

DESCRIPTIVE MODEL OF Au-Ag-Te VEINS

By Dennis P. Cox and William C. Bagby

DESCRIPTION Gold telluride minerals and fluorite in veins and breccia bodies related to hypabyssal or extrusive alkalic rocks.

GEOLOGICAL ENVIRONMENT

Rock Types Syenite, monzonite, or diorite; phonolite, monchiquite, and Vogesite. Silica-undersaturated low-Ti basalts (shoshonites).

Textures Porphyro-aphanitic. Volcanic breccias and lapilli tuff.

Age Range Mainly Cretaceous and Tertiary, but could be any age.

Depositional Environment Volcanic centers, caldera rims, and caldera-fill breccias.

Tectonic Setting(s) Disrupted Precambrian craton with thin Phanerozoic cover. Also late shoshonitic stage of volcanism in island arcs.

Associated Deposit Types Polymetallic veins, Polymetallic replacement deposits.

DEPOSIT DESCRIPTION

Mineralogy Calaverite, sylvanite, hessite, coloradoite, fine-grained pyrite, galena, sphalerite, tetrahedrite, and stibnite in veins of smokey quartz, calcite, purple fluorite, barite, celestite, roscoelite (V-mica), and adularia. Fluorite absent in Fiji deposit.

Texture/Structure Veins mainly carbonates and quartz. Ore minerals in clusters and locally in vug linings. Breccia-filling textures in some deposits.

Alteration Propylitic, dominated by carbonates (particularly dolomite) and pyrite. Sericite introduced in wallrocks. Silicification is rare.

Ore Controls Rich breccia ores in central zone of caldera. Veins on steep radial fractures and on faults gently inclined toward caldera. Veins may follow porphyry dikes. Replacement ore bodies may form where veins cut limestone, organic-rich argillaceous limestone being especially favorable.

Weathering Tellurides easily destroyed by weathering. Resulting "flour" gold may not be retained in placer deposits. Some tellurium redeposited as green oxides (emmonsite). Supergene enrichment, depositing native Au, occurs in some deposits.

Geochemical Signature Au, Ag, Te, Cu, Pb, Zn, Sb, Hg, F, Ba, PGE,

EXAMPLES

Cripple Creek, USCO

(Loughlin and Koschman, 1935;

Lindgren and Ransome, 1906)

Gold Hill, USCO

(Kelly and Goddard, 1969)

LaPlata district, USCO

(Eckel, 1949)

Zortman-Landusky (Little Rockies district), USMT

(Corry, 1933)

North Mocassin-Warm Springs district), USMT

(Blixt, 1933)

Emperor mine, Tavua, FIJI

(Coney, 1976)