



Geological and geochemistry correlation mapping of the Barrancos copper (gold) vein mineralizations, Ossa-Morena Zone, Portugal

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A geological and geochemical correlation study is being done in the Ossa-Morena Zone (OMZ), focused in the study of the Cu(Au) vein structures that occur in the Barrancos region, located in the Alentejo province, near the Portuguese/Spanish border, where 18 old Cu mines are known. The research includes the analysis of geological and remote sensing data, Cu, Zn soil geochemistry and alluvial heavy minerals (HM) surveys and Turam electromagnetic data, complemented with field work and exploration drill hole interpretation. The Barrancos region geological setting includes Cambrian, Ordovician, Silurian and early Devonian sedimentary sequences and four main Variscan NW-SE structures: Terena syncline, Barrancos anticline, Russianas syncline and the Fatuquedo anticline. At the Barrancos anticline occurs the late Variscan (Upper Carboniferous?) Barrancos Igneous Complex (BIC), hosted mainly by the Xistos Raiados Formation (Upper Ludlow-Upper Praghian). The BIC forms an imbricated N35W 60 km long belt (Barrancos-Juromenha-Rosário), oblique to the general N50W trend of the geological formations, and is represented by sub volcanic quartz-feldspar and dolerite rocks and breccias consolidated by ankerite+quartz+sulphides matrix. The following BIC units can be considered: i) felsic quartz-feldspar sub-volcanic rocks; ii) mafic (dolerite) sub-volcanic rocks; iii) breccias with felsic sub-volcanic fragments, iv) breccia with carbonate fragments. Other vein mineralized structures occur in the Barrancos region associated with N-S to NE-SW or ENE-WSW to E-W strike-slip fault zones, preferentially hosted in metasedimentary series. These veins are considered as Late-Variscan hydrothermal systems, characterized by low to moderate saline fluids previously responsible for metals scavenging in sediments at ca. 325-375°C. An upper supergene oxidation and hydration horizon is observed in these vein structures, including oxides, hydroxides, sulphates, phosphates, arsenates, native copper, hydrated silicates, carbonates and also secondary sulphides.

The BIC Mercês-Barrancos sector is highlighted by >100 mg/kg Cu soil anomalies and maximum values of 6000 mg/kg (Malhada das Vacas), 2000 mg/kg (Defesa das Mercês), 1200 mg/kg (Minancos), 400 mg/kg (Pedra do Galo) and 350 mg/kg (Ordem dos Lírios). Mercês soil samples show maximum value of 700 µg/kg Au and the HM study conducted in alluvial sediments shows the presence of iron oxides and hydroxides, associated with malachite, chalcopyrite, pyrite, rutile, cinnabar, gold, ilmenite, zircon, apatite, monazite, nodular monazite, amphibole, epidote and ankerite. Gold grains are small in dimension (<2 mm) and scarce (1-3), except in the Mercês-Cerro do Lírio area, where it can be up to 120 in one sample. The favorable correlation between the chemical and HM data is also linked with the presence of mineralization intersected in depth by exploration drill holes [e.g. Mercês: MC-5, 7,8 m @ 2,3 mg/kg Au; PME-1, 4,05 m @ 2,00 mg/kg Au; 5015,57 mg/kg As; 235,58 mg/kg Cu in silicified fine grained carbonates with banded ore (arsenopyrite+pyrite±chalcopyrite) and Ordem dos Lírios KBL-1, 2,03 m @ 17,8 mg/kg Au, 0,97 m @ 2,7% Cu]. Polymictic breccias in BIC sub-volcanic rocks, with strong hydrothermal silicification+carbonates are the best exploration guides.

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