Petrology and gold grade variations in different lithologies at the Dachang Gold Deposit, Qinghai, China

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This study assesses the nature of gold mineralization hosted at the Dachang prospect, a complex, structurally controlled gold deposit located within metasedimentary rocks (sandstone, siltstone, and shale) of the Bayan Har orogenic belt in the Eastern Kunlun Mountains, Qinghai, China. It involves a petrologic investigation of gold-mineralized samples, and an analysis of the gold-grade distributions and duplicate samples of mineralization. Eight distinct mineralization types are recognized. All contain variable amounts of pyrite, arsenopyrite, and subordinate stibnite; most are hosted in or adjacent to quartz ± calcite veins, stockworks, replacements, or fault zones. Mineralization is hosted by different lithologies, consisting of: sulphide minerals replacing matrix in: siltstone and shale (type AA), sandstone (type AB), interbedded siltstone and sandstone (type AC), highly fractured, quartzose sedimentary rocks (type AD); disseminated sulphide minerals in fault gouge (type B); silicified stockwork with extensive quartz veins (type C); a type transitional between types B and C (type D); and sheared sedimentary rocks with 30–40% stockwork (type E). The gold-grade distributions in these mineralization types vary, as indicated by gold-grade histograms. The sampling reproducibilities of these mineralization types also differ, as demonstrated by sample duplicates, which indicate that each mineralization type has a different-sized nugget effect. Numerical assessments of sample duplicates not only characterize the magnitudes of these nugget effects, but also allow determination of how large a sample needs to be collected from each mineralization type to reduce sampling error to an acceptable level. Results from this study will assist Inter-Citic Minerals, the project operator, to collect samples of appropriate size in future drilling programs, and to accurately characterize the grade distributions and petrology of mineralization types for metallurgical purposes in future feasibility studies.

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