

DESCRIPTIVE MODEL OF Cu SKARN DEPOSITS

By Dennis P. Cox and Ted G. Theodore

DESCRIPTION Chalcopyrite in talc-silicate contact metasomatic rocks (see fig. 57).

GENERAL REFERENCES Einaudi and Burt (1982), Einaudi and others (1981).

GEOLOGICAL ENVIRONMENT

Rock Types Tonalite to monzogranite intruding carbonate rocks or calcareous elastic rocks.

Textures Granitic texture, porphyry, granoblastic to hornfelsic in sedimentary rocks.

Age Range Mainly Mesozoic, but may be any age.

Depositional Environment Miogeosynclinal sequences intruded by felsic plutons.

Tectonic Setting(s) Continental margin late orogenic magmatism.

Associated Deposit Types Porphyry Cu, zinc skarn, polymetallic replacement, Fe skarn.

DEPOSIT DESCRIPTION

Mineralogy Chalcopyrite + pyrite ± hematite ± magnetite ± bornite ± pyrhotite. Also molybdenite, bismuthinite, sphalerite, galena, cosalite, arsenopyrite, enargite, tennantite, loellingite, cobaltite, and tetrahedrite may be present. Au and Ag may be important products.

Texture/Structure Coarse granoblastic with interstitial sulfides. Bladed pyroxenes are common.

Alteration Diopside + andradite center; wollastonite + tremolite outer zone; marble peripheral zone. Igneous rocks may be altered to epidote + pyroxene + garnet (endoskarn). Retrograde alteration to actinolite, chlorite, and clays may be present.

Ore Controls Irregular or tabular ore bodies in carbonate rocks and calcareous rocks near igneous contacts or in xenoliths in igneous stocks. Breccia pipe, cutting skarn at Victoria, is host for ore. Associated igneous rocks are commonly barren.

Weathering Cu carbonates, silicates, Fe-rich gossan. Calc-silicate minerals in stream pebbles are a good guide to covered deposits.

Geochemical Signature Rock analyses may show Cu-Au-Ag-rich inner zones grading outward to Au-Ag zones with high Au:Ag ratio and outer Pb-Zn-Ag zone. Co-As-Sb-Bi may form anomalies in some skarn deposits. Magnetic anomalies.

EXAMPLES

Mason Valley, USNV	(Harris and Einaudi, 1982)
Victoria, USNV	(Atkinson and others, 1982)
Copper Canyon, USNV	(Blake and others, 1979)
Carr Fork, USUT	(Atkinson and Einaudi, 1978)

GRADE AND TONNAGE MODEL OF Cu SKARN DEPOSITS

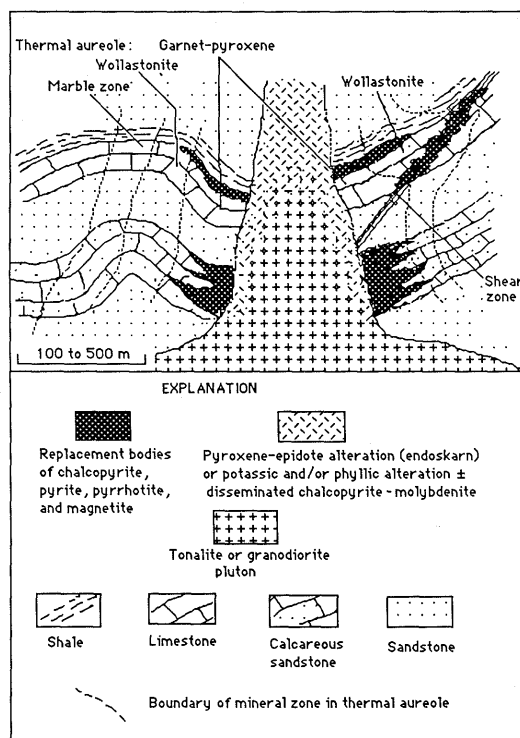
By Gail M. Jones and W. David Menzie

COMMENTS Data used in this model were restricted to copper skarns associated with barren stocks as recommended by Einaudi and others (1981). Some of the data are from districts. See figs. 58-60

DEPOSITS

<u>Name</u>	<u>Country</u>	<u>Name</u>	<u>Country</u>
Agordo-Brosso	ITLY	Loei-Chiengkarn	THLD
Arctic Chief	CNYT	Ludwig	USNV
B. C.	CNBC	Mackey	USID
Benson Lake	CNBC	Malko Trnova	BULG
Best Chance	CNYT	Marble Bay	CNBC
Black Cub	CNYT	Mason Valley-Malachite	USNV
Blue Grouse	CNBC	McConnell	USNV
Bluestone	USNV	Meme	HATI
Caledonia	CNBC	Mina El Sapo	CLBA
Cassius	HATI	Mina Vieja	CLBA
Casting	USNV	Mother Lode-Sunset	CNBC
Cerro de Cobre	CLBA	Obira	JAPN
Chalcobamba	PERU	Oregon	CNBC
Coast Copper	CNBC	Oro Denoro (Ema)	CNBC
Cobriza	PERU	Phoenix	CNBC
Concepcion Del Oro	MXCO	Queen Victoria (Swift)	CNBC
Copper Queen	CNBC	Rosita	NCRG
Cornell	CNBC	San Pedro	USNM
Cowley Creek	CNYT	Sasca Montana	RMNA
Douglas Hill	USNV	Sasagatani	JAPN
Gem	CNYT	Snowshoe	USNM
Hiragane	JAPN	Strandzha	BULG
Hope	CNBC	Tasu-Wesfrob	CNBC
Iide	JAPN	Tintaya	PERU
Indian Chief	CNBC	Traversella	ITLY
Kamaishi	JAPN	Tsumo	JAPN
Kedbeg Copper	URRS	Vananda	CNBC
Keewenaw	CNYT	War Eagle	CNYT
Kodiak Cub	CNYT	Western Nevada	USNV
Lily (Ikeno)	CNBC	Wexford	CNBC
Little Chief	CNYT	Yreka	CNBC
Lucky Four	CNBC	Zip	CNBC

**Figure 57.** Cartoon cross section of Cu skarn deposit showing relationship between contact metamorphic zones, ore bodies, and igneous intrusion.



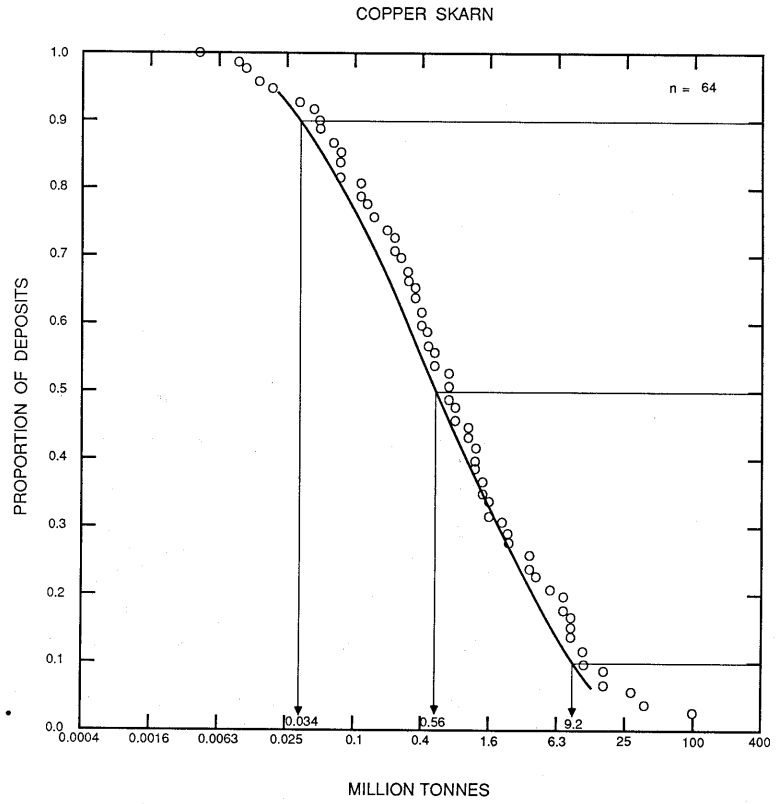


Figure 58. Tonnages of Cu skarn deposits.

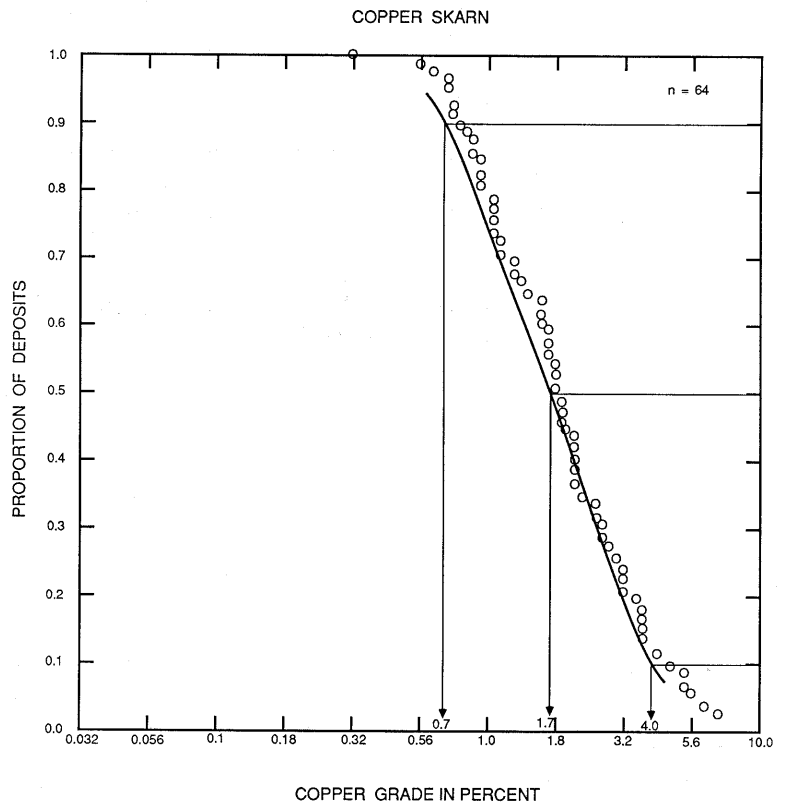
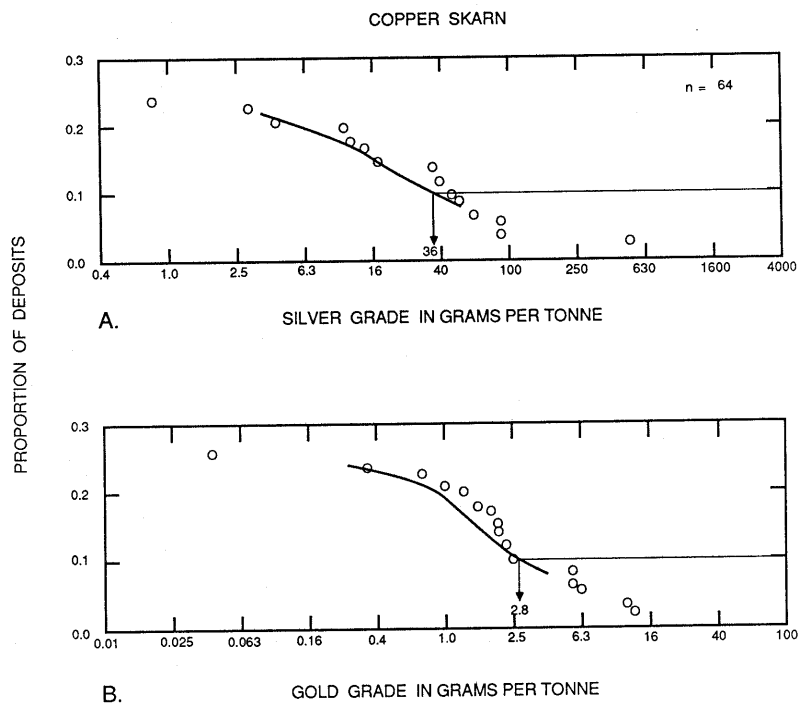


Figure 59. Copper grades of Cu skarn deposits.



**Figure 60.** Precious-metal grades of Cu skarn deposits. A, Silver. B, Gold.