



Porphyry and skarn copper mineralization at Mirador, Centinela district, northern Chile

P. Apablaza*

Antofagasta Minerals S. A. Apoquindo 4001, Piso 17, Las Condes, Santiago, Chile

**papablaza@aminerals.cl*

The Mirador deposit is a multiphase porphyry Cu-Au-Mo system, within which four intrusive pulses dated by the U-Pb zircon method at 41.3 ± 0.4 to 38.4 ± 0.7 Ma are currently recognized. These are: feldspar- and biotite-bearing granodioritic Mirador porphyry; dacite porphyry with biotite and quartz eyes; porphyritic granodiorite stock; and late dacite porphyry. The deposit occurs within the Domeyko fault system but is localized by a N65-80°W-trending fault, suggesting the possibility of a new structural system with potential to host porphyry copper deposits in the Centinela district. The porphyry system is emplaced into Jurassic calcareous shale and gypsum, giving rise to peripheral, locally mineralized skarn.

Four mineralization types are recognized: early porphyry Cu-Au with potassic alteration, EB, A and B veinlets, and hypogene chalcopryrite-bornite-Au mineralization; Granodiorite stock with Cu-Mo mineralization, sericite-chlorite alteration, fine-grained disseminated sulfides and abundant molybdenite; Cu-Au-bearing garnet skarn with chalcopryrite-pyrite-magnetite; and hornfels and skarn displaying in situ oxidation, which is affected by gravitational collapse due to basal gypsum dissolution. Piedmont gravel and tectonic and solution-collapse breccias then channeled supergene copper-bearing solutions, leading to precipitation of chrysocolla, antofagastite and copper wad. The resultant high-grade oxide copper ore is currently being exploited by Minera Centinela.