

## **Rhenium – Potential as Proxy for Mineralization: Insights from the Altar Porphyry Cu-(Au-Mo) Deposit**

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Rhenium is a critical metal ultimately sourced from molybdenite as a by-product of porphyry-type systems. At the middle to late Miocene Altar porphyry Cu-(Au-Mo) deposit (San Juan, Argentina), the rhenium abundance in molybdenite is up to ca. 3,500 ppm, suggesting that rhenium could have economic relevance for this project. Additionally, here we discuss how rhenium could have important applications in exploration and potential as a vector towards Cu-Au high-grade zones in porphyry-type deposits utilizing rhenium data from multi-element talus fines geochemical analyses and isotope dilution-negative-thermal ionisation mass spectrometry (ID-N-TIMS) rhenium-osmium molybdenite analyses. We identify two high-rhenium anomalies related to copper and gold high-grade sectors. The first is presented as superficial high-rhenium anomalies of about 2 km of lateral extent, located directly above the mineralized areas of the deposit, that open up the possibility of rhenium being considered key in exploration programs. The second is from an underground high-rhenium anomaly shown in monomineralic molybdenite separates related to molybdenite-bearing veinlets sampled over 1,000 vertical meters (Altar Central), coincident with copper- and gold-rich zones.

Future research in other sectors of the Altar porphyry mineral cluster (Altar Central, Altar Este, and Quebrada de la Mina-Radio areas) will further test the association of high-rhenium anomalies to vector Cu-Au mineralization and its potential as a recoverable by-product and, additionally, evaluate the duration of mineralization, which is currently estimated to be approx. 1.2 m.y. based on high-precision rhenium-osmium molybdenite dates.