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Gold Mineralization at the Tuvatu Alkalic Epithermal Au-Ag Telluride Deposit, Viti Levu, Fiji

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The Tuvatu deposit is an alkalic epithermal Au-Ag telluride deposit located on the island of Viti Levu in Fiji. The deposit lies in the southwestern corner of the Navilawa caldera along the ENE-trending Viti Levu Lineament, which controls the location of a series of important alkalic epithermal deposits. The Tuvatu deposit is hosted within a ~4.85 Ma monzonite that intruded into the Neogene volcanic succession exposed within the Navilawa caldera.

Gold mineralization at Tuvatu occurs over a strike length of almost 900 m, has a vertical extent of more than 500 m, and remains open at depth. Different vein stages have been recognized. Most of the gold occurs as native gold in paragenetically late quartz veins that are typically narrow (<4 cm). In addition to native gold, telluride minerals occur in variable amounts in these quartz veins, and include calaverite, sylvanite, hessite, stützite, altaite, and coloradoite. The native gold and telluride minerals form dendritic aggregates that occur together with delicate, fan-shaped roscoelite aggregates within a matrix of mosaic quartz. The mosaic quartz is interpreted to have formed through recrystallization of non-crystalline silica. As part of this study, pyrite contained in the quartz veins was investigated for the presence of invisible gold. Backscattered electron imaging of pyrite grains showed that As zoning is common. LA-ICP-MS trace element analysis confirmed that there is a close correlation between As and Au enrichment in pyrite and demonstrated that pyrite at Tuvatu contains invisible gold. Ongoing investigations focus on the quantitative evaluation of the contribution of invisible gold to the overall gold budget at Tuvatu. Although existing metallurgical studies indicate expected gold recovery of 87 to 92 percent at Tuvatu, invisible gold could have implications for future recovery at this and other alkalic epithermal Au-Ag telluride deposits on Viti Levu.