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Preliminary petrographic study of dolerites related to Sb-Au mineralizations: example of Ribeiro da Serra mine (Dúrico-Beirão mining district, NW Portugal)

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In the Dúrico-Beirão mining district, several occurrences of Sb-Au are known, which were exploited since the Roman occupation in Iberia until mid-last century. This region is located in the Central Iberian Zone of the Iberian Massif, part of the Ibero-Armorican Arc. The country rocks in the area consist of folded metasedimentary rocks from Cambrian to Carboniferous surrounded by syn- to post-orogenic Variscan granites. The Ribeiro da Serra Sb-Au mine, intensively exploited in the 19th century, occurs west of the western limb of the Valongo Anticline, a major ante-Stephanian structure with NW-SE trend. This Sb-Au deposit consist mainly of stibnite-bearing quartz veins hosted by slates, quartzites and conglomerates of the Schist-Greywacke Complex in a possible spatial relationship with dolerite dykes. These mafic dykes are emplaced in sub-parallel shear zones to the sinistral Douro Shear Zone and their presence may suggest the existence of mafic/ultramafic bodies at depth, which contributed to the occurrence of Sb-Au deposits.

This study aims to describe the dolerite dykes present through the region (petrographic composition, weathering, distribution, and dimension) considering a possible contribution for the Sb-Au occurrence. Dolerites are greyish-green colored and are intensely weathered. The samples surface shows a few millimeters of brownish supergenic alteration. The petrographic study highlighted an intense chloritization and saussuritization of plagioclase, whose tabular form and twinning are still preserved. The primary igneous texture is better preserved than the primary mineralogy. The texture is ophitic to sub-ophitic although the interstitial mass of the pyroxene is totally altered. Chlorites occur as fresh, green-colored patches, sometimes with radiated fibrous textures. Frequent polycrystalline quartz lenses and veins occur, also as consequence of the hydrothermal/metamorphic alteration. The opaques, not yet identified, occur in a great modal percentage, and are frequently associated with titanite. They do not seem to have a special concentration related to quartz veins and lenses. Apatite is a frequent accessory phase and appears to be preferentially associated with opaque minerals.

The knowledge of the petrographic characteristics of these dolerite dykes, associated with geochemical data, can be a great contribution to the understanding of the distribution of Sb mineralization and corroborate the hypothesis of non-outcropping mafic/ultramafic bodies.

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