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## The Sesmarias massive sulfide discovery in Portugal (Iberian Pyrite Belt): preliminary geochemical and petrological studies

Marta Codeço<sup>1</sup>, Sarah Gleeson<sup>1,2</sup>, Carlos Rosa<sup>3</sup>, Paul Kuhn<sup>4</sup>, Robert Trumbull<sup>1</sup>, Philipp Weis<sup>1</sup>, Anja Schleicher<sup>1</sup>, Jessica Stammeier<sup>1</sup>, and Franziska Wilke<sup>1</sup>

<sup>1</sup>GFZ German Research Centre for Geosciences, Telegrafenberg, 14473 Potsdam, Germany

<sup>2</sup>Freie Universität Berlin, Institute for Geological Sciences, Malteserstraße 74-100, 12249 Berlin, Germany

<sup>3</sup>EMISURMIN Lda, Av. António Augusto de Aguiar, nº 19, 4º, 1050-012 Lisboa, Portugal

<sup>4</sup>AVRUPA Minerals, 410-325 Howe Street, Vancouver, BC V6C 1Z7 Canada

The Iberian Pyrite Belt (IPB) in Portugal and Spain is a world-class metallogenic province that contains more than 1800 Mt of massive sulfide ore in over 100 deposits. The orebodies are hosted by submarine lithologies comprising felsic and mafic volcanic rocks and sedimentary units from the Volcanic-Sedimentary Complex (VSC) of Devonian-Carboniferous age. This study reports preliminary geological, mineralogical, and geochemical results from the Sesmarias prospect.

The Sesmarias VMS prospect is a blind discovery (~100 m of Tertiary cover) with the first lens intersected by drilling in 2014 (10.85 meters @ 1.81% Cu, 2.57% Pb, 4.38% Zn, 0.13% Sn, and 75.27 g/t Ag). Recent drilling has encountered 39.2 meters @ 0.44% Cu, 0.71 g/t Au, 27.1 g/t Ag, 2.07% Zn, and 0.79% Pb and 36.45 meters @ 0.72% Cu, 0.36 g/t Au, 0.82% Pb, and 21 g/t Ag in separate holes, and has extended the mineralization further to the SE. Through all phases of drilling, the company intersected copper-zinc massive sulfide mineralization in various lenses over a strike length of about 1.7 km; however, this value may easily increase with the continuation of the drilling program.

The Sesmarias massive sulfide system is heavily folded and strongly modified by several post-mineralization deformation events. The VSC at Sesmarias comprises black shales and felsic volcanics that are the primary hosts of the massive and semi-massive sulfide mineralization and a younger thick sequence of mafic volcanics (including intrusives) which overlap grey/green shales. Macroscopic observations complemented by petrographic studies and bulk rock chemistry of the volcanic rocks allowed to distinguish two main groups of volcanics rocks. The-mafic rocks are composed of plagioclase, relics of amphibole and pyroxene ( $\pm$ quartz), and are dominated by an alteration assemblage that includes chlorite, calcite, dolomite, epidote, ( $\pm$ quartz), and iron (hydro-)oxides. The felsic rocks include lavas and associated volcanoclastic rocks that are composed of quartz, plagioclase and are altered to muscovite  $\pm$  chlorite. Compositionally, all major elements except for Na<sub>2</sub>O, K<sub>2</sub>O, and Al<sub>2</sub>O<sub>3</sub>, show roughly negative correlations with SiO<sub>2</sub> and allow the discrimination of mafic from felsic rocks; however, the trends of magmatic differentiation are compromised due to secondary alteration. The results show that the VSC at Sesmarias is

dominated by mafic rocks of basaltic composition (alkaline basalts) which are strongly spilitized. In contrast, the felsic rocks that host the mineralization are mainly rhyodacites and dacites. Overall the magmatism at Sesmarias is more mafic in comparison with other mineralized areas such as Aljustrel and Neves Corvo, where the volcanism is predominantly rhyolitic.