

Metal Zonation and Evolution of the Bronson Slope Porphyry Cu-Au-Mo Deposit in the Iskut Region of British Columbia, Canada

Luis Yagual¹, Antonio Arribas

¹University of Texas at El Paso/Seabridge Gold, El Paso, United States

Bronson Slope is a Cu-Au-Mo porphyry deposit located in the Stikine Terrane of the Golden Triangle District, northwestern British Columbia, Canada. The system represents a complex, multistage magmatic-hydrothermal system emplaced into sedimentary and volcanoclastic rocks of the Triassic Stuhini Group. The deposit hosts an inferred resource of 517.3 Mt grading 0.33 g/t Au and 0.09% Cu. This study integrates detailed and quick logging of 20 drill holes totaling 20,296 m, SWIR spectral analysis, ICP-MS geochemistry, XRF analysis, magnetic susceptibility measurements, geochronology, and 3D geological models developed in Leapfrog Geo to define stratigraphy, intrusive architecture, alteration assemblages, metal zonation, and the evolution of the mineralizing system.

Mineralization is associated with monzonite to quartz monzonite intrusions emplaced in at least five pulses: pre-, early-, inter-, late-, and post-mineral stages. Pre-mineral monzonite and Stuhini Group rocks form the principal host for subsequent intrusions, alteration, and mineralization. Early-mineral quartz monzonite porphyries intruded as swarm dikes into the monzonite and triggered the first hydrothermal stage, characterized by pervasive magnetite alteration and quartz-magnetite stockwork and sheeted veining.

Inter-mineral quartz monzonite porphyries host the main Cu–Au–Mo mineralization, dominated by quartz-chalcopyrite-magnetite stockwork and sheeted veins in the upper margins of the porphyry and quartz-molybdenite sheeted veins in peripheral areas. Re–Os dating of molybdenite shows ages of 196.5–197.4 Ma, constraining mineralization to the Early Jurassic.

A broad white-mica alteration footprint developed along the top and margins of the system, overprinting earlier biotite-magnetite-K-feldspar alteration and forming a muscovite-to-phengite halo. Late Cretaceous contractional faulting exhumed the system overprinted by a NW–SE-trending gold-bearing pyrite shear vein system.