

ABSTRACT

The Wagwater Belt, which cuts across eastern Jamaica, and which contains 3-6 km of sediments and volcanics, was a graben during the early Tertiary (Green, 1977). The graben developed as an inter-arc basin following rifting of a Cretaceous island arc. The opening of the Wagwater Basin was accompanied by eruptions of tholeiitic mafic flows, followed by calc-alkaline felsic flows and minor andesite flows. Contemporaneous erosion occurred with the result that the lavas are interbedded with epiclastic sediments composed largely of andesitic debris.

The Hope Mine Deposit is a zinc-lead sulfide deposit situated within this sequence of Eocene volcanic and volcanoclastic rocks. The orebody is closely associated with an altered andesite flow which forms its footwall. Stable element chemistry places the andesite flow in the calc-alkaline suite, and its major element chemistry and mineralogy classify it as a Keratophyre. Hanging wall rocks are epiclastic sediments composed largely of andesitic debris - The Wagwater Formation. The intensely altered footwall rocks have been depleted in Na and Ca and enriched in K relative to the least altered rocks on the fringes of the alteration halo.

The alteration halo is divided into two zones. Less altered rocks are placed in a propylitic zone based on the mineral association albite-chlorite-epidote-calcite, whereas the more altered rocks which are closest to the orebody are placed in a potassic zone based on the mineral association

potash feldspar-quartz-analcime.

Ore minerals are sphalerite, galena and minor chalcopyrite. Average assays of samples give 4.7% Zn, 1.8% Pb, 5 ppm Ag and 3 ppm Au. Study of polished sections reveals that the orebody has been deformed, resulting in curvature of cleavage planes in galena, brecciation of sphalerite and development of granoblastic textures in calcite and quartz.

Results of chemical analyses suggest that Na, Ca, K were mobile during alteration. Consistent decreases in Na and increases in K are recorded in footwall rocks as the orebody is approached. As a result of these changes, the ratio K/Na is suggested as being useful for prospecting. The ratios Fe/Mn, Ca/Mg as well as the elements K, Na, Cd, Co, Ni, Ag and Pb are also useful as indicator elements.

No conclusive evidence has been found for the origin of the orebody, and two models are suggested for its genesis. The syngenetic model suggests that the deposit is a distal massive sulfide deposit whereas the epigenetic model suggests that it is a vein-type deposit.