

Critical Raw Materials distribution in residual soils of Iberian Pyrite Belt (Spain)

IVAN MARTIN MENDEZ¹ AND PABLO MARTÍN-PÁEZ²

¹Instituto Geológico y Minero de España

²Instituto Geológico y Minero de España (IGME-CSIC)

The Iberian Pyrite Belt (IPB) is a world-class Upper Paleozoic volcanic- and shale-hosted massive sulfide province, home to several supergiant ore deposits with a unique mining history. A comprehensive multi-element soil geochemical survey has been conducted across the IPB to build a geochemical database and enhance the understanding of the studied area.

The European Union has identified 34 critical raw materials essential for the development of European industry in its latest list (CITE). Mapping chemical elements provides insights into their behavior, controls, and associations in natural environments. Mono-element contour maps illustrate the distribution of these critical elements, some of which are part of the geochemical signature of the volcanosedimentary massive sulfide mineralizations. This is the case of Cu, which was added to the latest 2023 list, with a notable copper anomaly associated with the Rio Tinto deposit.

Additionally, Mn, another critical element on the list, has historically been an important resource in the Iberian Pyrite Belt, with deposits such as Soloviejo mined in the last century. Other elements, including As, Ba, Bi, Co, Ni, Sb, W, and rare earth elements (REE), also appear as secondary minerals within the signature of massive sulfide mineralizations, often showing significantly high values.