

Mobility of critical metals in the Bergslagen ore district

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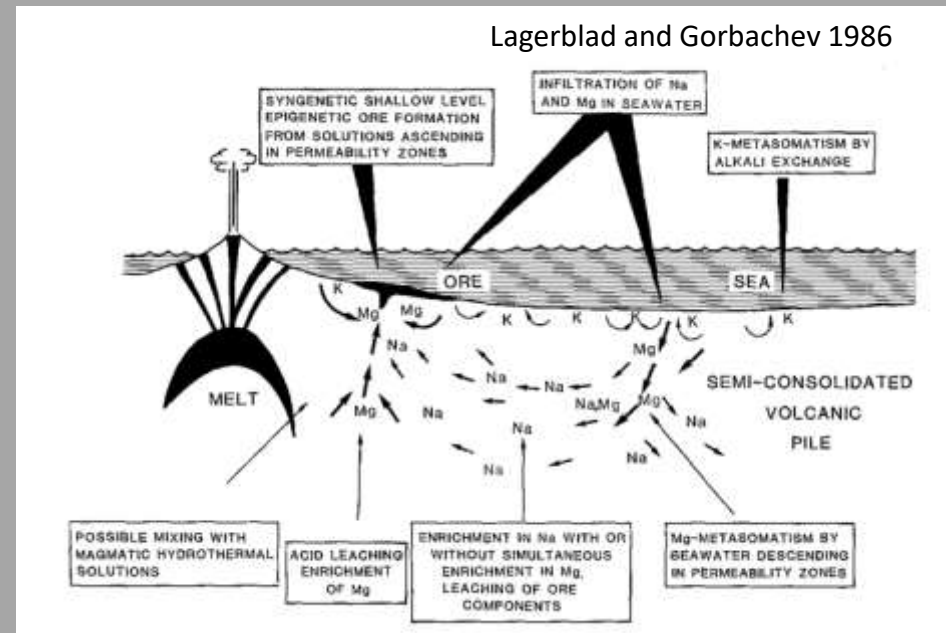
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Background

- The Bergslagen ore district in Sweden - key potential producer of CMs including Co, In, Ga, Ge, W and the REEs.
- Synvolcanic hydrothermal alteration is common in Bergslagen
- Ore metals are **depleted** in Na-Mg altered rocks deeper in the volcanosedimentary stratigraphy in Bergslagen (*Baker and De Groot 1983, Lagerblad and Gorbachev 1986*)

What is the link between regional hydrothermal alteration and mineralisation particularly with respect to CM bearing mineral deposits?

Are the hydrothermal altered rocks the source of metals enriched in the Bergslagen ores? If so for which metals?

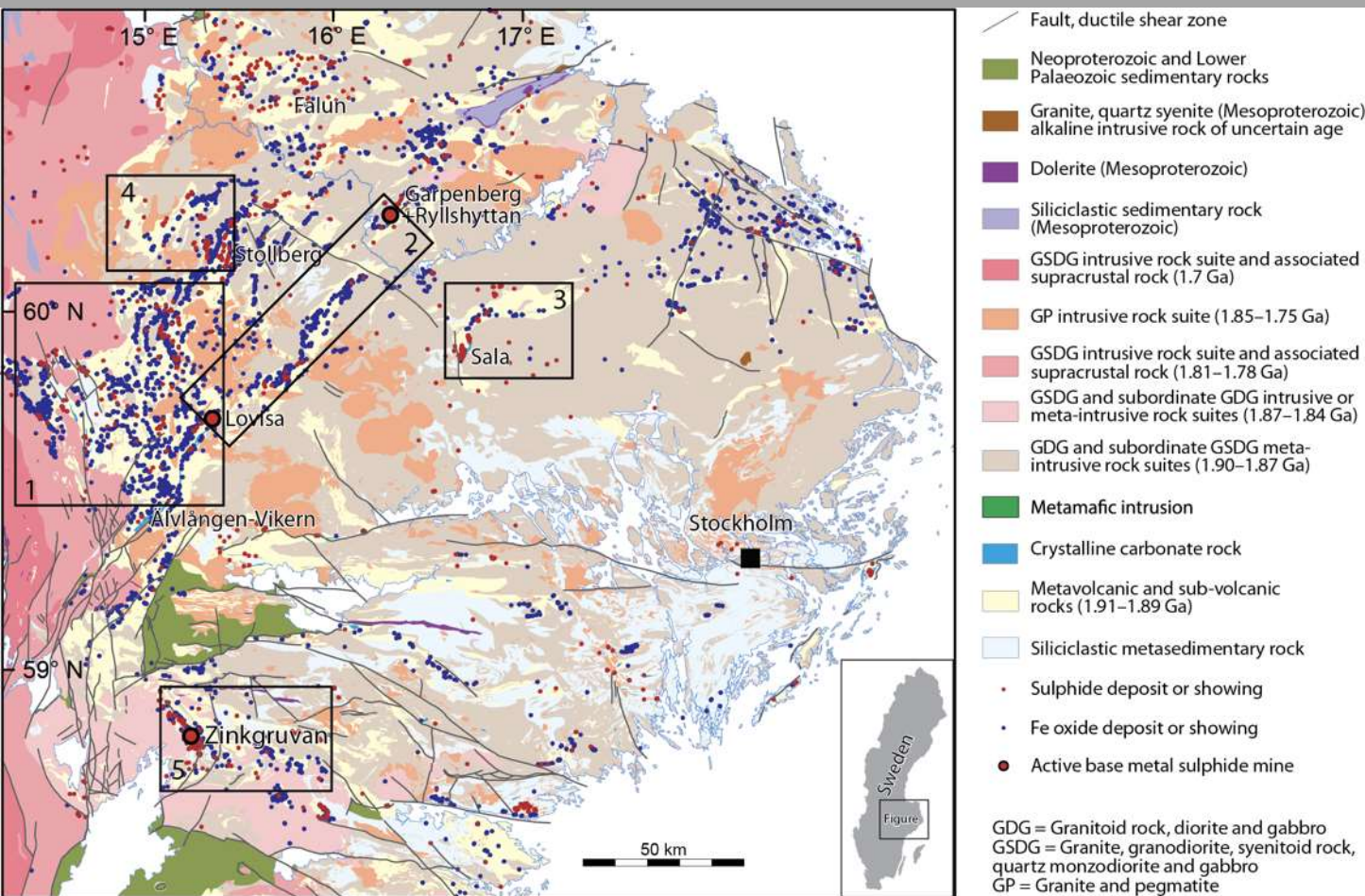


Aims

- Quantify the extent to which CMs were mobilised from the volcano-sedimentary stratigraphy in Bergslagen during hydrothermal alteration
- Identify the style, intensity and physical conditions (T, pH, redox) of alteration at which any mobilisation of the CMs occurs
- Constrain the isotopic fingerprint of the regions from which metals have been most intensely mobilised for comparison with that of different ore deposits to investigate the link between metal mobility during alteration and mineralisation

Project start – June 2020

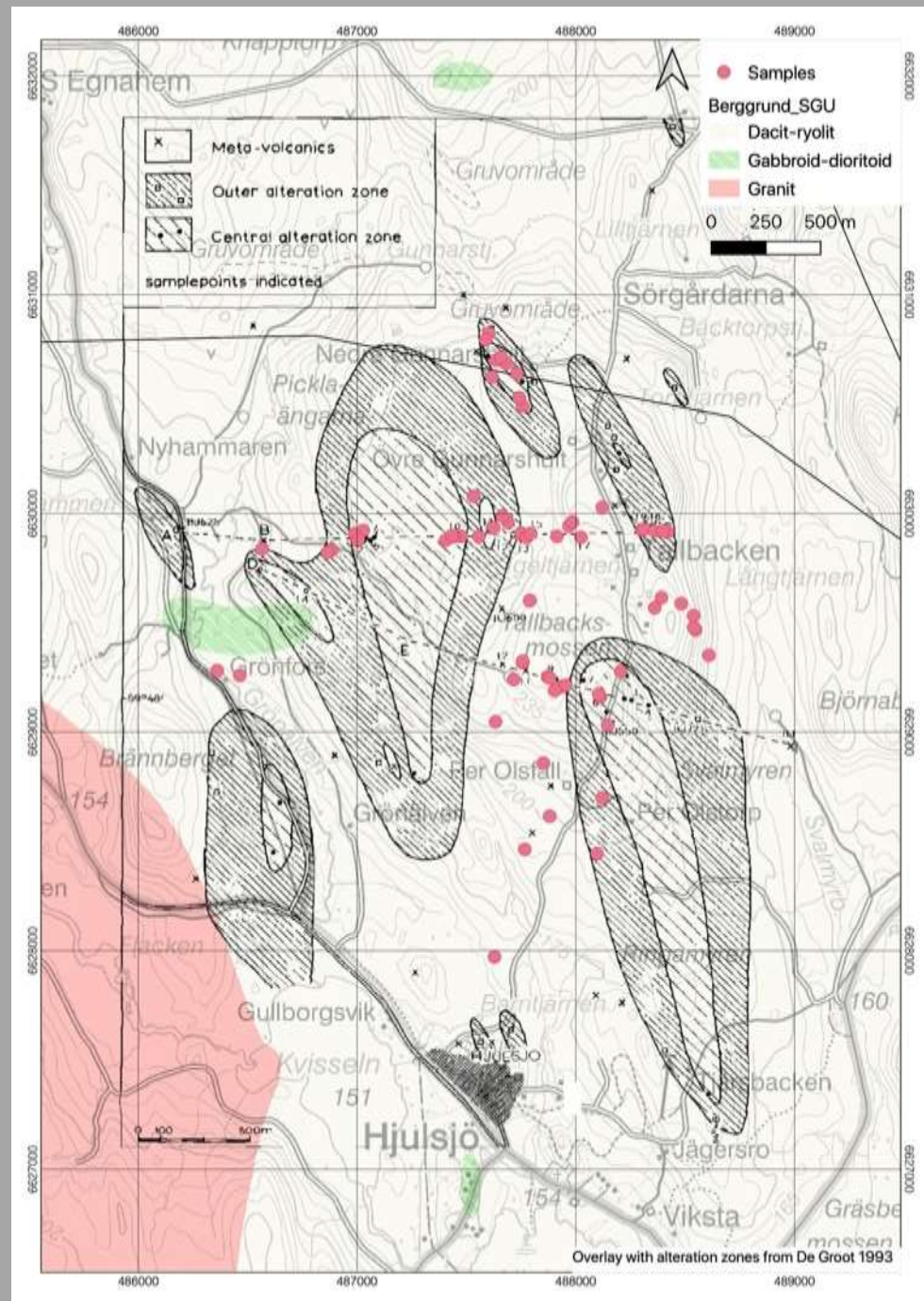
- Year 1 focus - Hällefors area (sub-area 1, Stephens et al. 2009)
 - Largest and possibly best preserved metavolcanic domain in Bergslagen
 - Lowest metamorphic grade (greenschist facies)
 - Type localities for Na-Mg alteration (Lundström 1995)



Geological map of the Bergslagen region including the location of key field areas for this study. Modified from Stephens et al. (2009); Jansson et al. (2017).

Year 1

- MSc student Robert Dunst
- 4 main project aims:
 - Defining the primary composition of least-altered volcanic and volcanoclastic rocks of the Sångern and Älgen formations
 - Constrain mass change for 2 styles of alteration in the area - Na and Mg alteration
 - Define mineral changes during alteration of primary volcanic textures such as lapilli
- 300 variably altered samples collected, 160 currently being analyzed for major and trace element concentrations



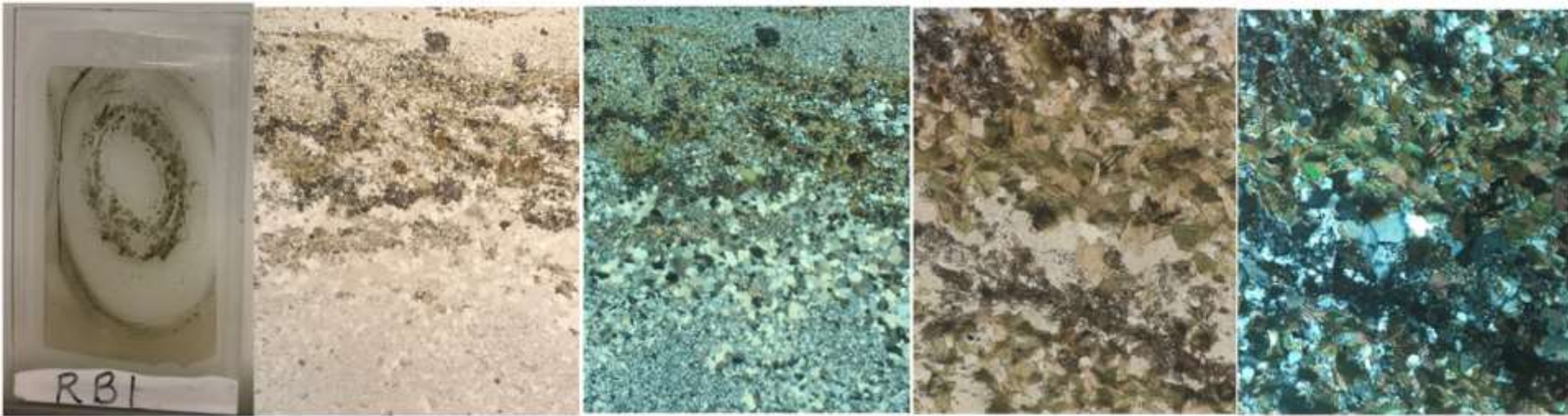


Primary volcanic textures – lapilli and spherules



Lundströms “cigar structures” – altered lapilli?

More to follow...



References:

Baker and De Groot (1983) *Contrib. Mineral. Petrol.* 82, 119-130.

Jansson et al. (2017) *Ore Geol. Rev.* 82, 285-308.

Lagerblad and Gorbatshev (1985) *Geologische Rundschau* 74, 33–49.

Lundström, I., 1995: Beskrivning till berggrundskartorna Filipstad SO och NO. *SGU Af177, 185*, 218 p.

Stephens et al. (2009) *SGU Ba58*, 259 p.