

## THE PETROLOGY AND MINERALIZATION OF THE BASEMENT AND ASSOCIATED MAFIC-ULTRAMAFIC ROCKS, SAN LUIS PROVINCE, CENTRAL ARGENTINA

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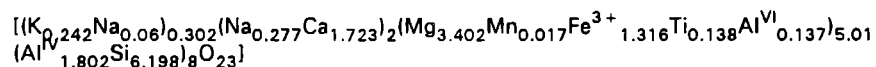
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The Sierras Pampeanas, in central Argentina, are characterized by a series of crystalline basement blocks of Precambrian-Early Paleozoic age. These were uplifted and tilted during Tertiary Andean compression in association with an episode of shallow subduction.

Within the Sierras Pampeanas of the San Luis province there are NNE-SSW trending mafic-ultramafic units which have been emplaced into a granulitic complex of Precambrian age. The ultramafics occur in two belts over a distance of 100 km, as concordant lenticular gabbros, norites, pyroxenites and differentiated ultramafics. Virorco and Las Aguilas are two of the larger bodies. The core of the Las Aguilas ultramafic body is composed of bytownite-bronzite-hornblendite. Virorco is considered to be a composite pluton intruded inside a vertically plunging fold in granulites. The ultramafic bodies may show intrusive contacts but also display tectonic contacts with the metamorphic country rocks.

Preliminary field and petrographic data, as well as electron microprobe analyses of basement rocks associated with the ultramafic bodies, indicate that metamorphic grade ranges from a low grade phyllite to a high grade granulite. The rock types range from metabasites (amphibolites) to metapelites-metagranitoids. The metabasites carry amphibole + plagioclase ± biotite ± epidote ± quartz with accessories such as apatite and zircon. The gneisses are characterized by alkali feldspar (microcline) + biotite + muscovite + quartz ± garnet. Within the ultramafic units of Virorco, granulites contain garnet + sillimanite + biotite + plagioclase + quartz + ilmenite and accessories such as apatite and zircon. A temperature of 700° C and pressure ranging from 4 to 8 kb has been determined for the granulite facies metamorphism using biotite-garnet pairs (for T) and garnet-plagioclase-sillimanite parageneses (GASP barometer).

The ultramafic rocks consist mainly of orthopyroxene-clinopyroxene-plagioclase-oxides and sulphides with accessories such as zircon and apatite. In some samples the orthopyroxene (En<sub>80-93</sub>) is replaced and enclosed by light yellowish-brown ferri-tschermakitic amphibole with a composition:



The coexisting plagioclase is An-rich with values ranging from An<sub>87</sub> to An<sub>92</sub>.

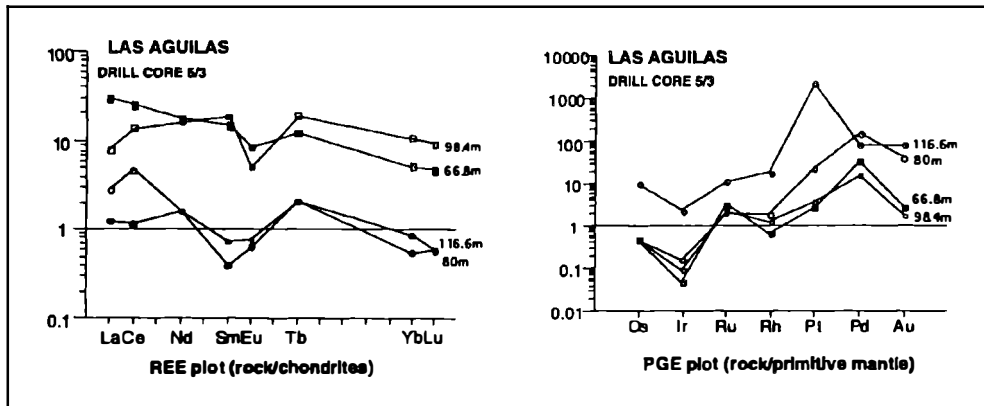


Fig.1: REE (rock/chondrite) and PGE(rock/primitive mantle) plots of mineralized samples from the Las Aguilas drill core 5/3.

The mafic-ultramafic rocks from the Las Aguilas mine were investigated using drill core samples. They contain various oxides, sulphides, mainly chalcopyrite, pyrrhotite, pentlandite associated with Fe-Ni-Co-bearing sulpharsenides. Within a massive base-metal bearing pyrrhotite layer at a depth of 126 meters Pd-Te-Bi-Ni phases occur. The analyses give the formula  $\text{Pd}_{25.3}\text{Ni}_{7.3}\text{Te}_{63.6}\text{Bi}_{3.8}$ , corresponding to merenskyite.

Major, trace, rare earth and platinum group elements have been analyzed from four selected ore samples of drill core Las Aguilas 5/3 at depths of 66.8, 80, 98.4 and 116.6 meters. The REE data normalized to chondrite values shows a bimodal distribution. Samples at depths of 98.4 and 66.8 meters are enriched in both LREE and HREE with a negative Eu anomaly. The mineralized samples at depths of 80 and 116.6 meters, however, have low LREE and HREE with a negative Sm anomaly. These are correlated with mantle normalized PGE data. The samples with a negative Sm anomaly are enriched in total PGE and those with negative Eu anomaly have lower PGE concentration. As these differences are observed within a thickness of 50 meters, variations in magma composition and the platinum group element geochemistry can be inferred.

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