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Paired Magmatic-Metallogenic Belts in Myanmar – an Andean Analogue?

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Myanmar (Burma) is richly endowed in precious and base metals, having one of the most diverse collections of natural resources in SE Asia. Its geological history is dominated by the staged closing of Tethys and the suturing of Gondwana-derived continental fragments onto the South China craton during the Mesozoic-Cenozoic. The country is located at a crucial geologic juncture where the main convergent Tethyan collision zone swings south around the Namche Barwa Eastern Himalayan syntaxis. However, despite recent work, the geological and geodynamic history of Myanmar remains enigmatic.

Plate margin processes, magmatism, metasomatism and the genesis of mineral deposits are intricately linked, and there has long been recognized a relationship between the distribution of certain mineral deposit types, and the tectonic settings which favour their genesis. A better knowledge of the regional tectonic evolution of a potential exploration jurisdiction is therefore crucial to understanding its minerals prospectivity. This strong association between tectonics and mineralization can equally be applied in reverse. By mapping out the spatial, and temporal, distribution of presumed co-genetic mineral deposits, coupled with an understanding of their collective metallogenetic origin, a better appreciation of the tectonic evolution of a terrane may be elucidated. Identification and categorization of metallotects within a geodynamically-evolving terrane thus provides a complimentary tool to other methodologies (e.g. geochemical, geochronological, structural, geophysical, stratigraphical), for determining the tectonic history and inferred geodynamic setting of that terrane through time.

Myanmar is one such study area where this approach can be undertaken. Here are found two near-parallel magmatic belts, which together contain a significant proportion of that country's mineral wealth of tin, tungsten, copper, gold and silver. Although only a few 100 km's apart, these belts exhibit a contrasting minerals endowment. The Mogok-Mandalay-Mergui (MMM) Belt hosts crustal-melt S-type granites with significant tin-tungsten mineralization, and contains the historically major tungsten deposit of Mawchi. The Wuntho-Popa Arc comprises I-type granites and granodiorites with porphyry-type copper-gold and epithermal gold mineralization, and includes the world-class Monywa copper mine. Recent U-Pb radiometric age dating has shown the potential for the two belts to be both active from the Late Cretaceous to Eocene.

The spatial juxtaposition of these two sub-parallel belts, the implication of contemporary magmatism, and their distinct but consistent metallogenic endowment bears strong similarities to the metallogenic belts of the South American Cordillera. Here we investigate whether they together represent the magmatic and metallogenic expression of an Andean-type setting in Myanmar during the subduction of Neo-Tethys. In this analogue the Wuntho-Popa Arc represents a proximal I-type magmatic belt sited immediately above the eastwards-verging Neo-Tethys subduction zone. Exhibiting porphyry-type copper-gold and epithermal gold mineralization, this would therefore be the Myanmar equivalent of the Andean coastal copper belts. Conversely, the parallel MMM Belt, comprised of more distal crustal-melt S-type tin granites, would have an analogue in the Bolivian tin belt.