

The Geochemistry and Alteration of the Pemberton Hills Lithocap Vancouver Island, British Columbia

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Located less than 10 kilometers from the prolific Island Copper deposit, Pemberton Hills is an active exploration site for porphyry and epithermal hosted precious metals. Despite the close proximity to Island Copper and other known porphyry deposits, Pemberton Hills remained relatively poorly researched until the commencement of this study which was undertaken by Patrick Hamilton in concert with Andrew Jedemann's green rock study.

This project focuses on the Pemberton Hills Lithocap, an extensive exposure of silicic, argillic, and advanced argillic alteration which exhibits subtle mineralogically controlled sub-domains, which generally outcrop as peaks and valleys in the hills where the property takes its name.

Although comparatively understudied, lithocaps and their genetic link to porphyry systems is broadly accepted by academia and industry alike. Lithocaps often manifest as laterally extensive domains of advanced argillic alteration with silicic, argillic, and intermediate argillic alteration. Defining alteration zonation as well as mineralogically controlled sub-zones in lithocaps is an ongoing research topic in exploration geology. The Pemberton Hills lithocap is continuously exposed for several kilometers and does not appear to have undergone complex deformation aside from regional tilting. This provides us with a study site that is uniquely suited to not only test and refine the lithocap model but also develop potential bathymeters as well as mineralogically controlled vectors that can be directly compared to those used in the Andrew Jedemann's green rock study.



Analytical techniques used for this study include XRD, SEM, SEM-CL, LA-ICP-MS, Ar and S isotopes, portable XRF, and SWIR. Such a broad range of data has given an incredibly deep pool of information to pull from to synthesize the genesis and define the complex zonation at Pemberton Hills. Actively comparing this study with other lithocap studies worldwide as well as with the on-site green rock study is integral in increasing the applicability of the current lithocap model in porphyry exploration campaigns.

