

Transition from High Sulfidation Epithermal Au to Porphyry Cu System and Associated Magmatism, Shangalon-Maharsan Area, North-Central Wuntho-Popa Arc, Myanmar

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The Shangalon-Maharsan Au-Cu ore districts lie in the southwestern part of the Wuntho massif within the Wuntho-Popa arc, northern Myanmar. The Wuntho-Popa arc extends from the Popa volcano in the south, through the Monywa high sulfidation copper deposit and Shangalon-Maharsan mineralization, and to the Taungthonlone volcano in the north. There are two districts we have studied that are 12 km apart: Shangalon and Maharsan. A middle Cretaceous batholith and younger plutons intrude Cretaceous or Jurassic basaltic andesite and andesitic pillow lava known as the Mawgyi Formation. Whereas Miocene-Eocene volcanic and intrusive rocks from the Shangalon ore district show a calc-alkaline to high calc-alkaline nature, Cretaceous or Jurassic volcanic rocks from Maharsan ore district have tholeiitic to calc-alkaline series features. The trace elements of plutonic and volcanic rocks from Shangalon are marked by significant enrichments in LILE (Cs, Rb, Ba, Th, and K) and depletions in HFSE (Nb, Ta, and Ti, with a high peak for Pb). These characteristics are similar to those typical of subduction-related rocks. The basaltic andesite from Maharsan shows lesser enrichments in Cs and Rb and a depletion in Nb.

In Maharsan, basaltic to dacitic andesite and andesitic silicified breccia host mineralization with the dominantly vein and manto type polymetallic sulfide ores that include chalcopyrite, sphalerite, galena, supergene sooty chalcocite, covellite, digenite, tennantite-tetrahedrite, and disseminated pyrite as identified by SEM-EDS. The predominant alteration minerals are kaolinite, sericite, chlorite, epidote, alunite, and pyrophyllite. In Shangalon, mineralization is hosted by a younger pluton comprising quartz diorite, diorite, and granodiorite, and the pluton is intruded by a tonalite-porphyry dike. The U-Pb zircon age of the dike and diorite yield ages of 37.35 ± 0.30 Ma and 38.01 ± 0.35 Ma, respectively. The mineralization age at Shangalon is probably younger than Eocene. The stock works of quartz-sulfide veinlets, sheeted quartz-sulfide-gold veins, and quartz-carbonate-sulfide-gold veins are dominant and also associated with disseminated sulfides. The ore-related minerals include chalcopyrite, pyrite, tennantite-tetrahedrite, bornite, and minor molybdenite and magnetite. Ore is closely associated with silicic alteration. Potassium feldspar is observed along the quartz vein as a halo, and rutile occurs along the cleavage of primary biotite that has been replaced by anhedral hydrothermal biotite in drill core. Open space veins, chalcedonic veins, and barren breccia occur outside of the zone of main mineralization. Alteration is strongly developed and hydrothermal breccia is widespread in the Shangalon-Maharsan mineralization area.

The geology of Maharsan-Shangalon supports possible multi-phase high-grade Au-Cu mineralization, which was controlled by the subduction and magmatic arc evolution. The mineralization style in Shangaon-Maharsan may be related to the deep transition from high-sulfidation epithermal to near top of a porphyry Cu-Au system.

