

Disseminated Orogenic Gold Mineralization in High-Grade Metamorphic Turbidites of the Central Zone of the Damara Belt, Namibia: Controls and Characteristics

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The recently discovered Twin Hills deposit is a large (>12-km strike length), disseminated, low-grade mineralized gold-sulfide (pyrrhotite > arsenopyrite » pyrite) system hosted by amphibolite-grade metaturbidites of the Pan-African Damara Belt of central Namibia. The deposit comprises distinct clusters of economic-grade gold mineralization, measuring several hundred meters along strike, separated by several kilometer-long intervals of only sporadic and sub-economic gold grades. Individual higher-grade clusters are controlled by the combination and interplay of two main factors, namely lithological contacts and subtle deflections of bedding of the highly-strained, subvertical metaturbidites. The ENE-trending mineralized corridor of the Twin Hills deposit is largely confined to imbricated and/or tightly folded packages of interbedded metapsammities-metapelites within the otherwise metapelite-dominated sequence. It is these units that promoted fracturing, fluid flow, and the development of fine-scale vein networks as a result of pronounced strain partitioning between schist units (ductile) and interbedded metapsammities (brittle) during regional deformation (flexural-slip folding). Clusters (shoots) of higher-grade mineralization (>1.5 g/t Au) follow these main lithological contacts, but are laterally confined to subtle (5°–15°) clockwise deflections of bedding (dilatational jogs) from regional ENE trends. Outside these deflections, gold mineralization is patchy and only sub-economic. On a regional scale, the position of the Twin Hills deposit coincides with the inflection of the vergence direction of regional-scale first-order folds. The structural and lithological controls on the mineralization at Twin Hills closely resemble those of orogenic gold deposits, but the fine-grained and dispersed textures of gold and associated sulfide mineralization are more reminiscent of those found in disseminated gold deposits.