

A large, layered rock specimen, likely a lithium-bearing mineral, is shown in the background. The rock has a complex, crystalline structure with various shades of brown, tan, and grey. A geological hammer is visible in the bottom left corner, providing a sense of scale.

# Lithium in the Nordics

Nordic Mining Day 2024

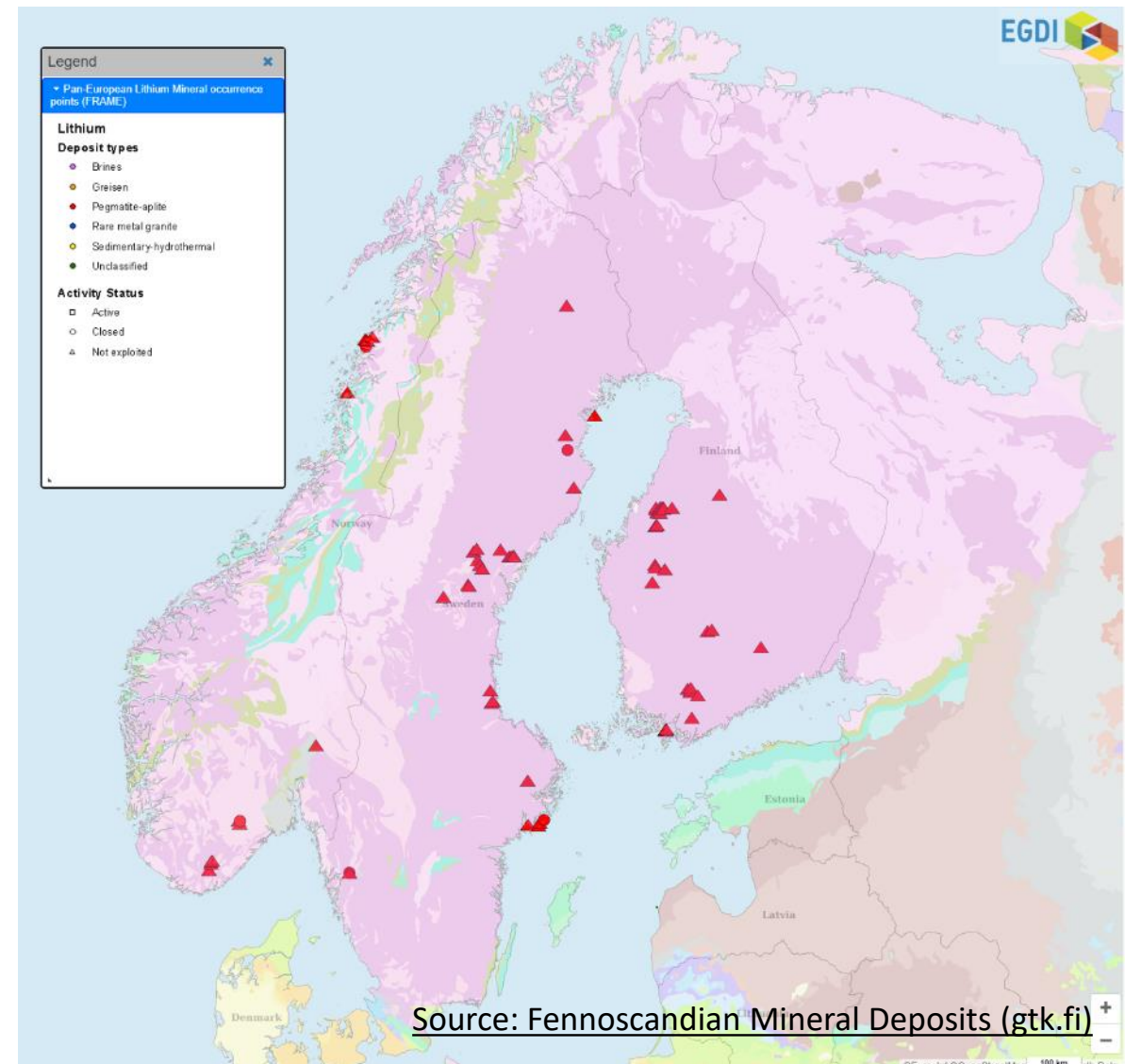
Tero Niiranen (GTK), Martiya Sadeghi (SGU), Nolvonn Coint (NGU)

Photo: Henrik Nygård, GTK



# Li in the Nordics

- Known Li provinces in all three countries, for the most part LCT-pegmatites
- Increasing exploration activity in Finland and Sweden
- SGU carrying out CRM mapping program in Västernorrland county with focus in Li-Nb-Ta
- GTK will continue country wide research and Li-potential mapping
- EU-funded Exploration Information Systems project (both GTK & SGU involved) ongoing
  - Mineral Systems Modelling (LCT-pegmatites)
  - Mineral Prospectivity Modelling



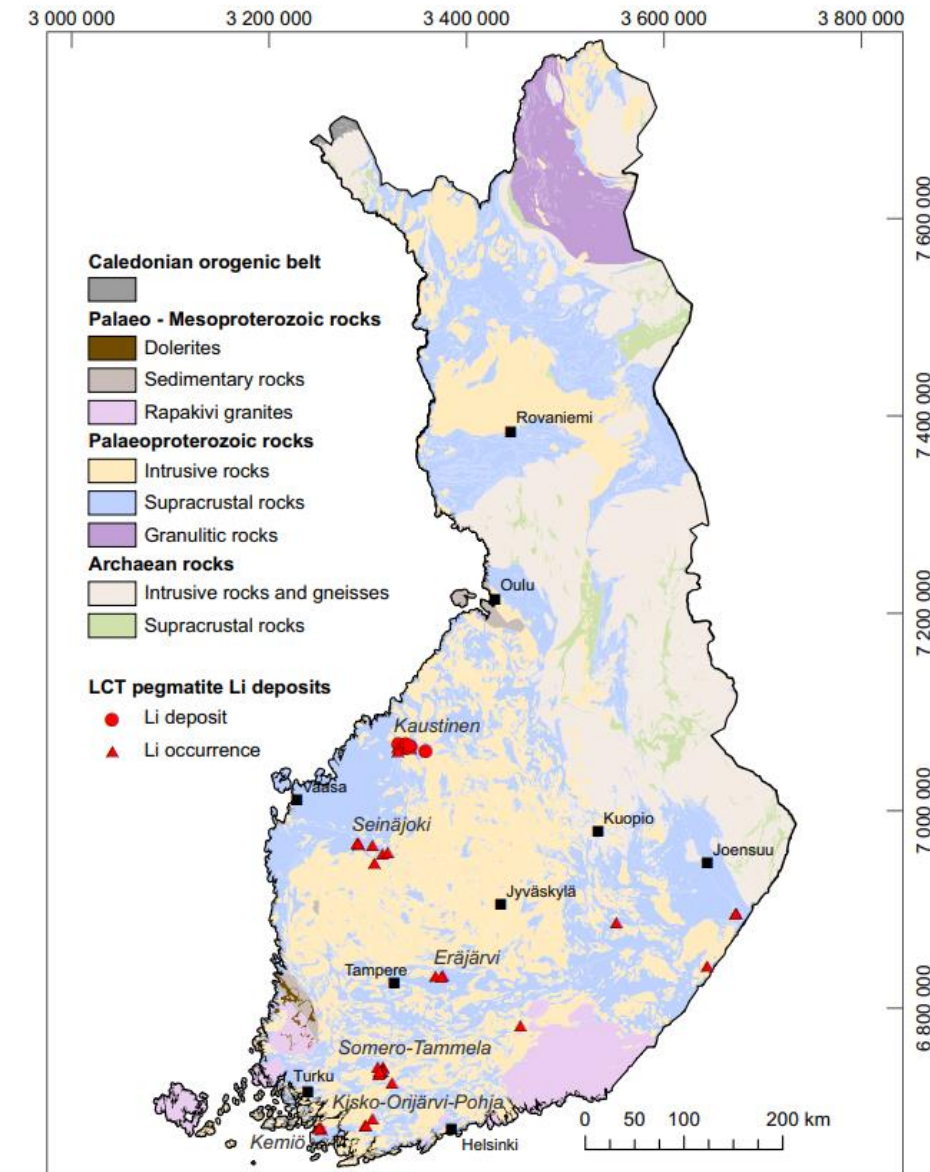
GEOLOGICAL  
SURVEY OF  
NORWAY  
- NGU -

SGU Geological  
Survey  
of Sweden



# Finland

- Several Li-provinces recognized, mostly in Southern Finland
  - Most promising of at the moment are the Ostrobothnia and Uusimaa provinces
  - All known deposits and occurrences LCT-pegmatite type
- One mining project to start production in 2025
- Clear increase in interest to Lithium by exploration companies based on the increasing number of exploration licenses and license applications



Rasilainen et al. (2018)



# Finland – Undiscovered Resources

- 2018 GTK carried out quantitative assessment for undiscovered Li resources in LCT pegmatites using USGS three-part-assessment method
- At 50% certainty the undiscovered Li resources are at least 510 000 t of Li (down to 1 km depth)

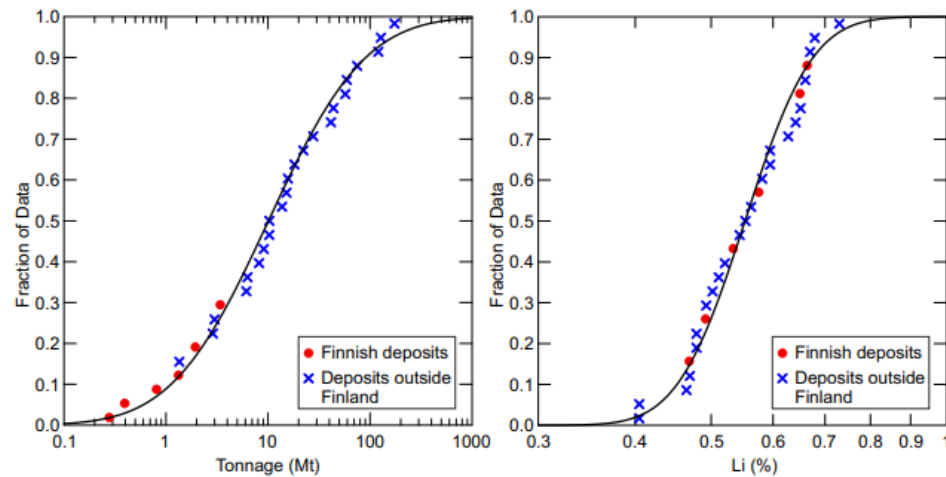
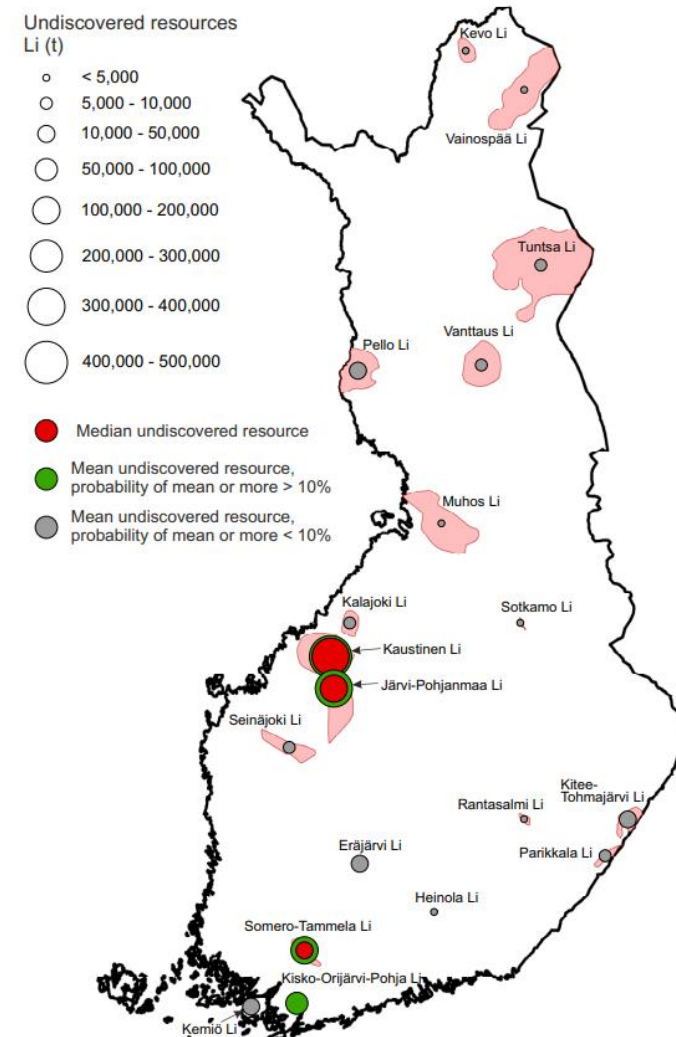
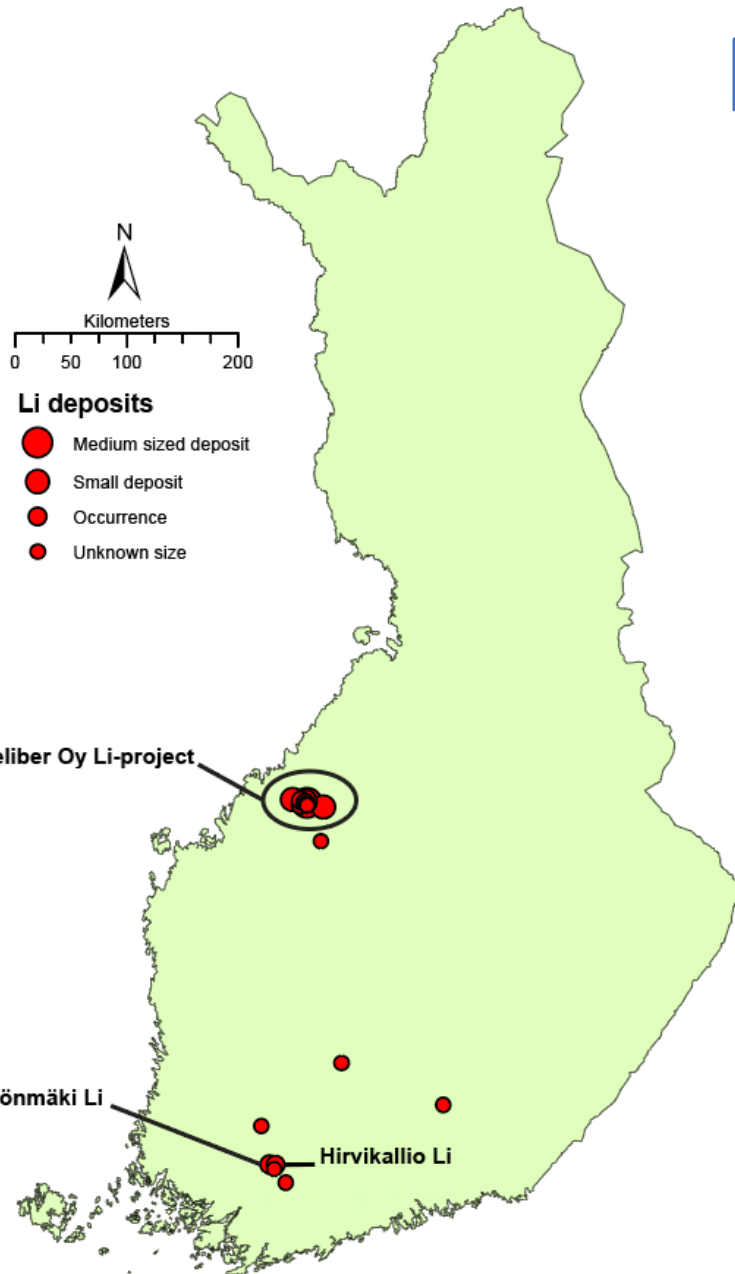


Fig. 1. Cumulative frequency plots of ore tonnage and lithium grade for all the 29 deposits in the dataset. The estimated lognormal cumulative distribution functions are shown as solid lines.



# FINLAND



Spodumene pegmatite, Rapasaari deposit. Photo: T. Niiranen

## Li Projects

Project	Highlights	Company
Keliber Li	<u>Mine development project</u> : Cluster of 6 LCT-pegmatites, tot. resources 15.2 Mt @ 1.12% Li <sub>2</sub> O. Mining will commence in 2025	Keliber Oy/ Sibanye Stillwater
Kietyönmäki Li	<u>Exploration target</u> : 0.4 Mt @ 1.5% Li <sub>2</sub> O*	Litiumlöydös Oy
Hirvikallio Li	<u>Exploration target/historic mine (Si)</u> : 0.1 Mt @ 1.78% Li <sub>2</sub> O*	element92 Suomi Oy

\*Non-compliant resource estimation



# Keliber Oy Lithium Project



- Keliber Oy/Sibanye Stillwater
- Six separate spodumene pegmatites = six deposits
- Discovery 1960-2010
- Permitting ongoing for open pit mining, processing plant and manufacturing plant for Li-hydroxide and Na-zeolite
- Expected mine life 20 years
- Annual mine production 625-850 kt
- Mine production to start in 2025

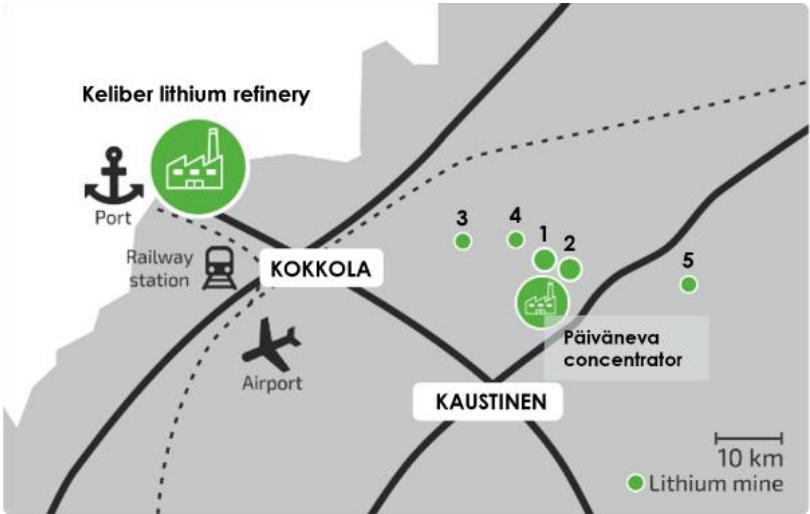
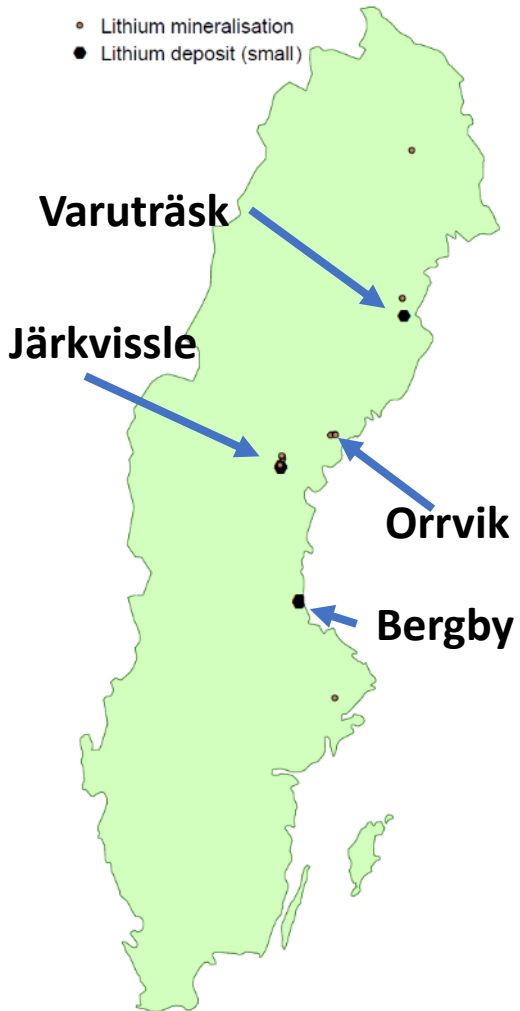


Figure: Keliber Oy

Mineral resources (2021) of the Keliber´s lithium project in Kaustinen

	Syväjärvi		Rapasaari		Länttä		Outovesi		Emmes		Leviäkangas		Total	
	Mt	Li <sub>2</sub> O%	Mt	Li <sub>2</sub> O%	Mt	Li <sub>2</sub> O%	Mt	Li <sub>2</sub> O%	Mt	Li <sub>2</sub> O%	Mt	Li <sub>2</sub> O%	Mt	Li <sub>2</sub> O%
Measured	1,542	7.55	2,343	2.09	0,422	2.09							4,307	4.19
Indicated	1,167	1.40	5,762	0,96	0,906	0.28	0,281	10.19	1,076	5.16	0,19	3.21	9,382	0.43
Sub-Total	2,709	5.16	8,105	0.00	1,328	0.57	0,281	10.19	1,076	5.16	0,19	3.21	13,689	1.40
Inferred	0,118	0,79	1,537	0,91							0,278	0,9	1,933	0,9
Total	2,827	4.48	9,642	0,98	1,328	0.57	0,281	10.19	1,076	5.16	0,468	0.00	15,622	1.12

# Sweden



Mine/Project	Highlights	Company
<b>Varuträsk</b>	Closed mine, 0.4 Mt ore @0.12% Li, contained 480 tonnes*	<b>Critical Metals</b>
<b>Järkvissle</b>	Not exploited, 0.6 Mt ore @0.45% Li, contained 2760 tonnes*	<b>Asera Mining AB</b>
<b>Järkvissle project</b>	Exploration of lithium adjacent to and along strike of the Järkvissle pegmatite sites	<b>Pure Resource limited</b>
<b>Orrvik</b>	Highly prospective for Spodumene-bearing lithium-caesium-tantalum (LCT) pegmatite-type lithium deposits. Assays up to 3.3% Li <sub>2</sub> O	<b>Ragnar Metals</b>
<b>Bergby</b>	4.65% Li <sub>2</sub> O and up to 803 ppm Ta <sub>2</sub> O <sub>5</sub>	<b>United lithium</b>
<b>Halleberget</b>	assays of up to 2.8% Li <sub>2</sub> O and 7,820 ppm Ta have been reported on pegmatites mapped for over 400m of the strike	<b>Ragnar Metals</b>

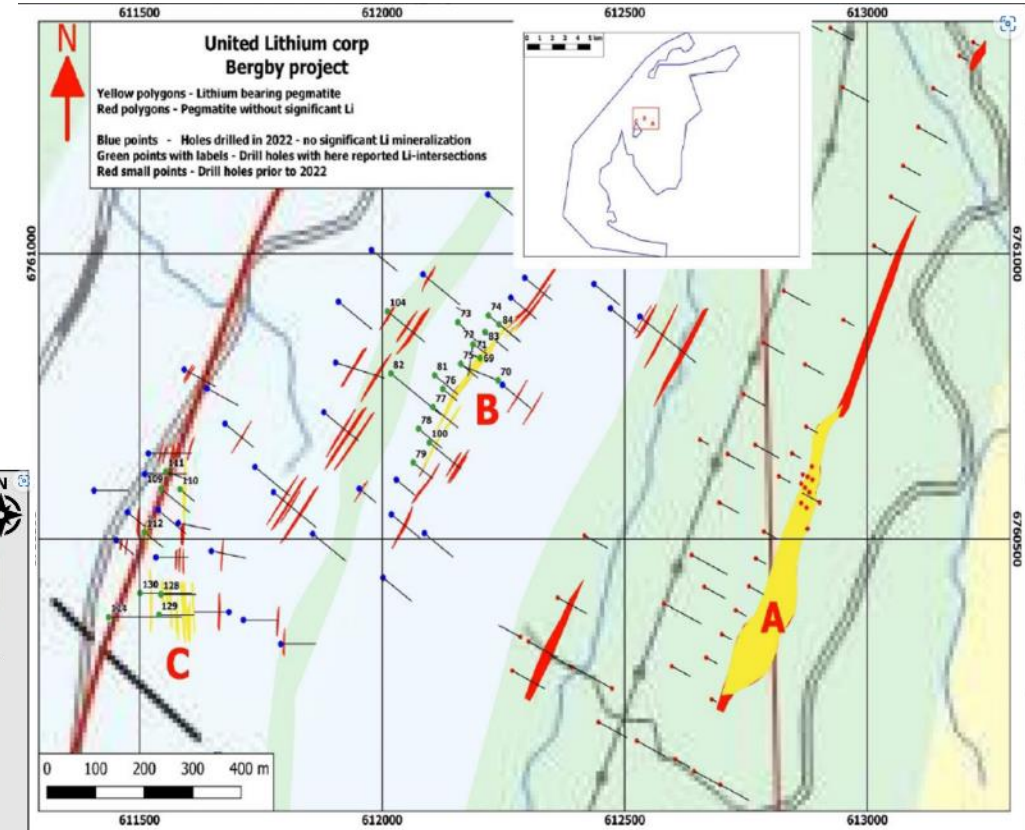
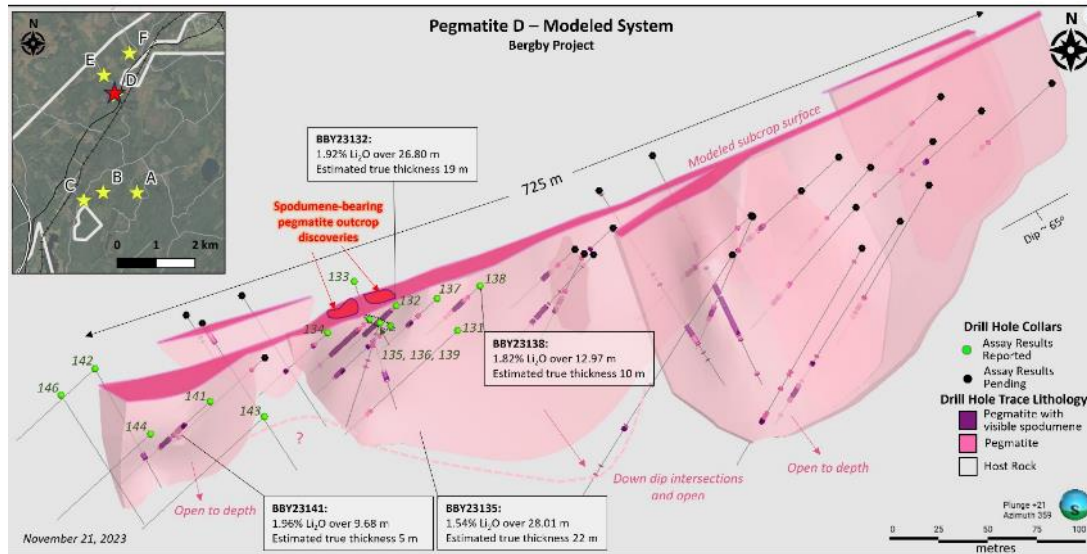
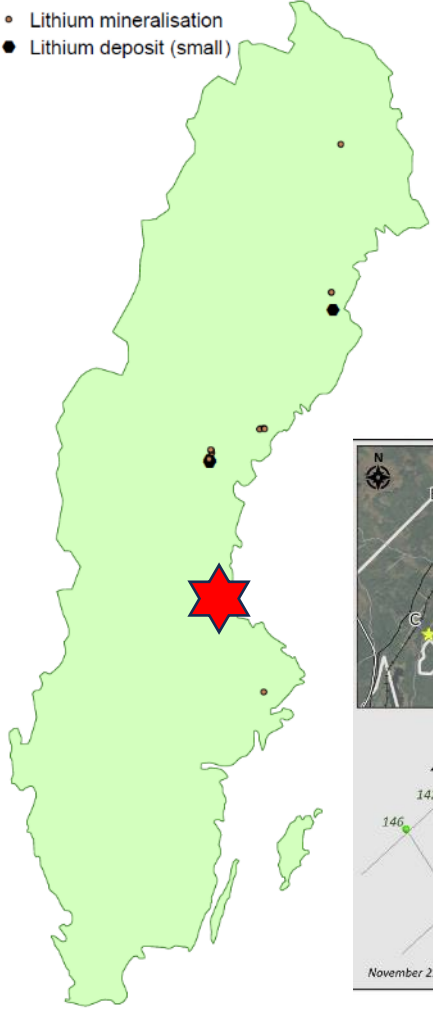
\*Non-compliant resource estimation

# Bergby



- Lithium mineralisation
- Lithium deposit (small)

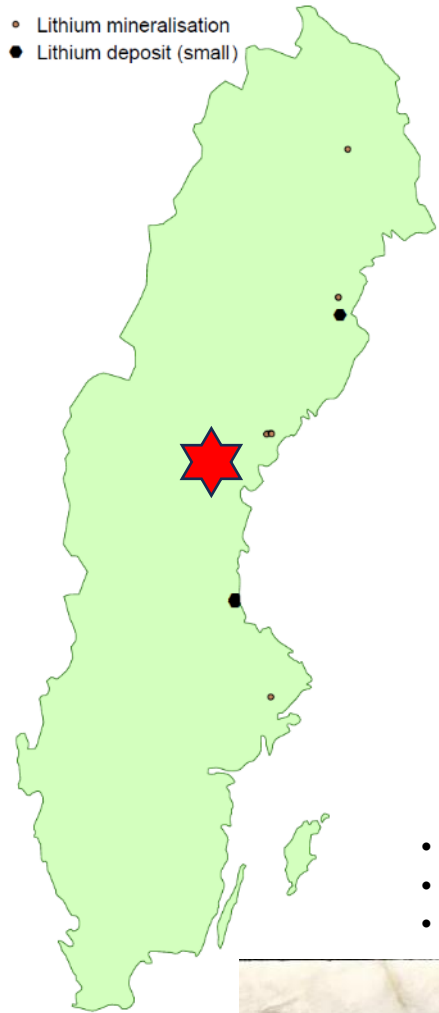
- Proximity to Highways and Rail
- 5 Drilled Lithium Pegmatites Neighbouring deep water intercoastal port
- Lithium battery gigafactory under construction nearby



Source for figures: Sweden – United Lithium Corp.



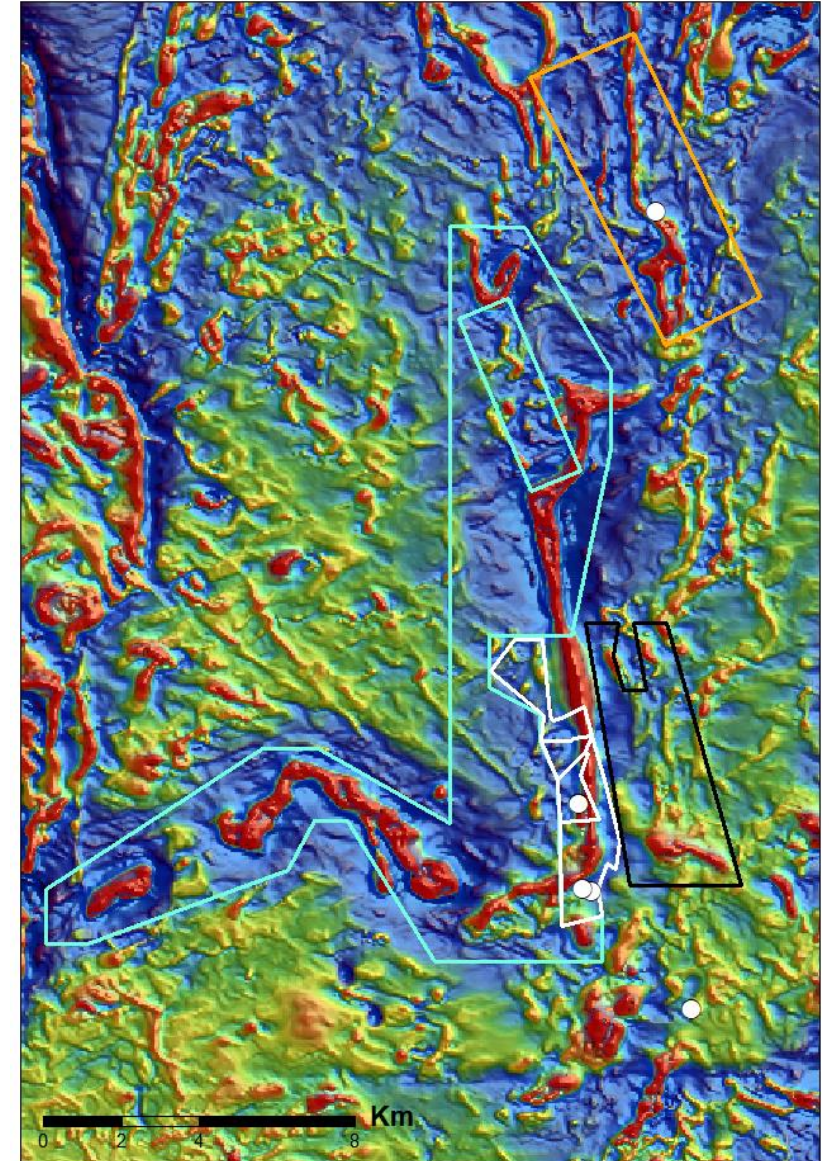
# Järkvissle



- Series of sub-parallel, approx. N-S-aligned pegmatite dykes
- Spodumene, petalite, cassiterite
- Historical mineral resource: 0.6 Mt @ 0.45% Li, 0.07% Sn & 80 ppm Ta

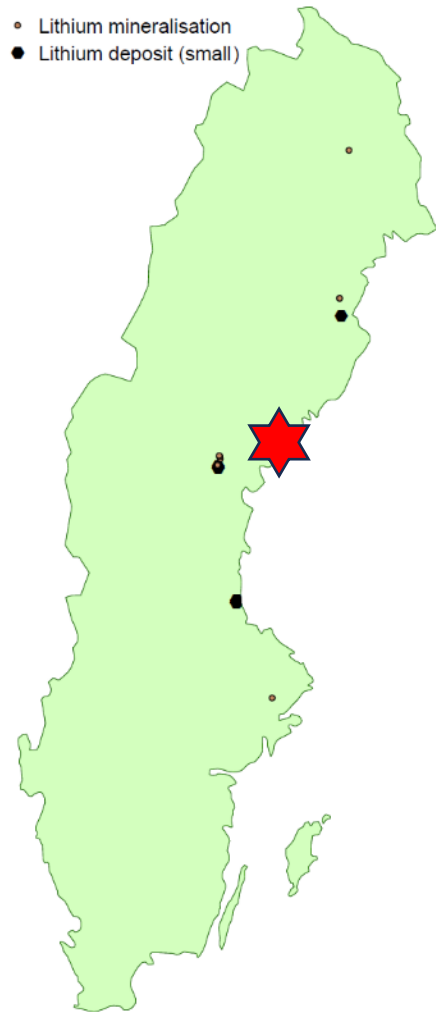


prospecting - Claim area

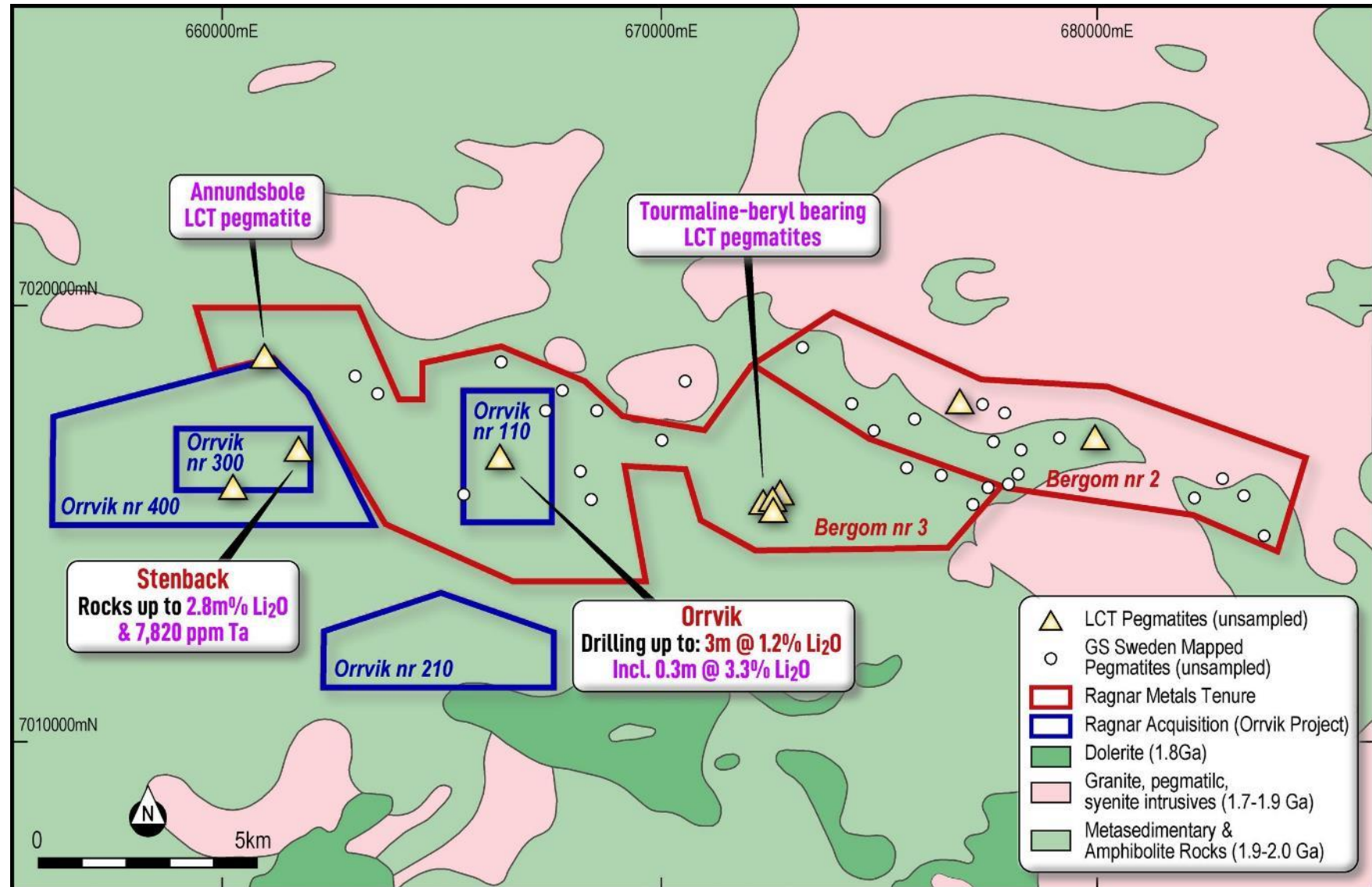




# Orrvik Lithium Project



- Lithium mineralisation
- Lithium deposit (small)



Source for figure: Orrvik Lithium Project — Ragnar Metals Ltd.



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