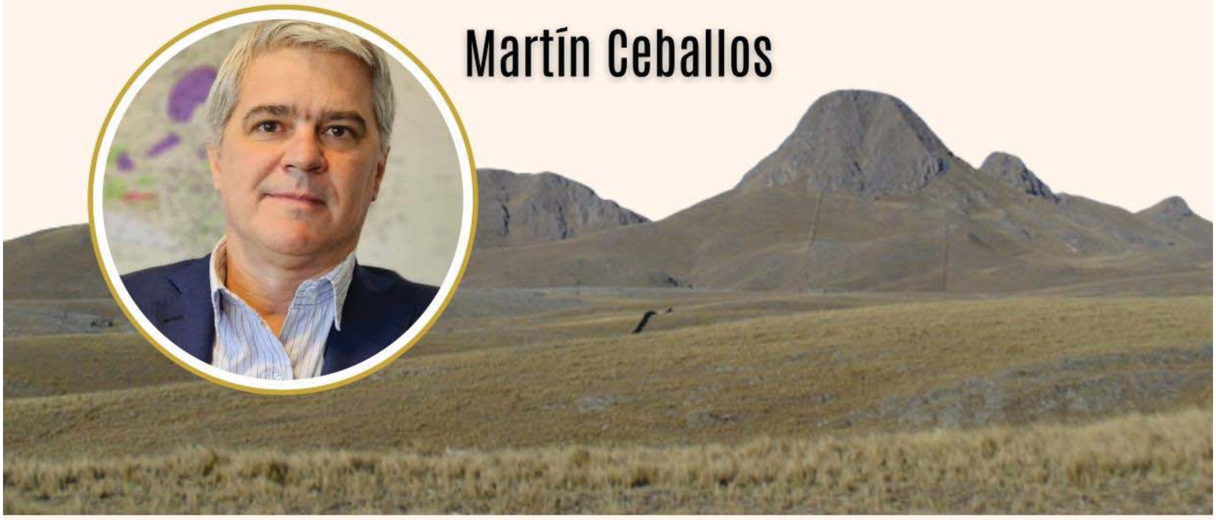
CONFERENCIA

EXPLORACIÓN Y DESARROLLO DE HIDROCARBUROS, DESAFÍOS RECIENTES Y FUTUROS DE LA COMPAÑÍA GENERAL DE COMBUSTIBLES CGC

Martín Ceballos



PORPHYRY AND EPITHERMAL ALTERATION-MINERALIZATION FEATURES ALONG DRILL HOLE TADD-159 IN THE CERRO SILLA NORTE SECTOR, TAGUAS PROJECT, SAN JUAN

Andrea Montoya[(1)], Laura Maydagán[(1,2)] and Josefina Pons[(3)]

[(1)] INGEOSUR, Universidad Nacional del Sur, Alem 1253 cuerpo B' 1° Piso, Bahía Blanca Argentina
[(2)] *Departamento* de Geología, Universidad Nacional del Sur, Alem 1253 cuerpo B' 2°piso, Bahía Blanca, Argentina.
[(3)] IIPG-CONICET, Universidad Nacional de Río Negro, Roca, Río Negro, Argentina.
E-mail: Avmontoya07@gmail.com

The Taguas project is located in San Juan Province (29°11'31,63"S, 69°52'21,38"W), approximately 200 km northwest of Tudcum town. It is situated in the Cordillera Frontal, within the El Indio – Valle del Cura region, which hosts significant high-sulphidation epithermal Au-Ag deposits, such as Veladero (Argentina), and porphyry Cu-Au systems as Valeriano (Chile). At the project site, a Miocene-age volcanic sequence lies on a Carboniferous to Lower Jurassic basement composed of meta-sedimentary, volcanic and granitoid rocks. This volcanic sequence includes rhyolitic welded tuffs, andesitic tuffs and lavas, red beds, and is intruded by andesitic porphyry rocks (Ángeles 2008). Taguas project comprises several hills: Cuarto, Tercero, Taguas Norte y Taguas Sur (Cerros Taguas), Campamento, Cuchilla Norte, Redondo, Silla Sur, and Silla Norte. Cerros Taguas hosts high-sulphidation Au-Ag mineralization in quartz–pyrite–enargite structures, along with disseminated mineralization, and supergene alteration up to approximately 200 m depth. Campamento and Silla Sur hills host Au-Ag mineralization in quartz-pyrite-enargite veins. In addition, evidence of porphyry-style mineralization in the project has been indicated (Kowalik et al. 2021). The aim of this contribution is to describe alteration-mineralization styles and associated vein types along the TADD-159 drill hole, located in Silla Norte hill, which show porphyry and epithermal style alteration-mineralization features. For this purpose, 35 hand-samples and 8 petro-chalcographic thin sections have been described, together with SWIR analysis. The drill hole intercepts a pyroclastic sequence dominated by an andesitic tuff along its entire length, with subordinate lapilli tuff and pyroclastic breccia levels. From 396 to 467.5 m, the pyroclastic sequence is cut by andesitic porphyry dikes. Four main alteration types have been observed along the drill hole: potassic, sericitic, intermediate argillic and supergene alteration. Potassic alteration is poorly represented by an assemblage of magnetite – hydrothermal biotite. Magnetite is disseminated throughout the matrix, as scattered crystals or in clusters up to 5 mm, intermittently present between 26.65–317.4 and 405–529 m. Subordinate hydrothermal biotite present at 26.6 m replaces primary feldspar. Associated with this alteration, Maricunga- (202.6–236.3 m, 430–529 m), A- (317.4 m) and B- (54.95–61.8 m and 466.25–479.3 m) type veinlets have been observed. Maricunga-type veinlets are parallel, straight to slightly wavy, with a thickness of 0.25–5 mm. They consist mainly of dark grey to light gray quartz bands with granular texture, and disseminated pyrite – chalcopyrite. A-type veinlets are irregular and discontinuous, with a thickness ranging from 0.3 mm to 2 cm, and well-defined boundaries. They exhibit a massive to slightly brecciated texture. These veinlets are predominantly composed of medium-grained quartz with a granular texture, and contain subordinated fine-grained disseminated magnetite, which is subsequently partially replaced by hematite. B-type veinlets are straight and continuous, with well-defined boundaries and a thickness of 0.2–10 mm. These veinlets predominantly consist of quartz with subordinated amounts of disseminated pyrite, molybdenite and chalcopyrite. The quartz is dominantly well-crystalized, elongated perpendicular to the veinlet walls; to a lesser extent anhedral crystals are observed at the edges and central part of the vein. Molybdenite, pyrite and chalcopyrite crystals are observed mostly in the central part of these veinlets. Sericitic alteration is present throughout the entire drill hole, characterized by an association of illite–quartz–pyrite–carbonate–chlorite, in variable amounts. Subordinated quantities of disseminated chalcopyrite, sphalerite and galena, as well as hematite replacing hydrothermal magnetite, have been recognized in the matrix. In the first 396 m of the drill hole, illite and quartz are dominant, mainly affecting primary felspar and the matrix. Illite appears as fine-grained laminar crystals of 0.004–0.04 mm; while quartz is observed as anhedral fine-grained crystals of 0.008–0.06 mm. From 396 m depth, chlorite becomes dominant along with illite, and quartz is subordinated. Chlorite appears as laminar fine-grained crystals of 0.01–0.05 mm, replacing primary and hydrothermal biotite and the matrix. Carbonate is present in subordinated amounts as crystals of 0.008 – 0.14 mm, replacing primary biotite and the matrix, throughout the entire drill hole. Pyrite is disseminated in the matrix along the entire drill hole, occurring as crystals of 0.01 – 0.25 mm. Chalcopyrite, sphalerite and galena were observed as fine-grained disseminated crystals in the matrix, from 61.8 to 236.35 m. Hematite occurs as a partial to total replacement of hydrothermal magnetite, between 26.65 – 31.95 m and punctually at 200 m. D- (61.8 m and 333–547.9 m), transitional D-E- (77.05–236.35 m) and E- (61.8–77.05 m) type veinlets, have been observed associated with sericitic alteration. D-type veinlets are pyrite-dominated, with subordinated amounts of carbonates – sphalerite – galena. These veinlets are straight to slightly wavy, continuous to discontinuous, with well-defined boundaries, and range from 0.04 to 1.5 mm in thickness. D-type veinlets have a sericite – quartz – pyrite halo, with a thickness of 2–8 mm. These veinlets appear as isolated veinlets or are crosscutting B-type veinlets, and to a lesser extent, Maricunga- and A-type veinlets, filling fractures in these pre-existing veinlets. Transitional D-E-type veinlets are dominated by pyrite – quartz, with subordinated amounts of disseminated sphalerite and galena, and also sericite and carbonates in quartz interstices. These veinlets are slightly wavy and discontinuous to continuous, with blurred boundaries and a thickness of 0.04 to 0.8 mm. E-type veinlets are quartz dominated, with subordinated amounts of disseminated galena, pyrite and sphalerite, along with minor carbonates, sericite, chalcopyrite and enargite. These veinlets are highly irregular, with blurred edges and range from 0.4 to 1.1 cm in thickness. These veinlets are crosscutting transitional D-E-type veinlets. Intermediate argillic alteration consists of montmorillonite with minor kaolinite. This alteration has been recognized by SWIR analysis mainly from 25.65–202.6 m to 466.25–529 m, with weak intensity. Supergene alteration is characterized by a hematite – jarosite association, observed as coatings with weak intensity along the first 380 m of the drill hole. Associated with this alteration, massive textured and irregular hematite veinlets (26.6–60 m) were observed, as well as massive to fibrous textured gypsum veinlets (333–410 m) with straight walls. Additionally, supergene covellite was observed filling fractures in chalcopyrite and sphalerite within an E-type veinlet. In the studied drill hole TADD159, both typical porphyry-style veinlets (Maricunga-, A- and B-type veinlets) and superimposed epithermal-style veinlets (E-type veinlets) were identified, along with veinlets exhibiting transitional characteristics between these two styles (transitional D-E type). High Au-Cu grades are associated with the magnetite-hydrothermal biotite alteration assemblage and Maricunga-type veinlets, while high Mo grades are linked to B-type veinlets. Additionally, high Pb-Zn grades are observed in association with transitional D-E- and E-type veinlets. Also, high grade Au-Cu grades in the first 25 m of the drill hole are attributed to supergene alteration.

Ángeles, C. 2008. Geología del área del Proyecto Taguas (Provincia de San Juan – Argentina). Informa técnico para Companía Minera Piuquenes S.A.

Kowalik, J. y Simpson, R. 2021. Independent Technical Report NI 43-101 on the Taguas Project, San Juan, Argentina. Technical Report prepared for Orvana Argentina S.A.