

# SEG 2022 Conference: Minerals For Our Future

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## **Epithermal Gold Mineralization Hosted in an Ophiolite: a Case Study of the Malabeg Prospect, Zambales Ophiolite Complex, Philippines**

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An intermediate sulfidation epithermal mineralization was recently recognized in the Malabeg Prospect situated within the Zambales Ophiolite Complex and flanked by the Bataan Volcanic Arc in Luzon Island. NW-trending quartz-adularia veins are hosted in the serpentinized harzburgite and diabase dikes of the Cabangan Massif. Gold-bearing veins and floats were discovered to have grades of up to 74 ppm gold.

The alteration and mineralization stages were determined through petrography, XRD and SEM-EDX. Stage 1 consists of talc, pyrophyllite and magnesite, which were produced from alteration of the serpentinized peridotites. Stage 2 consists of carbonates such as magnesite and dolomite at the rims of and as veins cutting Stage 1 talc-carbonates. Stage 3 consists of quartz-carbonate veins. Arsenopyrite is present in both Stages 2 and 3, wherein it cuts both quartz and calcite. Stage 4 consists of quartz-adularia veins where massive, comb and brecciated textures were observed. Ore mineralogy consists of chalcopyrite ± pyrite + galena + sphalerite ± electrum. Supergene alteration is represented by iron oxides, pyrolusite and secondary covellite.

Mean iron-sulfide mole percent for nine sphalerite points coexisting with pyrite and pyrrhotite is 14.91. Two-phase fluid inclusions were found in Stage 4 quartz-adularia veins. Modal homogenization temperatures range from 180-200 °C while salinity values range from 3.87-7.6 wt.% NaCl. Sulfide mineralogy, homogenization temperature, and iron-sulfide mole percent of sphalerite indicate an intermediate sulfidation state for the quartz-adularia veins of the Malabeg prospect.

The results suggest listwanitization of the serpentinized peridotites (Stages 1-3) through reaction with intermediate sulfidation fluids from a magmatic source possibly related to the Bataan Volcanic Arc. The high buffering capacity of the peridotites lowered the sulfidation state of the initial system, resulting to precipitation of arsenopyrite. The shallow depth of the listwanitized zone made it susceptible to brittle deformation, where subsequent IS fluids precipitated the quartz-adularia veins.