

# Sulphurets area, British Columbia: geology, geochemistry, and mineralogy

R.V. Kirkham<sup>1</sup>, S.B. Ballantyne<sup>1</sup> and D.C. Harris<sup>1</sup>

The Sulphurets area in northwestern British Columbia contains large pyritic alteration zones with porphyry copper and molybdenum and several different types of gold and silver mineralization. The area is underlain by Jurassic sedimentary and volcanic rocks of the Hazelton Group which are cut by porphyritic, subvolcanic, dioritic, monzonitic, syenitic, and low-silica granitic intrusions. The main pyritic alteration zones, extensive quartz vein stockworks, and early stages of copper, molybdenum, gold, and silver deposition were spatially and probably genetically related to the emplacement of these porphyritic alkalic intrusions. However, the area has been subjected to low-grade regional metamorphism, heterogeneous penetrative deformation, and a complex post-mineral fault history, during which possible significant redistribution and/or introduction of precious metals has occurred. Quartz, sericite, pyrite schists are common in the area. Both bulk tonnage and higher grade vein and "shear zone" precious metal occurrences are present in the region. Some of the vein-stockwork systems show evidence of both brittle and ductile deformation suggesting relatively deep environments of formation.

The Geological Survey of Canada, in collaboration with exploration company and British Columbia Geological Survey Branch geologists working in the area, has been carrying out an integrated study emphasizing deposit geology, lithogeochemistry, and mineralogy. One objective of this study is to document lithogeochemical and mineralogical patterns within a large, complex, pyritic porphyry Cu-Mo-precious metal system. This study should help define the spatial and temporal relationships of different metal, mineral, and alteration zones.

Broad areas with Cu-Au, Mo-Au, Cu-Mo-Au, and As (tennantite and/or arsenopyrite)-Au associations have been identified but other Cu and Mo and iron sulphide areas without significant precious metals are also present. Other quartz (? calcite and barite)-vein-stockwork systems with Sb-polymetallic (Zn, Pb, Cu)-dominated assemblages contain electrum and silver sulphosalts with bonanza grade Au and Ag. The interrelationships of the different metal and mineral zones are not fully understood but preliminary information suggests complex multiple stages of base and precious metal deposition.

<sup>1</sup>Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario K1A 0E8

*Raundys '89*