

An integrated, mineral systems approach to generating & advancing blind Carlin-type gold projects.

PRESENTED BY

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- What is the “Mineral System” approach?
 - The Carlin Type Deposit Mineral System
- Exploration program design & execution
 - Regional Scale
 - Camp Scale Program
 - Prospect Scale Program
- Results
 - South Grass Valley model & 2020 program
 - Wrap-Up

What is the “Mineral System” approach?

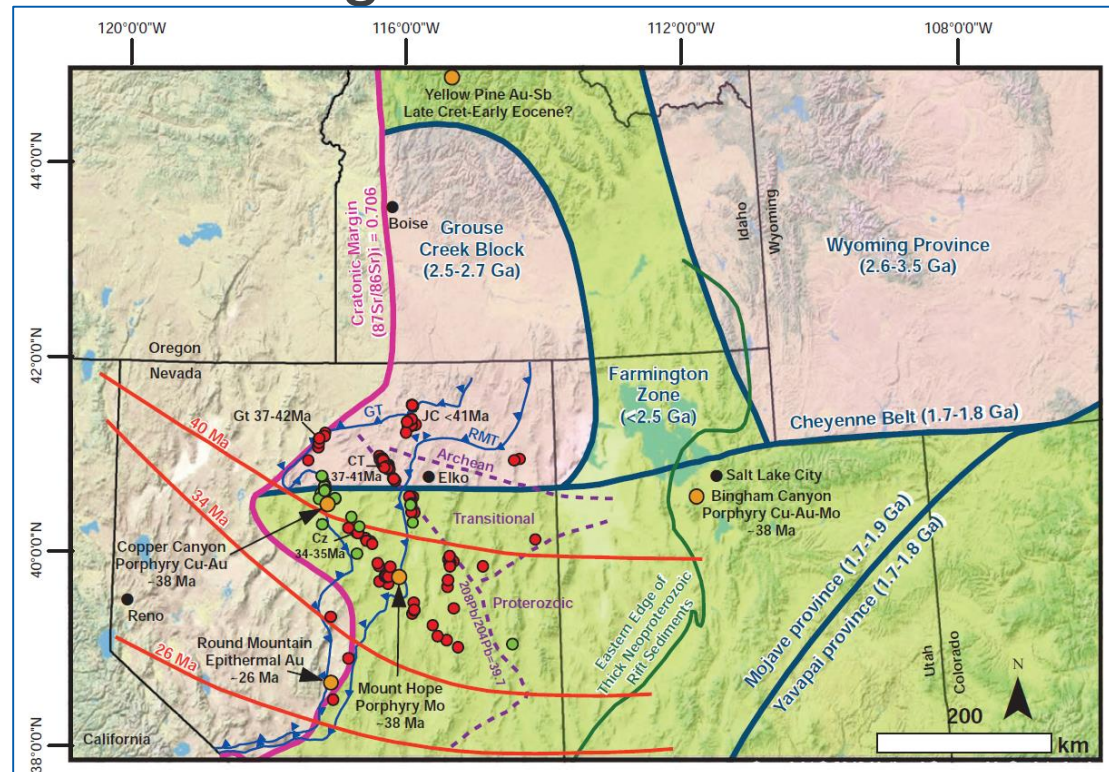
What is the “Mineral System” approach?

- Mineral systems are complex & dynamic
- Process based exploration concept:
 - Scale of features depends on scale of relevant geological process to be tested

		CRITICAL ELEMENTS			
		Fertility	Geodynamics	Architecture	Depositional Process
S C A L E	Prospect	N/A at this scale	N/A at this scale	Host structure dilational zone (pipe-like rock volume).	Favourable host sequence.
	Camp	Au in historic mine workings; significant anomalism in various sample media	Tectonic stress switch (uplift) - fluid systems self organise.	Major heterogeneity (rift-axial fault with antiform closure).	Greatest fluid pressure gradients (in upper 10Km) at time of mineralizing event.
	Regional	Au-enriched lithosphere or upper mantle lithosphere.	Terminal phase of syn-orogenic event.	Long-lived (continental margin) structure.	
	Continental	Unclear	Major collisional orogenic event.	Sub-continental scale lineament.	Upper 10-12Km of crust preserved by multiple orogenic cycles.

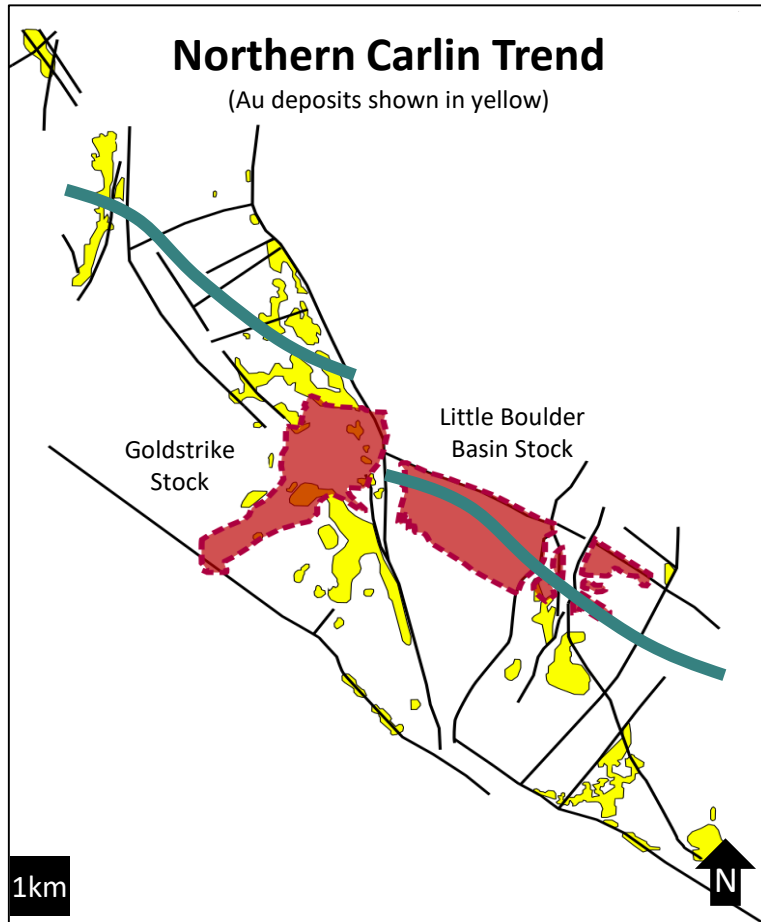
The Carlin Type Deposit Mineral System

- Regional scale footprint:
 - Narrows search space for mineral districts
 - Enables us to recognize common controls



From Muntean, 2018.

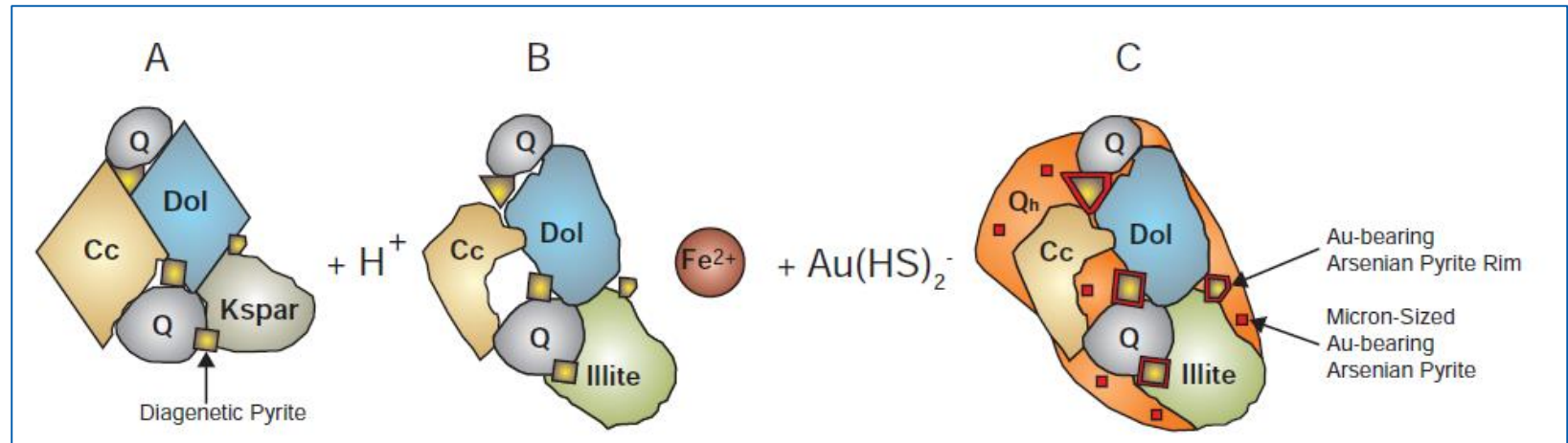
The Carlin Type Deposit Mineral System



Camp scale features:

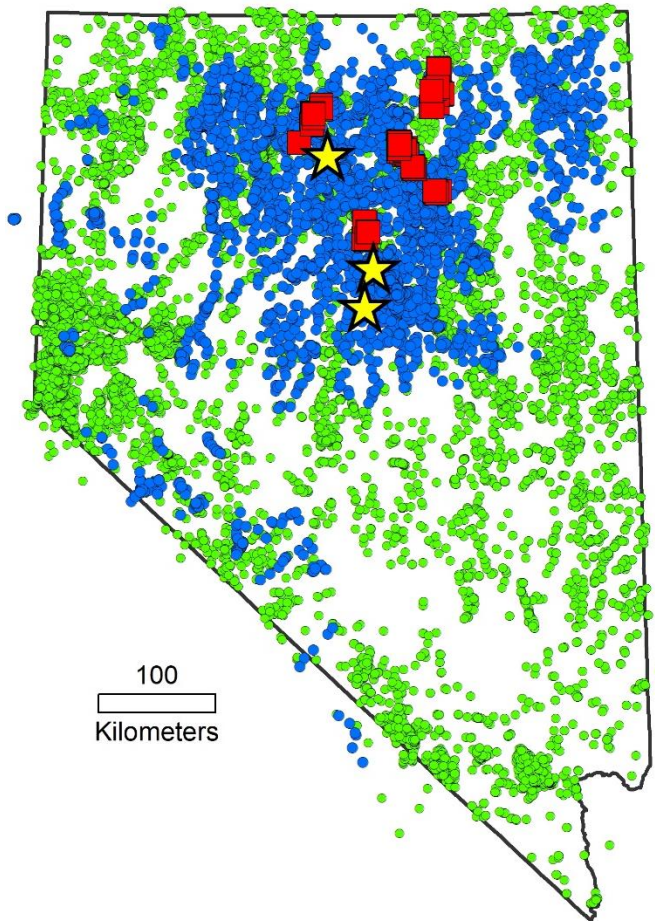
- Endowment: many known Au deposits
- Tectonic stress switch: inversion of pre-Eocene normal faults (Muntean, 2018)
- Major heterogeneity: Bootstrap shelf margin (blue line)

- Prospect scale characteristics:
 - Understanding of ore deposition processes allows target area ranking
 - Challenge is bias - data rich/data poor areas



Exploration program design & execution

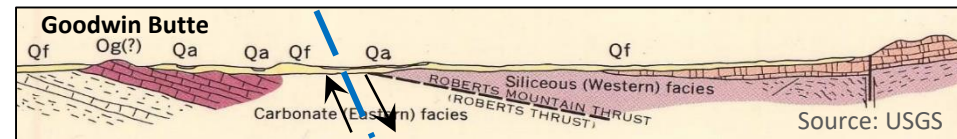
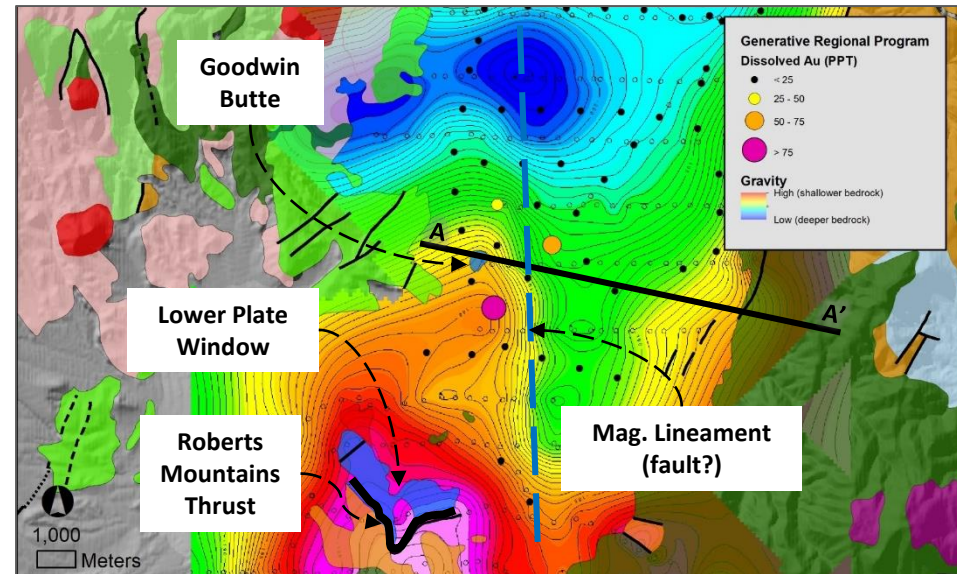
Regional Scale Program



- Public domain literature / data review
 - Geological, geochemical & geochronology
 - Re-process geophysics (magnetics, gravity)
- Extensive hydro-geochemistry program
- Ranked list of new camps under cover

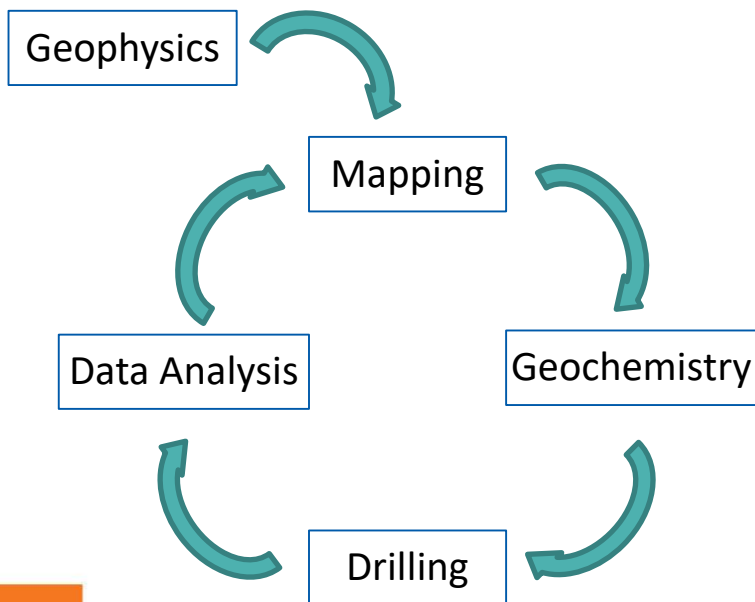
Camp Scale Program Design

- Reconnaissance mapping / sampling
- Geophysics
- Soil & water geochemistry
- Geochronology
- Core drilling

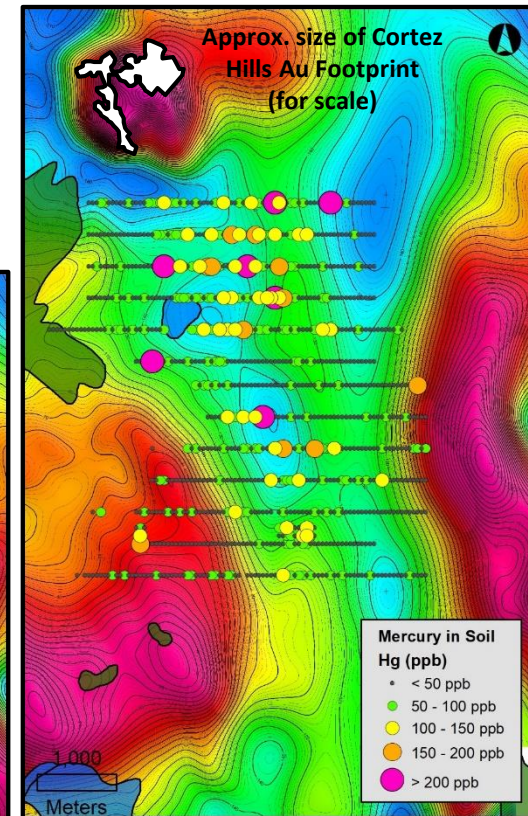
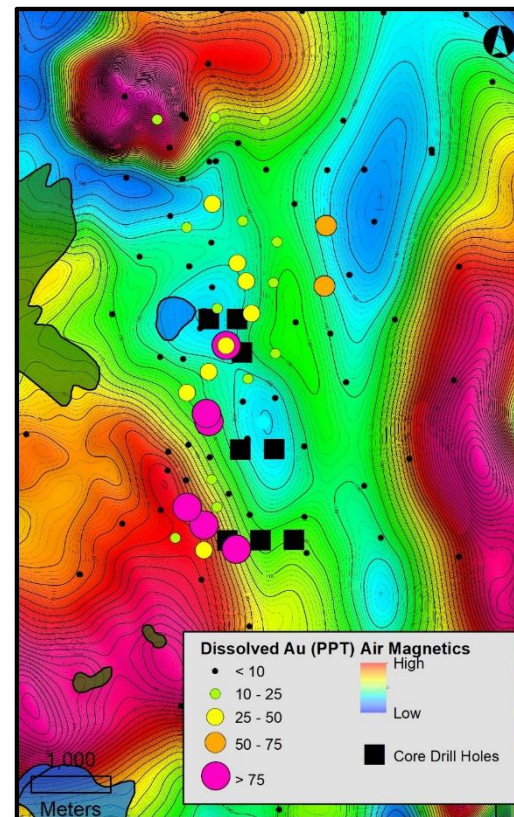


Camp Scale Program Execution

Multi stage, iterative process:



GOLD IN GROUNDWATER

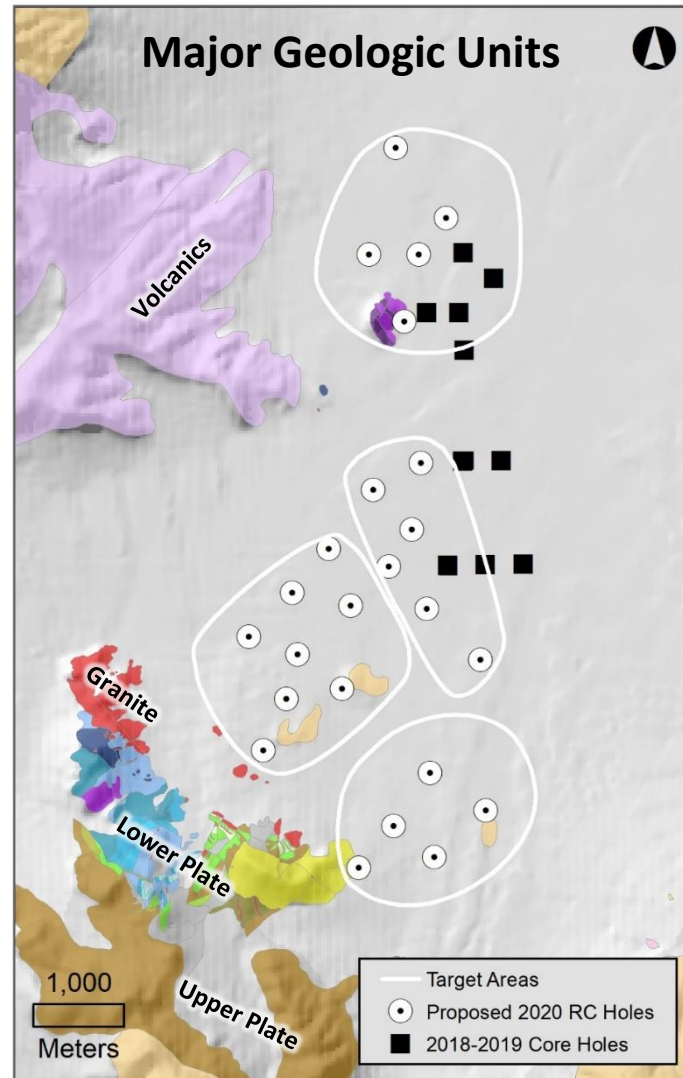


MERCURY IN SOIL + AIR MAG

Prospect Scale Program

Key features to test at this scale include:

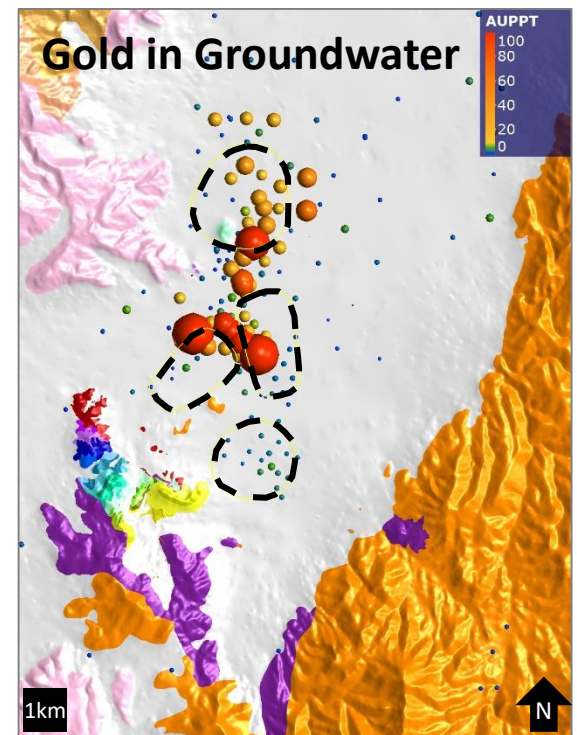
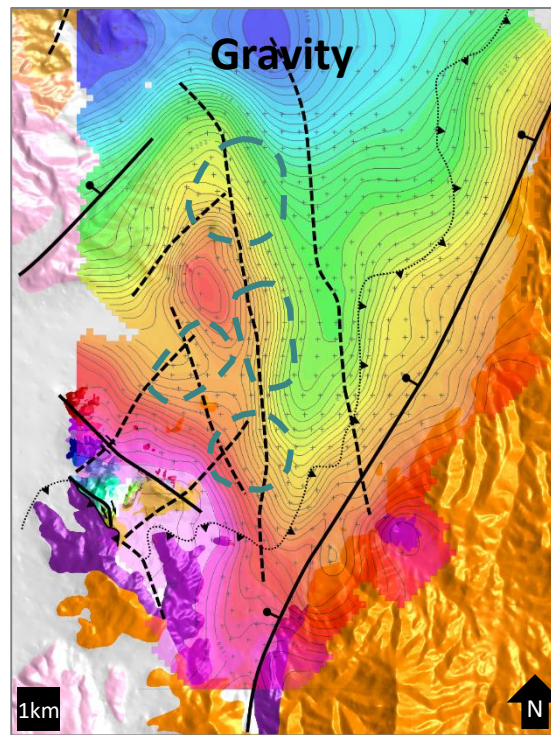
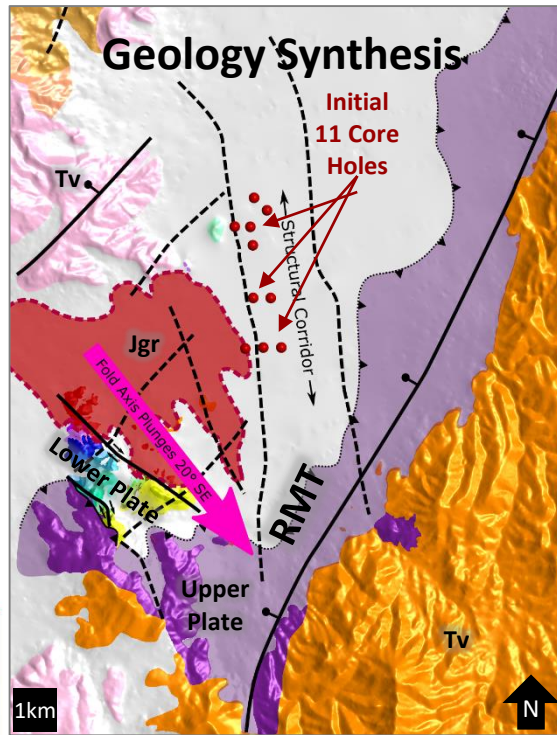
- Host structure dilational / pipe-like rock volumes (fold axes/hinges).
- Favorable host sequence.



Results

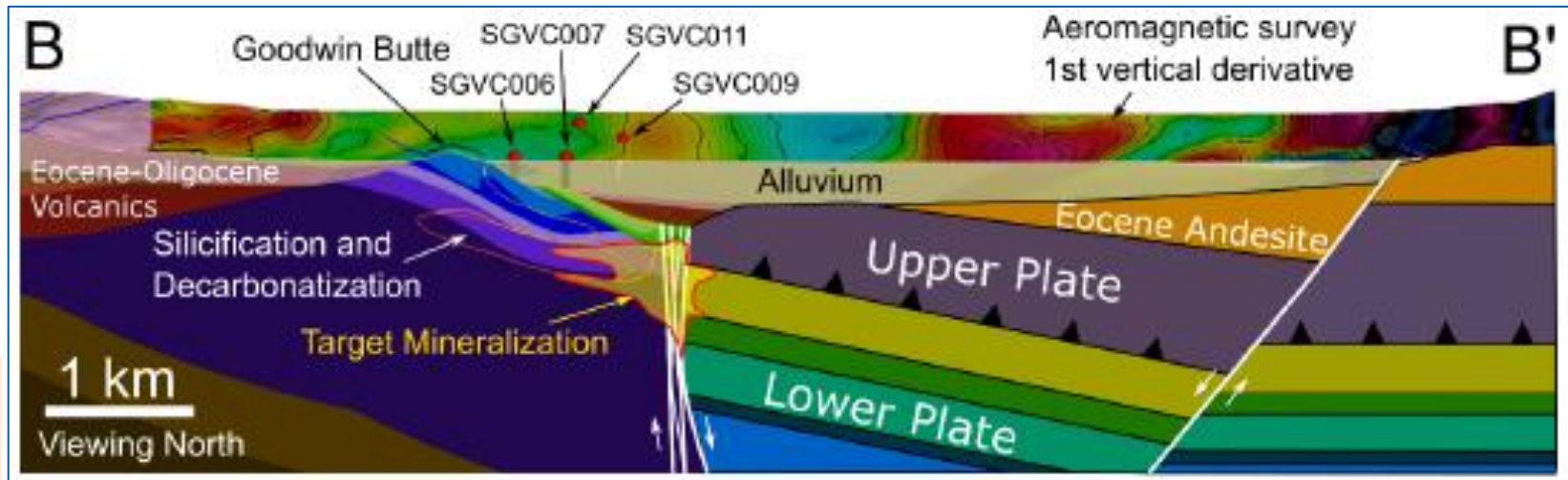
Results – Camp Scale

- New camp identified, similar in size to the Carlin-North Carlin Trend



Results – Prospect Scale

- High ranking targets
 - Silicified breccia
 - Hg-As-Sb-Tl
 - Decalcification, illite, isotopic depletion



- Sustained, disciplined application of Mineral System approach
- Resulted in significant technical success
- Watch this space for 2020 results



Questions

FOR MORE INFORMATION

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