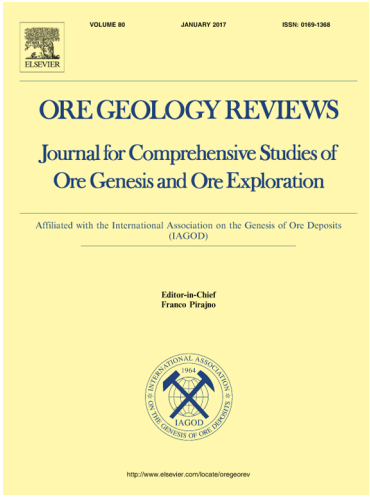

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Lithological and structural l controls on the genesis of the Candelaria-Punta del Cobre Iron Oxide Copper Gold district, Northern Chile

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The Candelaria-Punta del Cobre district is the largest Iron-Oxide Cu and Au (IOCG) district in the Chilean IOCG belt with more than 13 Mt of contained copper. Candelaria is the most important deposit in the distict, which includes seven other smaller producers (Carola, Punta del Cobre, Mantos de Cobre, Candelaria Norte, Granate, Alcaparrosa, Atacama Kozan, Las Pintadas). The district, which is characterized by an Early-Cretaceous volcanic-sedimentary arc sequence (~135-132 Ma; Punta del Cobre Formation) overlain by the marine-sedimentary Chañarcillo Group, formed in an extensional back-arc basin (~132–130 Ma). The Copiapó batholith, which occupies the western side of the district, was emplaced between ~118–110 Ma during the change from extensional to transpressional tectonics.

Mineralization is hosted predominately in the upper part of the Lower Andesite member and the overlying Volcano-sedimentary and Dacite members all within the Punta del Cobre Formation. Mineralization is hosted by fault zones, breccias, and specific lithologies. North-northwest faults are the dominant host for vertically extensive orebodies. Stratigraphically-controlled mineralization forms extensive stratabound ore bodies ("mantos"). Textural evidence suggest that the hydrothermal system evolved and advanced upwards over time. The earliest event was dominated by magnetite-actinolite in stratigraphically-controlled mantos and extensive zones of disseminated magnetite-actinolite below Candelaria, which were subsequently overprinted by chalcopyrite-dominant mineralization with magnetite-actinolite-biotite-K-feldspar alteration. In addition to magnetite, iron oxides include widespread mushketovite and hematite in the upper part of some deposits. Geochronological data suggest that the main phase of mineralization occurred between ~122 Ma and ~115 Ma (U-Pb in zircon), overlapping in age with the two major early phases of the Copiapó batholith. There is no field evidence to indicate that exposed phases of the batholith were the source of mineralizing fluids. Alteration and mineralization in the earliest phase of the batholith (La Brea) occurs in

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