

SEG 2023 Conference: Resourcing the Green Transition

Controls on the High-Grade Gold-Cobalt Mineralisation at Rajapalot, Finland

Lily Dickson, Taija Torvela, Robert C. Chapman
University of Leeds, Leeds, United Kingdom

Rajapalot is a gold-cobalt deposit owned by Mawson Gold in the Peräpohja Schist Belt (PSB), Northern Finland. It is an example of an orogenic gold deposit (OGD) with an atypical metal association, of which the PSB hosts several types: (e.g., Au-Cu, Au-U) [1].

OGDs with an atypical metal association commonly occur in Paleoproterozoic-aged rocks, for example in the Transvaal Basin, South Africa, and Tennant Creek, Northern Australia [2]. The deformation of evaporite-hosting intracratonic basins releases unusually saline fluids, which can transport base metals [2]. It is possible that Au and Co are transported together in an anomalously saline orogenic fluid [2,3], however this has not yet been demonstrated at Rajapalot. Co-transport of Au and Co would probably generate covariance within the deposit, but instead, Co-only, Au-only, and Au-Co zones have been identified, each with distinct whole-rock trace element signatures [4].

The gold-only mineralisation stage has been dated between 1.75 and 1.78 Ga [5], however no dating of the primary- or late-phase Co in the Rajapalot prospect has been conducted, and the deposit model explaining Co distributions is not currently understood.

Chemical mapping has been undertaken using core micro-XRF analysis at Bruker Nano Analytics (Berlin). This information will inform subsequent subsampling to generate thin sections for routine mineralogical and paragenetic characterisation of ore samples, which will also seek to identify minerals that could underpin geochronological studies. Trace element distribution in sulphides will be established using LA ICP-MS to investigate the evolution of the entire mineralised system to establish the genetic relationships of Au and Co throughout the deposit.

References:

- [1] Eilu (2015). In: *Mineral Deposits of Finland*.
- [2] Goldfarb et al. (2001). *Ore Geology Reviews*, 18
- [3] Williams-Jones and Vasyukova. (2022). *Economic Geology*, 117(3)
- [4] Raič et al. (2022). *Solid Earth*, 13(2)
- [5] Molnár et al. (2016). *Mineralium Deposita*, 51(5)