COPPER MINERALIZATIONS CONTROLLED BY BRITTLE STRUCTURES FROM SEIVAL MINE, NEOPROTEROZOIC-CAMBRIAN CAMAQUÃ BASIN, SOUTHERN BRAZIL

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This study was developed in the Seival Mine, located in Lavras do Sul region, which is composed by volcanoclastic rocks and andesitic dikes associations, belonging to the Hilário Formation. This formation is positioned in the stratigraphic base of the Bom Jardim Group which compounds the depositional sequence of the greater Camaquã Basin, of Neoproterozoic depositional age (Ediacaran-Cambrian). These associations were deposited following evolved tectonic stages of South Rio-grandense shield, controlled by N45°W (Ibaré Lineament) and N40°E (Caçapava do Sul anomalous zone) oriented shear zones. The mineralization is identified in 6 inactive mines with an average of 0.6-2.5% of copper and 15-70 ppm of silver. In the Camaquã Basin, the copper and copper-gold mineralization occurs mainly in the Bom Jardim and Santa Bárbara Groups. For the region of Lavras do Sul, the rocks from Seival Mine does not show any influence from the metamorphic contact with the Lavras do Sul granite unlike the other copper deposits near the area. Until now, a few studies have being developed to understand the mineralization process and its main control in the region. Whit this premise, we performed structural analysis dividing the description into macro (remote sensing data) and meso (fieldwork structural measurements) scales. We have also used an optical microscope and x-ray diffractometry to determine the mineralogy and alteration assembly. The faults and fractures hosting mineralization show intense hydrothermal alteration in areas of highest brittle deformation, locating most of the influence of a hydrothermal mineralization halo in rocks near fault boundaries. The mineralization occurs at the intersection of main NE and NW (> 100 meters) oriented fault plans and near to pyroclastic deposits and lava flow pile lithological contacts. The andesitic and trachy-andesitic dikes occur along NE oriented structures and belongs to the lavas of the Hilário volcanism and may have contributed to the re-circulation of fluids in the volcanic rocks favoring the remobilization and precipitation of the ore minerals in the fault plans. The intense fracturing generates stockwork structures filled by clay (chlorite, mix chlorite-smectite and corrensite), calcite and barite. Structural measurements enable to determine an N-NE major trend for the mineralization and, consequently, for hydrothermal alteration halos. Reactivation of brittle structures, that hosts the copper mineralization, is well preserved in the fault plans and represented by horizontal and vertical fault slickenlines, featuring dominantly transcurrent and normal movements. In this context, we conclude that the mineralization was controlled by brittle structures without any influence of contact metamorphism generated by igneous adjacent rocks, which also hosts hydrothermal clays and copper deposits. These sulfides are remobilized by strain-relief areas characterized by intense fracturing caused by the intersection of faults and fractures.

PALAVRAS-CHAVE: BRITLE STRUCUTURAL GEOLOGY, COOPER MINERALIZATION, HYDROTHERMAL ALTERATION.