

GTK'S BATTERY MINERAL EXPLORATION UPDATE

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CONTENTS OF THIS PRESENTATION

- GTK's battery mineral related budget projects
- Few 1 slide examples of areas/approach taken
 - LCT-pegmatites West and Southeast Finland
 - Graphite
 - Co in Lappland
 - Redefining Co-potential in East Finland

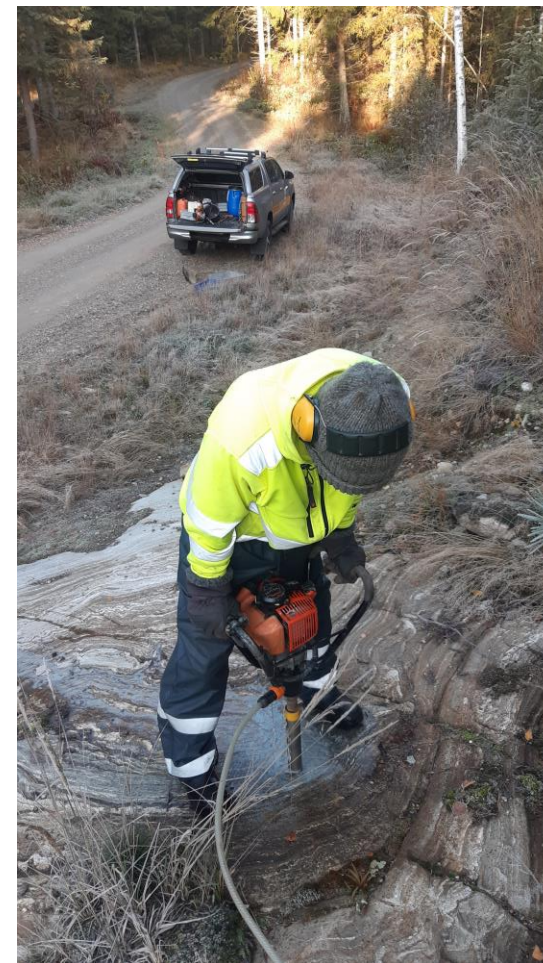
BATTERY MINERAL POTENTIAL PROJECT

- Aim to support the basis of the battery cluster
- 2019–2022
- Mainly: Co, Li, flake graphite
- Evaluate potential, exploration left to the private sector
- Identify new or underexplored areas, point out potential



MINERAL SYSTEMS AND MATERIAL CHARACTERIZATION METHODS

- GTK's budget funded project 2020–2023
- Evaluates the potential of application of “new” methods to work on battery mineral potential
 - Analytical methods
 - Possible to use the collected material in new, more efficient ways
- Characterisation of Li-deposits based on trace elements and isotopes?
- Usage of halos to locate Li-deposits?



DATABASES, MODELLING AND FLEXI- DESKING MAKE MIRACLES.....



....., BUT FOR SOME PEOPLE THE REALITY IS LESS GLAMOROUS IN THIS PROJECT.



.....IT HAS ALWAYS STARTED FROM THE FIELD AND SAMPLE. AND STILL DOES.....



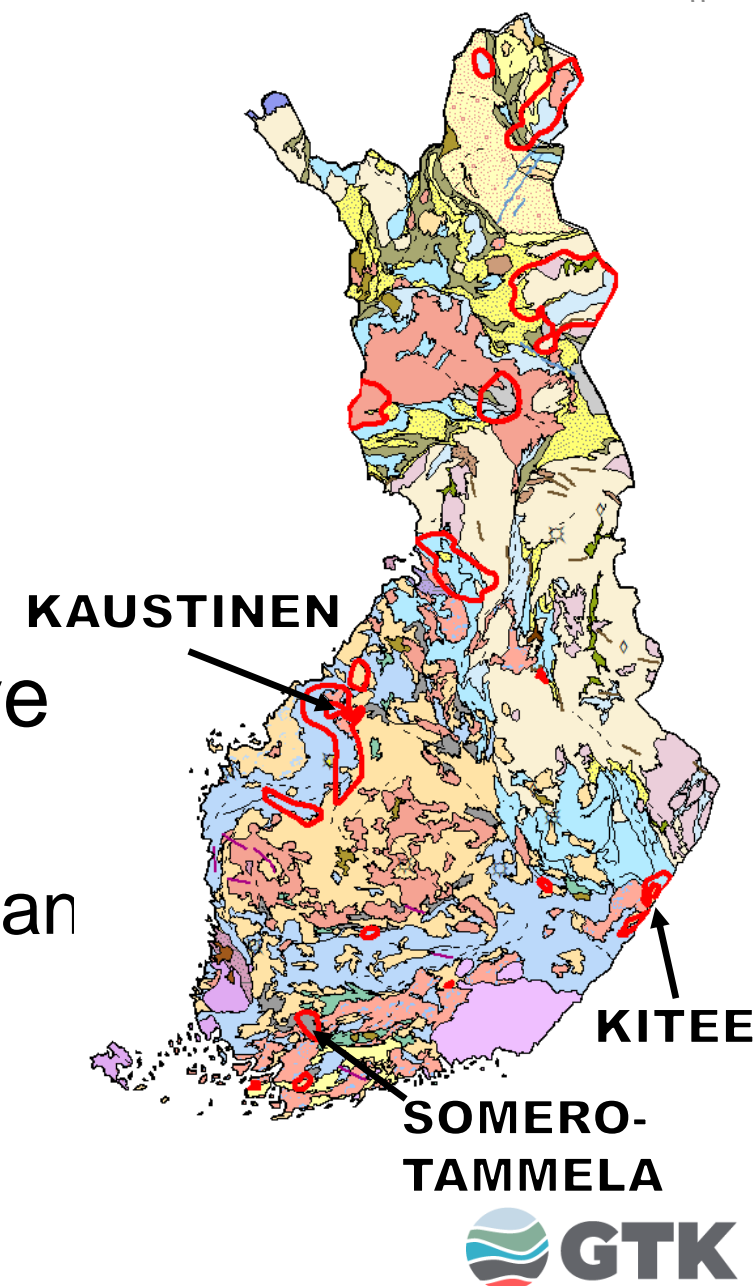
LCT-PEGMATITES, KEY POINTS FROM PAST IN FINLAND

- Have been mostly targeted for lithium
- First dykes with abundant spodume found in 1960s
 - 60 years later, a test pit dug and just few more years to production....
- Limited activity in 1980s and 1990s
- Keliber, junior mining company found in 1999
- GTK active since ~2000 with focus on lithium



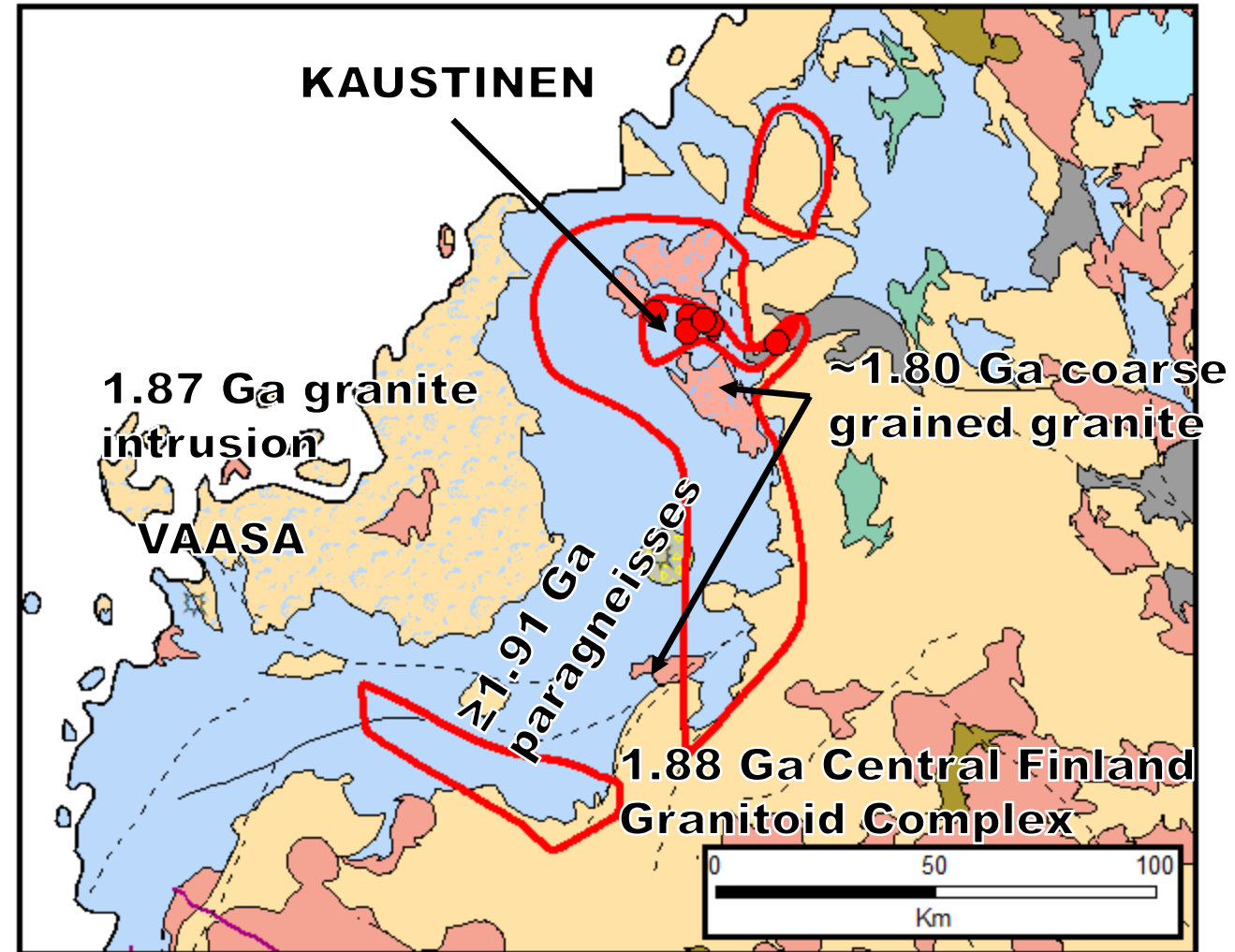
LCT-POTENTIAL IN FINLAND

- Red areas on the map in the right LCT-potential areas from Rasilainen et al. 2018
- Kaustinen the only one with deposits
- Others contain occurrences or simply have promising geology
 - Out of these Somero-Tammela best explored and with most indications



KAUSTINEN

- Variably fertile ~1.80 Ga pegmatite intrusions surround the known deposits
- GTK heading from "Kaustinen core" outwards
 - New dykes located, too early to talk about size & grade
 - But they certainly exist



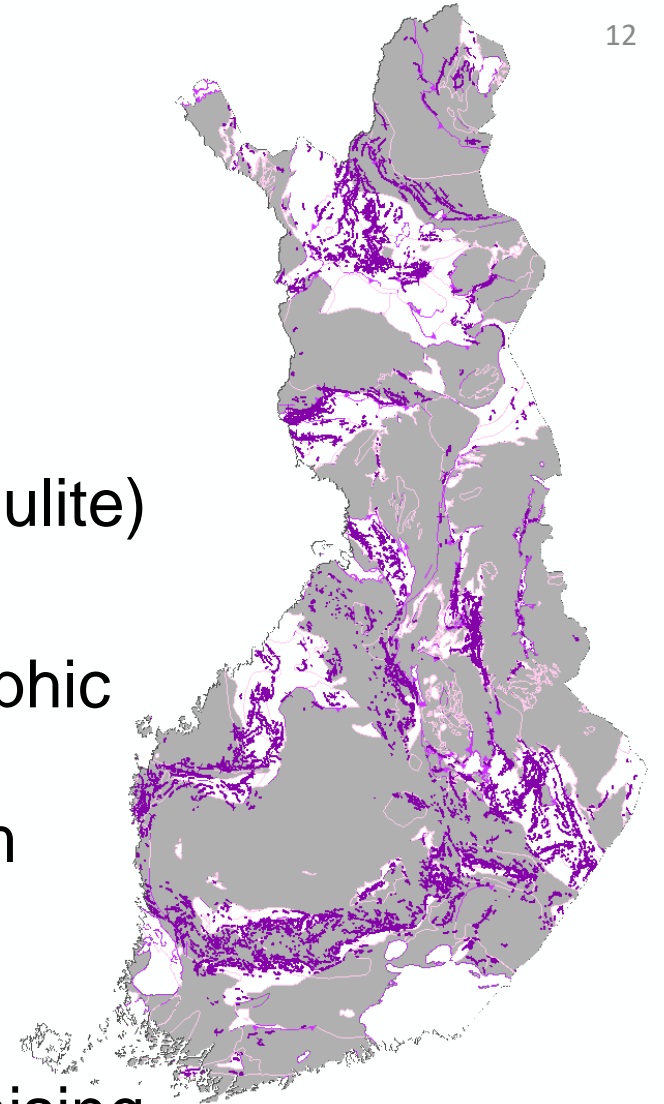
KITEE & PARIKKALA

- LCT-pegmatites known from 1970s
 - Known outcropping dykes studied in great detail
 - BUT plenty of areal work remains to be done
- Also plenty of unfertile pegmatites
- GTK commenced work in 2020 with aim to create a new target area for Li-exploration

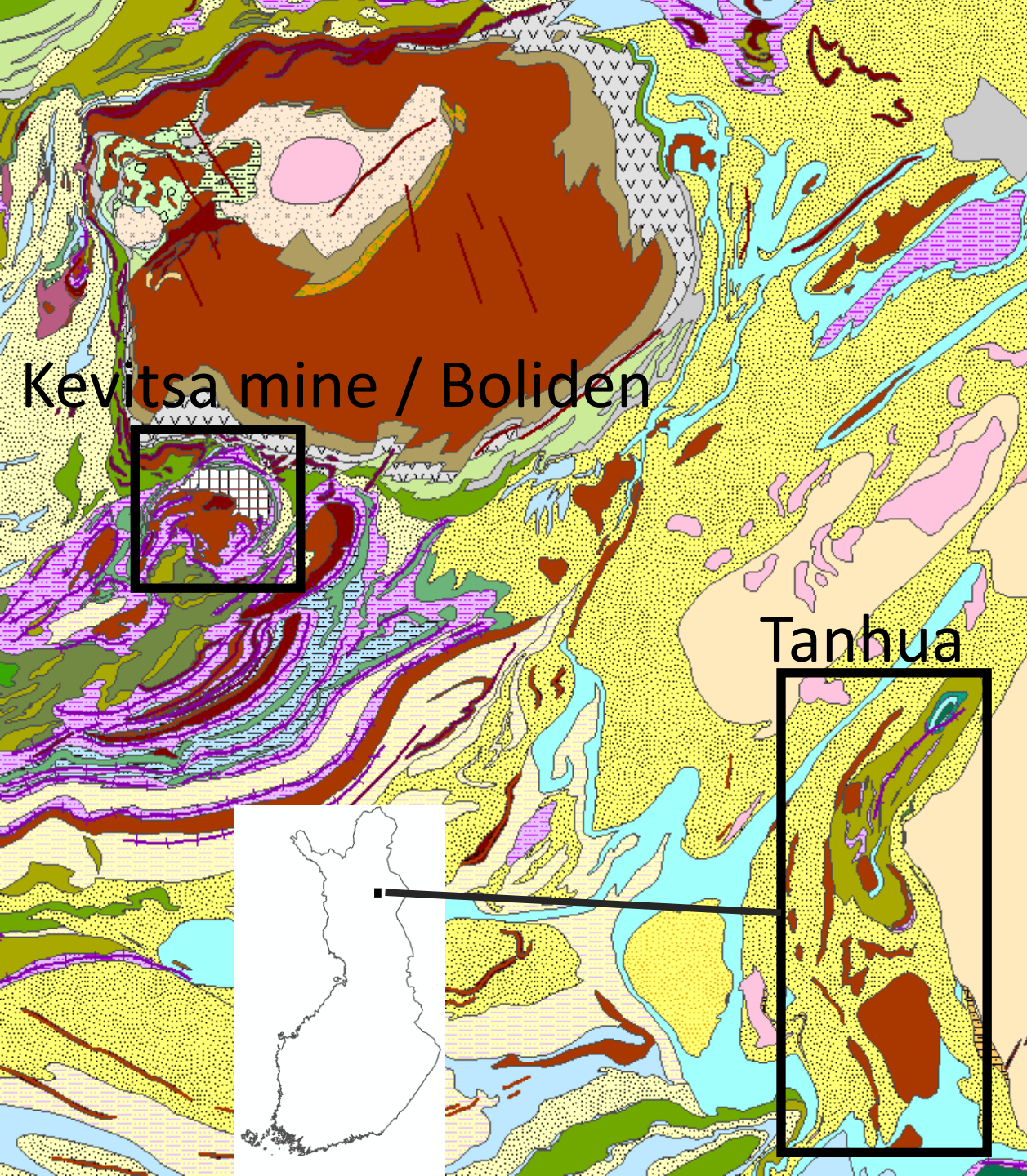


GRAPHITE

- Blackschieists are abundant (Purple lines)
- Metamorphic grade high (Grey=Upper amphibolite/granulite)
- Nationwide systematic evaluation
- Selection of target areas with geophysics and metamorphic degree
- Actually collecting physical samples and analysing them
- Possibility to "dig deeper" with the finds
- First delination of potential areas by end of 2022
- Bench scale enrichment/purification tests for most promising targets



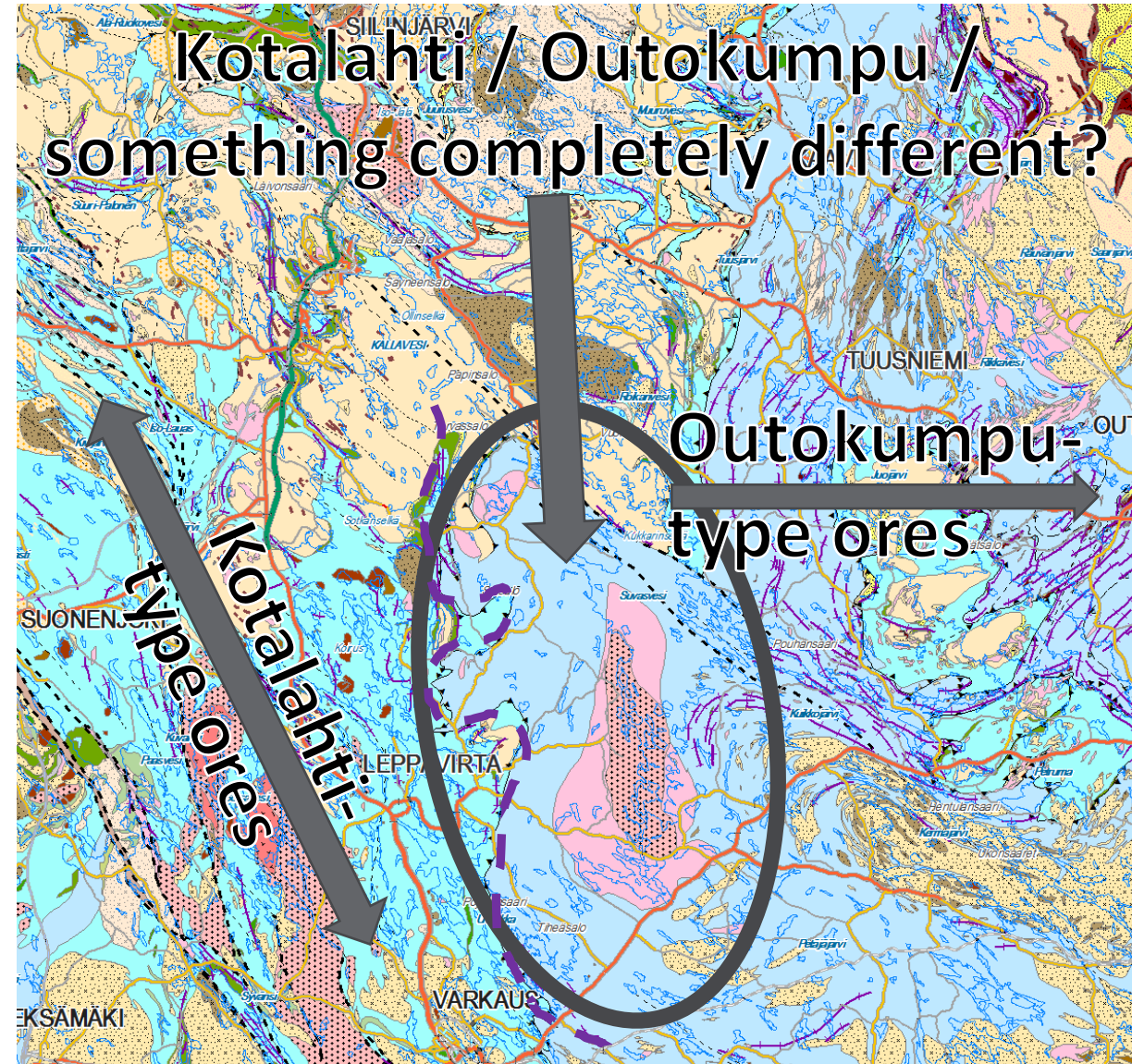
TANHUA



- Reading old reports paid off
 - Exploration for V in 1970s
 - No success, one sentence "Co concentrations are highly anomalous"
 - Core resampled, $Co \leq 0.3\%$
- Gabbro intrusions in clastic sediments
- Albitization causing post crystallization metal mobility?
- No direct hit, but certainly new type of potential

OUTOKUMPU WEST

- Outokumpu-type Co-Cu-potential in the east (altered ophiolite fragments)
- Kotalahti-type Ni-Cu-Co-potential in the west (magmatic sulphide ores)
- But what's the practically unexplored area between these two?
 - Is it truly empty, and if, why?
 - Are the ores deeper, 3D-modelling in belt scale





THANK YOU!

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