

# THE MAGNETIC ANOMALY ON THE PERMIAN ALCAPARROSA PORPHYRY (ARGENTINA): A CASE OF PYRRHOTITE-REMANENCE-DOMINATED ANOMALY

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The Permian Alcaparrosa porphyry is a small (600 meters in diameter) rhyodacite stock outcropping in the Precordillera geological province, San Juan, Argentina. It developed a 3-kilometers-long, NW-SE-trending alteration halo (“Faja Amarilla”, *yellow belt*) in the host rocks, which is a sequence of Ordovician marine mudstones with interbedded basaltic flows included in the Alcaparrosa Fm. The porphyry-related alteration overprinted a previous low-grade-metamorphic alteration assemblage characteristic of an oceanic floor environment.

The aeromagnetic survey revealed a bipolar anomaly in the total magnetic intensity (TMI) coinciding with the outcropping alteration halo. The surrounding Alcaparrosa Fm is non-magnetic and therefore the anomaly is clearly defined in a quiet magnetic zone, showing a minimum to the north, centred on the porphyry, and a semi lunar maximum to the south. The shape of the anomaly is opposed to the expected shape of induced magnetic anomalies in mid latitudes of the southern hemisphere.

Available data show that both the Permian porphyry and its alteration halo carry a magnetic remanence with positive inclination (i.e. reversed polarity), probably acquired during the Permo-Carboniferous Reversed Superchron. The Königsberger ratio (Q) for the porphyry resulted lower than 1, which means that remanence is not intense enough to control the shape of the magnetic anomaly. On the other side, outcropping rocks of the alteration halo show intense supergene alteration and are non-magnetic. However, relics of phyllic alteration were found relatively preserved of supergene alteration, and they showed monoclinic pyrrhotite as magnetic carrier, and a Q ratio higher than 1. We used those data to model a body carrying a reversed magnetic remanence. The shape and extension of the modelled body seems a good approximation to the possible shape of the sulphide-bearing alteration halo around the rhyodacite porphyry.

The presence of monoclinic pyrrhotite carrying reversed-polarity, high-Q remanence in the Permian porphyry systems of Precordillera should be assessed, as its related inverted anomalies could be used as an exploration guide in aeromagnetic surveys.

Pyrrhotite, Porphyry, Remanence-dominated anomaly

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