

DESCRIPTIVE MODEL OF BASALTIC Cu

By Dennis P. Cox

APPROXIMATE SYNONYM Volcanic redbed Cu (Kirkham, 1984).

DESCRIPTION A diverse group including disseminated native copper and copper sulfides in the upper parts of thick sequences of subaerial basalt, and copper sulfides in overlying sedimentary beds.

GENERAL REFERENCE Kirkham (1984).

GEOLOGICAL ENVIRONMENT

Rock Types Subaerial to shallow marine basalt flows, breccias and tuffs, red-bed sandstone, tuffaceous sandstone, conglomerate. Younger tidal facies limestone and black shale.

Textures Amygdules, flow-top breccias in lava. Laminated algal carbonate rocks. Sediments with high original porosity.

Age Range Proterozoic, Triassic and Jurassic, and Tertiary deposits known.

Depositional Environment Copper-rich (100-200 ppm) basalt interlayered with red elastic beds and overlain by mixed shallow marine and continental deposits formed near paleo-equator.

Tectonic Setting(s) Intracontinental rift, continental margin rift. Regional low-grade metamorphism may mobilize copper in some districts. Deposits are characteristic of the Triassic part of Wrangellia terrane in Alaska.

Associated Deposit Types Sediment-hosted copper. Volcanogenic Mn at Boleo, Mexico.

DEPOSIT DESCRIPTION

Mineralogy Native copper, native silver in flows and coarse elastic beds. Chalcocite and other Cu₂S minerals and locally bornite and chalcopyrite are concentrated in overlying shale and carbonate rocks. Fine-grained pyrite is common but not abundant with copper sulfide minerals.

Texture/Structure Flow-top breccia and amygdule fillings in basalt. Fine grains in matrix and along shaley parting in elastics. Massive replacement of carbonates at Kennicott. Finely varved chalcopyrite sediment at Denali.

Alteration Calcite-zeolite + epidote + K-feldspar. Red coloration due to fine hematite.

Ore Controls Flow-top breccias, amygdules, fractures in basalt; organic shale, limestone in overlying sequence. Limestone is tidal, algal, with stromatolite fossils. Synsedimentary faulting may be important.

Weathering Widely dispersed copper nuggets in streams draining basalts.

Geochemical Signature Cu-Ag-Zn-Cd. Co at Boleo, Mexico. Cu:Zn ratio is very high. Au anomalously low.

EXAMPLES

Keweenaw, USMI	(White, 1968)
Calumet, USMI	(Ensign and others, 1968)
Kennicott, USAK	(Bateman and McLaughlin, 1920)
Denali, USAK	(Seraphim, 1975)
Boleo, MXCO	(Wilson, 1955)
Buena Esperanza, CILE	(Ruiz, 1965)
Redstone, CNNT	(Ruelle, 1982)
Sustut, CNBC	(Harper, 1977)