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New data on Fe-Ti±V mineralization from Ślęża and Strzegomiany-Kunów prospect, SW Poland: insights from geophysical surveys and geochemical exploration

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The Strzegomiany-Kunów Fe-Ti±V prospect is located within the eastern edge of Ślęża ophiolite which belongs to the Central-Sudetic ophiolites (CSO), forming part of the Variscan suture zone. The Ślęża ophiolite is the largest exposed section of the Central Sudetic Ophiolite and retains a nearly complete, typical ophiolite pseudo-stratigraphic sequence. The Kunów-Strzegomiany prospect marks the north-eastern part of the Ślęża ophiolite, covered by the Cenozoic sediments.

The conducted geophysical and geochemical exploration aimed to identify previously unrecognized deep-seated potential for Fe-Ti±V mineralization within the Ślęża area and the Strzegomiany-Kunów Fe-Ti±V prospect. A set of Electric Resistivity Tomography and Induced Polarization profiles was conducted as well as magnetic measurements (ground and airborne). Chemical composition analysis of the samples was conducted using portable X-ray fluorescence, WD-XRF and the ICP-MS.

On Ślęża Mountain, four elongated lenses oriented SW-NE and W-E were delineated, exhibiting enrichment in iron, titanium, and vanadium. These zones are characterized by elevated titanium concentrations, with a maximum of 5.59 wt.% and a median of 4.19 wt.%. High titanium and iron contents show a strong positive correlation with vanadium, which is generally abundant in Ślęża gabbros, reaching up to 1446 ppm (median 993 ppm). The analyzed samples also display slightly elevated scandium concentrations, a critical element as classified by the European Commission. Scandium in Ślęża gabbros ranges from 8.4 to 72.5 ppm, with an average of 55.6 ppm and a median of 57.5 ppm. Elevated scandium levels generally correlate positively with TiO₂ but show no correlation with iron or vanadium.

In the Kunów area, samples were collected from several small outcrops on and around Kunów Hill, as well as from two boreholes, Kunów-B1 and Kunów-B2, which document the subsurface extent of the Kunów gabbro body to a depth of 89 m below ground level (b.g.l.). The gabbros from Kunów Hill exhibit a chemical composition similar to those from the Ślęża area. Titanium concentrations in the Kunów samples are locally elevated, with a maximum of 5.17 wt.% and a median of 3.74 wt.%, slightly lower than the values observed in the Ślęża gabbros. Vanadium levels in Kunów samples are generally high, with individual samples showing enrichment relative to Ślęża, ranging

from 141 ppm to 1603 ppm (median: 509 ppm).

In the two studied boreholes, several oxide-bearing intervals of variable thickness (0.2 to 2.0 meters) were identified. The highest concentrations of Fe, Ti, and V occur within semi-massive to massive oxide ore hosted in ophitic gabbro. These Fe-Ti-V-enriched intervals are interpreted as south- or southwest-dipping lenses or dikes of oxide gabbros/ferrogabbros. The lateral extent of these, previously unknown, bodies remains poorly constrained and will require additional exploratory boreholes for detailed characterization.

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