Goldschmidt 2021 Abstract
https://doi.org/10.7185/gold2021.6291

DISTAL SIGNATURES OF, AND VECTORS TO, HYDROTHERMAL ORES IN CARBONATES IN THE CANDELARIA-PUNTA DEL COBRE DISTRICT, CHILE

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The Candelaria-Punta del Cobre district is a NE trending Cu-Au-(Zn-Ag) mineralized zone within the Chilean Iron belt. IOCG mineralization in the district is commonly hosted in volcanic rocks of the Punta del Cobre formation and in calcareous rocks of the Chañarcillo Group. Deposits are mainly found in structurally controlled breccias (Santos, Alcaparossa) but may be of manto type (e.g. Candelaria). Lower grade mineralization also occurs in skarns hosted in calcareous sediments of the Chañarcillo group located stratigraphically above the volcanic rocks. The Chañarcillo group is well exposed in the eastern and southern peripheries of the district. Developed in these sediments are fluid escape structures (calcite veins) that are the distal expressions of spent mineralizing fluid(s) from the hydrothermal system. In this study, 86 samples of fluid escape veins and the wall rock they are hosted in were collected along traverses that extend from known orebodies to distal locations in barren rock. Samples of vein and wall rock were submitted for bulk rock geochemical analysis. Preliminary results of LA-ICP-MS analysis of calcite in vein and wall rock material from traverse #1 show a trend in Mn concentration over 8km distance. Manganese in veins is weakly elevated close to the orebody (~1,000-2,500 ppm). It increases to ~15,000 ppm about 2.5 km away from the main ore zone, then decreases steadily away to 100s of ppm at locations about 8 km away. Calcite in veins has a different trace element geochemical signature than calcite in wall rock. On average, veins have lower Mn and Fe concentration than the wallrock calcite. Wallrock calcite, particularly calcite in fossils, has higher P (up to ~100 ppm) and S (up to ~1,000 ppm) than calcite in veins (dominantly below detection limits of 10s to a few 100 ppm). The concentrations of Sr, Cr, Ba, U and Th are also relatively lower in vein calcite. Calcite in veins shows various florescence colors (e.g., white, light blue, pink) under short-wave ultraviolet light, likely related to the Mn/Fe ratio.