Sericite Type, Color and Composition by ICP-MS and SWIR for Porphyry Vectoring

Application of Sericite Type, Color and Composition for Exploring Porphyry Mineralization at Depth: Example from Camp Creek, Thorn District, British Columbia, Canada

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BACKGROUND

Sericite is the most common alteration type that occurs in shallow levels of porphyry deposits, above potential mineralized K-silicate alteration. Several sericite types with distinct colors commonly occur in porphyry deposits. The Late Cretaceous Camp Creek Cu-Au-Ag-Mo property in northwestern British Columbia has zones of advanced argillic alteration near the surface, which transitions to sericite alteration. Drilling by Brixton Metals identified blind porphyry mineralization hosted by K-silicate alteration at depth. This classic alteration and geochemical zoning provide an opportunity to study the application of sericite for porphyry vectoring.

METHODS

Core logging supported by lithogeochemical (4-acid-ICPMS) and shortwave-infrared-spectroscopy (SWIR) data characterized sericite color and assemblages. A total of 275 LA-ICP-MS spot analyses from 13 samples characterized the composition of sericite at Camp Creek.

DISCUSSION

Grey sericite occurs at the shallowest level and then transitions to pale-green and green sericite. SWIR data shows pyrophyllite near-surface, which transitions to illite and phengitic illite with depth. Sericite is K-deficient illite (<6% K) and some celadonitic (Fe-Mg-rich but Al-poor). Below the pyrophyllite zone, phengitic illite occurs locally as vein halo, suggesting pre-cursor K-feldspar alteration. The Zr/Zn and Tl/Rb ratio of sericite decreases with depth. These mineralogical variations provide an effective tool to characterize sericite alteration and vector toward blind porphyry mineralization in BC and elsewhere.

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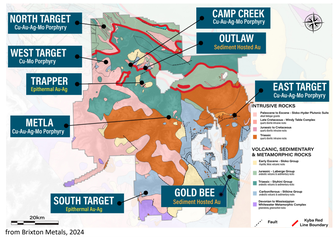
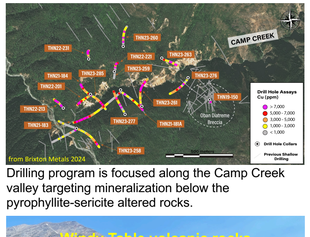
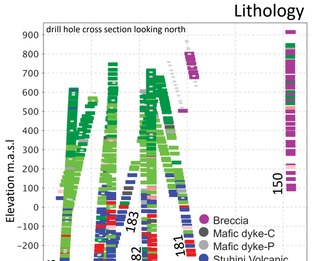
Location and Geology

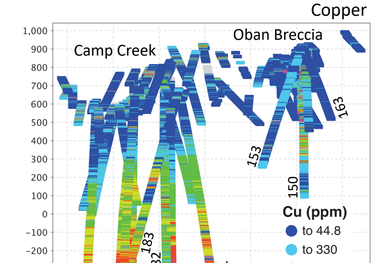


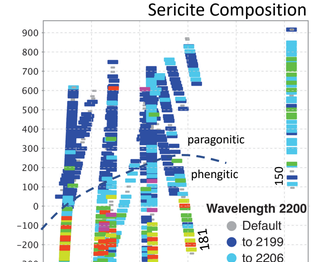
from Brixton Metals, 2024



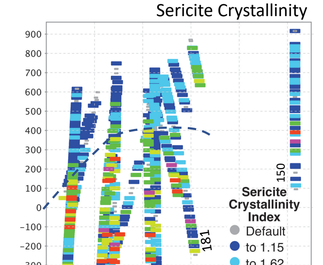
Drilling program is focused along the Camp Creek valley targeting mineralization below the pyrophyllite-sericite altered rocks.



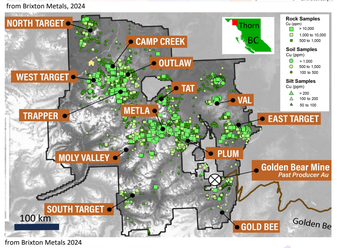




Sericite has phengitic composition at depth.

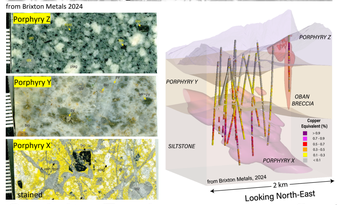


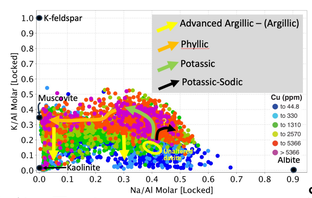
Sericite crystallinity increases with depth.



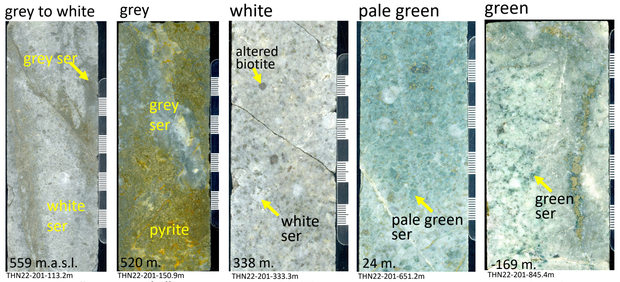
from Brixton Metals 2024

Mineralization occurred at 86.6 ± 0.36 (Re-Os) with porphyry bodies of similar age.



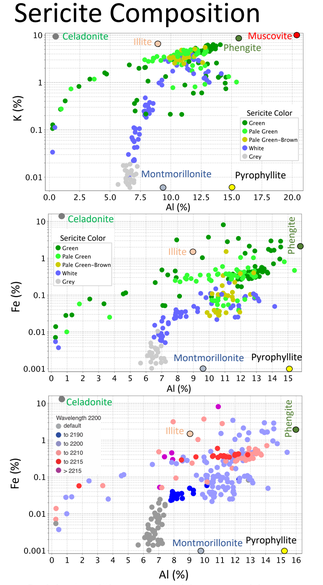


Sericite Color

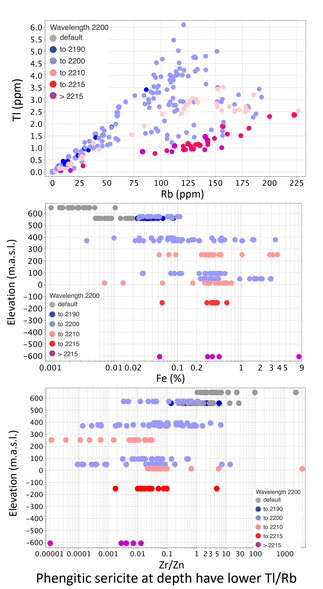


SWIR:

Sericite Composition

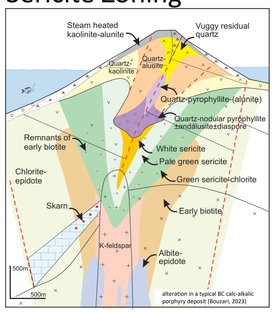


Sericite has illite to phengitic composition, some Al-poor (celadonitic), with its color and W2200 correlating with the composition.

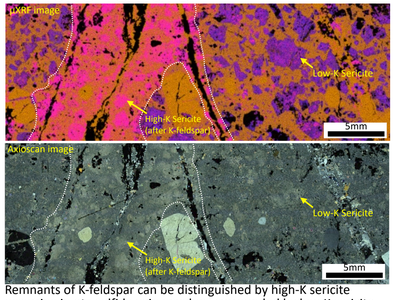


Phengitic sericite at depth have lower Tl/Rb and Zr/Zn relative to sericite occurring at shallow level.

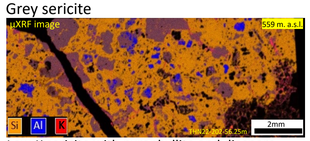
Sericite Zoning



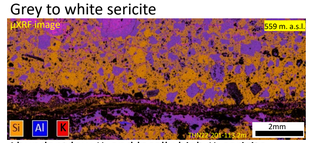
Sericite Texture



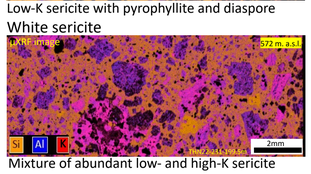
Remnants of K-feldspar can be distinguished by high-K sericite occurring in qtz-sulfide vein envelops surrounded by low-K sericite



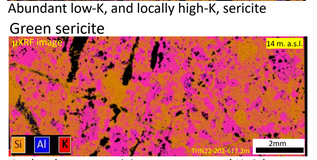
Low-K sericite with pyrophyllite and diaspore



Abundant low-K, and locally high-K, sericite



Mixture of abundant low- and high-K sericite



At depth, most sericite are green and K-rich

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