REVEALING MULTISTAGE EVOLUTION OF THE PAPAGAIOS GOLD DEPOSIT THROUGH PYRITE TRACE ELEMENTS GEOCHEMISTRY, PITANGUI GREENSTONE BELT, SÃO FRANCISCO CRATON

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The Papagaios gold deposit is located at northern portion of the Archean Pitangui Greenstone Belt (PGB), São Francisco Cranton. The mineralization is hosted primarily in metavolcanic mafic-ultramafic rocks, carbonaceous phyllites, meta-banded iron formations, and within granitoids. The main lodes comprise gold-sulfide assemblages in quartz-sericite veins that are structurally controlled by local ENE-WSW shear zones. In these lodes, gold occurs free and associated with sulfide assemblages of sphalerite + galena + chalcopyrite + pyrite ± arsenopyrite ± marcasite in silicified zones. Trace element geochemistry was performed in three pyrite types. Pyrite I (py I) corresponds to xenomorphic coarse-grained crystals that occurs disseminated in distal chlorite hydrothermal alteration zones and preceded Sn mylonitic foliation. Idiomorphic fine-grained pyrite II (py II) occurs disseminated in distal chlorite zone and is syn to post Sn mylonitic foliation. Pyrite III (py III), however, occurs disseminated in silicified main lodes as coarse-grained idiomorphic crystals enveloping galena, sphalerite and chalcopyrite crystals. All three pyrite types have different geochemical signatures. Geochemical correlations showed that py I and py II has VHMS pyrite signature, whereas py III showed Orogenic Au pyrite signature. Selenium thermometry also showed different average crystallization temperatures for py I (~280°C), py II (~340°C) and py III (~170°C), sustaining that each pyrite was formed under different physico-chemical conditions. As-Au relation indicates that all samples fall below the Au solubility lines of Carlin-Epithermal and Orogenic Au deposits. In this case, Au occurs as dissolved nanoparticles in pyrite lattice. Py III has a vertical trend in As-Au correlation graph, suggesting that the gold enrichment is not associated with As content, but possibly controlled by temperature decreasing. These preliminary results suggests that gold mineralization at Papagaios deposit was likely formed in a multistage evolution. In the early stages of formation, VHMS-like signatures are recorded in pyrite I, though there is no evidence of a VHMS style of mineralization. Although, the absence of VHMS feature may be due to an overprint by the main stage of gold mineralization with hydrothermal fluids that circulated during orogenic stage. In this sense,

early precipitation of sulfides in the VHMS stage may had provided some metals for the main Orogenic Au mineralization.
Keywords: Greenstone Belt Pitangui; Orogenic gold; Trace element geochemistry