Characteristics of Sediment-Hosted Epithermal Deposits

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Gold-rich sediment replacement deposits, here called sediment-hosted epithermal deposits (SHEDs), form the most distal member of the sequence of intrusion-related deposits in zoned intrusion-centered camps. Economic SHED mineralization has been shown to be largely restricted to Neogene volcanic arcs at convergent continental or island-arc plate margins. Examples of this important class of deposits include Sihayo-Sambung and Mesel (Indonesia), Bau (Malaysia), Sepon (Laos), Gualcamayo (Argentina), Jeronimo (Chile), and Ada Tepe (Bulgaria).

SHEDs have been called Carlin-style; however, they are more likely to be related to the distal part of mineralized porphyry intrusive centers. The critical features that define the SHED style of mineralization include lithological and structural control, enrichment in Au-As-Sb, silicification (jasperoid) and carbonate alteration, the close spatial association with porphyry and related styles of epithermal mineralization, and isotopic evidence for a magmatic contribution to metals and hydrothermal fluids. These characteristics are more similar to carbonate-replacement deposits than to typical Carlin-type sediment-hosted gold deposits.

Gold is submicron in size, locked in very fine (<10 μm) disseminated and fracture controlled pyrite, arsenical pyrite, and arsenopyrite or in the linings of vugs in late-stage quartz veins. Primary mineralization is therefore refractory in nature and requires oxidation of sulfide before conventional cyanidation treatment. The fringes of many well-endowed porphyry and skarn districts hosted by carbonate and or carbonaceous sequences, beyond all known base-metal mineralization, are a prime location to explore for SHEDs.