



**ArcPacific**  
Resources Corp.

# LMSL Project, B.C.

Review Summary

TSX.V: ACP

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# Executive Summary

## Geochemistry of the Lucky Mike Project, contextualized by geology and geophysics

On a large scale, Lucky Mike is well placed. It appears to reside in a structural corridor which also hosts a cluster of porphyry deposits to the south, Axe and Primer. The abundance of nearby skarn (hosted by Ashcroft) and polymetallic (hosted by Nicola) showings in the immediate area bodes well for hydrothermal activity and metallogeny. Abundant surface geochemistry is somewhat complicated by a large variety of analysis types employed, but results generally agree that the TMI magnetic anomaly, most likely representing an intrusive complex, drives the majority of anomalism, which is also structurally guided by a prominent N-S striking feature bordering a wedge of Ashcroft carbonate sediments.

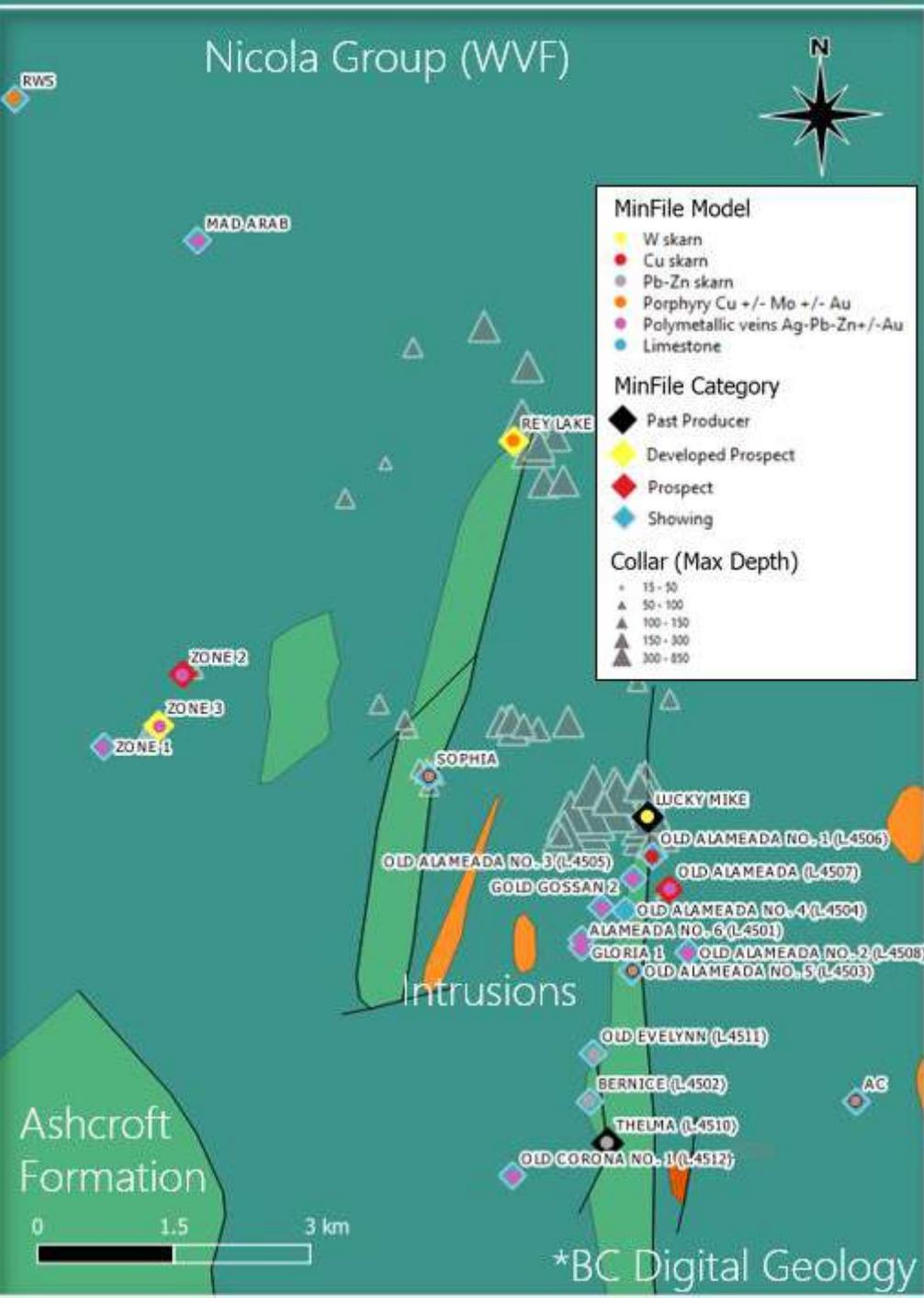
Historic drill testing would appear to have confirmed the presence of a hydrothermal system but narrowly missed the core, and presumably better mineralized portion.

Acquisition of further data, geochemical and geophysical, southward from the current area of coverage, and integration with historic data is recommended prior to developing drill targets.

### Conceptually:

The geochemistry reviewed would suggest that a hydrothermal cell(s) were originated from the underlying batholith noted in TMI imagery, mineralizing upper levels with base metals and silver, followed by continued development of a molybdenum shell.

The fundamental question to be answered from the economic perspective is whether the hydrothermal activity was focused above a highly fractionated cupola of the batholith and related porphyry stocks, and properly lidded in the sense that metals could be concentrated into a focused central area of higher grades, or if the smoke seen in the area is the product of a broad, open system, related to the simple cooling and devolatilization of the underlying batholith. Either possibility remains open, although the presence of stockwork veining and breccias in drill-core supports the favorable, lidded hypothesis.



# Metallogeny and Architecture

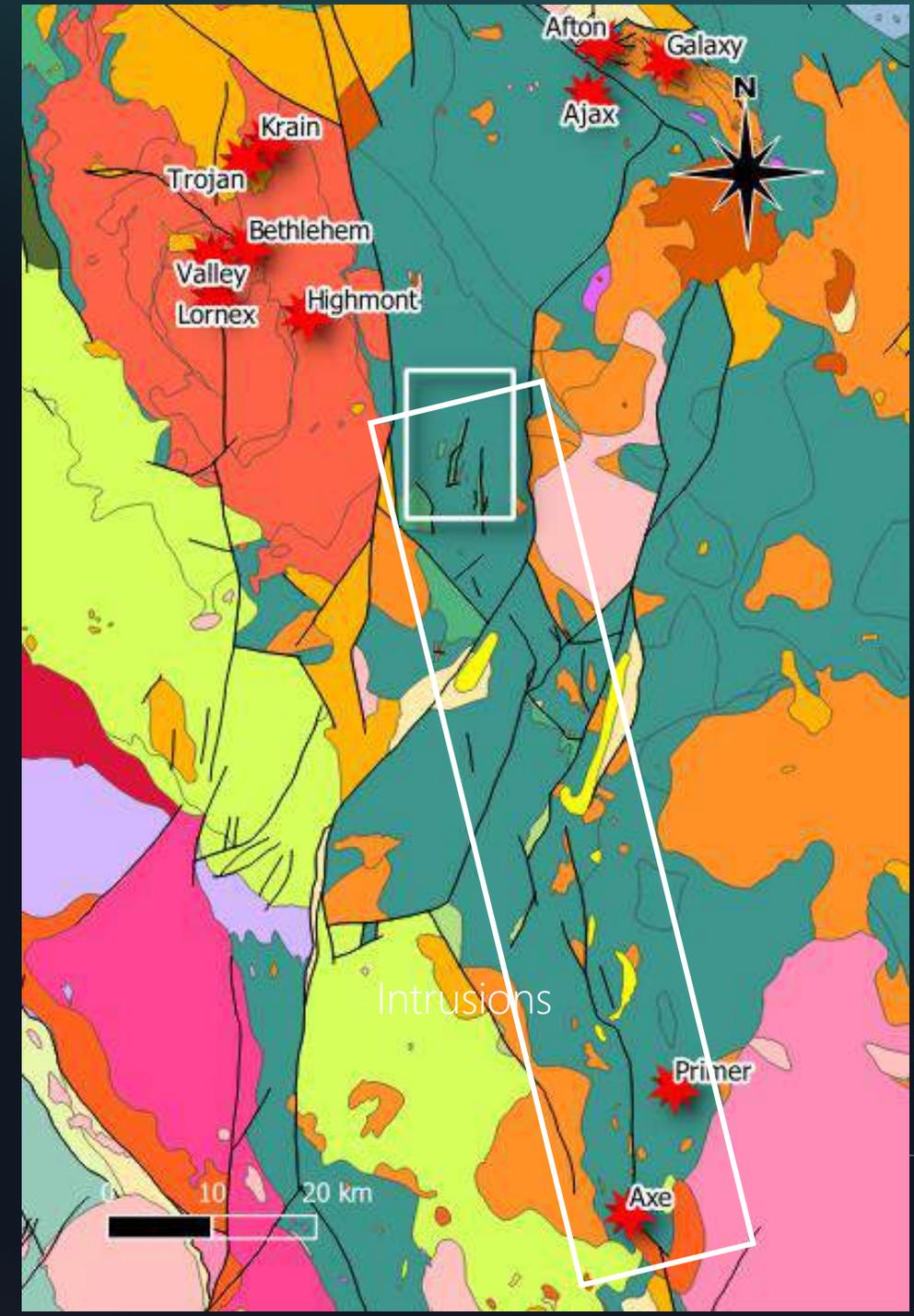
BC Minfile Showings at Left:

Numerous showings, predominantly of magmatic-hydrothermal affinity, including two porphyry copper prospects (Rey Lake and Zone 3).

The area directly south of Lucky Mike proper contains polymetallic showings hosted in Nikola volcanics, and Pb-Zn skarns hosted by Ashcroft sediments.

USGS Porphyry Deposits at Right:

Large scale lineaments are traceable from the Axe and Primer areas and appear to be on-strike (approximately) with the Lucky Mike area, suggesting an important architectural element for metallogeny in the area (white rectangle, at right).



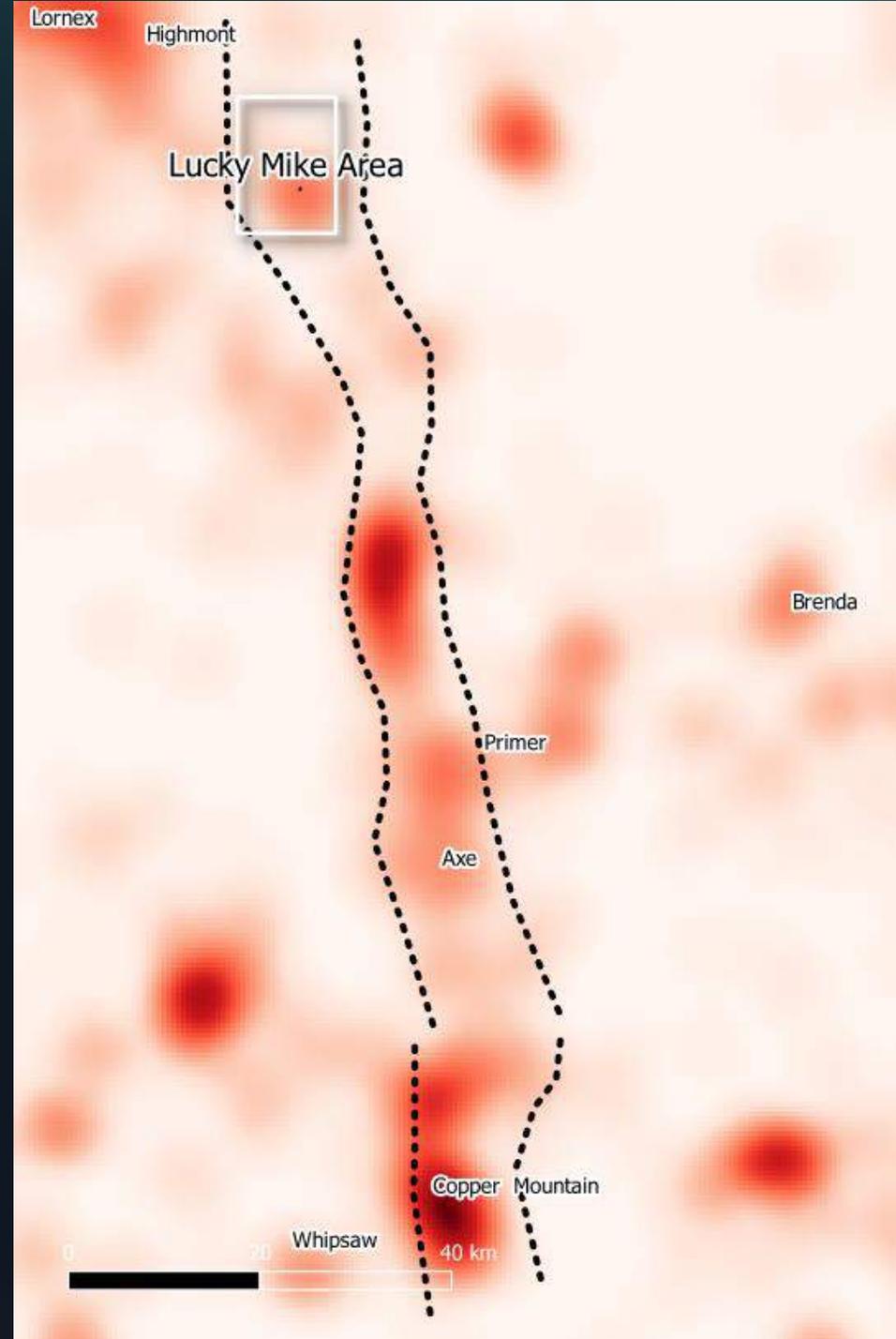


# Metallogeny and Architecture

Also a clear concentration of past producers, prospects, and showings along this structural corridor (left). Showings heat-mapped at right.

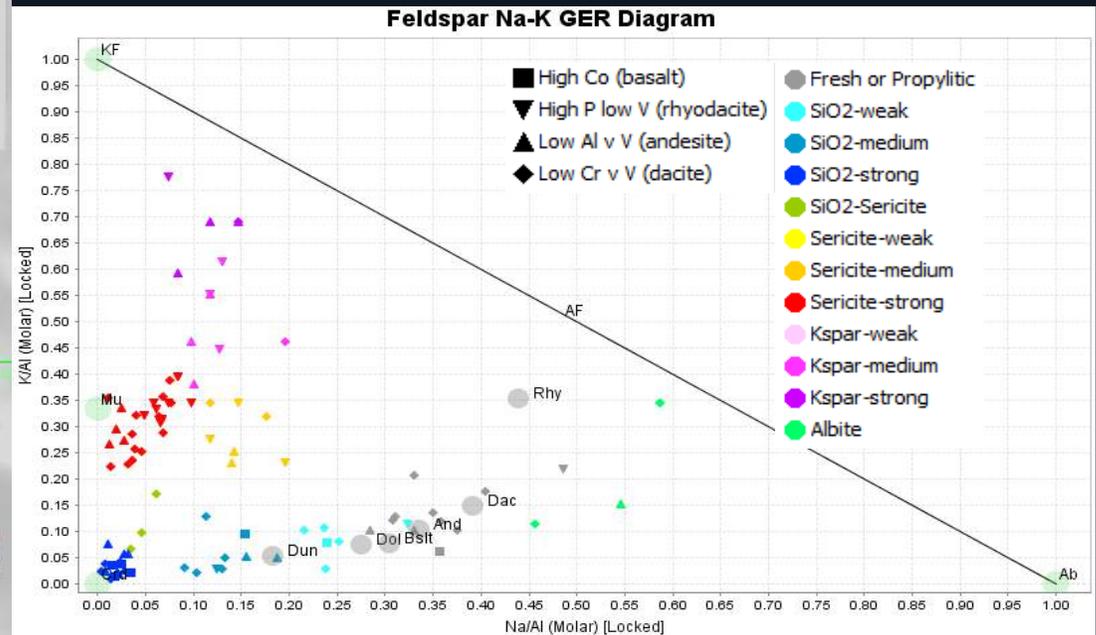
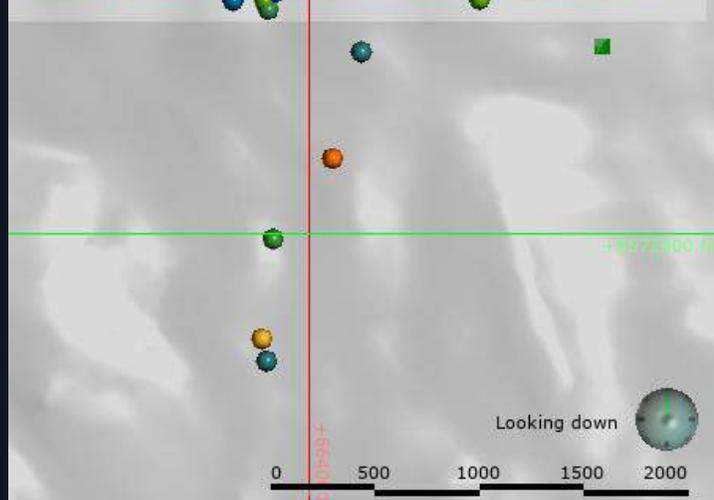
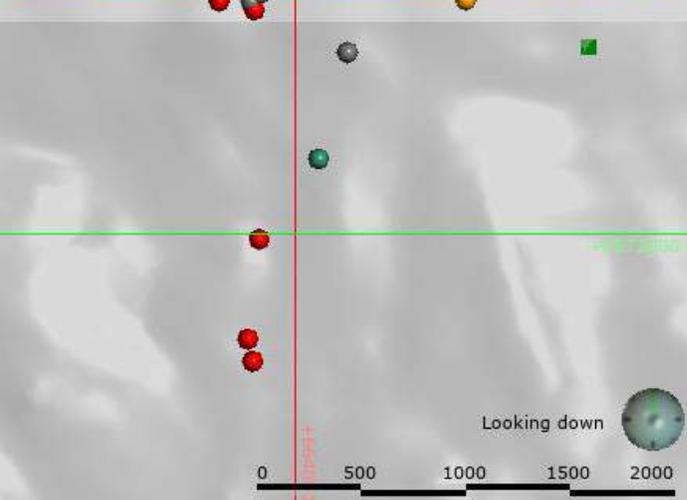
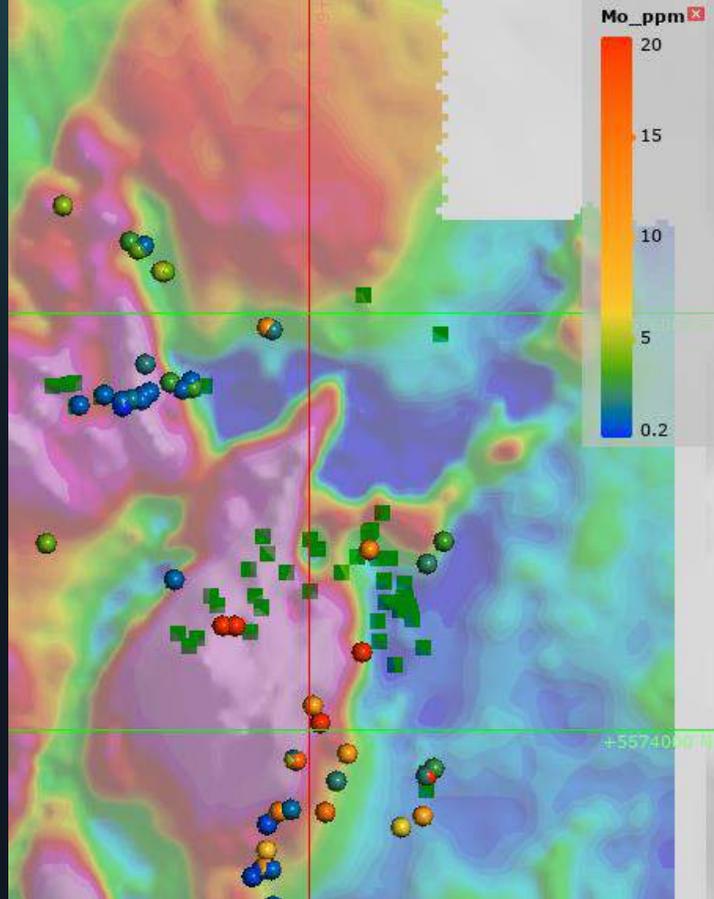
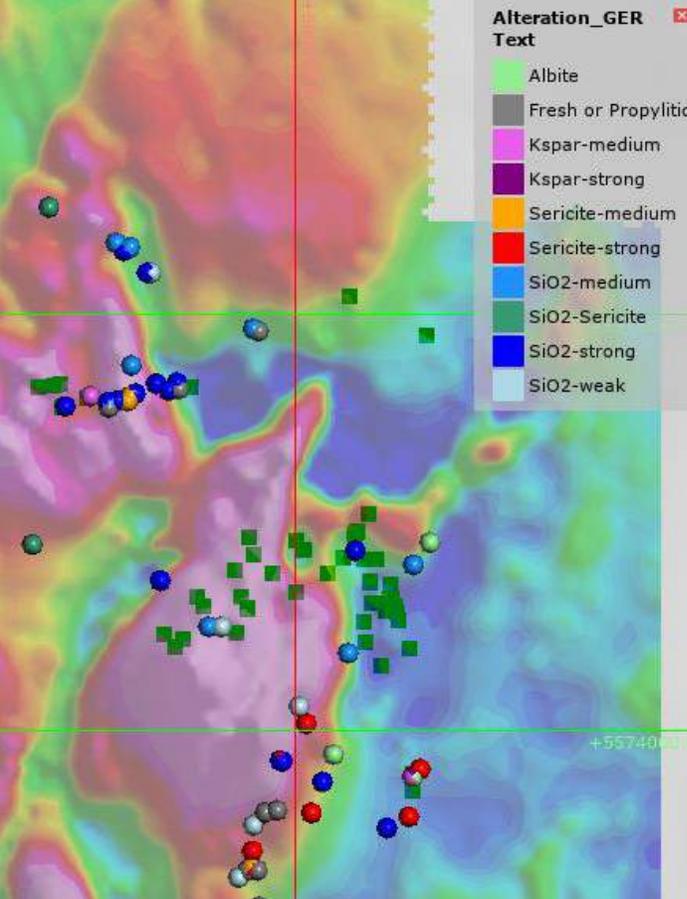
Corridor can be extended for at least 130 km along strike by combining density of showings with structural mapping from the BCGS.

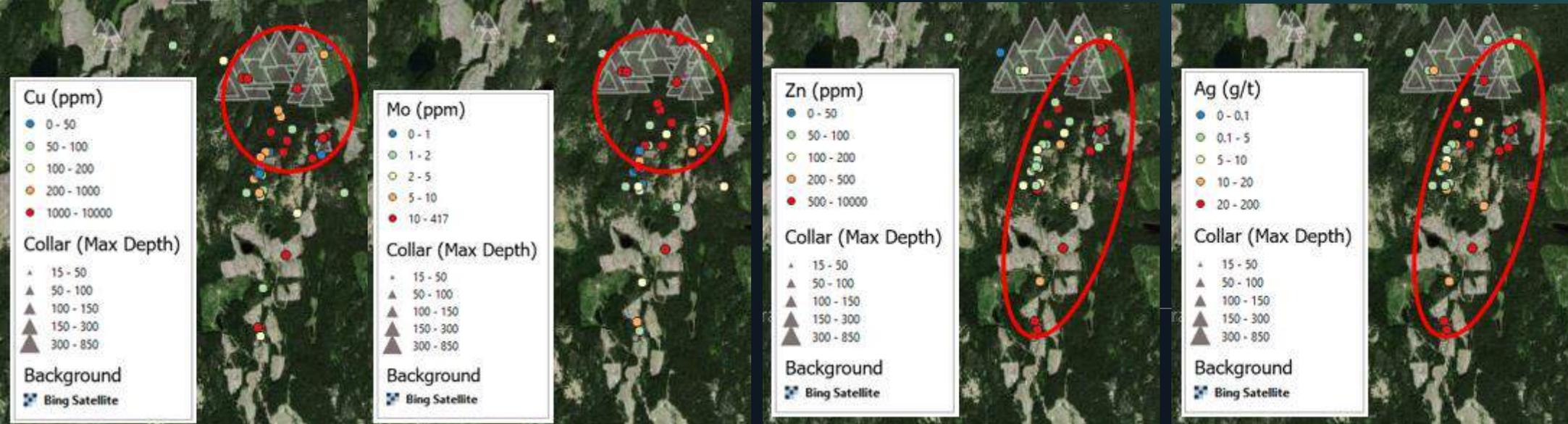
\*Data from BC Minfiles.



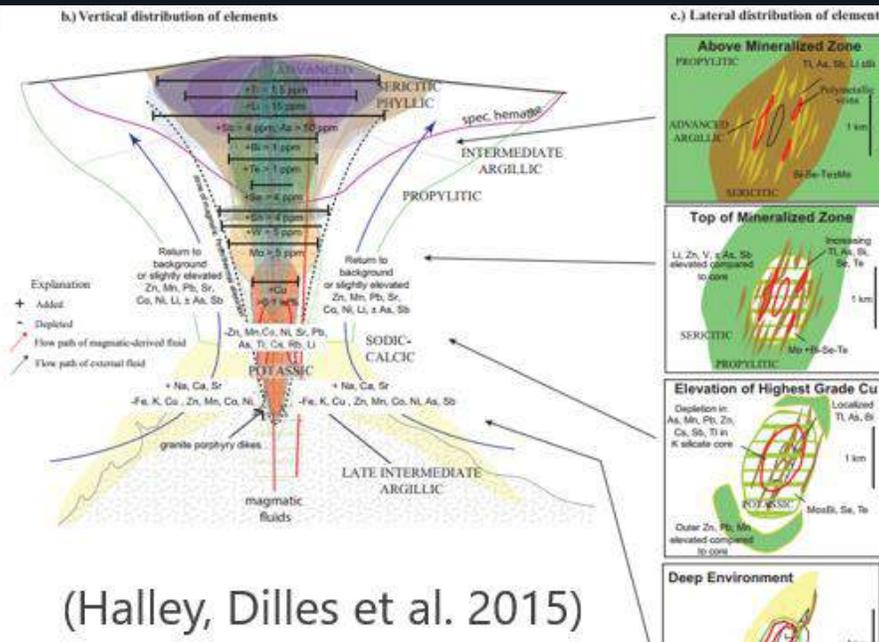
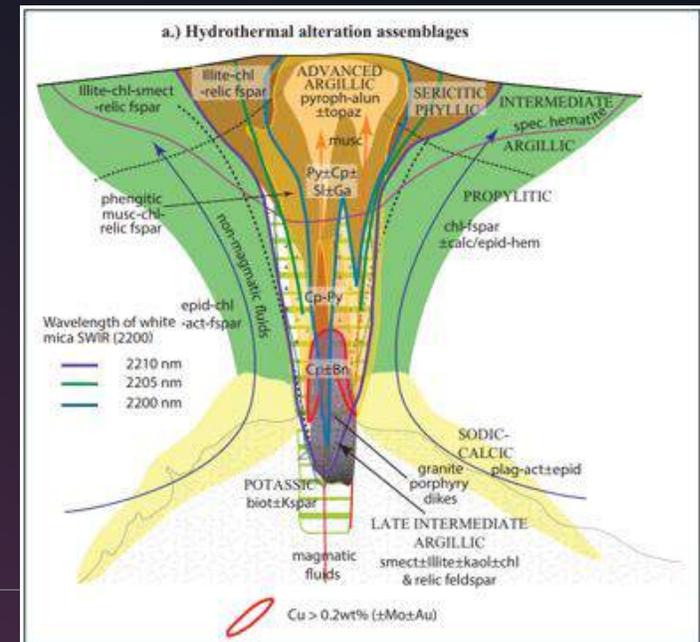
# Alteration Patterns in Rock Geochemistry

- Green squares show historic collar locations for reference. TMI raster as background.
- Leached or siliceous compositions are predominant in the area of historic drilling, and more sericitic chemistry becomes increasingly common to the south.
- Area around the TMI anomaly (likely batholith) broadly anomalous in Mo values.





# Pathfinder Patterns in Rocks



(Halley, Dilles et al. 2015)

**TABLE 1. Typical Pathfinder Elemental Ranges (ppm)**

Metal	Average crust abundance <sup>1</sup>	Potassic	Deep sericitic	Shallow sericitic
Cu	75	>200-ore	100	50
Mo	1	0.5-ore	2-20	0.5-5
Sn	2.5	0.5-10	2-30	bkgd
W	1	bkgd	2-20	0.5-5
Mn	1,400	<bkgd	1,000-5,000	400-1,000
Zn	80	<bkgd	200-1,000	10-100
Pb	8	50	200-1,000	10-100 <sup>2</sup>
Ag	0.08	0.5-3	1-50	1-10 <sup>2</sup>
Ni	20	<bkgd	bkgd-30	<bkgd
Co	10	<bkgd	bkgd-20	<bkgd
Se	0.05	5-20	1	1
Te	0.001	0.1	1-5	0.1-1
Bi	0.06	0.05	1-10	0.05-1
As	1	<bkgd	10-50	50-1,000
Sb	0.2	<bkgd	1-3	3-100
Li	13	<bkgd	<bkgd	15-50
Tl	0.36	0.2	0.2	1-50
Hg	0.08	0.05	0.05	0.2-10
Cs	1	<bkgd	1-10	1-20

<sup>1</sup>Background concentration (bkgd) varies by rock unit; this is the average crustal abundance (Ni and Co = average upper crust; Taylor and McLennan, 1985); alteration zones are potassic from ore zone, deep sericitic above ore zone, and shallow sericitic and associated advanced argillic near surface

<sup>2</sup>Autunite is commonly enriched in Pb, Ag, Ba, and Sr in advanced argillic alteration

**FIGURE 1. a.)** Vertical cross section of a typical porphyry Cu deposit showing distribution of hydrothermal alteration and sulfide minerals. Also shown are generalized contours of the 2,200-nm peak measured in SWIR instruments.

**FIGURE 1. [Cont.] b.)** Vertical variations in trace elements in a porphyry Cu system. c.) Schematic changes in hydrothermal alteration assemblages and trace elements through a porphyry Cu system viewed as a series of map views through a vertical system.

## Alteration (GER-based) in 2013 Rock Geochemistry

Sparse 2013 GC  
But resembles S to P  
Area chemically (?).

Sericitic to  
Potassic Level  
w/ Ag/Zn/Pb  
overprint

Advanced Argillic/  
Epithermal Level

Deep, barren  
Potassic Level

Sericitic  
(phyllic) Level

### Alteration (GER)

- Fresh or Propylitic
- SiO<sub>2</sub>-weak
- SiO<sub>2</sub>-medium
- SiO<sub>2</sub>-strong
- SiO<sub>2</sub>-Sericite
- Sericite-medium
- Sericite-strong
- Kspar-medium
- Kspar-strong
- Albite

### Collar (Max Depth)

- ▲ 15 - 50
- ▲ 50 - 100
- ▲ 100 - 150
- ▲ 150 - 300
- ▲ 300 - 850

### Background

Bing Satellite

# Alteration vs Pathfinders

Based on the 2013 rock Geochem viewed via pathfinders and contextualized by GER alteration classification we can propose the broad strokes of a hydrothermal system model.

Western side (purples): Cu, Mo, and sericitic alteration suggest transition from phyllic toward a potassic assemblage. To the southeast samples have a stronger potassic signature but less metal, suggesting a deep, barren level in the porphyry model. Ag, Zn, and Pb overprints the area (a later event perhaps, base metal distal veins from a distinct, later center?).

Eastern side (blue to red): very siliceous, altered rock in the north, resembles advanced argillic, transitions southward into an area with phyllic characteristics. Looks as though previous operators were strongly focused on the transition zone (looking for epithermal Au most likely). Again, this area contains abundant Ag, Zn, and Pb, suggesting overprinting.

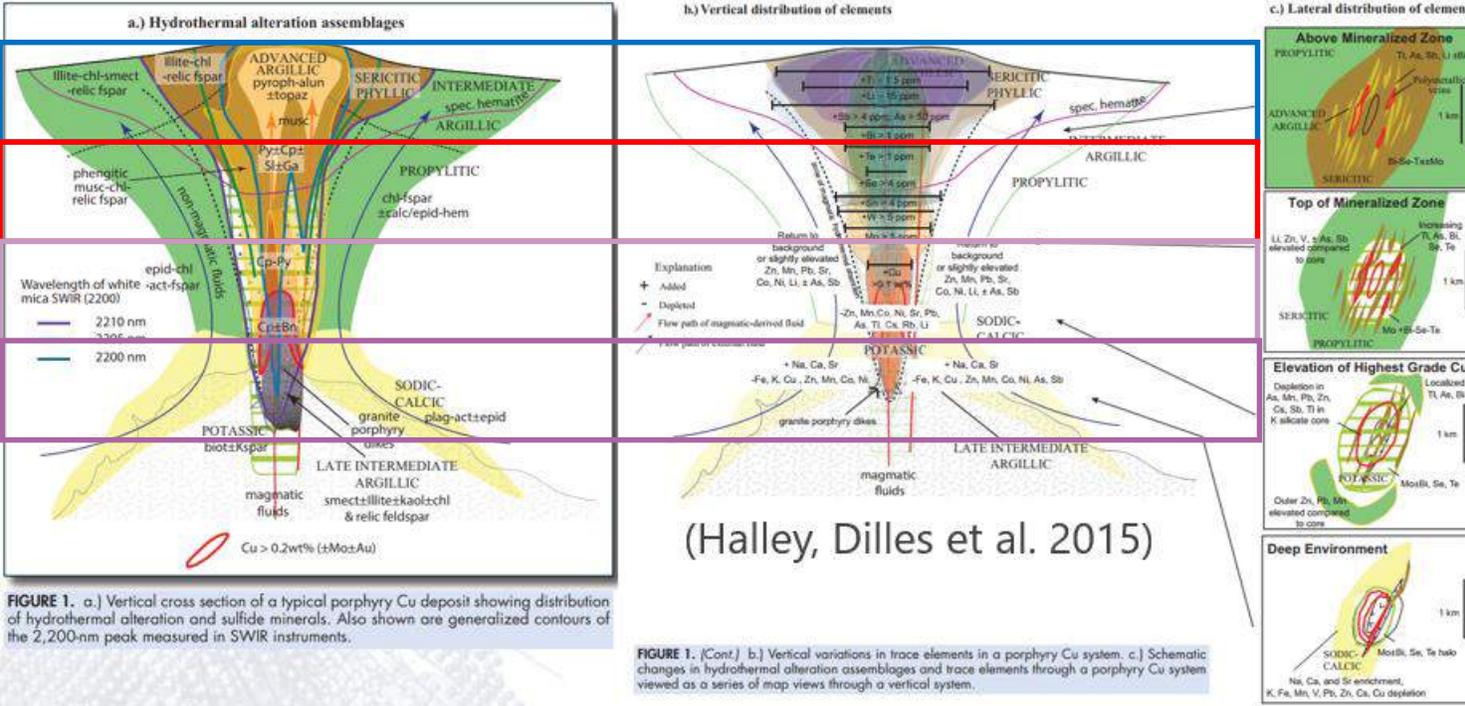
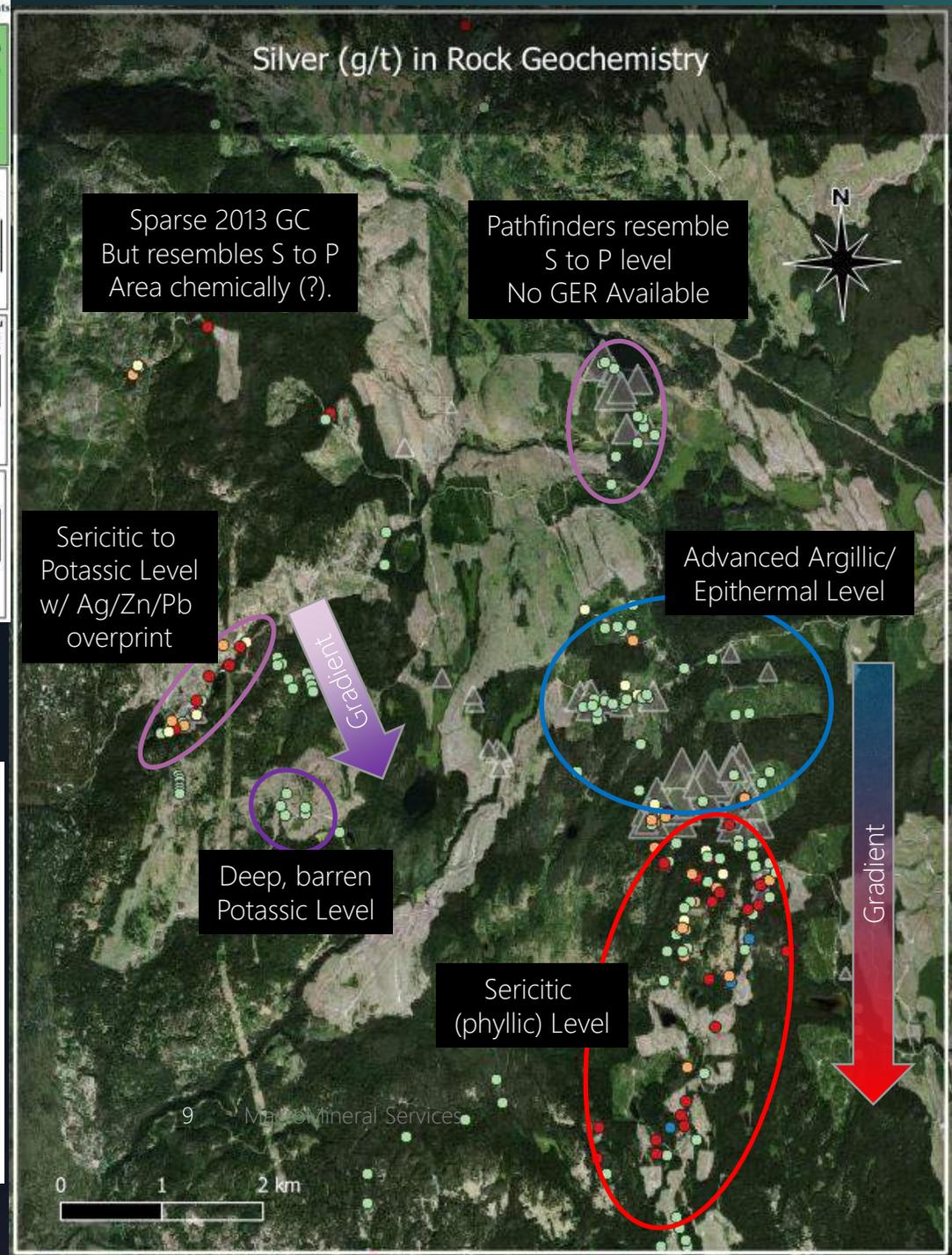
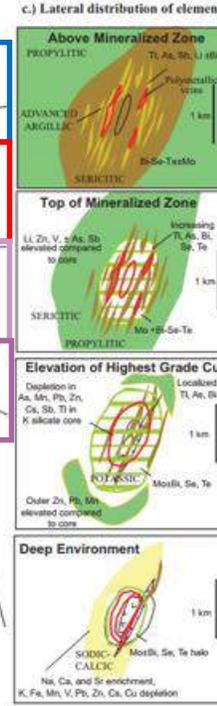


FIGURE 1. a.) Vertical cross section of a typical porphyry Cu deposit showing distribution of hydrothermal alteration and sulfide minerals. Also shown are generalized contours of the 2,200-nm peak measured in SWIR instruments.

FIGURE 1. (Cont.) b.) Vertical variations in trace elements in a porphyry Cu system. c.) Schematic changes in hydrothermal alteration assemblages and trace elements through a porphyry Cu system viewed as a series of map views through a vertical system.



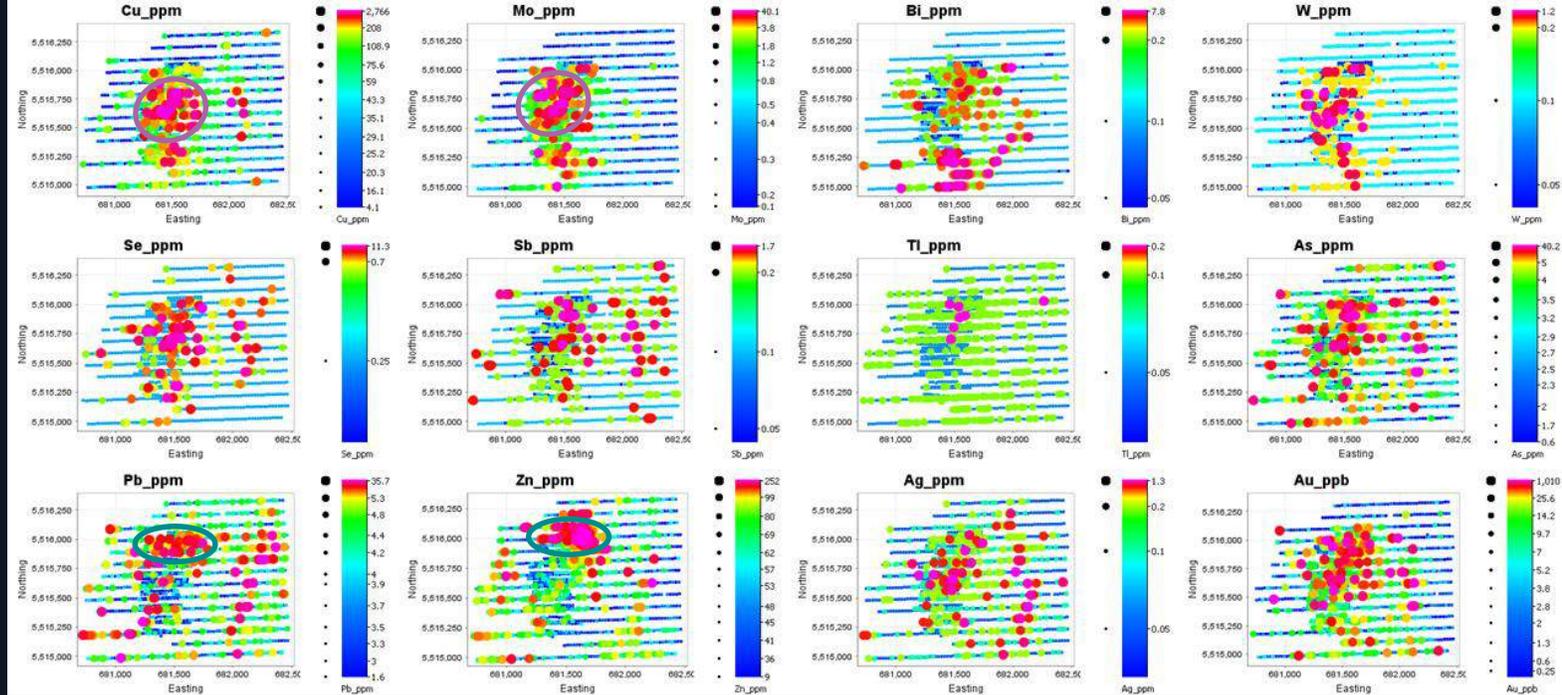
# Rock Geochemistry

- Pathfinder response of drilled area in the NE resembles a sericitic to potassic level like that seen in the west. Check drillhole data to validate.
- Must consider structural influence on patterns (some very elongate patterns at work).
- Very compelling gradients observable in terms of alteration chemistry.
- Given the scale of the area, gradients and transitions most likely represent distinct centers exposed at distinct system levels... cluster scenario.
- Unusual combinations of Ag/Pb/Zn in conjunction with Cu/Mo in places suggests overprinting of events (or an unusual hydrothermal system).

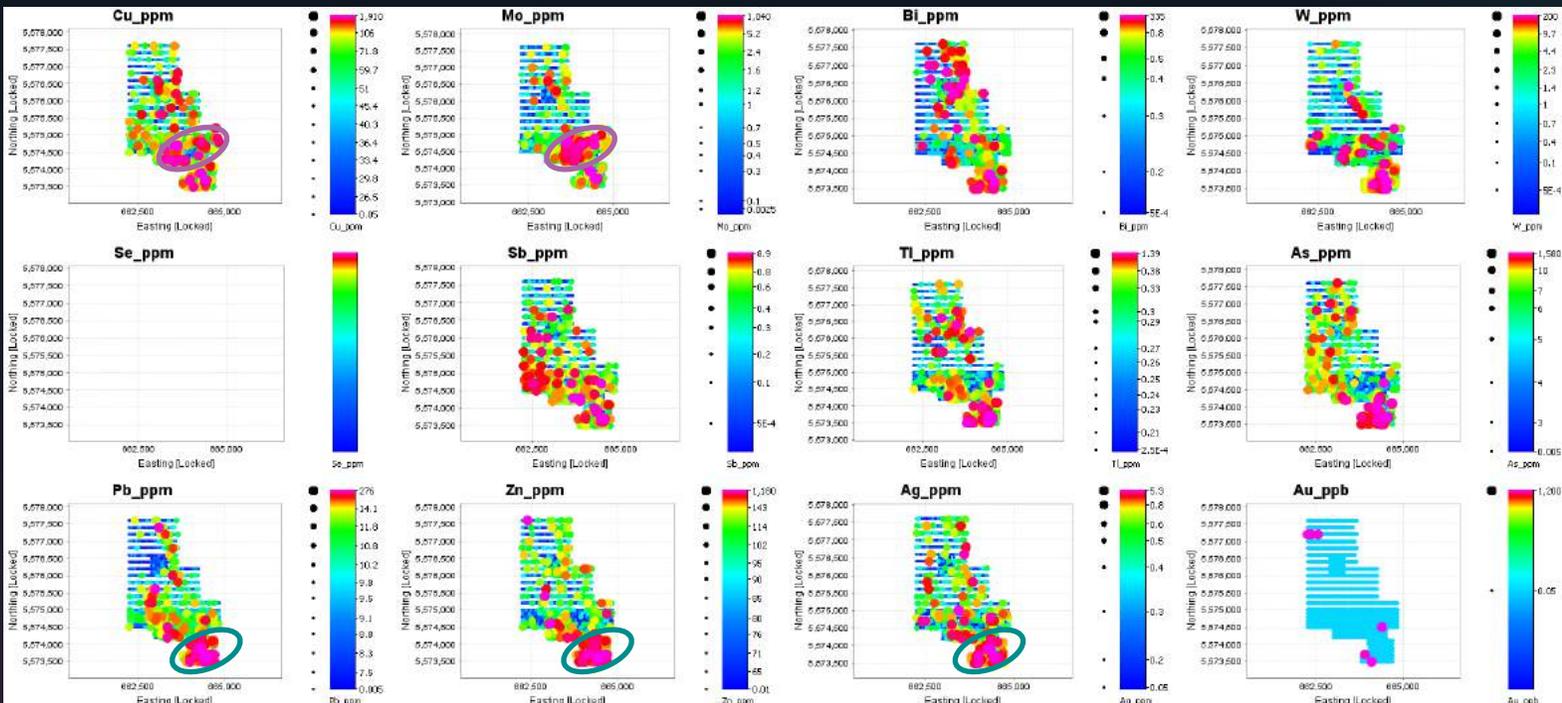
Ag (g/t)	
●	0 - 0.1
●	0.1 - 5
●	5 - 10
●	10 - 20
●	20 - 200
Collar (Max Depth)	
▲	15 - 50
▲	50 - 100
▲	100 - 150
▲	150 - 300
▲	300 - 850
Background	
Bing Satellite	

# 2013 Soil Survey vs Primer Soils

Primer

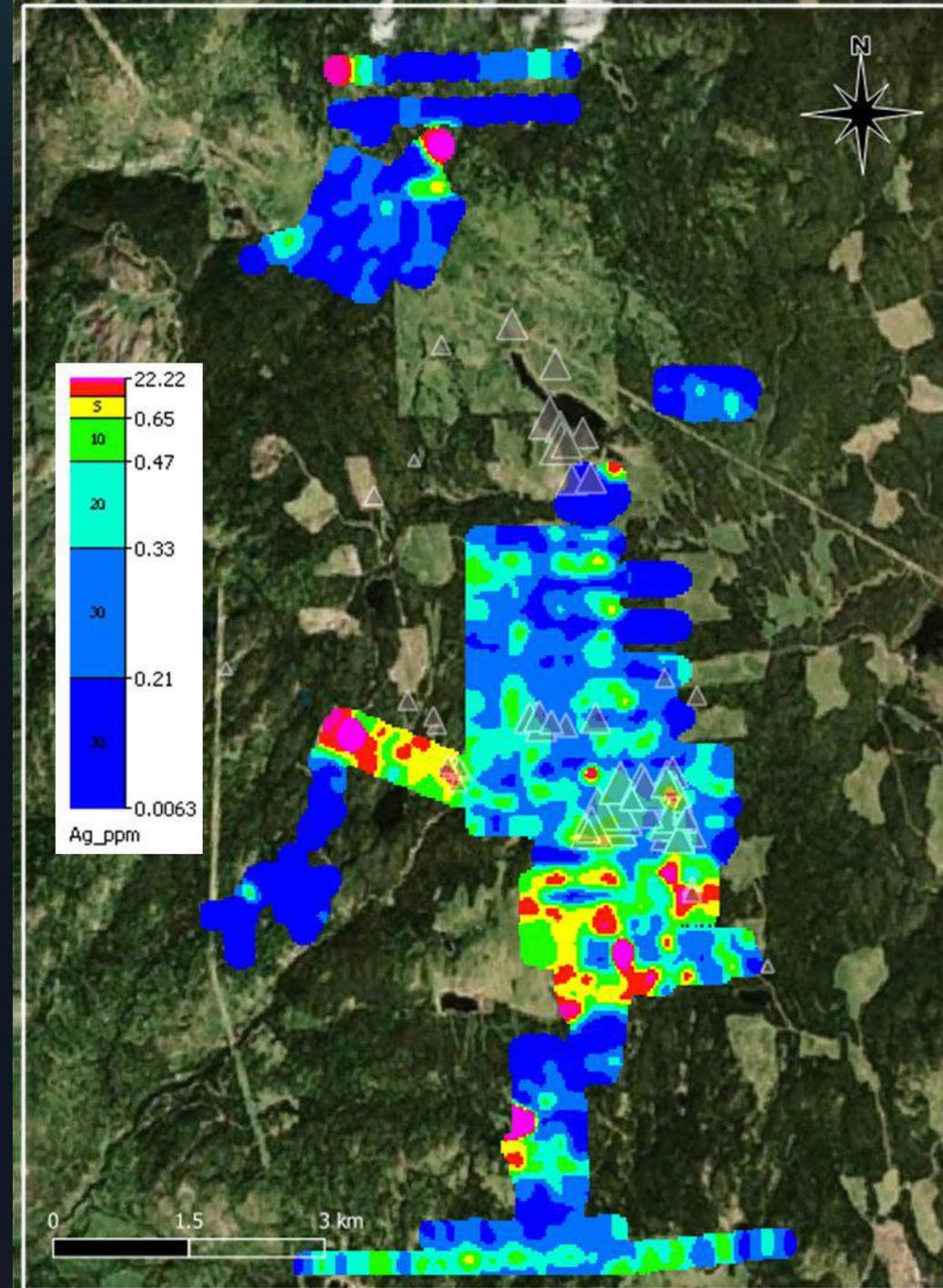


- Similar scales of anomalism.
- Some interesting parallel results in the sense that Primer shows a central Cu-Mo anomaly with a base metal anomaly to the north and the drilling area of LM shows a Cu-Mo anomaly with a base metal anomaly to the south.
- Base metal and silver tenor is much higher in Lucky Mike, perhaps to be expected in a skarn scenario (higher reactivity in carbonate units)
- Note that the LM anomalies are open in the south.



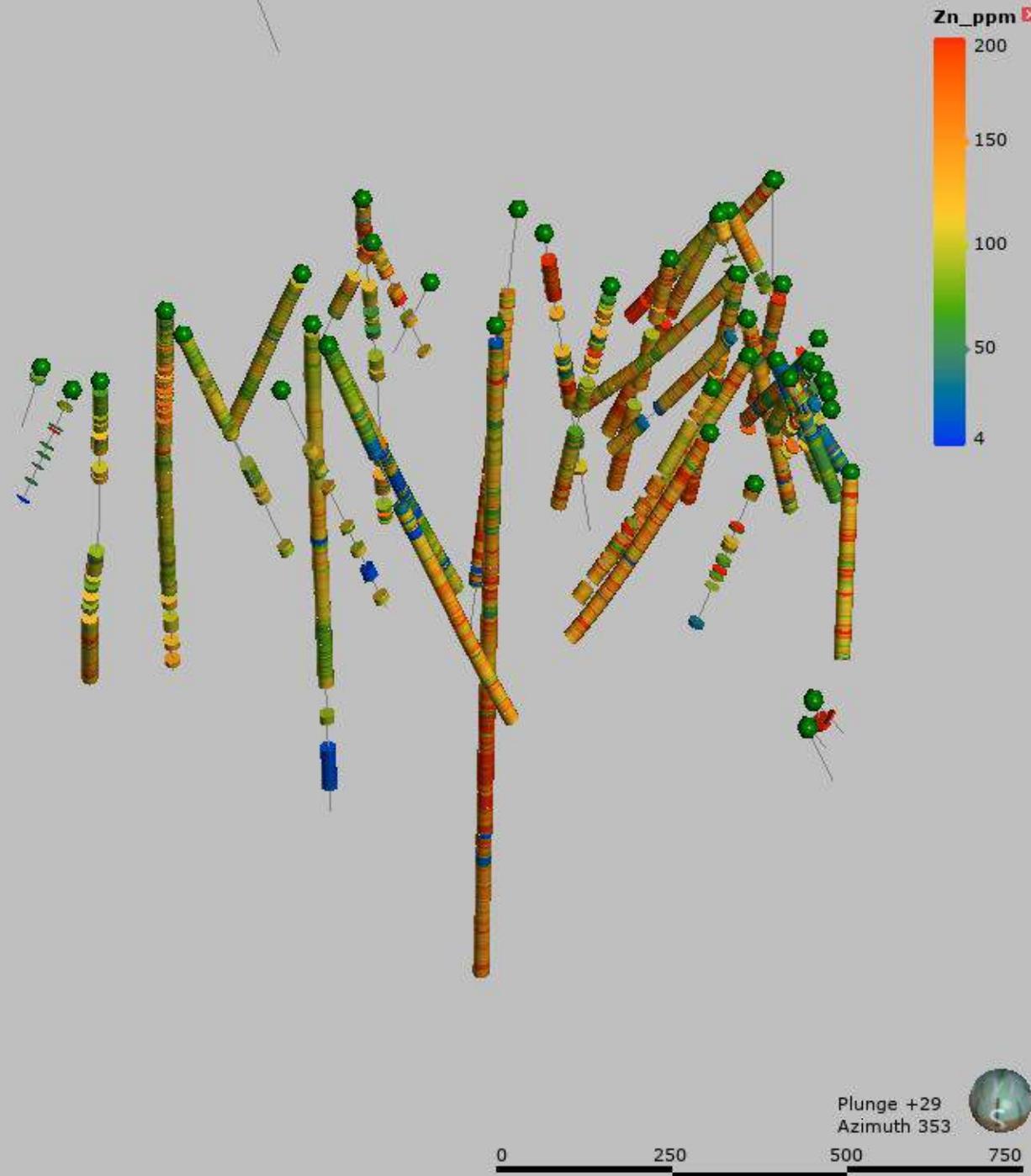
# Soil Geochemistry

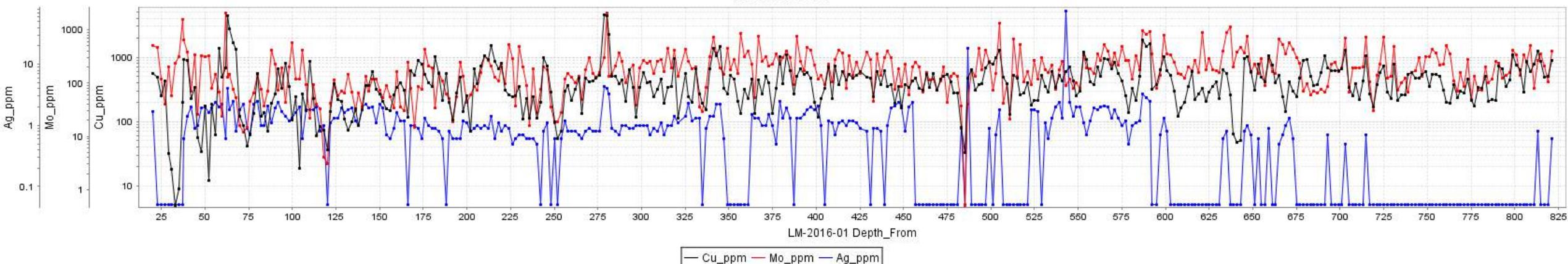
- Gridded composites from pathfinder elements which appeared to be comparable between surveys at right.
- Note that the main drilled area corresponds well to Mo anomalism. Mo values are extremely high in drillhole assays.
- Ag and Zn are higher to the south, which perhaps led to the prior workers constraining the system. Rock geochemistry contradicts this as a distal representation, however (more sericite southward). Likely the increased Ag and Zn values are driven by skarnification effects in the Ashcroft carbonate sediments. In that context I'd see the Ag/Zn as less of a constraint.
- Definite NNE grain to anomalism, fits well with structural interpretation derived from magnetics.



# Drillhole Geochemistry

- There are some tremendous Mo values in here. No rhenium in the assays but we can likely assume that it is way above background as well. Not sure how the market for Mo and/or Rh is currently. Mo generally higher on the west side so that may be giving us a vector.
- Cu is anomalous but doesn't reach economic grades in any of the assayed intervals.
- Ag is getting towards 2 grams in places but surprisingly low given how much is in the surface geochemistry. Probably a function of "high grading" rock samples at the surface.
- Zn looks like a high background (around 150-200 ppm) but As and Pb are generally low (insignificant values).



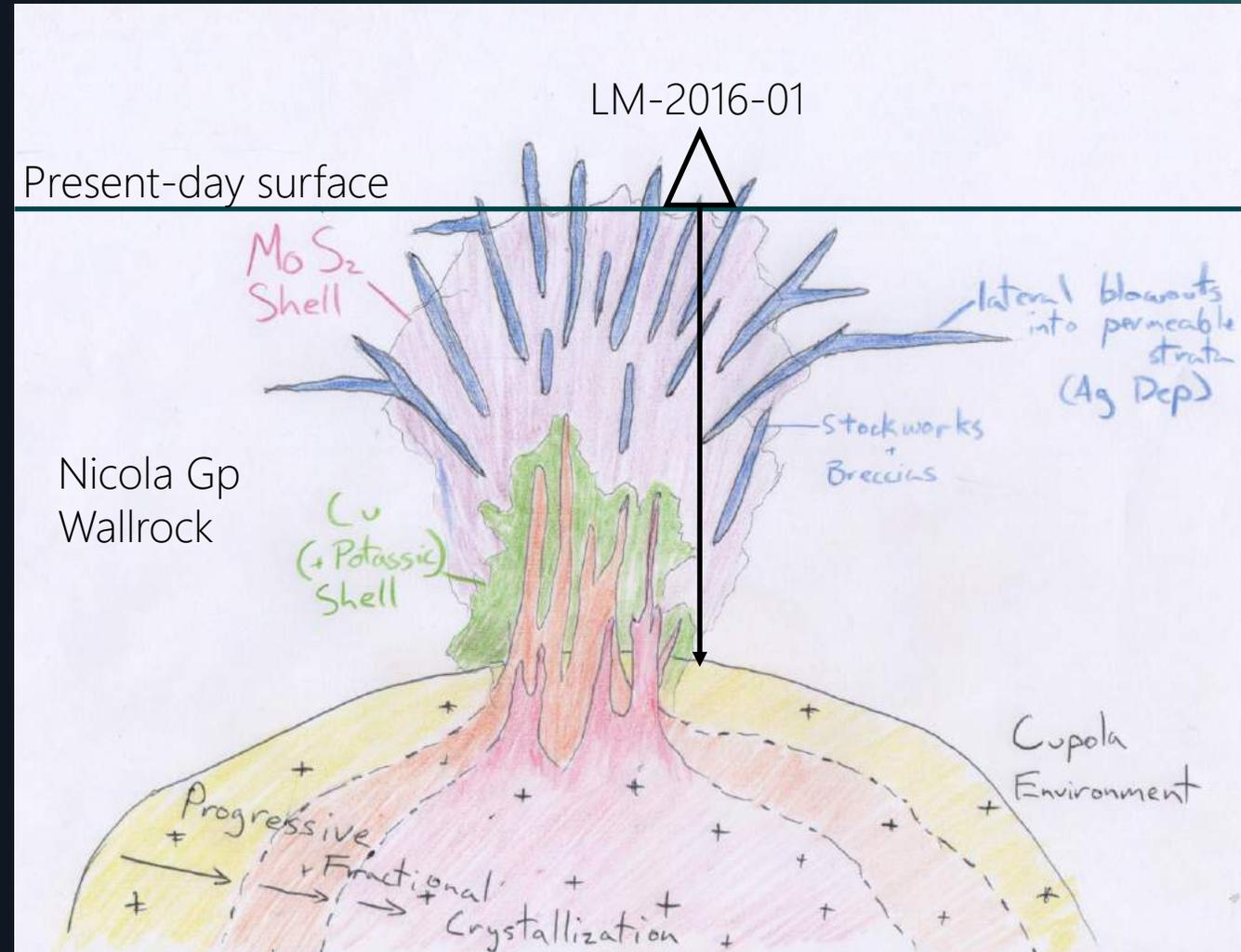


# LM-2016-01 Observations

- Deepest hole in the area, hence the focus on it.
- Reading through the log for this hole it's evident that the operator did clip a porphyry-type hydrothermal system.
- Based on the erratic zonation patterns I'd suggest that they drilled along the margins of the system, clipping mixed alteration zones, and a couple of dykes deeper down. Vertical drillhole so a vertically oriented system can produce that effect.
- Alteration assemblages are mainly chlorite-epidote and/or chlorite-actinolite, with frequent intercepts of stockwork quartz (+/- MoS<sub>2</sub>) veining and "solution" breccias. There's an observation of sericitic vein halos around 489-499m which is encouraging and suggestive of a phyllic assemblage.
- Numerous observations of potentially potassic alteration at depth but not consistent or well-zoned, again suggesting a drill path beside the principal system.
- Lots of mention of magnetite in association with chalcopyrite... Ajax and Primer both mention magnetite as ore gangue so perhaps this is a common feature between deposits in the region.
- Molybdenite is observed frequently and is extremely high in assays. Interesting how Ag begins to taper off around 600m.

# Drillhole Observations

- LM-2016-01 is an interesting read. The logging geologist notes long intercepts with molybdenite mineralization and local chalcopyrite, and lots of stockwork veining.
  - Porphyry-type alterations are observed in a few places, most notably a 10m sericitic intercept and a few observations of what may be potassic alterations.
  - Chlorite-epidote and chlorite-actinolite alteration are observed regularly. In some camps this would be viewed as the deeper parts of a system (sodic-calcic assemblage) due to the presence of actinolite, but I would disagree and suggest that a saline propylitic alteration can also produce actinolite.
- 
- In a VERY schematic way, we can imagine the surface molybdenum and silver, base metal anomalism at surface explained by the erosional level placed on a system like that at right.
  - In LM-2016-01, the erratic alterations and transition away from Mo and into higher copper at depth would be consistent with the same model.
  - Probably overdid the stockwork/breccias (dark blue) but you get the idea.



# Drillhole Observations

- Overlaying the molybdenum values in drilling on the conceptual model makes a compelling case for the centre being nearby, to the SW.
- This also fits with Mo anomalism in soils.
- So I'd suggest that LM-2016-01 grazed our system on the NE side and the holes further to the SW didn't go deep enough.

**Colour**

**Mo\_ppm Progressive Half**

- Mo\_ppm to 26 [50.00%]
- Mo\_ppm to 108 [75.00%]
- Mo\_ppm to 206 [87.00%]
- Mo\_ppm to 301.3 [93.00%]
- Mo\_ppm to 534 [98.00%]
- Mo\_ppm to 4000 [100.00%]

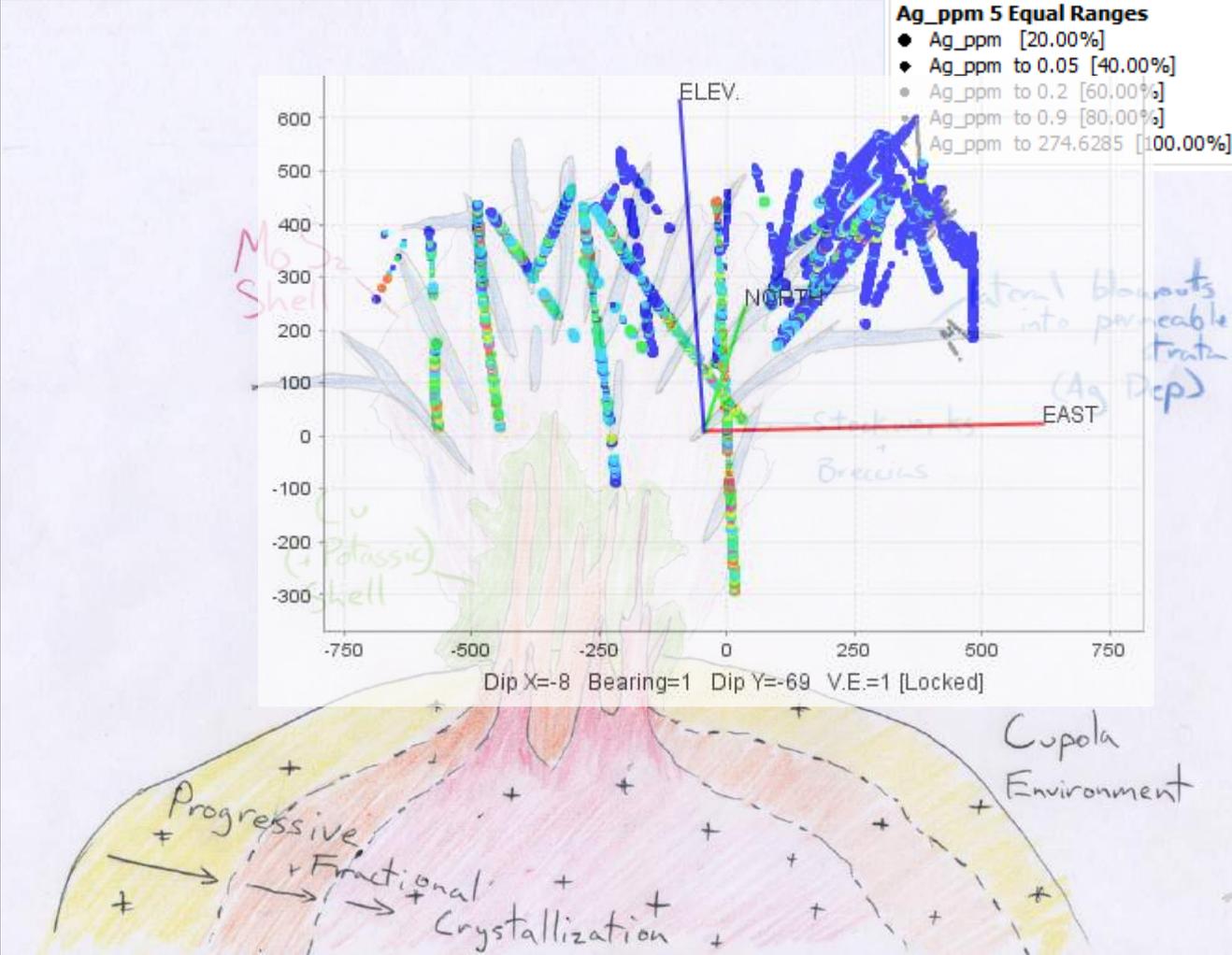
**Shape**

- Default Shape

**Size**

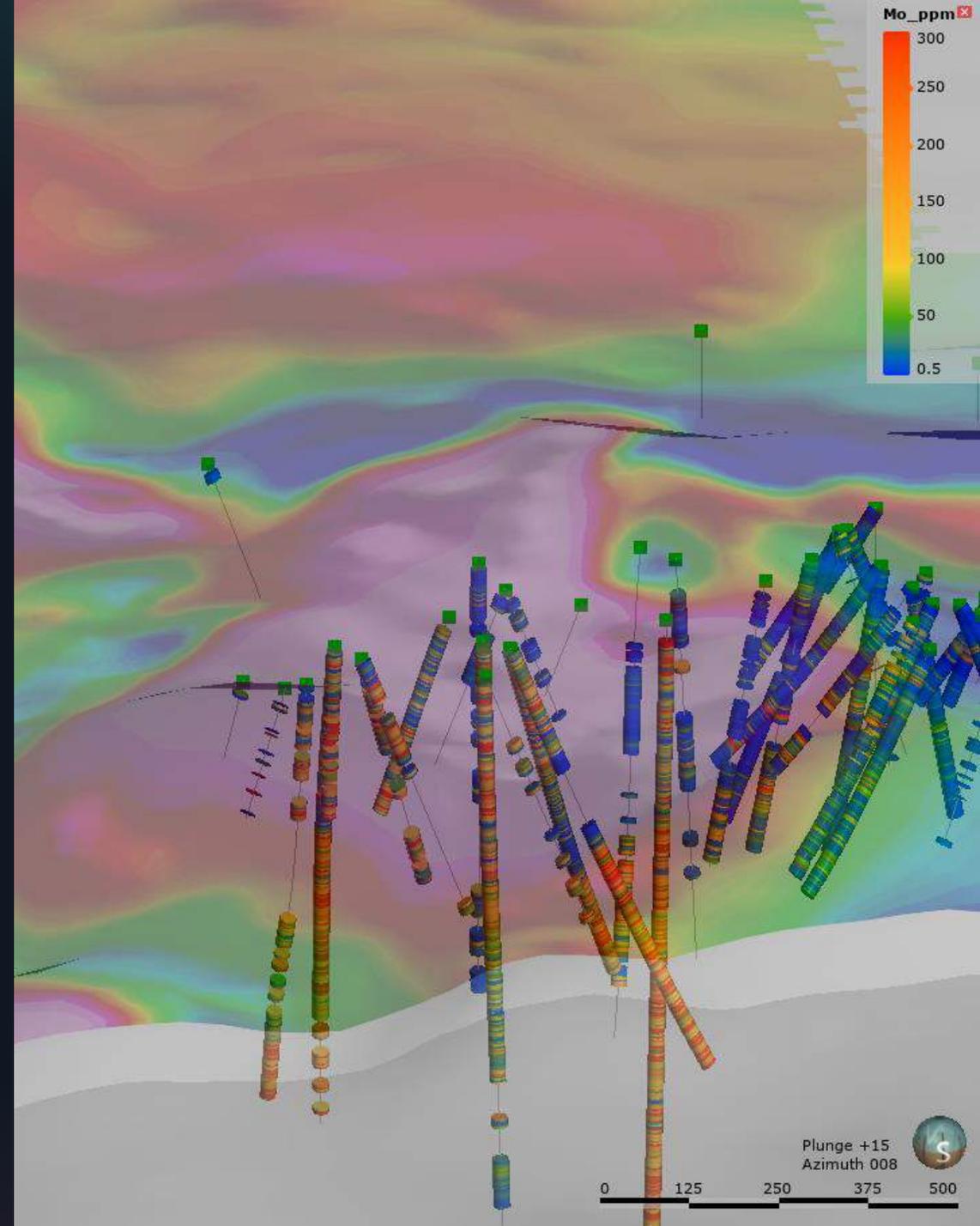
**Ag\_ppm 5 Equal Ranges**

- Ag\_ppm [20.00%]
- Ag\_ppm to 0.05 [40.00%]
- Ag\_ppm to 0.2 [60.00%]
- Ag\_ppm to 0.9 [80.00%]
- Ag\_ppm to 274.6285 [100.00%]



# Synthesizing with Mag

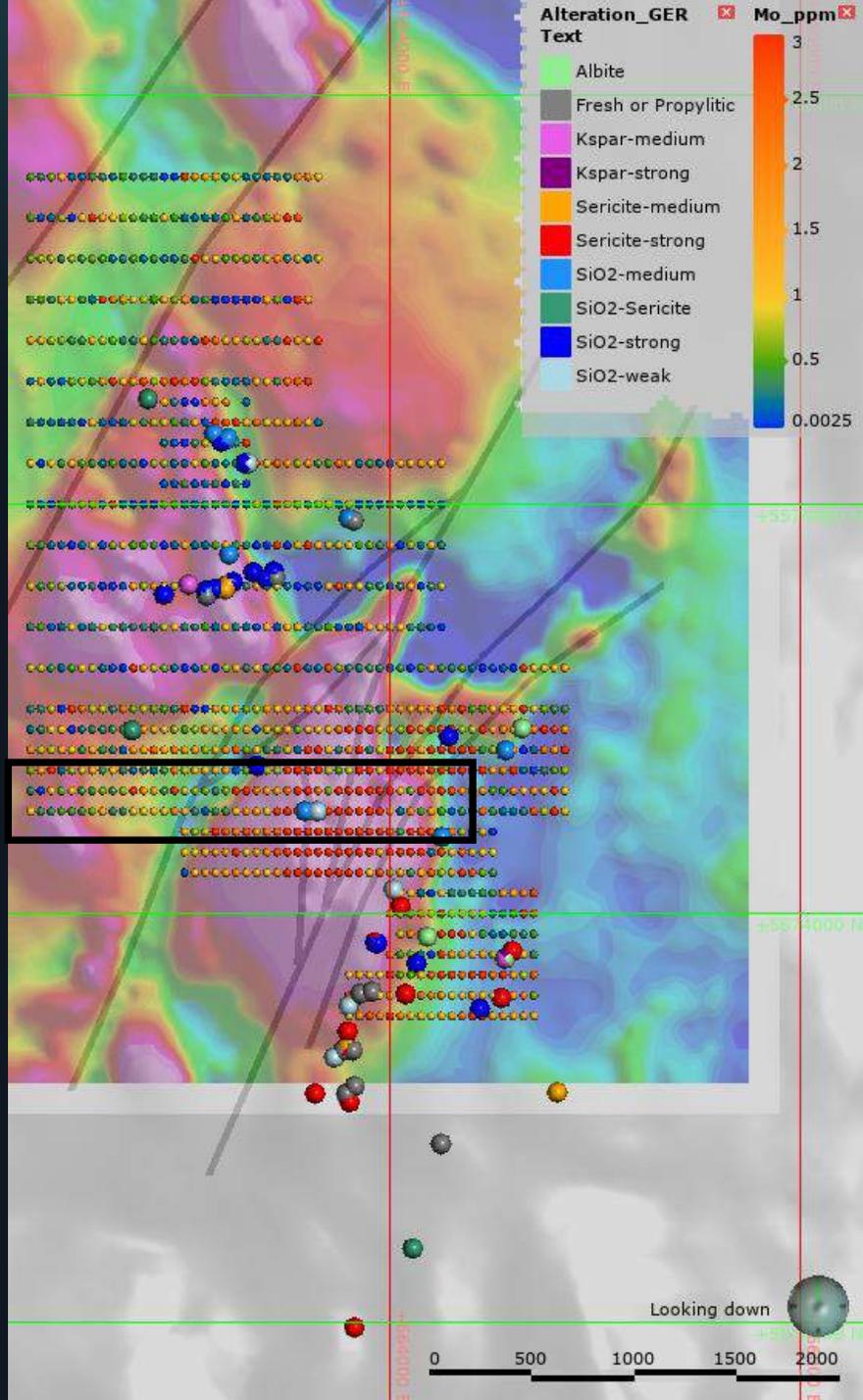
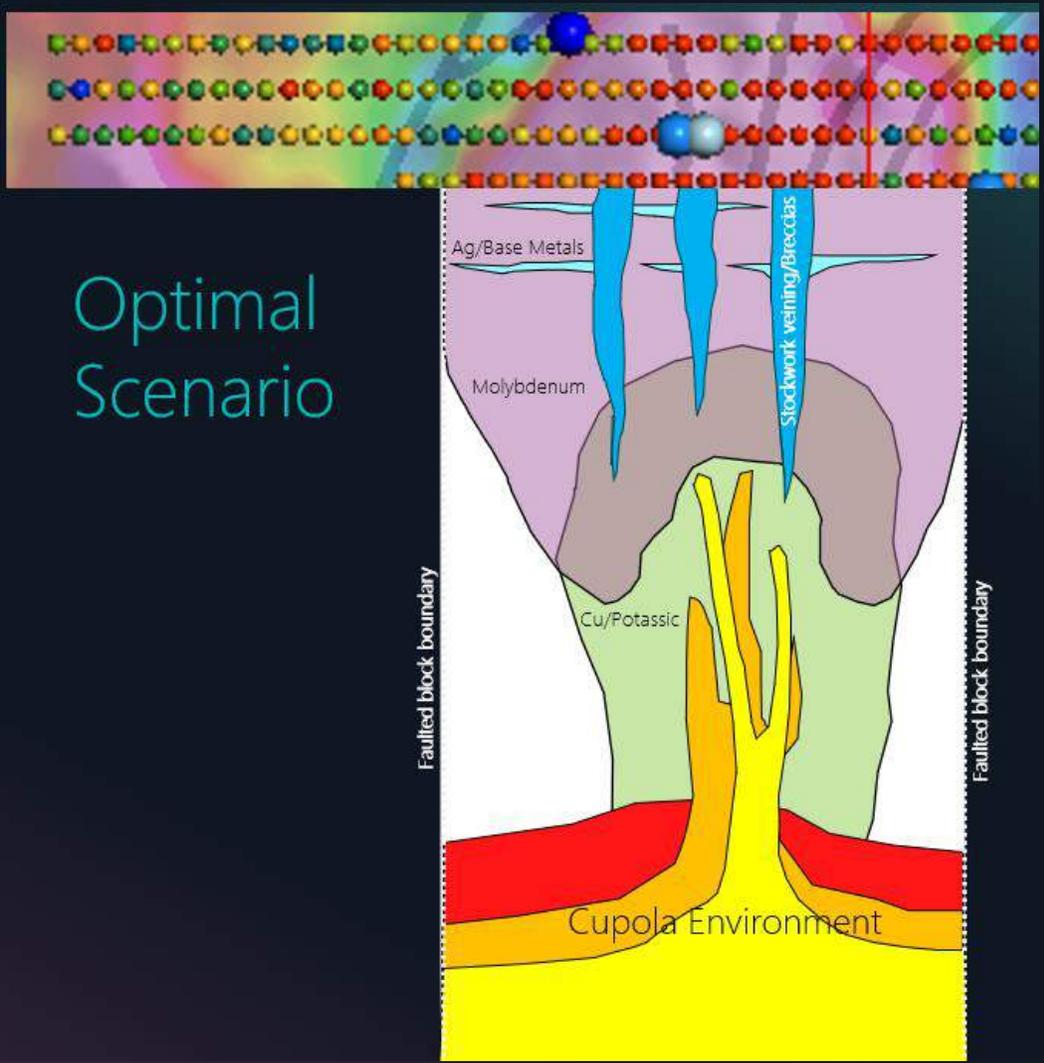
- Correlation with the TMI feature and Mo at surface is excellent.
- Constrained with magnetics, LM-2016-01 still looks like its at the edge.



# Further Synthesis

- 2013 soils grid.
- 2016 rock geochemistry as large points, GER alteration.

- Conceptually we can explain most of the datasets with either of the two models at right.
- Hypothetically a hydrous batholith, slowly cooling, without the appropriate compression above it maintain circulation could generate polymetallic veins, skarns, and locally high metal values. This sort of smoke would be captured above the batholith and conducted out into the NNE-trending structures. So from an economic perspective this is the model to disprove.
- Ideally our batholith had enough compression above it to fractionate for a long period of time and circulate fluids without degassing and dispersing metals. The presence of breccias and stockwork veining supports this... a 'farty' batholith would be unlikely to overpressure enough to generate stockwork veining and brecciation above it.



# Conclusions



Cluster play: Geochemical signals throughout the area are consistent with a series of hydrothermal centers at varying levels of exposure at surface, ranging from the lithocap/advanced argillic environment down to a high temperature potassic level.

Located in a NW-trending large scale structural corridor which also hosts the Axe and Primer porphyry deposits. Interesting as a favorable architecture.

Porphyry-epithermal signatures are present but unusual in the distinctively high Ag values, which may represent 1) overprinting events or 2) reflect high host rock reactivity and skarn formation.

In the context of superimposed and genetically related skarn/porphyry systems the patterns observed could be explained adequately. Early base/precious metal-bearing fluids which normally form a more distal halo could be buffered and precipitated much closer to source and be preserved through the continuing porphyry event(s). In other words, carbonate horizons in the Nicola or Ashcroft would capture early base and precious metal fluids as skarns and the evolving system could generate sericite in volcanic facies of the Nicola in proximity to said skarns.

Historic drilling in the main area most likely focused on a very high level part of a porphyry system, within the molybdenite halo and with base and precious metal deposition as skarn and stratigraphic horizons. The underlying porphyry is likely roughly parallel to LM-2016-01 in terms of orientation and not far away (within a couple hundred metres at most, probably to the southwest).

# Recommendations



- **Surface works:**
  - sampling (soils on a 200m square grid, rocks where available), covering the historic drilled area but extending southward along the fault and encompassing the historic polymetallic and skarn showings.
  - alteration mapping in conjunction with soil sampling.
- **If it's possible to access historic drill cores:**
  - acquire SWIR data on all cores (ASD).
  - consistently relog all cores, or at least standardize existing logs. Ideally a single geologist or pair of geologists working closely together.
- **Geophysical:**
  - Extend electrical geophysics and magnetic coverage to the south. Invert both and look for the underlying porphyry patterns. Use this (plus the above) to 3D target deep, angled holes in the SW part of the main drilled area, and look for additional centres southward.



# SKETCHES

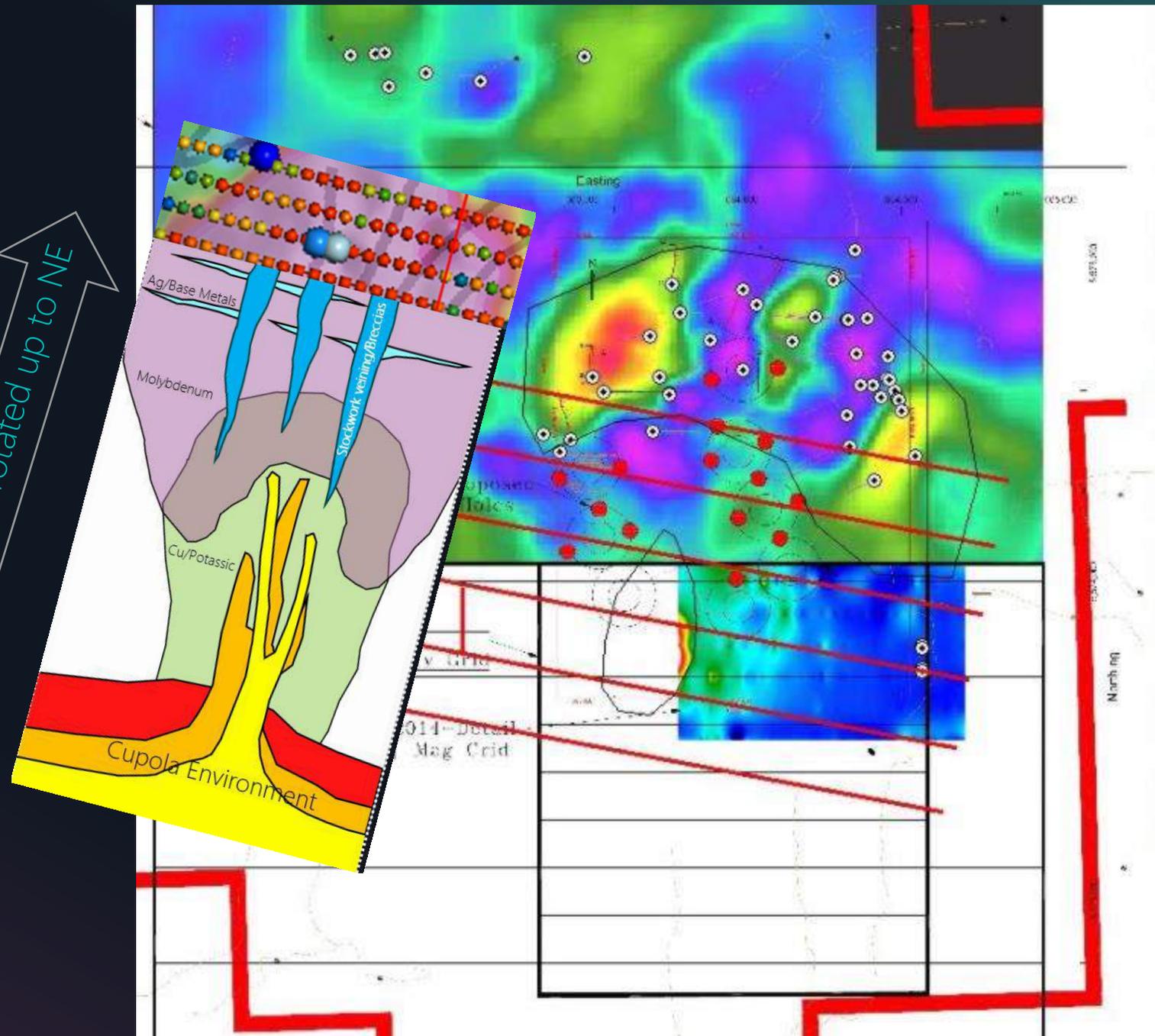
# NEW Concept

Large tilted system model.

Showing over compiled chargeability with drilling

Red lines proposed IP  
Red dots proposed drilling – will be adjusted based on new IP data

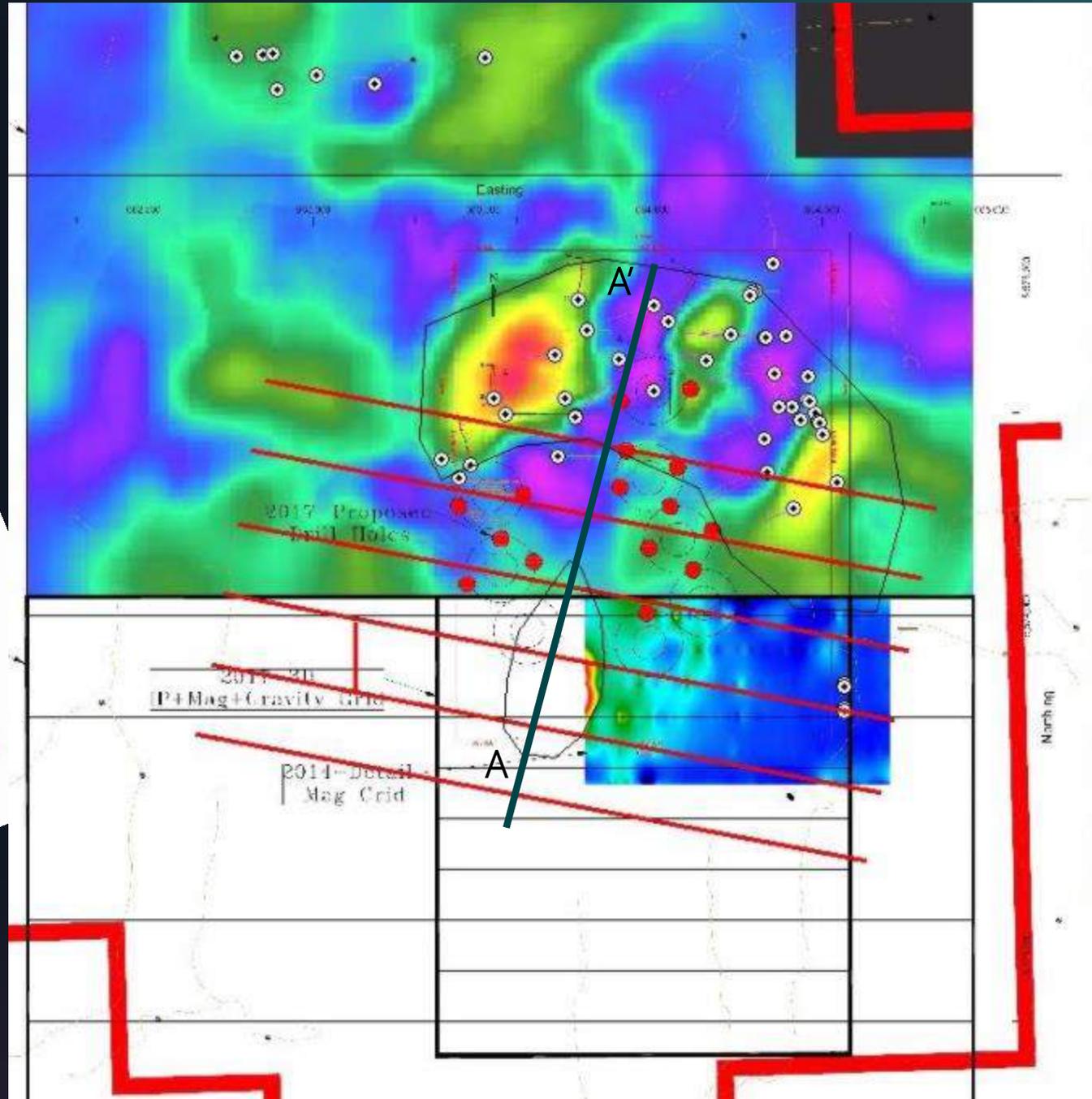
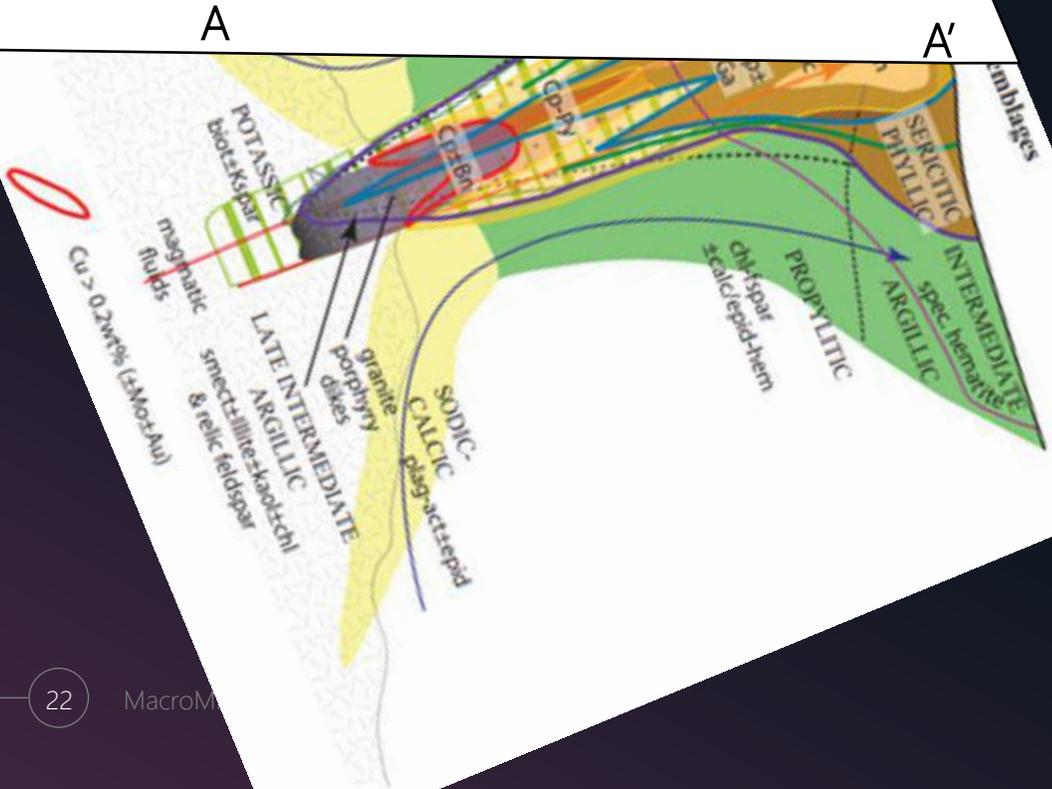
System rotated up to NE



# Potential Scenario

In another sense:

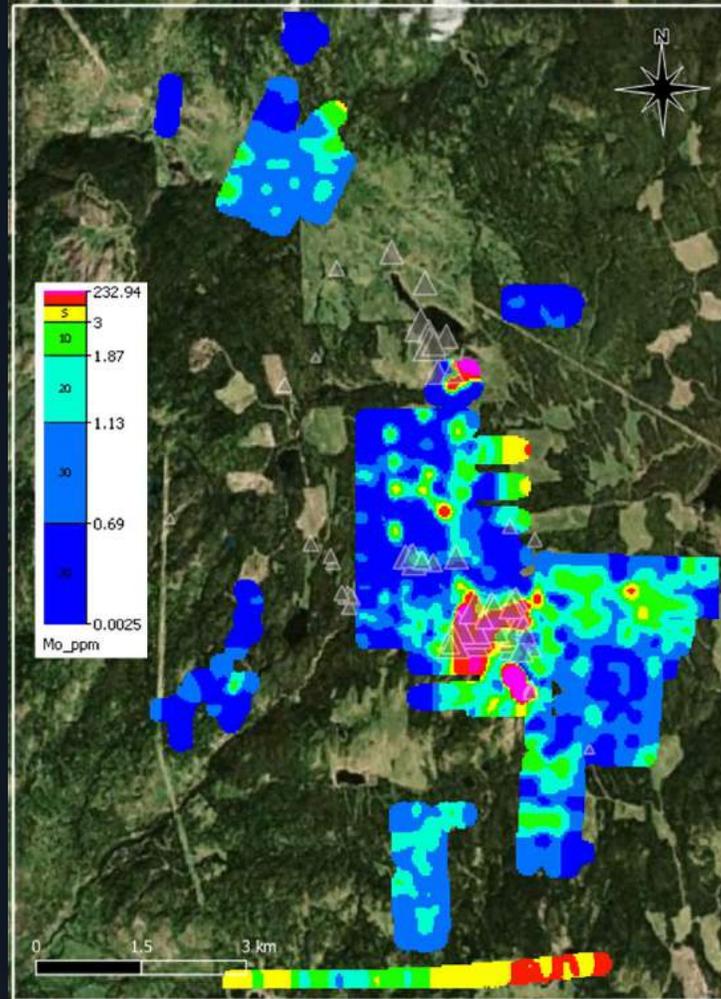
Looking toward WNW



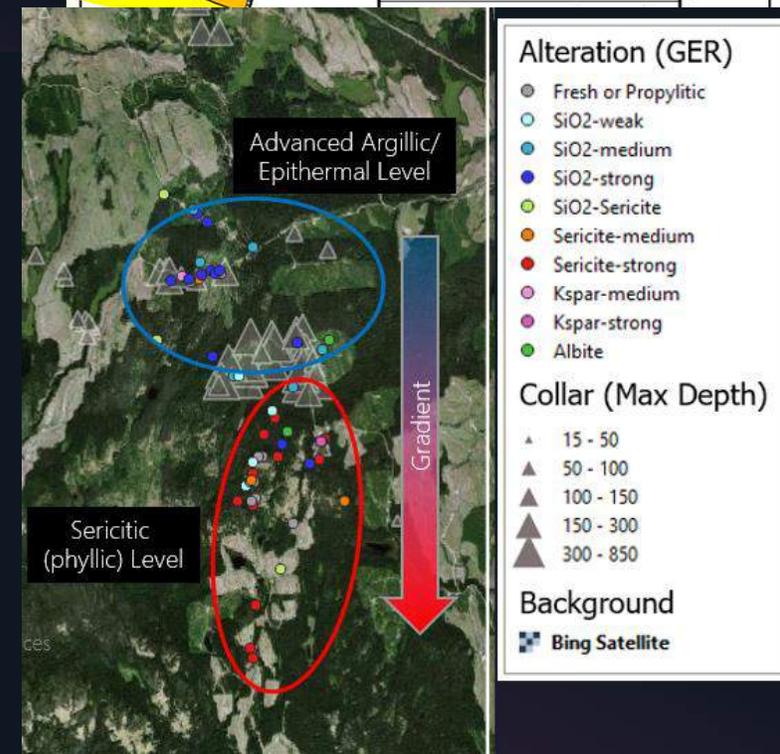
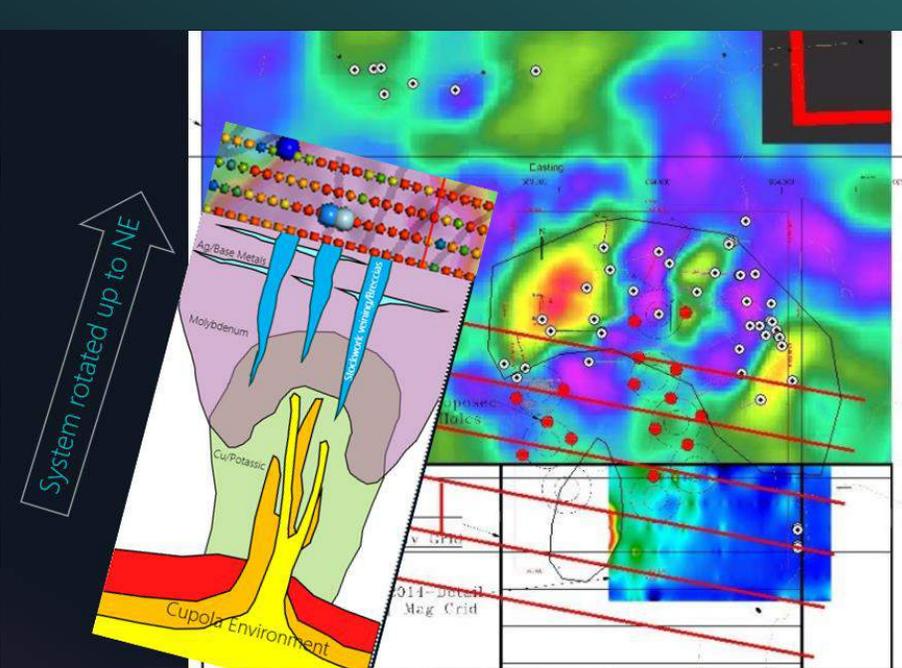
# NEW Concept: Favourable Evidence

Potential exists that the drilled area is high level. Abundance of Mo, rock Geochem points at SiO<sub>2</sub>, logged silicification, breccias, propylitic assemblages.

Fits very well with the gradient shown in GER alteration (2013 rock Geochem)



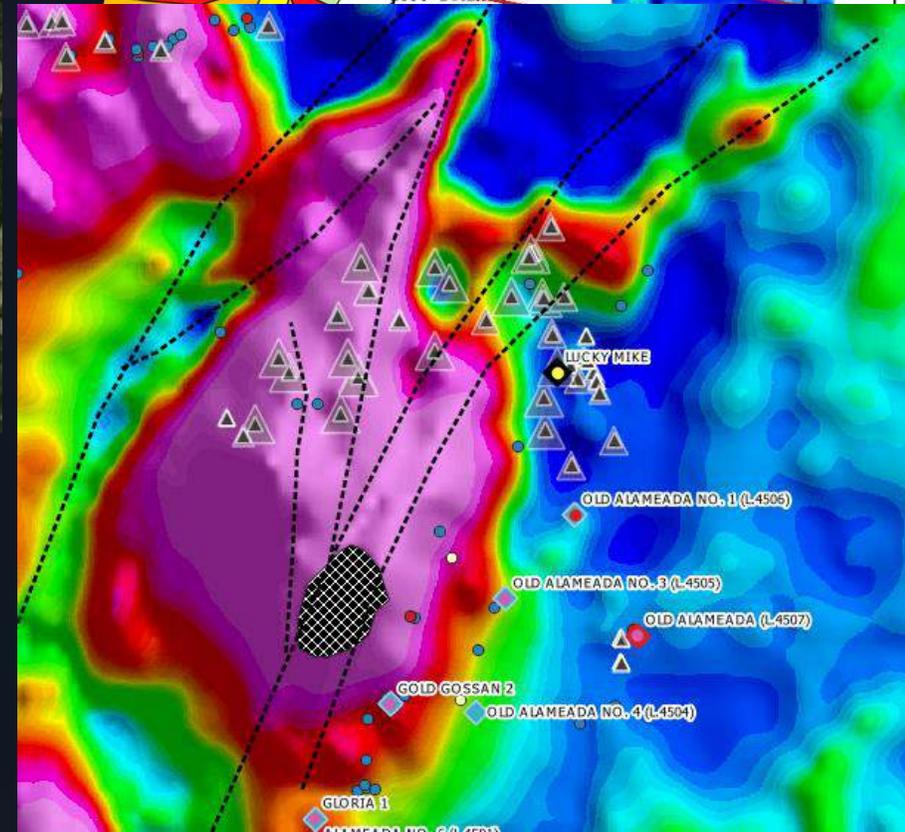
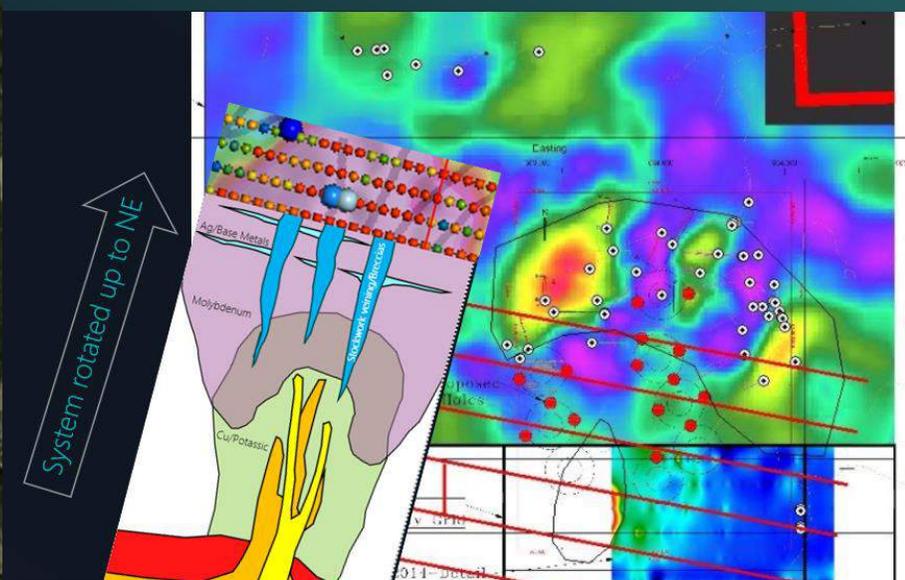
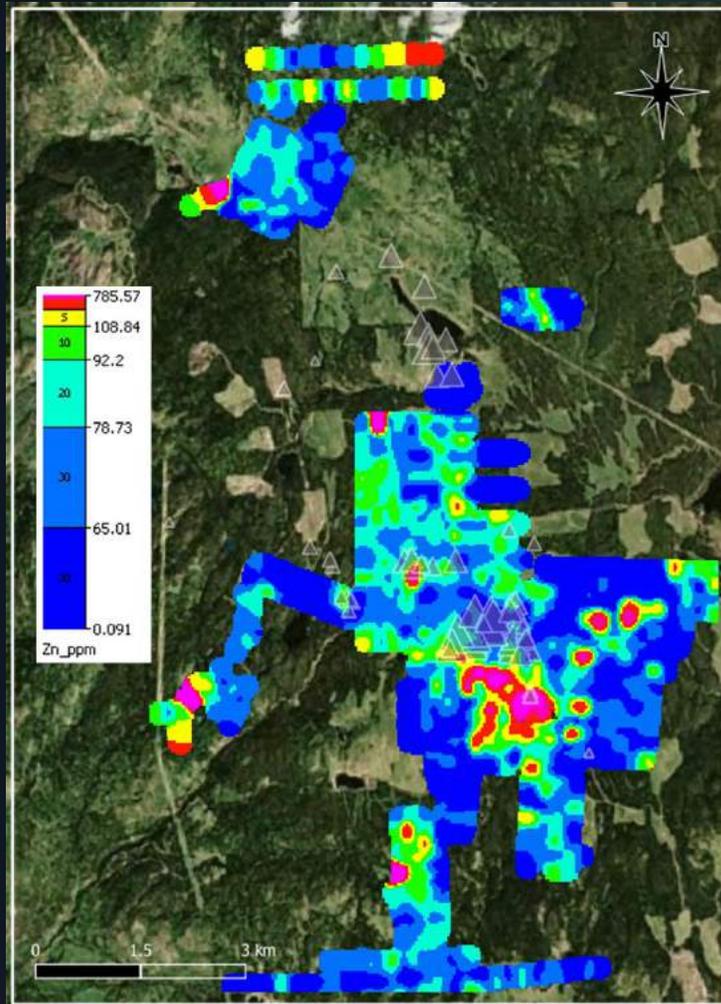
Geometries make sense with a SW-down tilt on a system.



# NEW Concept: Unfavourable Evidence

Lots of zinc in the wrong spot (deep in the proposed system)... this could be explained by some preserved early skarns though (Ashcroft host), and relative block movement across NE trending faults.

Large magnetic feature (TMI) at right not suggest complete rotation onto side, potentially indicating only a slightly tilted scenario with an underlying batholith.



# Optimal Scenario

Some partial degree of system rotation a slightly tilted scenario with an underlying batholith.

This could explain fanning of molybdenum anomaly towards the north and north-east.

