

Igneous-Rock Hosted Orogenic Gold Deposit at Hog Mountain, Tallapoosa County, Alabama

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The discovery and production of gold from epithermal and volcanogenic massive sulfide deposits in the Carolina slate belt of the southern Appalachians perhaps has overshadowed the gold potential of orogenic gold deposits in relatively higher grade metamorphic terranes of the southern Appalachian Piedmont. There has been a limited amount of exploration in the non-Carolina slate belt southern Appalachians since early 1980s. Here we describe some of the recent exploration activity and geology of gold occurrences in the most productive part of the Alabama Piedmont, including the Goldville and Devil's Backbone districts.

The Hog Mountain deposit (historically the largest producer both in the district and in Alabama) is located in northern Tallapoosa County, Alabama. Gold in the district is typically located in schists and phyllites of the Wedowee Group. Most of the Wedowee Group phyllites and schists in the Goldville district contain garnet zone metamorphic assemblages, with biotite, muscovite and quartz. Gold at Hog Mountain deposit occurs in quartz veins hosted by an equigranular granitoid intrusion consisting principally of plagioclase, quartz, and biotite with metamorphic garnet and described as quartz diorite or tonalite/trondhjemite. The gold-bearing veins at Hog Mountain cut across synkinematic, synmetamorphic tonalite plutons and therefore appear to have been emplaced later than Goldville veins, slightly after the peak of metamorphism. Veins at Hog Mountain comprise predominantly quartz, typically with a dark blue color, minor plagioclase, and muscovite, and as much as 10% sulfide minerals, consisting of pyrrhotite, chalcopyrite, and arsenopyrite, all visible in hand samples and cores.

In this area, there is a strong geochemical association of gold and arsenic in bedrock, saprolite, and soils, which reflects the mineralogical association of gold with arsenian pyrite and arsenopyrite in mineralized zones. These orogenic-type gold systems formed during the final assembly of Pangea in the region, and are thus coincident with the Alleghenian orogeny, which records the collision of proto-North America with proto-Europe-Africa during the Carboniferous. Thus, mineralization is inferred to have been coincident with peak metamorphism, deformation, and faulting. The general geologic setting of gold deposits in the Alabama-Georgia Appalachian Piedmont has, therefore, many similarities to other quartz vein-hosted gold systems in metasedimentary sequences including the Otago schist, South Island, New Zealand, and Bendigo-Ballarat area of Victoria, Australia.