DESCRIPTIVE MODEL OF PORPHYRY Sn

By Bruce L. Reed

APPROXIMATE SYNONYM Subvolcanic tin (Grant and others, 1977).

DESCRIPTION Subvolcanic intrusive complexes containing disseminated, veinlet- and breccia-controlled fine-grained cassiterite in quartz porphyry and adjacent rocks.

GENERAL REFERENCE Grant and others (1980).

GEOLOGICAL ENVIRONMENT

Rock Types Intermediate to acid quartz porphyry stocks (quartz-latite, dacite, rhyodacite) and cogenetic talc-alkaline pyroclastics and lavas (quartz-latite to rhyodacite).

Textures Intrusions most closely associated with mineralization are strongly altered and brecciated quartz porphyry.

Age Range May be any age. Classic Bolivian porphyry tin deposits are Miocene. Subvolcanic W-Mo-Sn deposits at Mount Pleasant, New Brunswick, are late Carboniferous.

Depositional Environment Subvolcanic stocks emplaced 1 to 3 km beneath or within vents of terrestrial strato-volcanoes.

Tectonic Setting(s) Paleozoic foldbelt cut by subduction-generated high-level stocks and cogenetic volcanic rocks.

Associated Deposit Types Sn veins and Sn polymetallic veins.

DEPOSIT DESCRIPTION

Mineralogy Cassiterite and quartz accompanied by sulfide minerals (chiefly pyrite) but including pyrhotite, stannite, chalcopyrite, sphalerite, and arsenopyrite; late veins commonly carry complex sulfostannates and Ag minerals.

Texture/Structure Disseminations, veinlets, and fractures in igneous breccia and adjacent wallrock; stocks commonly funnel-shaped and 1-2 km^2.

Alteration Pervasive alteration and porphyry tin mineralization predates tin-silver veins; concentric zoning grades from a central quartz-tourmaline core (minor disseminated cassiterite), outward to sericite-tourmaline, sericite (closely related to disseminated cassiterite), and propylitic alteration; argillic alteration present in upper parts of some systems.

Ore Controls Porphyry mineralization is breccia controlled and centered on stocks emplaced in the inner, deeper regions of volcanoes; close relation between disseminated cassiterite and sericitic alteration; late fracture- controlled quartz-cassiterite and quartz-cassiterite-sulfide veins occur within or near the margins of intrusive centers.

Weathering Surface iron staining variable (pyrite); supergene enrichment unlikely; cassiterite may be concentrated in nearby placer deposits.

Geochemical Signature: Sn + B center; Sn, Ag, Pb, Zn, As, Sb, Cu, Ba in outer zone.

EXAMPLES

Chorolque, BLVA	(Grant and others, 1980)
Catavi (Salvadora stock, Llallagua), BLVA	(Sillitoe and others, 1975)