The Geochemical and Geochronological Framework of the Monywa High Sulfidation Cu and Low Sulfidation Au-Epithermal Deposits, Myanmar

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High sulfidation epithermal-type Cu deposits and low sulfidation epithermal-type Au mineralization occur in the area west of Monywa City, Central Myanmar. The Monywa area is within a geanticline running the N-S extent of the country. The deposits include four known ore bodies (Sebataung, Sebetaung South, Kyisintaung, and Lepadaung) with an estimated resource of 2010 Mt @ 0.35% Cu (7 Mt contained Cu). Host rocks to mineralization are the Magyigon Formation; a series of andesite porphyry intrusive and extrusive facies and a rhyolitic suite of mixed volcanic rocks, hosting Cu deposits and Au mineralization, respectively. Zircon geochronology data show Cretaceous basement ages, Oligocene rhyolites forming between 27 to 24 Ma, and Miocene andesite porphyry; the oldest mineralized emplacement age being 19 Ma at Letpadaung.

A distinct temporal gap in volcanic activity at around 4 Ma occurs between the latest rhyolite and the earliest andesite porphyry. Furthermore, temporal and geochemical patterns for the emplacement of andesite porphyry bodies show a distinct phase of bulk rock K_2O enrichment. This phase of K_2O enrichment is possibly related to the grades and tonnage of the various Cu deposits in the Monywa mineralized district. Geochemical classification of both mineralized and barren lithologies deliver a tholeiitic composition on the majority of samples studied. Bulk rock geochemistry completed on a number of lithologies indicates a volcanic arc environment. Furthermore, these data indicate that the tectonic environment responsible for the ascent of magma related to Tertiary volcanism in Myanmar is an oceanic island-arc setting. Additionally, regional extensional processes appear to have played a role in the emplacement of the magma related to mineralization in Monywa.

With the setting responsible for magmatic evolution and migration are under oceanic island-arc conditions, it is likely that these processes led to the emplacement of the Central Volcanic Corridor; a broad corridor likely following the N-S–trending geanticline. Other regional scale tectonic processes probably occurred, affecting the geotectonic evolution of this geanticlinal structure. Crustal extension may have allowed for mantle wedge melting, altering the magmatic compositional trends toward tholeiitic. This process provides a model for the enrichment of Cu and Au in the underlying magmatic chamber that was responsible for Cu and Au mineralization in the Magyigon Formation of the Monywa district.