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THE NATURE OF CARBONATE WALL

CASSIAR, NORTH-C

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Department of Geological Scien

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Gold-silver ore occurs in white quartz veins that are mostly within mafic volcanic rocks. K-Ar dates on sericite from several gold-silver-bearing white quartz veins indicate that mineralization occurred at about 130 Ma.

Rocks within the Erickson mine were effected by four types of alteration: synvolcanic hydrothermal, regional metamorphic, epigenetic hydrothermal and contact metamorphic. The most important type is epigenetic carbonate alteration of basalt, that occurs as well-developed envelopes around gold-silver-bearing white quartz veins and associated, but uncommon, carbon veins. Uncommon layered dolomite veins are also surrounded by similar carbonate alteration envelopes; these veins postdate white quartz veins and carbon veins. Pervasive and fracture-controlled carbon may be also present around white quartz veins and carbon veins.

An idealized model of carbonate alteration envelopes was developed based on field observations supported by mineralogical studies. Carbonate alteration envelopes are composed of rocks containing varying amounts of ankerite, siderite, dolomite, quartz, sericite, kaolinite, pyrite, carbon and minor titanium oxides. An idealized model of mineralogical variations throughout the envelopes around white quartz veins, carbon veins and layered dolomite veins was also developed.

Mass-balance calculations, using Gresens' (1967) metasomatic equation, indicate the following compositional changes around a gold-silver-bearing white quartz vein: gain of K_2O and SiO_2; loss of Na_2O, Fe_2O_3 and MgO; loss of CaO from the outer portion of the envelope and gain in the inner. Loss on ignition and the alteration assemblage indicate gain of CO_2, H_2O and S.

Geochemistry of carbonate alteration envelopes was investigated by multi-element ICP partial analyses and gold-silver fire assays. Comparison of ICP partial analyses to XRF total analyses show that for most elements ICP partial analyses reflect trends in XRF total analyses. Therefore, multi-element ICP partial analysis is viable for determining patterns useful in exploration.

Strong enrichment in potassium, barium, boron and arsenic, and sporadic enrichment in gold, silver, copper, lead, zinc and antimony occur in carbonate altered basalt around gold-silver-bearing white quartz veins.

THE NATURE OF CARBONATE WALL ROCK ALTERATION AT ERICKSON GOLD MINE CASSIAR, NORTH-CENTRAL BRITISH COLUMBIA

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ABSTRACT

The Erickson mine is within the McDame lode gold camp, approximately 12 km southeast of Cassiar, British Columbia. The mine is within mafic volcanic, ultramafic and sedimentary rocks of the Upper Paleozoic Sylvester Allochthon.

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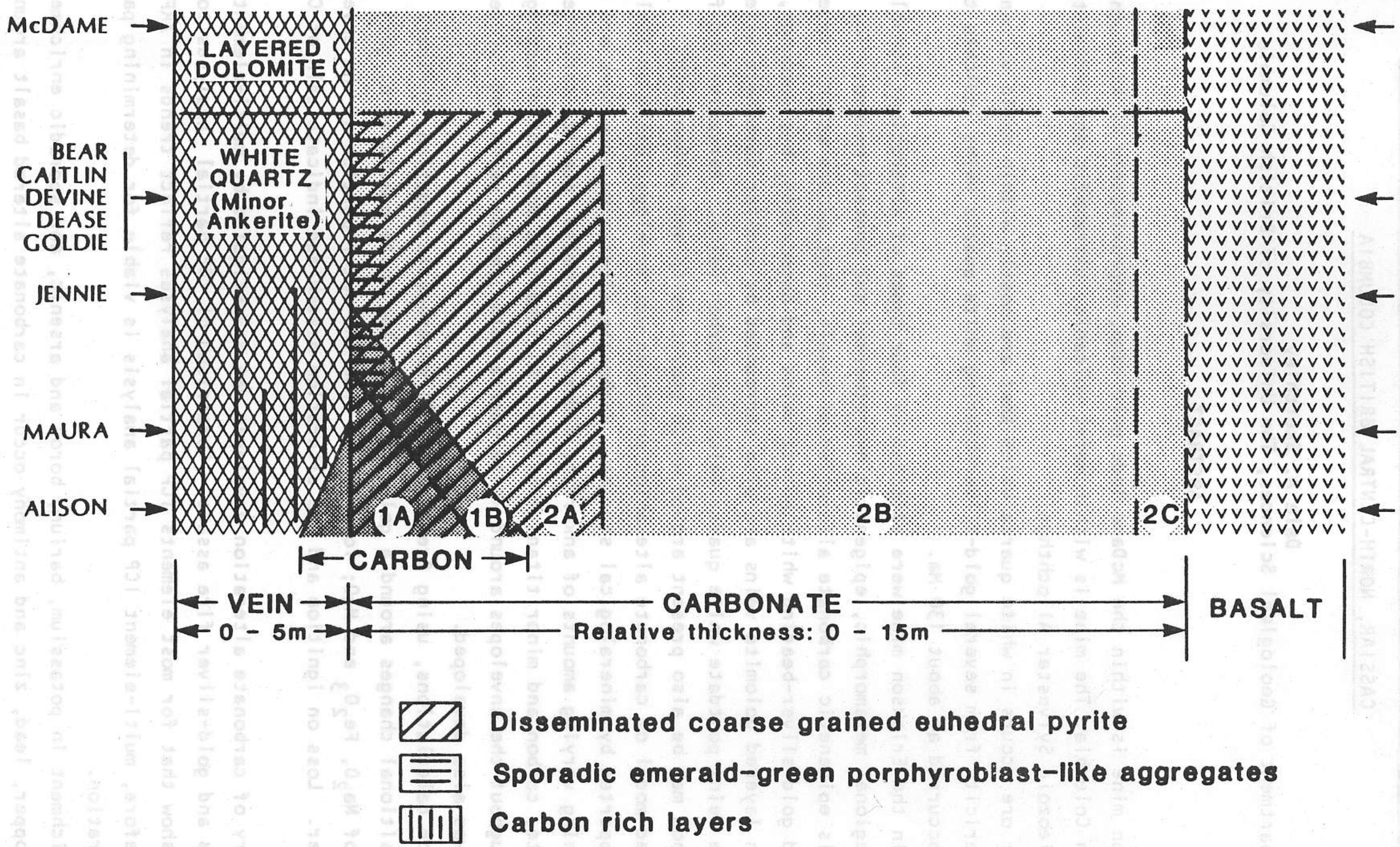

CROSS SECTION OF IDEALIZED CARBONATE ALTERATION ENVELOPE