

OROGENIC GOLD DEPOSITS IN TAPAJÓS MINERAL PROVINCE, AMAZON, BRAZIL

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In Tapajós Mineral Province located on the Amazon Craton gold-bearing quartz veins occur and were formed during compressional to transpressional deformation processes at convergent plate margins in accretionary orogen. The deposits show features of both Archaean lode-gold mesothermal deposits and epithermal precious-metal mineralization. The gold mineralization is associated with metamorphic terranes (greenschist facies), and postdates peak regional metamorphism. The gold occurs in a variety of host-rocks in quartz veins (lode-gold), but stockworks and breccia are also developed. Alkali metasomatism represents the most expressive wallrock alteration. The deposits are polymetallic quartz veins with ~5% of sulphides. The lead isotopic compositions suggested two phases of mineralization at 1.96 Ga and 1.88 Ga. The involvement of deep crustal Pb within the ore fluids indicates deeply sourced fluids. Fluid inclusions are: H₂O-CO₂, CO₂-rich and H₂O types with various amount of CO₂ indicating different P and T conditions. Oxygen and hydrogen isotopes show a restricted range of $\delta^{18}\text{O}_{\text{quartz}}$ values and fit on the magmatic fluid and juvenile water fields. Meteoric water was added to the hydrothermal system at upper crustal levels. The Tapajós gold mineralization represents Proterozoic mesozonal to epizonal gold deposits deposited from a similar, but variously evolved, ore fluid at a variety of crustal depths. This model suggests that the shallow deposits are seated on the east side of the province, where the pluton-volcano system is well preserved, while the deposits with transition character occur mostly in the basement (central domain), where the erosion level has a profound influence on preservation.