

The Whisker Valley Au-Ag-Te Alkalic-Type Epithermal Gold Prospect in the Baie Verte Peninsula, Newfoundland, Canada

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The Whisker Valley gold prospect, located on the Baie Verte Peninsula, Newfoundland, Canada, represents a well-preserved alkalic-type epithermal Au-Ag-Te system developed in a post-collisional setting. Gold mineralization occurs as steeply south-dipping, high-grade quartz veins enriched in Au-Ag tellurides and base-metal sulfides, spatially controlled by rheological contrasts at contacts between mafic dikes and calc-alkaline plutonic host rocks of the Burlington granodiorite. The deposit is temporally and genetically associated with Mid- to Late Silurian alkaline magmatism of the King's Point Complex and a related alkalic monzonite intrusion, product of slab break-off following arc-continent collision.

Lithogeochemical data distinguish two distinct magmatic suites: Late Ordovician-Early Silurian calc-alkaline arc magmatism and younger post-collisional A-type magmatism product of slab-break off. Despite contrasting tectonomagmatic affinities, these units share similar REE patterns and isotopic characteristics, suggesting partial inheritance from remelted arc crust. Hydrothermal alteration is dominated by sericitic and propylitic assemblages, with minor distal calc-potassic alteration. Alteration intensity and mineralogy are strongly controlled by host-rock composition, with felsic rocks favoring quartz-sericite assemblages and mafic rocks developing chlorite-epidote assemblages.

Integration of whole-rock geochemistry, SWIR spectroscopy, and mineral chemistry reveals systematic proximal-distal alteration zoning, including phengitic muscovite (>2210 nm) and Fe-Mg chlorite (>2250 nm) proximal to mineralization, grading outward to more muscovitic white mica (<2210 nm) and Mg-rich chlorite (<2250 nm). Chlorite-illite geothermometry indicates alteration temperatures of ~200-350 °C. The dominance of Au-Ag tellurides, isotopic data, and presence of neutral proximal alteration assemblages indicate that mineralization came from magmatic-dominated, neutral to slightly alkaline hydrothermal fluids. These characteristics distinguish Whisker Valley from other epithermal systems and highlight the exploration significance of post-collisional magmatism in the Baie Verte Peninsula.