Mineralization in the Blanca Creek, La Huerta range, San Juan Province, Argentina

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The Sierra de La Huerta is part of the Western Sierras Pampeanas Range and consists of granulitic gneisses, coronitic gabbros, marbles, calcsilicates and rhyolitic extrusives and breccias. The range owes its present configuration and elevation to uplift by block-faulting in the upper Tertiary.

As reported by Stoll (1958) the ore deposits are of three types: 1) sulphide replacements along shear zones in non-calcareous metamorphic rocks, including auriferous pyrite deposits (Caledonia Mine in Blanca Creek) and galena -sphalerite deposits with carbonate gangue; 2) lenticular deposits of auriferous quartz (e.g. El Morado); and 3) fissure veins with argentiferous galena (e.g. Santo Domingo).The most important old mine is the Caledonia mine situated 6 kms north of Marayes. It is a pyritic gold deposit, apparently formed at considerable depth and at medium to high temperatures.

During this research three mineralized areas (Caledonia mine, Yanzi Creek and the San Pedro mine) have been sampled. The Caledonia group comprises the Caledonia-Albon, Blanca, Rajo de la Blenda and Azufre gold mines, with an average grade of 20g/ton gold. The Blanca and Rajo de la Blenda veins carry, besides gold, important zinc content, that indicates a metal zonation from the Caledonia-Albon mine (only Au) to the NNW (Zn + Au). In Caledonia-Albon mines, the oxidation zone provided all the high-grade ore of up to 80 g/ton (Cardo and Castro de Machuca, 1999) Field observations indicate that the mineralized zones are mostly associated with the occurrence of metacarbonate outcrops within the high grade basement consisting of coronitic gabbros and granulitic gneisses..In some areas like the Caledonia mine massive rhyolites and rhyolite breccias associated with the metacarbonates, granulitic gneisses and gabbros may have played a role in the mineralization. The San Pedro mine is characterized by dark tinted rocks in the field indicating manganese -rich mineralization.

Preliminary reflected light microscopic investigation and electron microprobe analyses of representative mineralized samples from the Caledonia mine show the presence of several ore minerals. Among them are pyrite $Fe_{0\cdot0.98}(S_2\ As_{0.01})$, bornite ($Cu_{3.85}\ Ag_{0.08}\ Cd_{0.03}$

$Pb_{0.02}$ $Bi_{0.03}$) $Fe_{1.2}$ $S_{4.7}$, chalcopyrite ($Cu_{0.71}$ $Fe_{1.09}$ $S_{2.18}$), galena (Pb $_{0.84}Cu_{0.02}$) ($S_{1.08}$ $As_{0.03}$) to ($Pb_{0.8}Fe_{0.03}Zn_{0.05}Cd_{0.02}$) ($S_{1.03}$ $As_{0.05}$), arsenopyrite ($As_{0.85}$ $Bi_{0.01}$) $Fe_{1.03}S_{1.1}$), tennantite-tetrahedrite ($Fe_{0.6}$ $Cu_{7.5}$ $Zn_{2.3}$)($As_{2.8}$ $Sb_{0.05}$)$S_{0.15.12}$, sphalerite ranging in composition from ($Zn_{0.94}$ $Fe_{0.03}$ $Cd_{0.02}$)S to ($Zn_{0.78}$ $Fe_{0.15}$ $Cd_{0.05}$)S, greenokite ($Cd_{0.94}$ $Co_{0.01}Zn_{0.01}Ag_{0.01}Pb_{0.01}$) $S_{0.99}$ and hematite. This is the first time that modern analytical data has been presented on these old mines. Greenokite is reported for the first time in the in mineralized samples from the La Huerta Range. The composition of sphalerite is variable with Zn contents ranging from 48 to 64 At. % and where the Zn-content is low, Fe, Cu and Sb are found to be high.

On a thin section level the mineralization is generally zoned in three layers 1) rich in pyrite + arsenopyrite + galena + sphalerite¸2) mainly hematite rich with some galena and pyrite and 3) a mixture of 1) and 2. Back scattered electron microprobe images and element concentration mapping indicate an internal zonation in the mineralized zone layer (1) with pyrite in the core rimmed by chalcopyrite – galena – sphalerite – and tenantite-tetrahedrite at the rim.

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