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Geology of the Golddigger Intrusion-Related Gold Deposit in British Columbia, Canada

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Goliath Resources' Golddigger exploration project is located at the southern tip of the Golden Triangle of British Columbia, which is a region known for its unusual precious metal endowment. Extensive drilling in 2021 and 2022 revealed the presence of several high-grade sulfide-bearing quartz veins. The Surebet Zone is the main ore occurrence, which occurs as a planar 1.6-km² orebody that is crosscutting folded sedimentary strata assigned to the Hazelton Group. Ongoing research will unravel the ore-forming processes, timing, and mineral associations to inform ongoing exploration. The research includes core logging, whole-rock geochemical analysis, transmitted- and reflected-light microscopy, cathodoluminescence microscopy, scanning electron microscopy, fluid inclusion petrography, sulfur isotope studies, and Re-Os isotope dating. Initial petrographic investigations revealed that quartz formation occurred at conditions close to the brittle-ductile transition. Early vein quartz has been affected by intense recrystallization and is interpreted to have formed at lithostatic conditions, whereas late vein quartz forms euhedral crystals that formed at hydrostatic conditions. Early fluid inclusion populations have been affected by reequilibration during the pressure change from lithostatic to hydrostatic conditions. High CO₂ contents in primary and secondary fluid inclusion assemblages suggest that the deposit formed at a significant depth, likely >5 to 6 km below the paleosurface. The sulfide minerals postdate both generations of quartz. This includes pyrrhotite, galena, and sphalerite with minor pyrite and chalcopyrite. High Au and Ag assay values correlate with the occurrence of native gold and silver-rich tetrahedrite. Current evidence suggests that the mineralization is genetically linked to a deep intrusion within the Alice Arm region. Classification of Golddigger as an intrusion-related gold deposit opens up new opportunities for exploration within the region.