Age of Cu - Au - Ag mineralization at Copper Mountain: Part of a ~200 Ma copper episode in BC

Mitch Mihalynuk, James Logan and Vic Preto

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Introduction

A suite of older Cu-Au-Ag porphyry deposits and several small epithermal and volcanic rocks situated along the length of the Canadian Cordillera. These are the product of a prolific mineralizing event that occurred in the Late Triassic (~200–205 Ma) and may be coeval with the ~202 Ma Copper Mountain porphyry and its related mineralized veins. The timing of this event has been constrained by a variety of geochronologic tools, but the extent and magnitude of the mineralization and its spatial relation to the intrusions has yet to be fully tested. In northern Stikinia, this event is consistent with the results of initial data from southern Stikinia. The Stikine Terrane (to the northwest) corresponds to the Cordilleran belt of alkalic porphyry deposits (e.g. Iron Mask and Moroc, Ksini). Hence, these could be considered a package of older (Late Triassic) porphyry deposits that may have similar geologic characteristics to similar porphyry deposits found in the Cordilleran belt. This represents a significant exploration opportunity.

Time scale evolution

Early studies at Copper Mountain argued for relatively synchronous emplacement and mineralization of the Copper Mountain stock and those of both the Quesnel (Lockyer et al., 2000) and Stikine (Malcolm et al., 1995) terranes. However, a time scale revision in 1992 (Halden et al., 1992) placed the Triassic-Jurassic boundary back to 208 Ma, creating a ~15 Ma time gap between these two events and suggesting a subsequent emplacement of the Copper Mountain stock. This redefinition of the Triassic-Jurassic boundary, placing it at 208 ± 1.0 Ma, The Copper Mountain emplacement is now ~30–50 Ma earlier than suggested by previous studies. This raises the possibility of a similar ~30–50 Ma younger pulse, ~204 Ma, a chain of Cu-Au±Ag-laden porphyry intrusions was emplaced along the arc (Phinney et al., 1994). The best place on Earth

Geochronologic results

Our sampling of mineralization includes veins hosted by near-surface intrusions associated with the Copper Mountain stock and those of the Quesnel arc and Stikine terrane. We have used two different techniques: 40Ar/39Ar biotite (C) and U-Pb zircon (D) TIMS dating of mineralized veins. Metal contents are more robust than the Ar-Ar biotite exchange used in part this study for the Triassic-Jurassic boundary, 204 ± 2.0 Ma, as they are determined in a systematic age range and are measured by two independent techniques. This is beyond the capabilities of the Ar-Ar biotite method.

Mineralized arcs

Quenal Arc (BC) is also associated to the interior South (USA), a set of rift that begins in the Late Triassic near the end of the massive intrusions in the Quesnel section and continues into the southern Cordillera. In detail, it is a belt duplicated within the Cordilleran belt of alkalic porphyry deposits (e.g. Iron Mask and Moroc, Ksini). Hence, these could be considered a package of older (Late Triassic) porphyry deposits that may have similar geologic characteristics to similar porphyry deposits found in the Cordilleran belt.

To what sample

First samples were selected on the basis of silicified remobilization zones that contain medium-grained crystals of titanite for U-Pb determinations (A). The titanite used in this study is highly evolved, has a relatively high closure temperature for lead diffusion in titanite at 660–700°C (Scott and St. Peter, 1994). The titanite population in the Cu-Au-Ag porphyry intrusions (A) and the Cu-Au-Ag ore (B) was studied from the “Mine dykes”.

Copper Mountain deposit

In 2005, the company reported a resource of 4.9 million tonnes grading 0.35% Cu and 0.37 g/t Au and 0.57 g/t Ag at 0.45
tons ($40 million) (Montemont et al., 1995). It is located within the crystallographic age range of mineralization and its measurement is beyond the capabilities of the U-Pb zircon and biotite dating currently available to us.

Underground mining techniques have enabled extraction of the deep portions of porphyry deposits at economic scales. Often considered a relatively new innovation, “block caving” was originally developed for underground mining in Utah in 1958 (Parker, 1961). Early mining techniques utilized in underground mining of large tonnages, however, were well established with the recent emergence of mineralized porphyry deposits in British Columbia, especially within the Quesnel Terrane (Figure 2). Copper Mountain Mining Corp., has undertaken a series of underground mining techniques to minimize pollution and to develop “Mine dykes”.

What’s in it for you?

Abar of older Cu-Au-Ag porphyry deposits and several small epithermal and volcanic rocks situated along the length of the Canadian Cordillera. These are the product of a prolific mineralizing event that occurred in the Late Triassic (~200–205 Ma) and may be coeval with the ~202 Ma Copper Mountain porphyry and its related mineralized veins. The timing of this event has been constrained by a variety of geochronologic tools, but the extent and magnitude of the mineralization and its spatial relation to the intrusions has yet to be fully tested. In northern Stikinia, this event is consistent with the results of initial data from southern Stikinia. The Stikine Terrane (to the northwest) corresponds to the Cordilleran belt of alkalic porphyry deposits (e.g. Iron Mask and Moroc, Ksini). Hence, these could be considered a package of older (Late Triassic) porphyry deposits that may have similar geologic characteristics to similar porphyry deposits found in the Cordilleran belt.

Province-wide Potential

Contemporaneity of intrusion and hypogene mineralization at Copper Mountain and the coeval Quesnel and Stikine arcs. This represents a significant exploration opportunity.

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