

Multiple mineralization stages and relative timing of gold distribution in the Satinoco Deposit, NW of Quadrilátero Ferrífero, Brazil

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Satinoco is an Archean orogenic gold deposit located in a succession of metavolcanic mafic and ultramafic rocks that were intruded by granitic magma. Several Au-bearing sulfide mineralization stages were revealed by X-ray element maps acquired by electron microprobe, and reconstructed with the support of garnet porphyroblasts, whole rock geochemistry, geothermometry, and structural relationship of the granite apophyses.

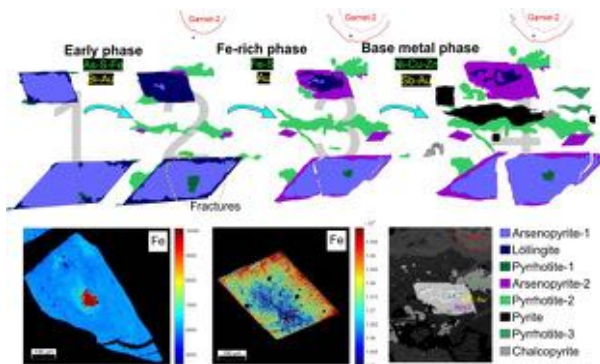


Fig. 1: Schematic geological evolution of the Satinoco deposit based on gold-bearing sulfide phases; also shown are EPMA element maps of Fe in arsenopyrites from first two au-bearing sulfide stages.

An early arsenopyrite-löllingite-pyrrhotite stage developed during prograde metamorphism (~468 to 650 °C), associated with progressive dehydration of the host rocks and induced by the emplacement of 2.66 Ga granite that likely also contributed some magmatic fluid. A subsequent Fe-rich hydrothermal stage generated a pyrrhotite-arsenopyrite assemblage upon cooling from c. 500 to 440 °C towards the end of granite emplacement. A further, base metal-rich, mineralization stage (Pb-Sb-Cu-Zn-Au) with pyrite-pyrrhotite-chalcocopyrite-galena-ullmannite is ascribed to thermal re-equilibration during a post-tectonic event at upper greenschist-facies metamorphic conditions.