

## **Hydrothermal alteration and styles of mineralization of the Santa Lúcia Copper deposit, Carajás Province.**

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The Santa Lúcia Cu-(Au) deposit is located in the Carajás Domain (CD), north of the Carajás Province (CP), southern part of the Amazon Craton. This deposit represents one of the new targets of exploration of the OZ Minerals, which is currently in the pipeline to become a copper mine in the CD. The Santa Lucia deposit is a shallow, low tonnage, high grade copper deposit with subordinate contents of gold and zinc. Despite previous studies, many questions about metallogenetic evolution and genetic models of the Santa Lúcia deposit remains unclear. In this work, we present a general overview of the deposit based on six drill cores and we show the hydrothermal alteration halos and styles of mineralization. Host rocks include mainly felsic volcanic rocks from the Neoproterozoic Grão Pará Group and fine-grained granitoids of unknown age, which were intensely affected by hydrothermal alteration. Pegmatite bodies crosscut the host rocks and hydrothermal alteration halos, but its relation with mineralization remains unclear. Hydrothermal alteration is widespread all over the deposit predominantly with a greisen-type alteration. The latter consists of widespread muscovite + tourmaline  $\pm$  quartz, forming muscovite-rich mylonitic rocks in some portions. Chlorite (chlorite + quartz) and potassic alteration (K-feldspar) also appear, but its relation with the greisen-type alteration remains dubious. These zones envelop the ore zones, which commonly crosscut the hydrothermal halos. Five styles of hypogene mineralization can be seen, but likely formed in the same hydrothermal event. Those include (i) chalcopyrite disseminated along the foliation, (ii) fronts and pockets of chalcopyrite, (iii) quartz-chalcopyrite veins, (iv) quartz-chalcopyrite breccias, and (v) massive sulfide. The ore zones are chiefly comprised by chalcopyrite and pyrite with restricted portions with sphalerite and molybdenite. This hypogene hydrothermal mineralization is altered to supergene assemblage with bornite, chalcocite, cuprite, native copper, malachite and chrysocolla, which define the oxidized and transitional ore zones in the Santa Lúcia deposit. Our results demonstrate that Santa Lúcia deposit is a unique type of copper deposit in the CD with high grade copper zones within a greisen-type alteration. These results show that copper metallogeny in the southeastern part of the CD, particular in the Canaã Shear Zone, may extend beyond the large tonnage IOCG deposits.

**Acknowledgements:** This research was funded by ADIMB (Agência para o Desenvolvimento e Inovação do Setor Mineral Brasileiro) and OZ Minerals. The first author would like to thank CAPES for its scholarship, PROEX and PPGEARN (UFOP) for funds.