

ORIGIN AND AGE OF GOLD DEPOSITS AT SÃO BENTO AND MORRO VELHO, BRAZIL

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São Bento is a syngenetic gold deposit hosted by carbonate-facies iron-formation. Pb-Pb analyses of mineralized and non-mineralized rocks define an age of 2.72 Ga for the electrum-arsenopyrite-pyrrhotite-pyrite deposit and host rocks. Chemical analyses of mineralized and non-mineralized rocks show no alteration of the host rocks. Ore textures are metamorphic; syngenetic, low-temperature arsenopyrite is overgrown by moderate-temperature arsenopyrite. Gold is highly correlated with arsenic as invisible gold in arsenopyrite. Au/Ag ratios in electrum are constant. Gas geochemistry of quartz veins that parallel a weak foliation reveals that the veins were generated in-situ during regional metamorphism. Only very minor gold remobilization is associated with the veins. São Bento strongly resembles Homestake and Jardine in the U.S. and Lupin in Canada. Preliminary data from Cuiabá and Lamego, situated between São Bento and Morro Velho, suggest that they are syngenetic deposits associated with carbonate-facies iron-formation. Morro Velho is an epigenetic gold deposit hosted by the Lapa Seca, a dolomite and iron-rich dolomite. Pb-Pb analyses of mineralized and non-mineralized rocks define an age of 2.82 Ga for the electrum-arsenopyrite-pyrrhotite-pyrite-chalcopyrite-ullmannite deposit. The Lapa Seca is older and undated. Chemical analyses of mineralized rocks show extensive iron enrichment and light-rare-earth depletion adjacent to and within disseminated to massive sulfide ore zones. Ore textures are epigenetic. Mineralization may have taken place after isoclinal folding of the Lapa Seca. Sulfide minerals are notably euhedral to subhedral. Gold is correlated with copper. Au/Ag ratios in electrum are highly variable. Morro Velho lacks extensive quartz veins and has minor remobilization of gold. Mineralization at Morro Velho may have taken place in a shelf environment by replacement processes associated with syngenetic mineralization in a nearby restricted marine basin.