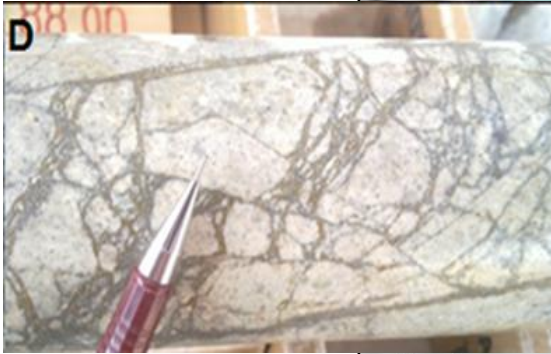
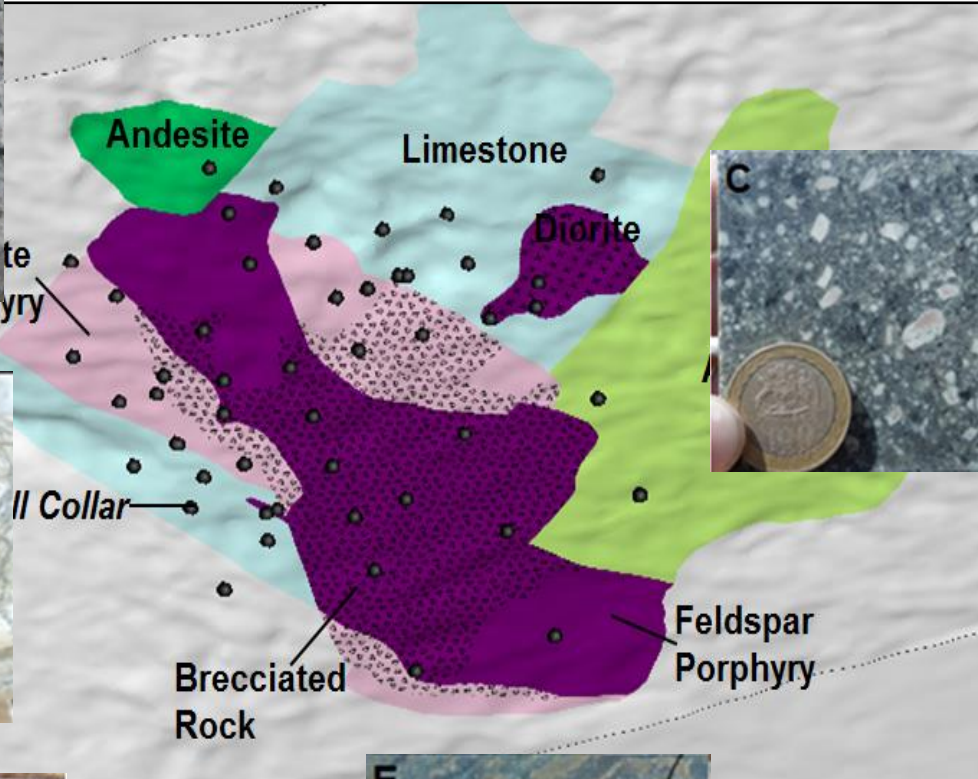
- Low lying hills exposed between extensive recent gravel pampa
- Jurassic-Paleocene/Eocene volcanics and volcano-sedimentary packages. Dominantly intermediate-felsic
- Located between major Atacama and Domeyko fault systems (NS)
- Localised by intersection of ENE and NW trending faults



Local Setting & History



Deposit Setting & Geology



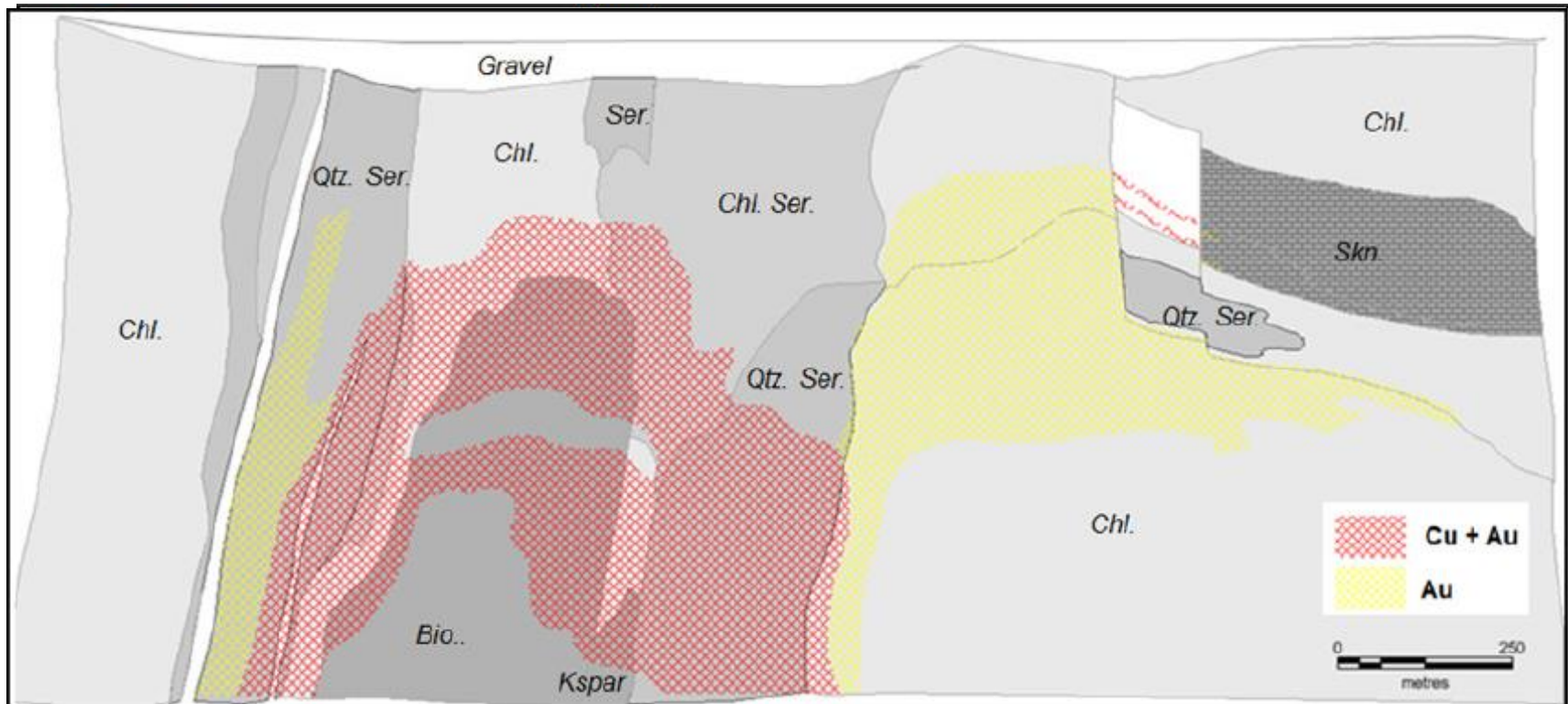
North



Type Section

Lithology

Alteration/Mineralisation

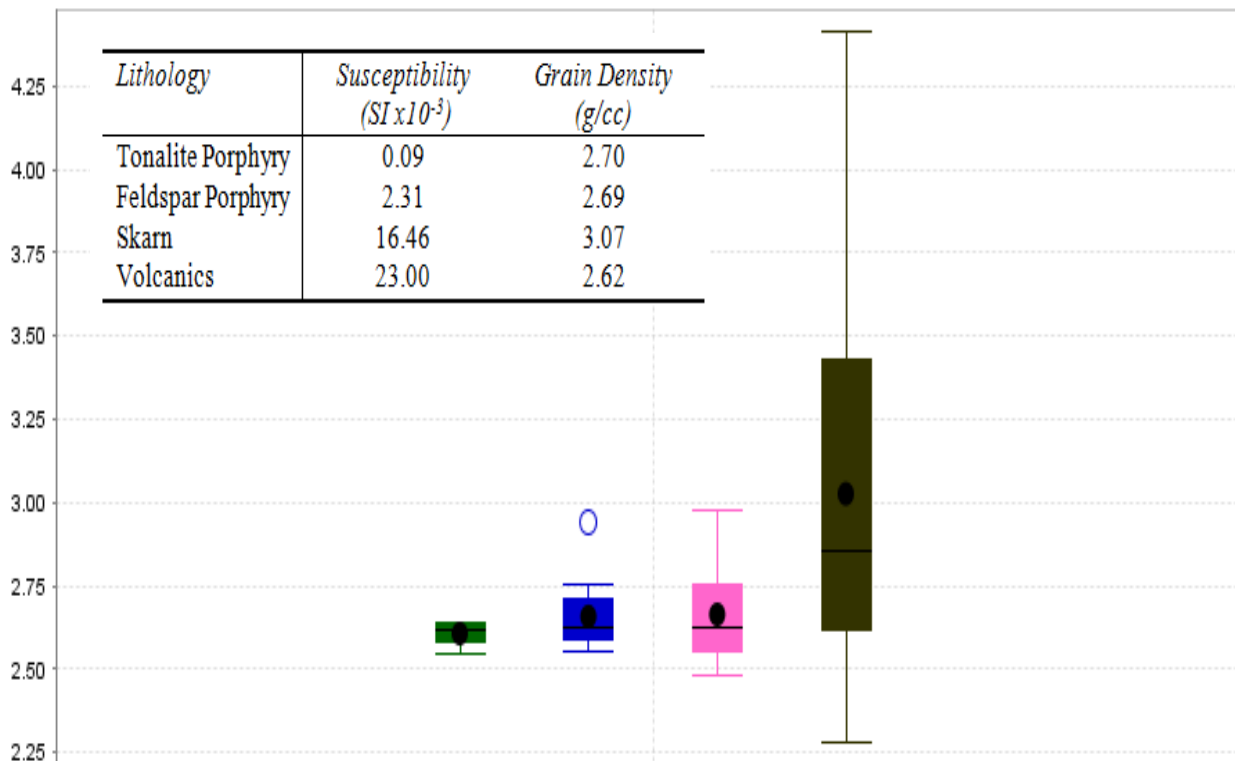


- 30-60m gravel cover, phyllic overprint to >600m
- Essentially vertical contacts in barrell
- Biotite defined by strong alteration
- Epidonophy wepp Cu-Au intrude early tonalite

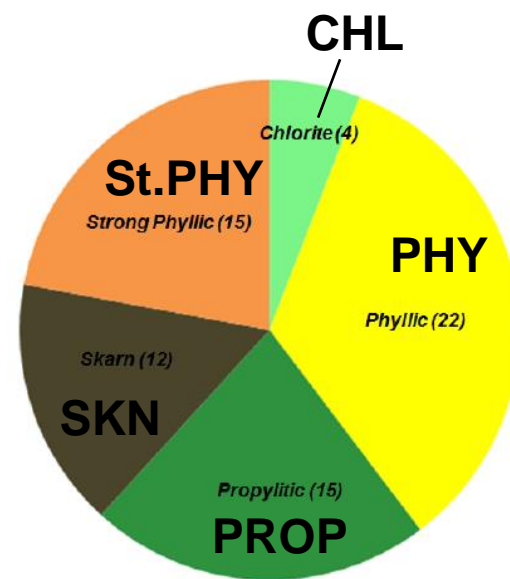
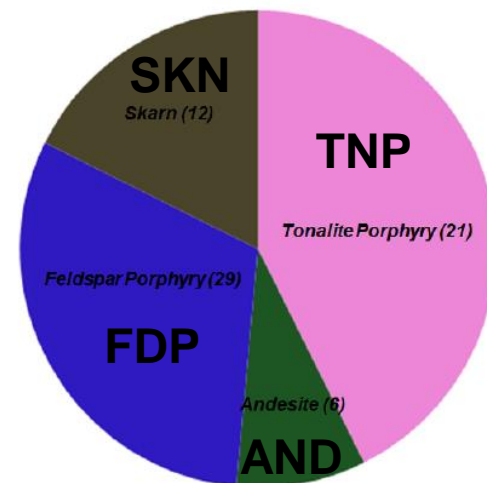


Petrophysics - Potential Fields

Dry_Bulk_Density



- Porphyry phases weakly magnetic
- Skarn variably-highly magnetic
- Andesite uniformly magnetic
- Skarn unit clearly anomalous in density

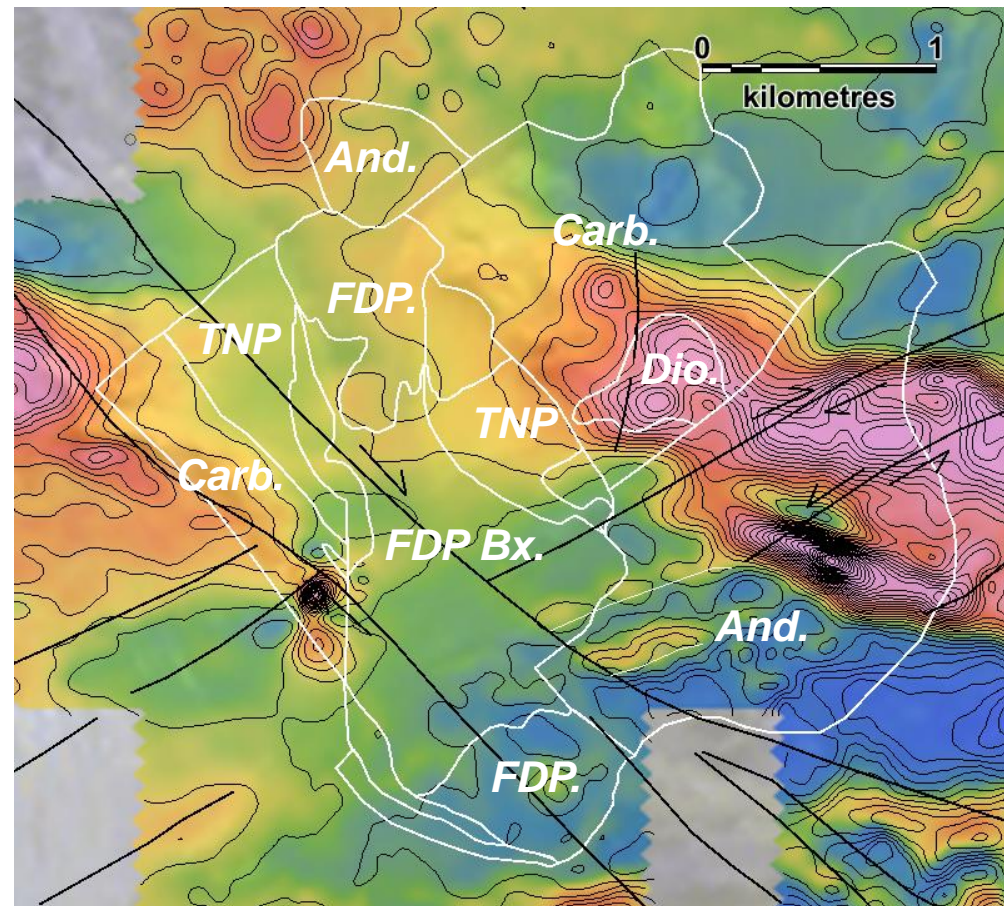


67 petrophysical samples acquired to sample project

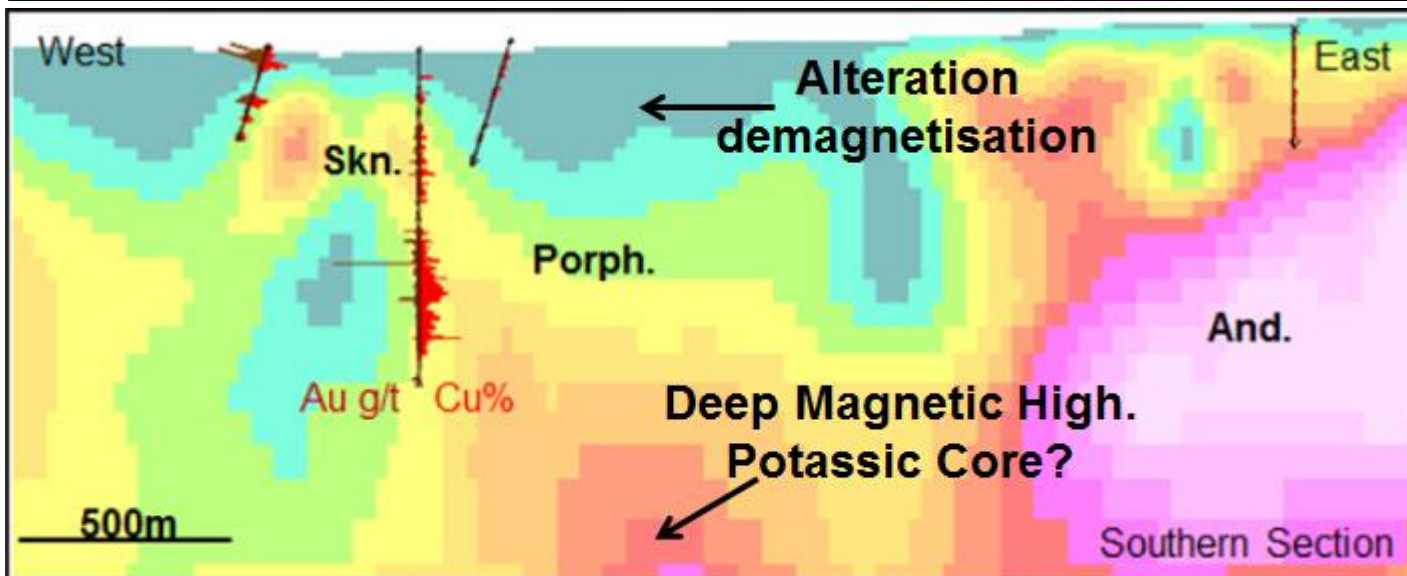
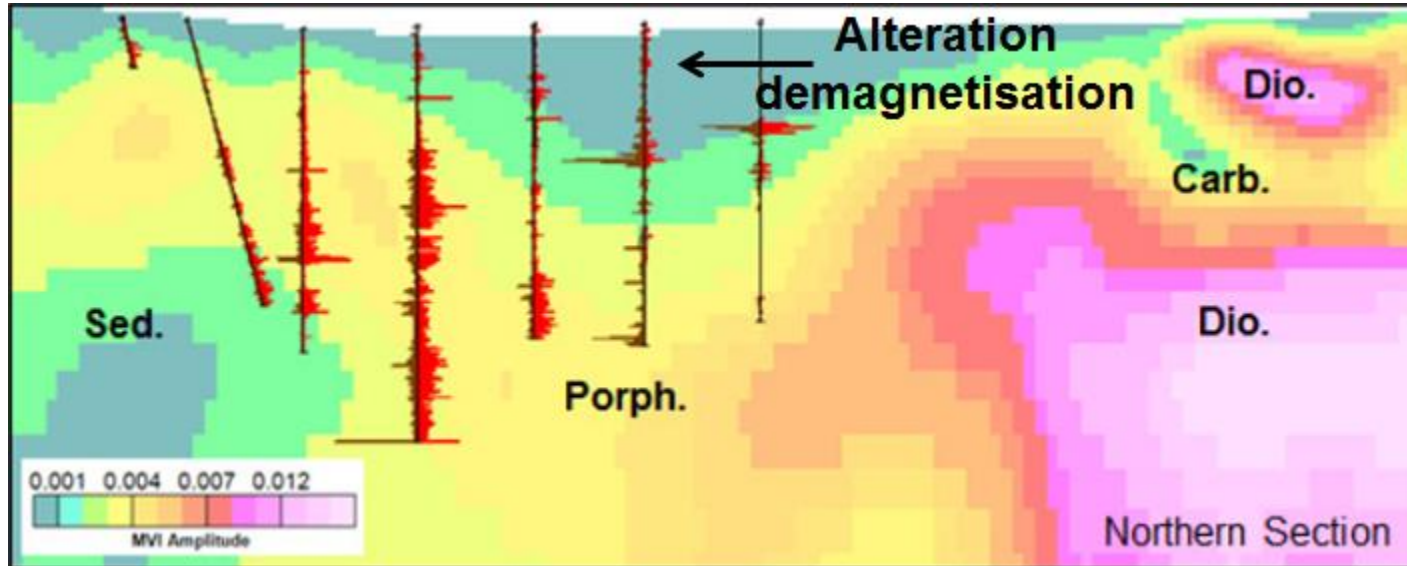
Ground Magnetics

- Deposit is characterised by magnetic low in RTP data
- NW and NNE structural control evident at deposit scale
- Fresh volcanics main source of magnetic anomalism (remanent)
- Skarns- localised magnetic highs
- Elevated magnetite in carbonate units adjacent to intrusives

RTP Ground Magnetics – 25nT Contours

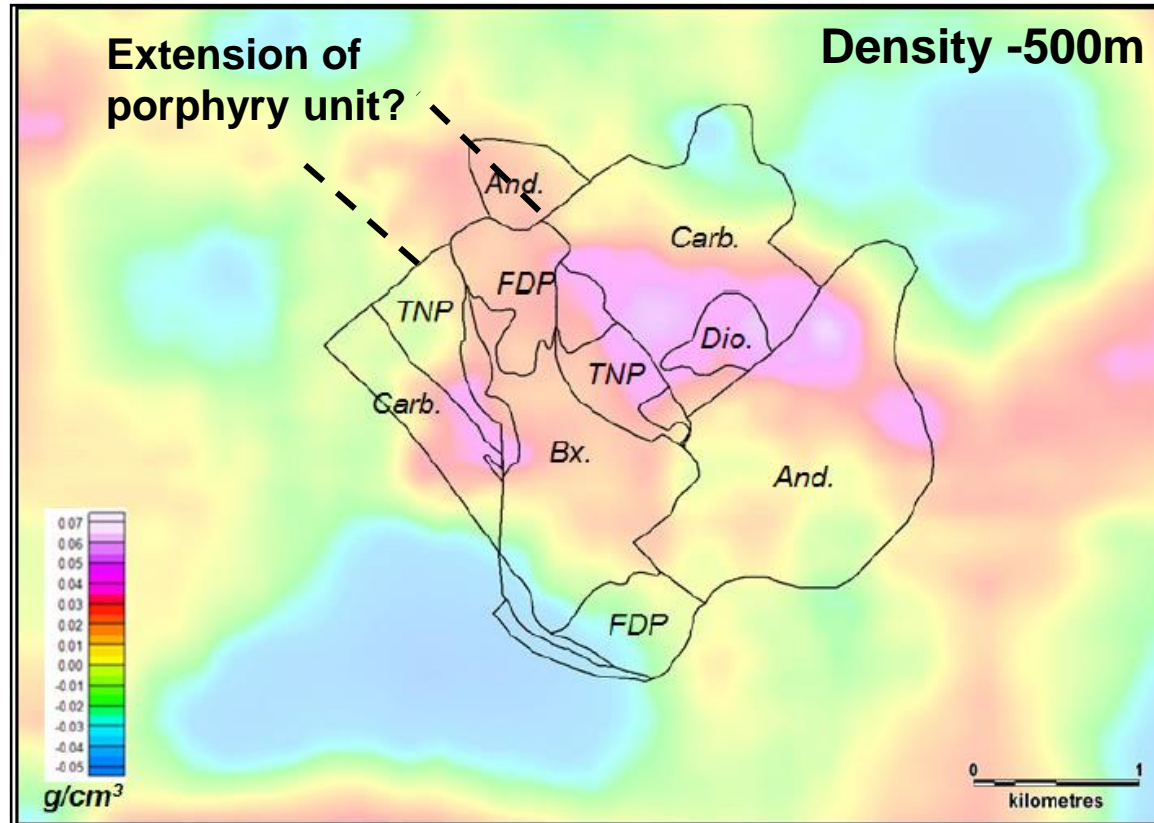


Magnetic Inversion

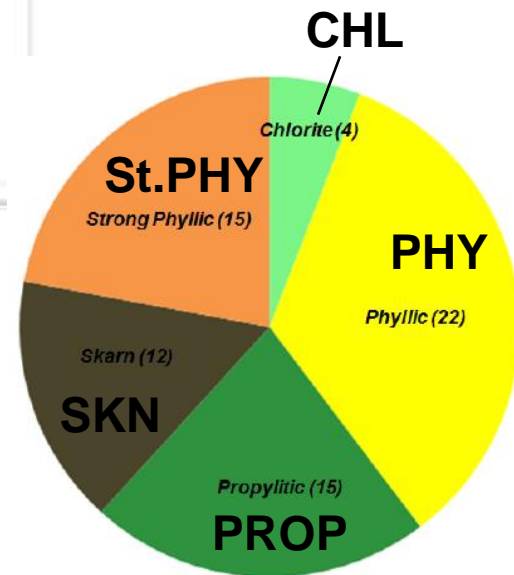
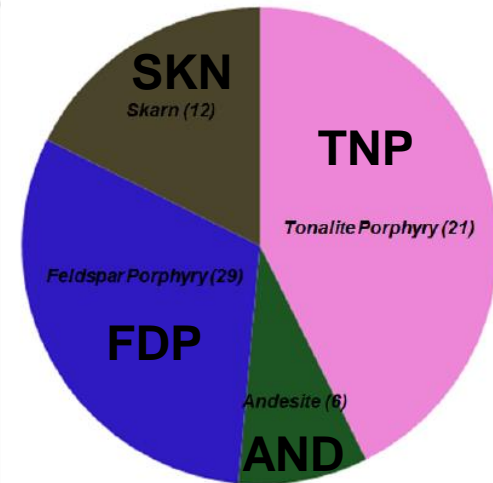
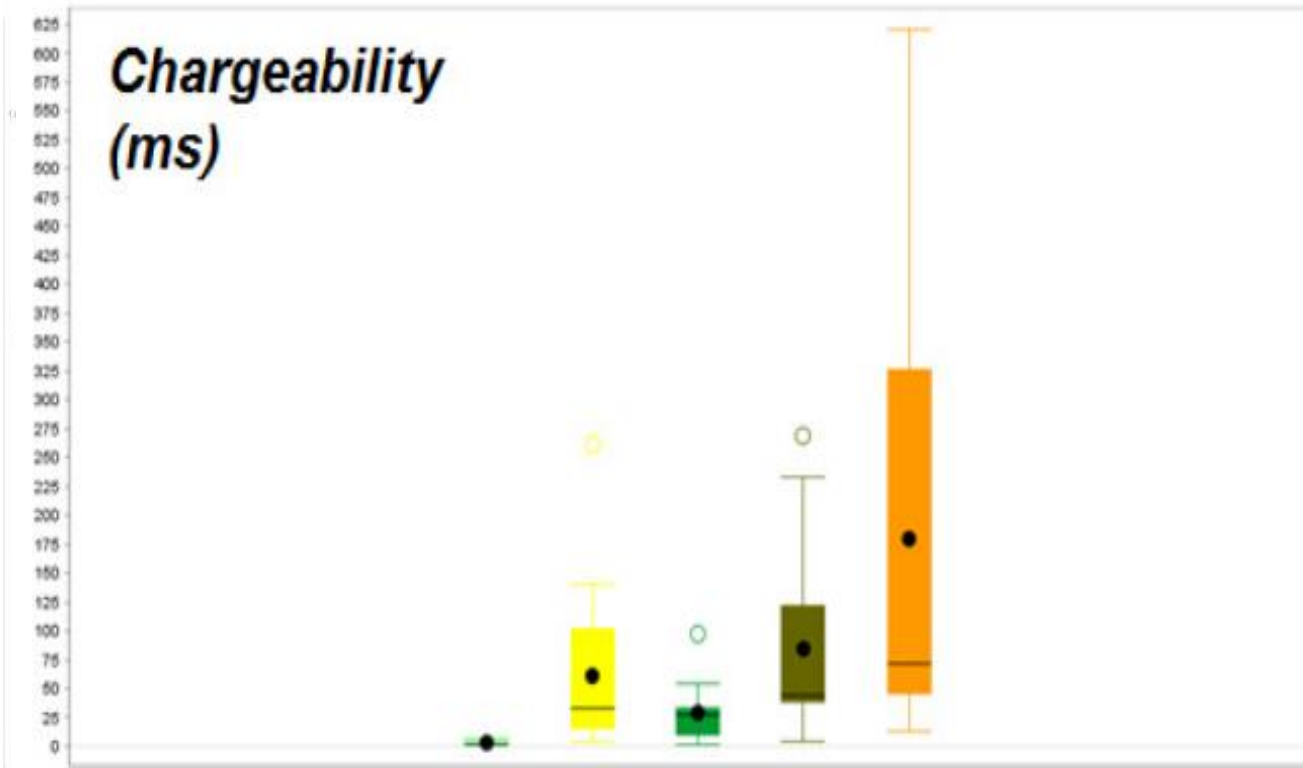


Gravity

- “Non-traditional” technique
- 200-400m grid of stations
- Focus on shallow skarn potential
- Subtle anomalism requires high quality data and corrections
- Reminder - porphyry units denser than host volcano-sedimentary package



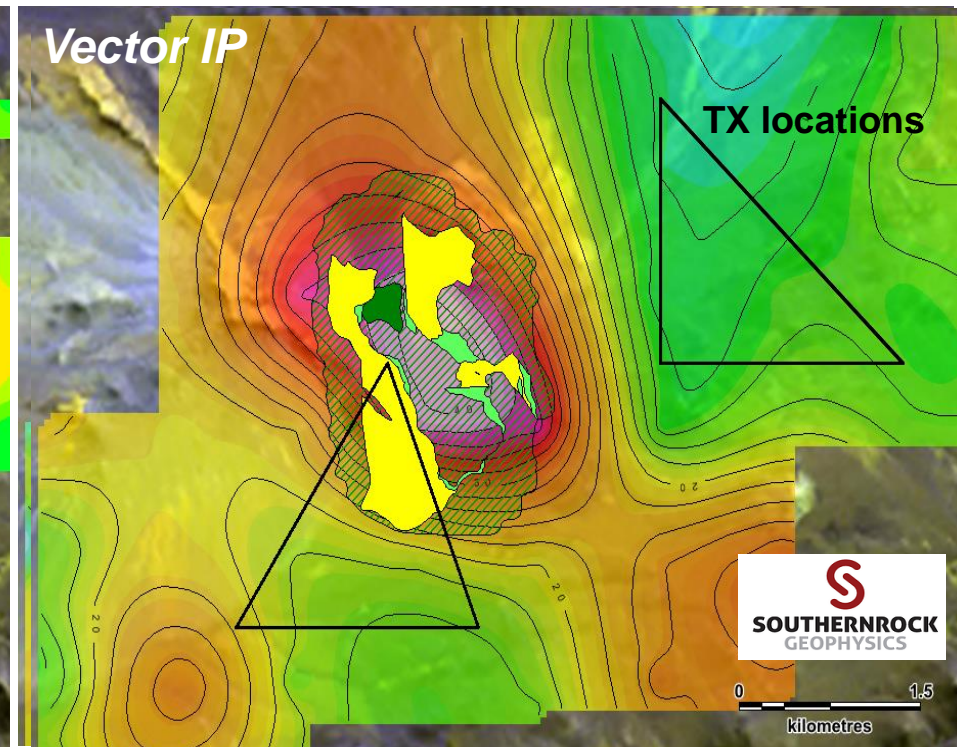
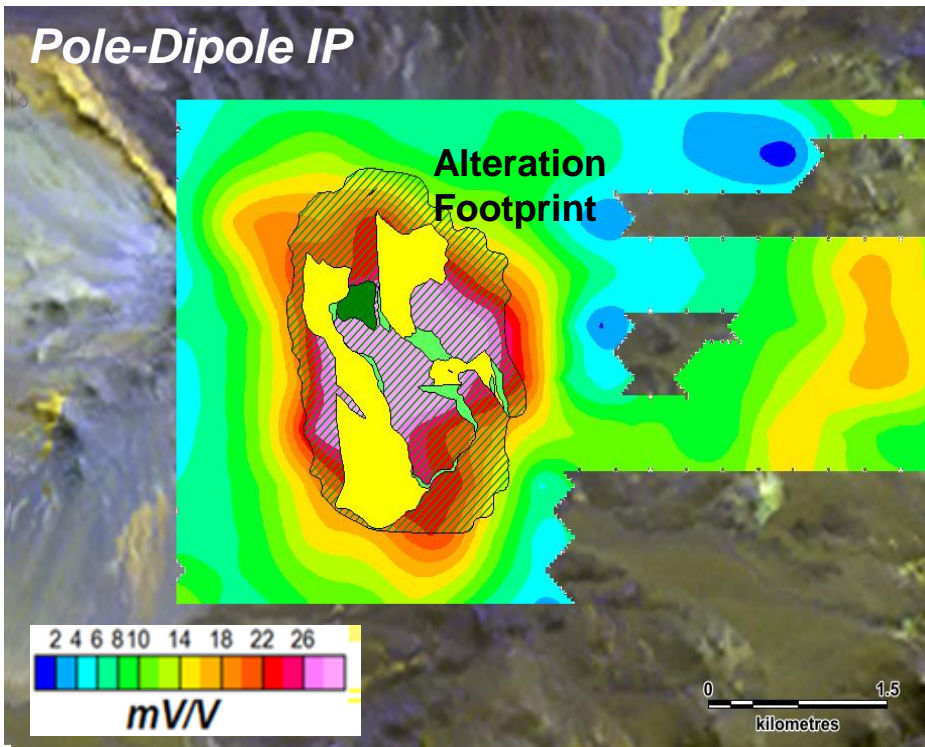
Petrophysics - Electrical Properties



- At best weak lithological control on resistivity
- All mineralised lithologies variably chargeable
- More proximal alteration decreases resistivity
- More proximal alteration increase chargeability

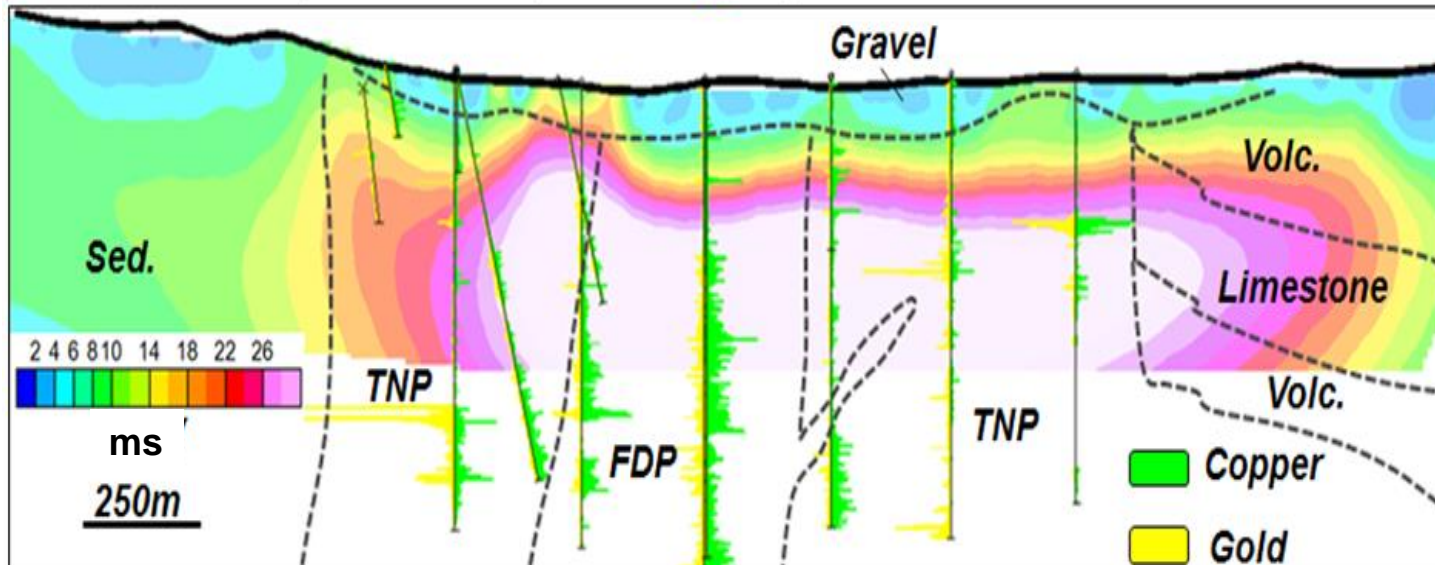
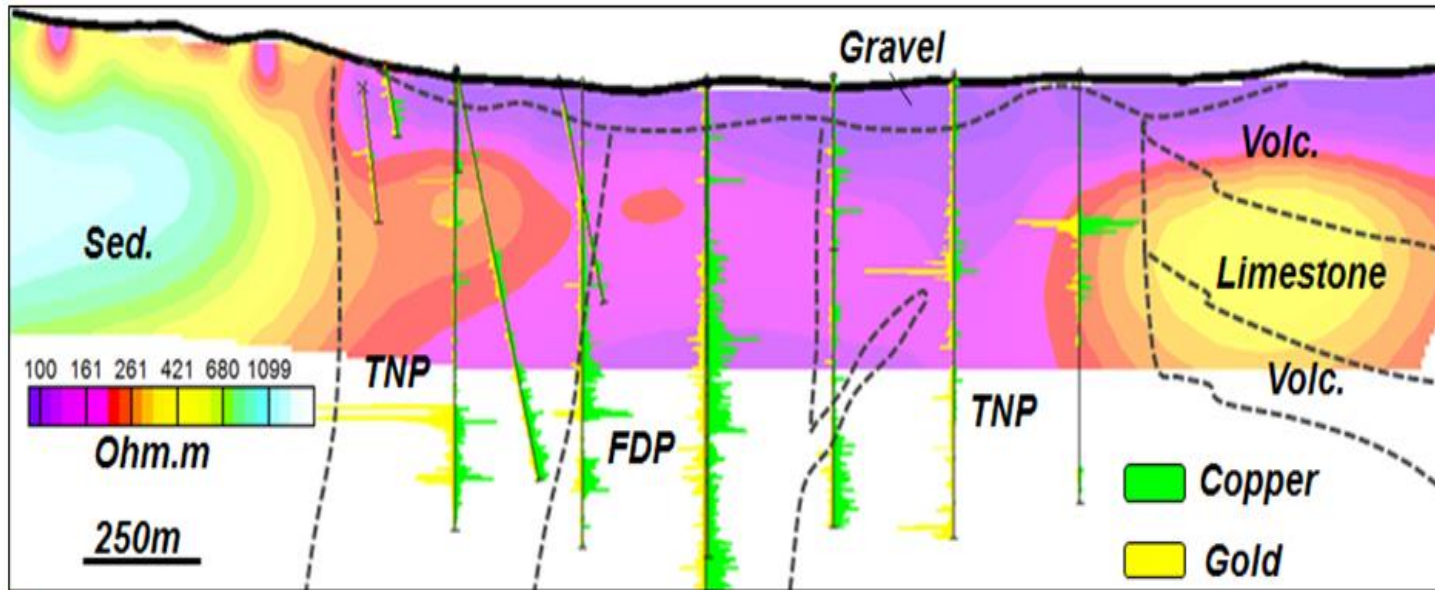
Electrical properties acquired with GDD SCIP

Induced Polarisation

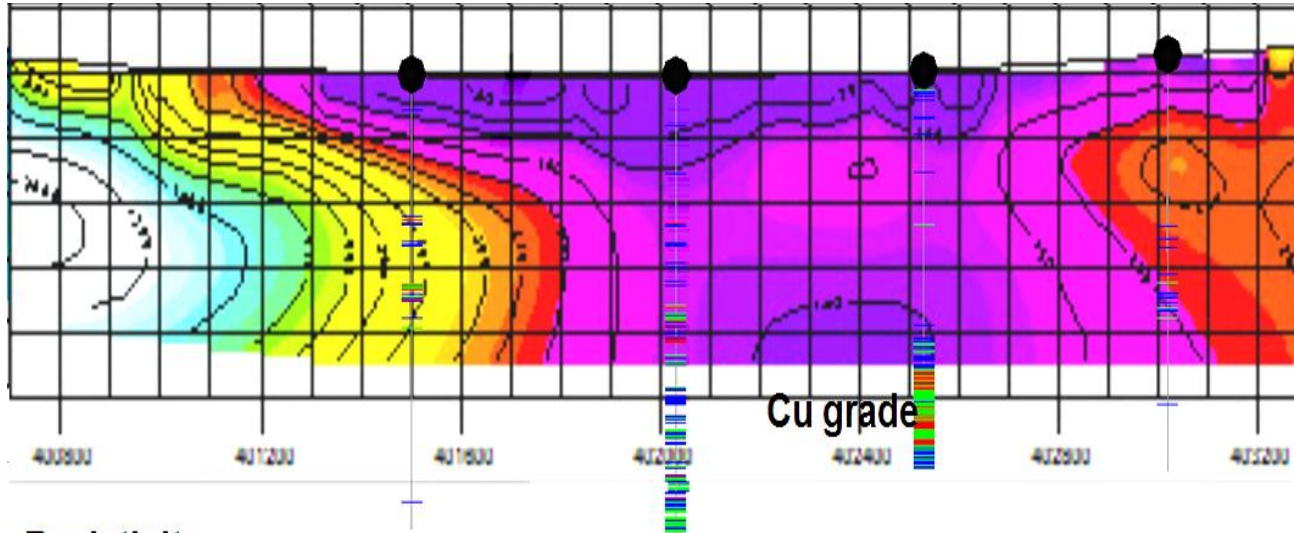


- Chargeability maps footprint of hydrothermal cell
- Resistivity spatially linked to increased Cu grades
- Application of Vector/Tensor IP would provide rapid low cost screening tool leading to discovery in this case

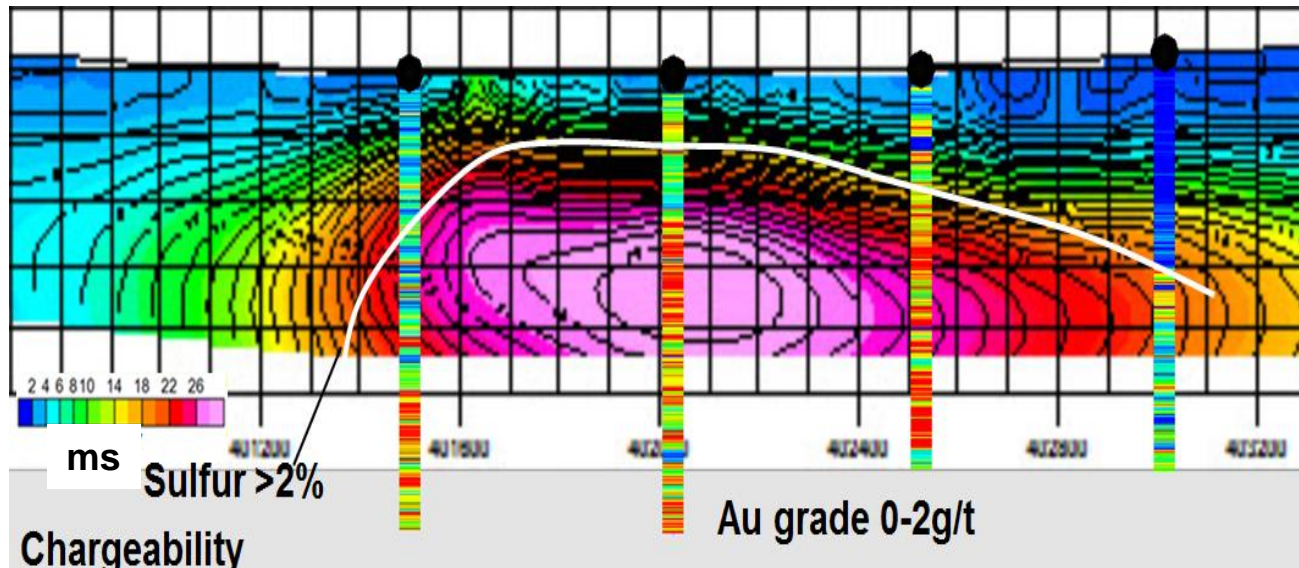
IP Section (North)



IP Sections (South)



Resistivity

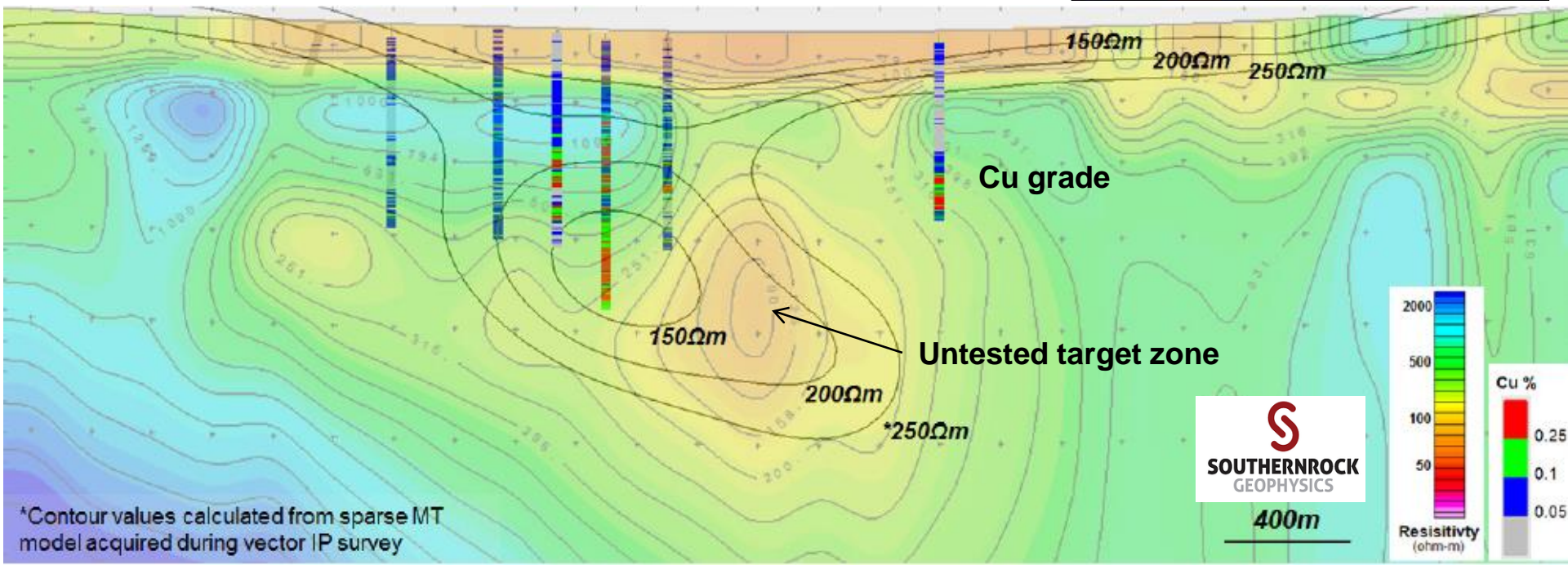
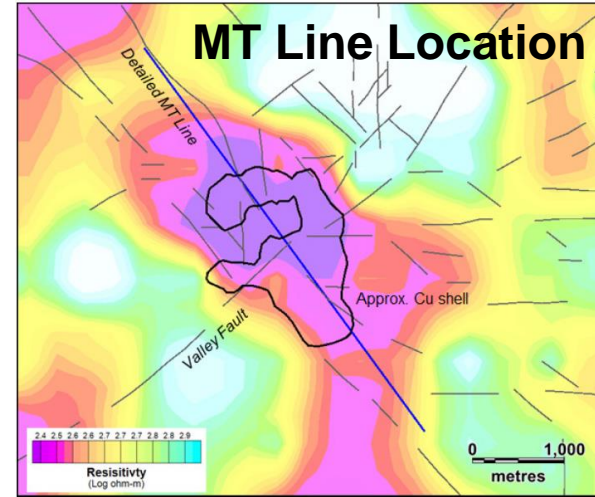


400m

Chargeability

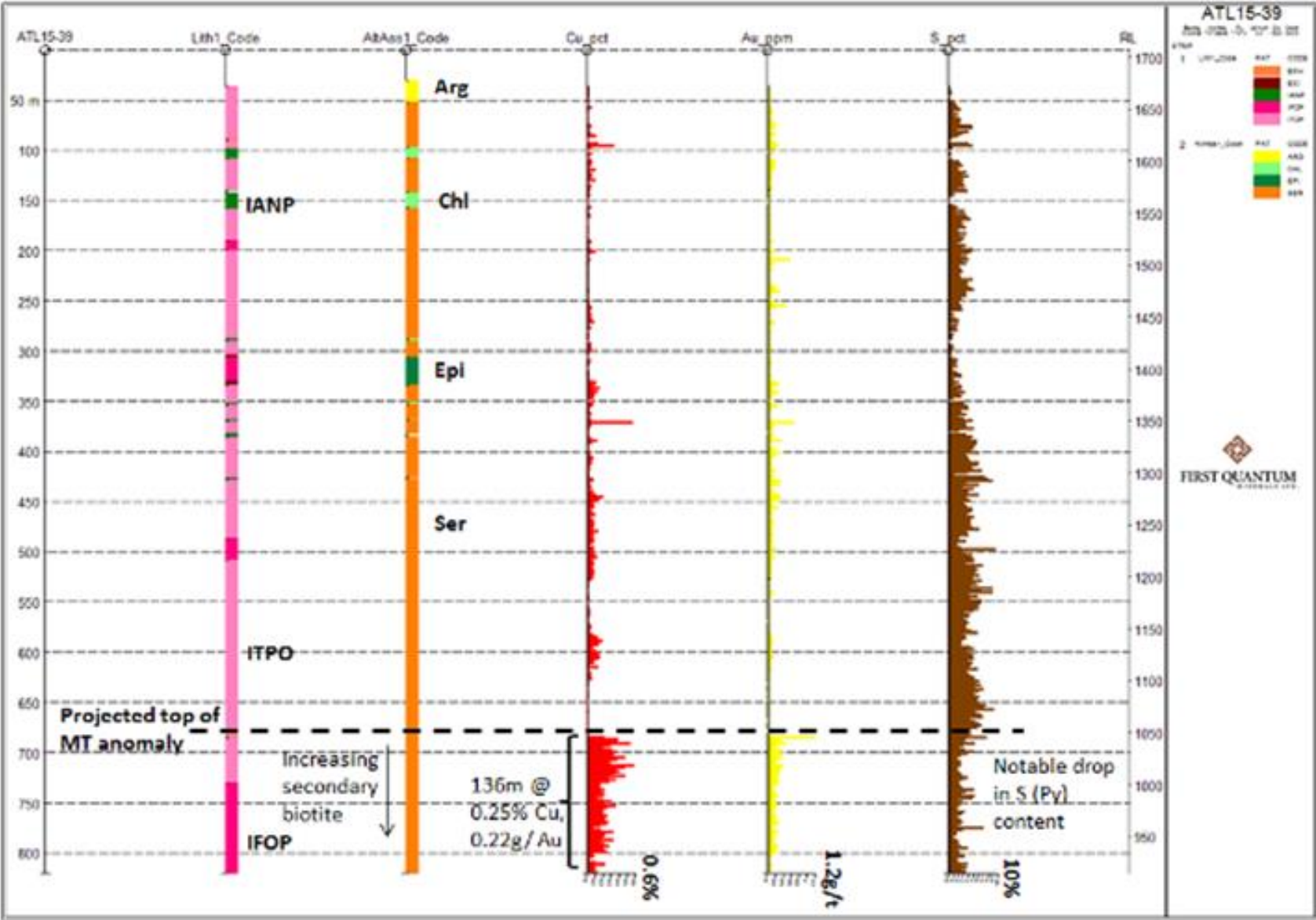
Magnetotelluric Section

- 200m spaced Ex, Ey receivers with sparse Hx, Hy
- See's "through" pyrite zone to a core-zone of low resistance
- New target generated and drill tested
- Sparse MT from TIP survey powerful tool



*Contour values calculated from sparse MT model acquired during vector IP survey

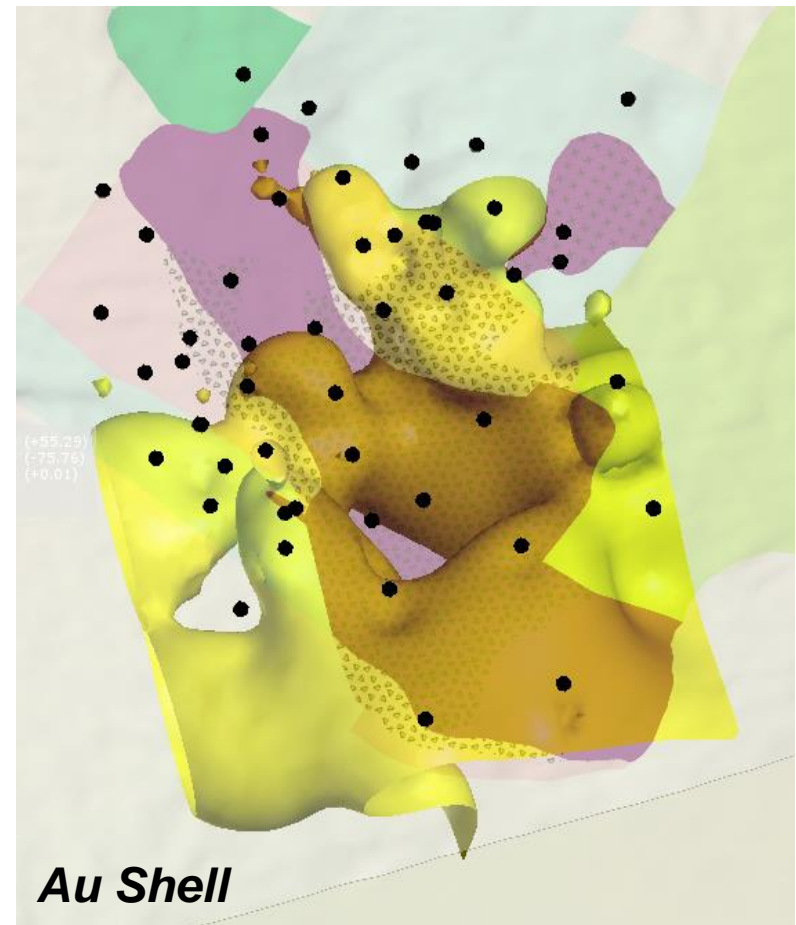
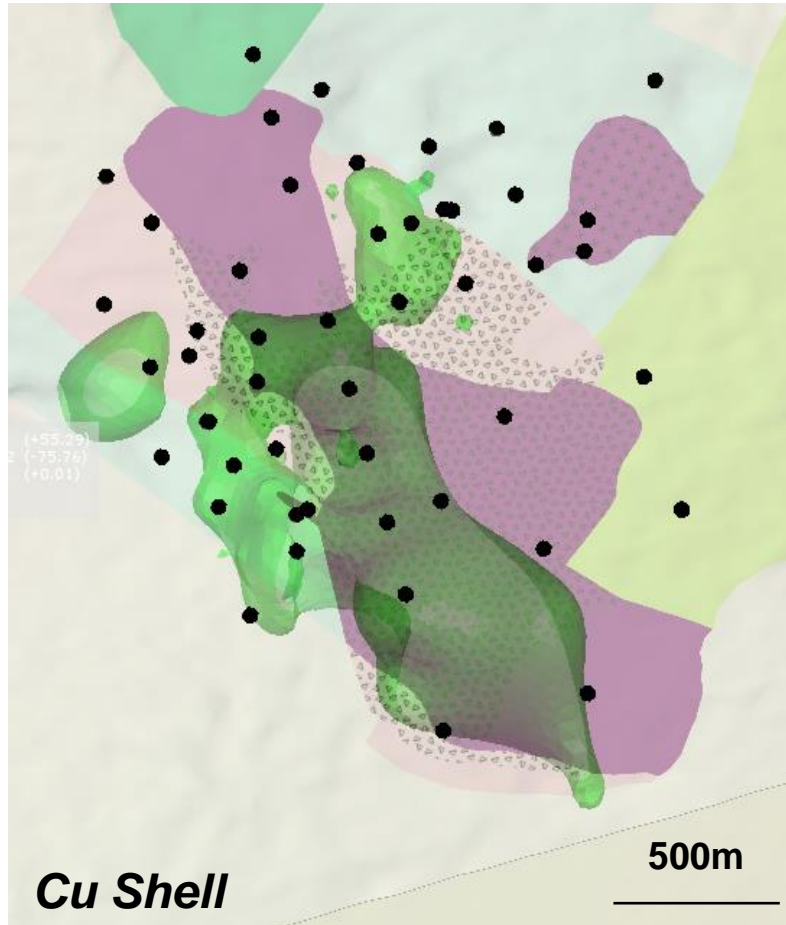
Deep MT Test Strip Log



Concluding Comments

- Opportunity taken to learn from a covered project
- Petrophysical data significantly increases confidence in case study reviews
- Use of Vector IP powerful tool for screening large pampa domains after prioritisation using potential field interpretations
- Recognition that Au closely linked to chargeability, whilst Cu with resistivity important for targeting at deposit scale..Strong Au only event/ modest Cu-Au event
- Residual potential remains for shallow skarn mineralisation and higher grade Cu at depth
- Satellite targets generated during trial programs may warrant further work

Questions?



Thanks to the Chile exploration team for inspiration and to FQML management and current owners of the project for permission to present