

### **Eocene Intrusion-Related Gold in the Golden Triangle of British Columbia**

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The Golddigger property of British Columbia is a recently discovered gold prospect hosting a series of base and precious metal-rich quartz veins. It is in the Golden Triangle of British Columbia, a region home to several noteworthy gold and silver producers, past producers, and prospects. Most Au-Ag systems in the Golden Triangle are believed to be related to the Mesozoic Stikine island arc, and early workers interpreted Golddigger to be a Mesozoic epithermal deposit. Extensive field research was conducted at Golddigger during the 2022-2024 drilling seasons and complemented by laboratory work to unravel the nature and timing of mineralization. Petrographic investigations, cathodoluminescence imaging, and fluid inclusions petrography reveal two distinct generations of quartz. Early quartz formed under lithostatic conditions whereas later quartz was deposited under hydrostatic conditions. The elevated CO<sub>2</sub> content in primary fluid inclusions entrapped at hydrostatic pressures suggests that the paleodepth of vein formation was >5-6 km below the paleosurface. Paragenetic relationships indicate that the sulfides and precious metals post-date both generations of quartz. Enrichment of Au-Bi is most pronounced in quartz veins overprinting ilmenite-series granitoid dikes and volcanic host rocks whereas enrichment of Ag-Sb occurs further away from the inferred causative intrusion within sedimentary host rocks. There is textural evidence that the CO<sub>2</sub>-rich hydrothermal fluids responsible for mineralization underwent phase separation, which was accompanied by exsolution of Au-Bi-Te and Ag-Sb-S melt droplets – a process that has not previously reported to occur in hydrothermal environments. Geochronological investigations yielded a zircon U-Pb age of  $52.0 \pm 1.5$  Ma for the granitoid dikes crosscut by the mineralized veins and a molybdenite Re-Os age of  $50.7 \pm 1.0$  Ma for the sulfides. The study demonstrates that Golddigger is an Eocene intrusion-related deposit, which has significant exploration implications at the Golddigger property and the greater Golden Triangle.