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GAC Cordilleran Section Afternoon Lectures

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Till mineralogy and geochemistry in the Highland Valley Cu-Mo porphyry district, south-central British Columbia

Thursday June 1st at 4:00 pm

Geological Survey of Canada Discovery Centre

15th Floor, 605 Robson Street, Vancouver, BC

Abstract - The Highland Valley district includes five economic Cu-Mo porphyry deposits hosted in the Guichon Creek batholith of south-central British Columbia. Between 1962 and 2013, 1615 million tonnes of ore grading 0.4%Cu and 0.01% Mo have been processed at the Highland Valley Copper mine (HVC)



representing one of the largest Cu deposits in Canada. The HVC region is characterized by an extensive cover of glacial sediments with a predominance of tills from the Late Wisconsin Fraser Glaciation and a single phase of ice flow to the southeast. Till samples were collected within a 1000 km² area centered on HVC to identify the geochemical and mineralogical footprint of the porphyry mineralization in glacial sediments. Geochemically, the Cu-Mo mineralization is well reflected in till with high Cu and Mo concentrations (e.g. >1500 ppm Cu and >20 ppm Mo in the silt plus clay) close to mineralized zones progressively decreasing to background concentrations (<200 ppm Cu and <1.5 ppm Mo in the silt plus clay) approximately 20 km to the southeast. Similarly, K₂O content of till varies from 3.4% near mineralized zones and drops to background concentrations <2.5% 15-20 km to the southeast. The high K content of till near mineralization is interpreted to be derived from the potassic alteration. Similar to the Cu concentrations, the number of chalcopyrite grains in till (0.25-0.5 mm; >3.2 specific gravity) is highest (>100 grains/10kg) near mineralized zones and decreases to <10 grains/10kg at about 10 km to the southeast. The regional geochemical and mineralogical footprint measured in till at Highland Valley is interpreted to result from glacial erosion of a cluster of economic and sub-economic mineralized zones and detrital glacial dispersal up to 20 km to the southeast. This project was a collaborative effort between the British Columbia Geological Survey and the Geological Survey of Canada supported by the Targeted Geoscience Initiative (TGI) and the Canadian Mining Innovation Council (Cu Footprint Project).