GENESIS OF BASE METAL DEPOSIT IN THE CAMAQUÃ BASIN (RS) AND GUIDES FOR THE MINERALIZATION

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ABSTRACT

The Santa Maria Zn-Pb-(Cu)-(Au)-(Ag) deposit is hosted in the volcanic-sedimentary sequences of the Ediacaran Santa Bárbara Group, which is composed mainly by siltstones and arcosean sandstones with subordinated sedimentary breccias and polymictic conglomerates. This sequence is crosscut by amygdaloidal andesites *sills*. The mineralization is predominatly stratabound, up to 200 meters in deep, and is associated to inverted cone-shape hydrothermal zones controlled by faults. The ore is composed of sphalerite and galena-rich veins and veinlets, with minor copper sulfides, as well as disseminations in sedimentary rocks. A pervasive illitic/sericitic alteration characterized by intense leaching of the host rock envelops the mineralization, fine-grained muscovite and illite, pyrite and silicification is common. Copper mineralization occurs mainly associated to faults. At shallower levels the ore mineral is chalcocite, and at depths more than 400 meters, chalcopyrite, bornite and galena predominates. These ore minerals fill fractures with quartz and carbonate with chloritic alteration halo, with some hydrothermal biotite, superimposed on sericitic alteration. Stockworks with galena veins and high-grade copper mineralization with chalcopyrite, and intense silicification are also identified. Silver and very fine-grained (invisible to the naked eye) native gold are present throughout the deposit associated with sulfide-rich veins. These present adularia, spatic and platy calcite indicating that the ore precipitation is possibly related to boiling process. A late structurally controlled carbonate alteration, with siderite, ankerite, calcite and pyrite occur in all areas, and hydrothermal hematite alteration may occur near the surface. These characteristics suggest an intermediate-sulfidation epithermal origin for the Zn-Pb-(Au)-(Ag) Santa Maria deposit, with chalcopyrite in deeper parts possibly representing distal veins over/lateral to a buried porphyry system. Hydrothermal alterations vector to the mineralization are: distal fissure-controled illitic, proximal pervasive sericitic/illitic alteration with adularia. Chloritic alteration is mainly associated to faults and to deeper levels, where hydrothermal biotite suggests temperature increase and incipient potassic alteration. These vector is confirmed by geothermometry (96ºC to 345ºC), illite crystallinity (0,124 to 0,466 Δº2□), and W, Mo, Tl, Ba and Sr content increase.

Keywords: Sericite; Chlorite; Copper; Epithermal; Boiling.