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Geology of the Paleoproterozoic Järkvissle Li-Sn-Ta Pegmatite System, Central Sweden

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The Järkvissle Li-Sn-Ta prospect in central Sweden is a key example of an LCT-type granitic pegmatite system in the country. Historical exploration at Järkvissle identified pegmatite dikes containing spodumene, petalite, cassiterite, and columbite group minerals, and produced a pre-regulatory resource of c. 600 kt grading 0.45% Li, 0.07% Sn, and 80 ppm Ta. In this presentation, we give an overview of the geology of the Järkvissle prospect based on new field mapping, litho-geochemistry and geophysical data, and 3D geomodelling. Results form part of the larger EIS project* which aims to develop new digital exploration tools for several critical metal-bearing mineral systems.

The oldest rocks at Järkvissle are metamorphosed siliciclastic sedimentary and intercalated volcanic rocks that form part of a Paleoproterozoic (c. 1.9 Ga) continental margin termed the Bothnian Basin. The sedimentary-volcanic package records at least two episodes of ductile deformation as evidenced by bedding-cleavage relationships, large- to mesoscale folds, crenulation cleavages, shear bands, and boudin structures. Two main intrusive rock types also occur; a foliated biotite-muscovite granodiorite-granite, and a foliated garnet-bearing granite with unzoned "simple" pegmatite parts.

At Järkvissle, a set of subvertical, mainly NNE- to NNW-trending, spodumene-bearing pegmatite dikes occur over a c. 2- × 7-km area. The pegmatites range from c. 0.2 to 2.0 m in thickness, are c. 10 to 800 m in length, have planar to somewhat wavy forms, and are internally zoned. They occur as either individual dikes or grouped "sheeted" bodies that preferentially intrude the eastern limb and hinge zone of a large-scale, steeply SSE-plunging asymmetrical fold. Pegmatite orientations follow those of pre-existing planar fabrics in metasupracrustal host rocks, indicating earlier-formed structures were pathways and/or traps for pegmatite-forming volatile-rich melts. Several pegmatites also display folded forms, suggesting localized ductile deformation accompanied pegmatite emplacement.

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