

DESCRIPTIVE MODEL OF CLIMAX Mo DEPOSITS

By Stephen D. Ludington

APPROXIMATE SYNONYM Granite molybdenite (Mutschler and others, 1981).

DESCRIPTION Stockwork of quartz and molybdenite associated with fluorite in granite porphyry (see fig. 47).

GENERAL REFERENCE White and others (1981).

GEOLOGICAL ENVIRONMENT

Rock Types Granite-rhyolite with >75 Percent SiO₂. Rb, Y, Nb are high, Ba, Sr, Zr low. Stocks with radial dikes; small breccias common.

Textures Porphyry with fine- to medium-grained aplitic groundmass.

Age Range Examples are mainly mid-Tertiary.

Depositional Environment Multistage hypabyssal intrusions.

Tectonic Setting(s) Mainly extensional zones in cratons. May be related to subduction, but found far from continental margins in areas of thick crust, and late in the cycles.

Associated Deposit Types Ag-base-metal veins, fluorspar deposits. On the basis of similar geochemistry of associated rhyolite magmas, rhyolite-hosted Sn deposits may be a surface expression. Porphyry tungsten deposits, as at Mount Pleasant, Canada, may be W-rich Climax systems.

DEPOSIT DESCRIPTION

Mineralogy: Molybdenite + quartz ± fluorite ± K-feldspar ± pyrite ± wolframite ± cassiterite ± topaz.

Texture/Structure Predominantly in veinlets and fractures; minor disseminations.

Alteration Intense quartz and quartz + K-feldspar veining in ore zone. Upper phyllic and propylitic zones. Halo of rhodochrosite, rhodonite, spessartine garnet. Minor greisen veins below ore body.

Ore Controls Stockwork ore zone draped over small, <1 km² stocks. Multiple phases of intrusion and mineralization are highly favorable.

Weathering Yellow ferrimolybdite stains.

Geochemical Signature Mo, Sn, W and Rb anomalies close above ore zones. Pb, Zn, F, and U anomalies in wall rocks up to a few kilometers distant. Cu anomaly external to Mount Emmons deposit. In panned concentrates, Sn, W, Mo, and F may be important.

EXAMPLES

Redwell Basin, Winfield, Middle Mtn.
 Climax, Henderson,
 and Mt. Emmons, USCO (White and others, 1981)
 Pine Grove, USUT (Abbott and Williams, 1981)
 Mount Hope, USNV (Westra, 1982b)
 Big Ben, USMT (Witkind, 1973)

GRADE AND TONNAGE MODEL OF CLIMAX Mo DEPOSITS

By Donald A. Singer, Ted G. Theodore, and Dan L. Mosier

COMMENTS See figs. 48, 49.

DEPOSITS

<u>Name</u>	<u>Country</u>	<u>Name</u>	<u>Country</u>
Big Ben	USMT	Mount Hope	USNV
Climax	USCO	Pine Grove	USUT
Henderson	USCO	Questa-Goat Hill	USNM
Malmbjerg	GRLD	Redwell	USCO
Mount Emmons	USCO		

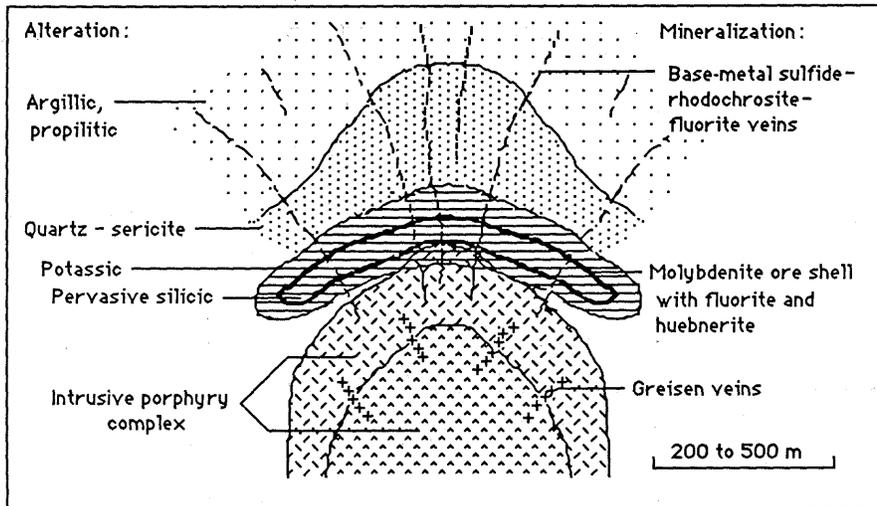


Figure 47. Cartoon cross section of Climax Mo deposit showing relationship of ore and alteration zoning to porphyry intrusions from Mutschler and others (1981). Cartoon represents a region about 1 km wide.

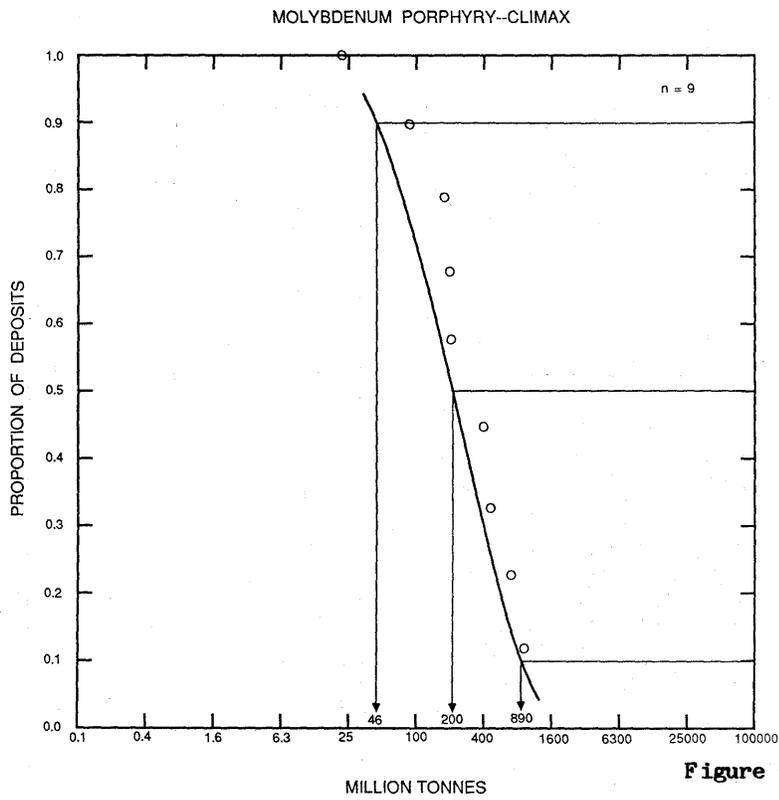


Figure 48. Tonnages of Climax Mo deposits.

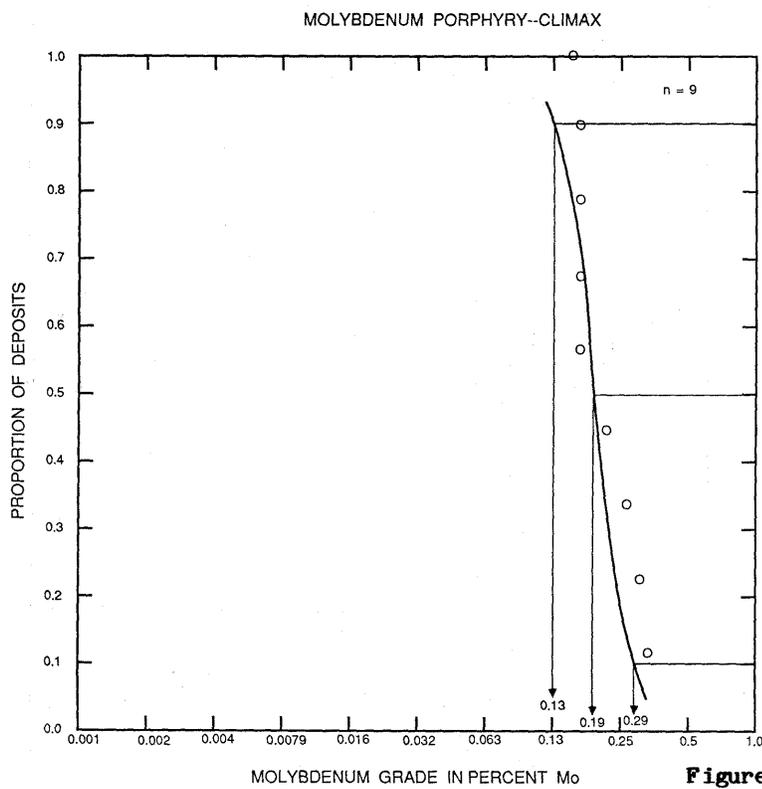


Figure 49. Molybdenum grades of Climax Mo deposits.