See Thesis GSC Library.

GAC, Vanc Jan 25/80

675252
103P/5

Anyox type: back-arc basin, sheeted dykes, features from Cyprus type.

MASSIVE SULFIDE DEPOSITS, ANYOX AREA, WESTERN B.C.

Sharp, Robert J.
The University of Alberta
Edmonton, Alberta T6G 2E1

Tholeiitic metabasaltic pillow lavas either enclose or underlie a number of cupriferous massive sulfide deposits near Anyox, British Columbia. The Hidden Creek, Double Ed, and Bonanza copper deposits are three volcanogenic massive pyrite-pyrrhotite-chalcopyrite orebodies which have attracted mining and exploration investment at Anyox since the early 1900s. The Hidden Creek deposit is characterized by tabular, cupriferous iron sulfide bodies that lie conformably along a major volcanic-sedimentary contact. A large zone of altered metabasalt stratigraphically underlies the stratiform sulfide layers. Epigenetic sulfide-bearing quartz stockworks crosscut the alteration zone and extend to the base of the overlying stratiform deposits. The Double Ed and Bonanza deposits are enclosed in pillowed metabasaltic lava and occur 150 m stratigraphically below the main volcanic-sedimentary contact at Anyox. These two deposits are narrow, pipe-like orebodies that are conformable with their metavolcanic host rocks. Small alteration zones are associated with each deposit. Major element geochemical analyses show that the original basaltic magma was tholeiitic. Comparison of analyses between the altered and unaltered metabasalts defines chemical trends which accompanied rock alteration by hydrothermal fluids. Altered basalts have retained iron, sulfur, and magnesium, but have lost calcium, silica and sodium. Trace element analyses reveal weak to strong copper enrichments in the altered rocks. Y, Nb, Cr, Zr abundances in the unaltered metabasalt indicate that the ore deposits formed in a back-arc ocean basin. Trace element contents in the metamorphosed chert layer, along the volcanic-sedimentary contact at the Hidden Creek Mine, show that there was little exhalative dispersion

of metals away from the orebodies.

Environment of ore formation is similar in the deposits. Sea water was cycled into a geothermal system within the volcanic pile; it was heated and underwent reduction and chemical exchange with the basaltic rocks within the hydrothermal system. The ore solutions perc lated slowly onto the sea floor and accumulated in depressions near the fumaroles. Capping by lava flows or sediments preserved the deposits from erosion. Similar cupriferous massive sulfide deposits are found at Løkken, Norway; Besshi, Japan; Cyprus; Whalesback Mine, Newfoundland; and Goldstream, British Columbia.

SIGNIFICANCE OF LEAD ISOTOPES TO METALLOGENY OF POLYMETALLIC SULPHIDE DEPOSITS, SOUTHERN COAST PLUTONIC BELT, SOUTHWESTERN B.C.

Sinclair, Al J., Colin I. Godwin, and Barry D. Ryan
Department of Geological Sciences, U.B.C.
Vancouver, B.C. V6T 2B4

Massive sulphide deposits have been known in the southern Coast Mountains of B.C. for more than half a century, principally through the Britannia deposits from which a total of 53 million tons of ore were produced grading 1.1% Cu, 0.65% Zn, 0.20 oz Ag/ton and 0.02 oz Au/ton. Recent work has shown that some of these, including the Britannia and Seneca deposits, are of volcanogenic origin, whereas controversy surrounds the origin of others such as the Northair deposits.

Lead isotope abundances for many of these deposits cluster near the mean crustal growth curve and the geochron, with dispersion little more than experimental error. This uniformity of lead isotope ratios encompasses (1) within-deposit uniformity, (2) uniformity among deposit types (volcanogenic, skarn,