

Miaolong sediment-hosted antimony-gold deposit, Sandu-Danzhai metallogenic belt, Guizhou Province, China: A product of antimony mineralization superimposed by late gold mineralization

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The Sandu-Danzhai metallogenic belt in southeastern Guizhou Province contains a series of Hg, Au, and Sb deposits and occurrences. The Au systems exhibit many of the characteristics of the Youjiang Basin sediment-hosted Au deposits located at the junction of Guizhou, Yunnan and Guangxi districts, which are geologically similar to the Carlin-type Au deposits in Nevada, USA. It is still debated whether these Au, Hg, and Sb deposits and occurrences formed during the same hydrothermal event or during discrete hydrothermal events. The Miaolong deposit, an Sb-Au deposit in the Sandu-Danzhai Hg-Au-Sb metallogenic belt, has been studied to determine the sequence of Au, Hg, and Sb mineralization, and to determine its similarities to and differences from Youjiang Basin Carlin-like Au deposits.

Ore and alteration minerals and textures at the Miaolong Sb-Au deposit indicate that the deposit formed during two discrete hydrothermal events comprised of early Sb precipitation and later Au precipitation. Textural relationships of the Sb mineralization indicate early to late precipitation of quartz-Fe dolomite, chalcostibnite, stibnite-calcite, native Sb. Stibnite is the common Sb-bearing mineral. Native Sb and chalcostibnite, which also contains Sb, occur in trace amounts at Miaolong. Native Sb, a rare mineral in nature but identified in the Miaolong deposit, typically encompasses stibnite or fills cracks in stibnite indicating it was the latest mineral to precipitate during Sb mineralization. The native Sb formed from an evolved late-ore fluid with unusually low sulfur and oxygen fugacities. We suggest that the black carbonaceous shale and/or carbon-rich matter at Miaolong provided reducing conditions responsible for the formation of native Sb in this deposit.

Au-bearing arsenopyrite, Au-bearing arsenian pyrite, jasperoid, dolomite and illite precipitated during the Au event at Miaolong. These minerals crosscut, encompassed, or replaced minerals that formed during Sb mineralization, confirming the mineral paragenesis. The mineral assemblages and alteration that formed during the Au event are quite similar to mineralization in the Carlin-like sediment-hosted Au deposits in the Youjiang Basin.

The presence of early Sb mineralization and later, crosscutting Au mineralization in the Miaolong deposit is consistent with the formation of the Sandu-Danzhai Hg-Au-Sb metallogenic belt during at least two discrete hydrothermal events, with the later Au event being similar to the Carlin-like mineralization in Youjiang Basin. The relationship of Hg to Au and Sb mineralization in this metallogenic belt remains to be determined.