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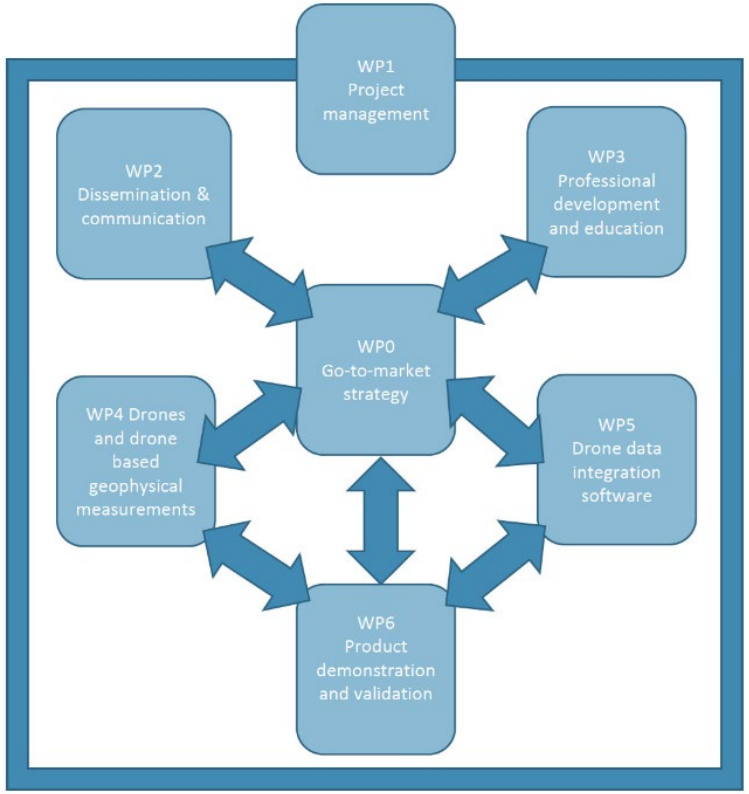
DroneSOM project

- KAVA 8 upscaling project co-funded by EIT RawMaterials
- 2022-2024 + DroneSOM.speed 2025
- Upscaling project: From the prototype to commercialization
- Geological Survey of Finland (GTK), www.gtk.fi
- Beak consultants GmbH, www.beak.de
- Radai Oy, www.radai.fi
- Technical University of Denmark (DTU), www.dtu.dk, DTU Space www.space.dtu.dk (2022-2024))



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PROJECT GOALS

To create a service that combines fast and cost-effective geophysical data collection with data modelling and integration

Upscaling of drone geophysics

- Electromagnetic measurements (RADAI)
- Gravity measurements (DTU)-> The target level was not fully achieved.

Upscaling of interpretation / integration technology

- 3D inversion of drone geophysical EM data (GTK)
- Self-organizing maps in 2D (GisSOM, GTK)
- Self-organizing maps in 3D (advangeo® 3D Prediction, BEAK)

Main commercialization partner: Radai

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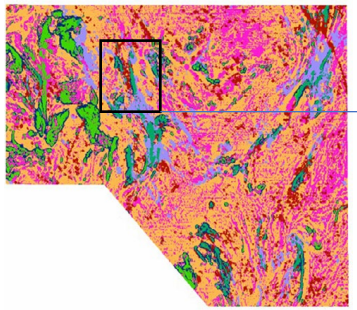
Data Integration using SOM

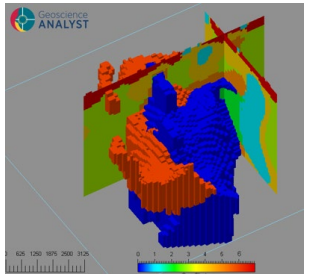
Existing Data



Cluster map of prospective areas for exploration

Selected targets

Modelling and Data Integration in 3D



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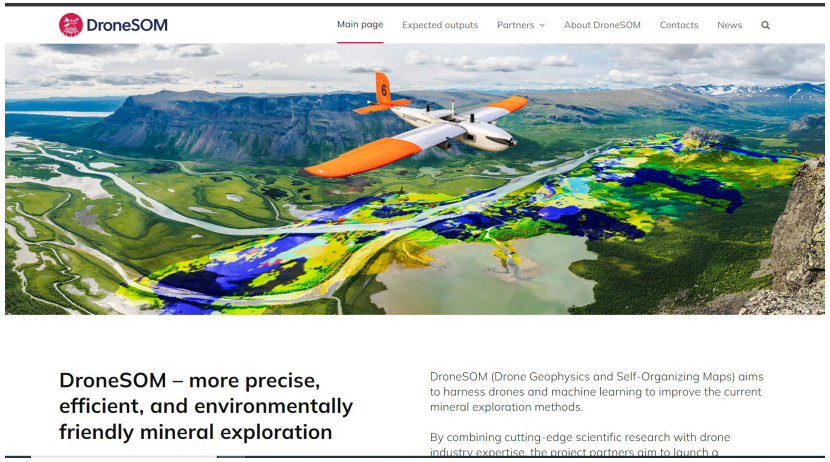
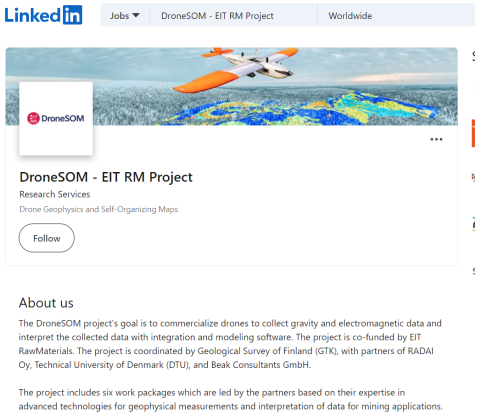
- dronesom.com



- Linkedin



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Educational events organized during the project

- University courses on gravity and data integration in Finnish and Danish universities.
- DroneSOM-oriented workshops in SEG conference in Namibia and FEM conference in Finland

- Courses on mineral potential mapping using various data integration techniques will be organized at Finnish universities also in the future. Upon request, GTK can also arrange similar courses for interested clients.

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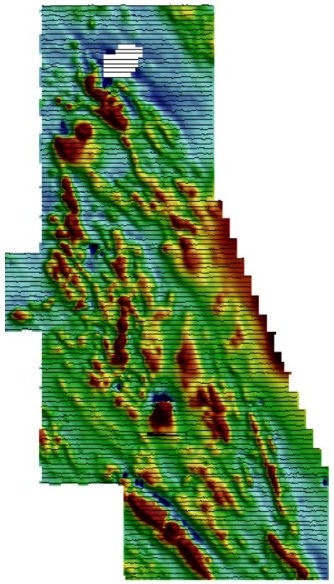
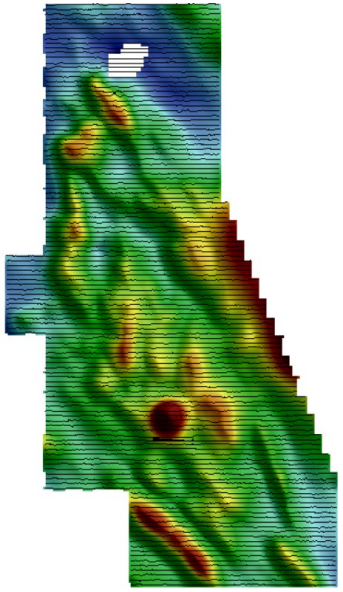
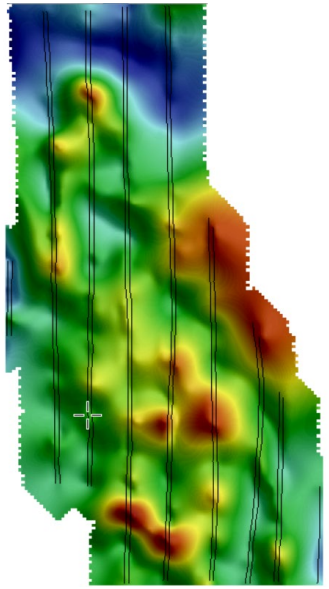
Example of magnetic survey results measured from different heights.



Ground mag, line spacing 50m, station spacing ~1m



Ground mag 40m upward Continuation. ~dronemag



Aeromag 1983, line spacing 200m, flight height ~40m station spacing 25m

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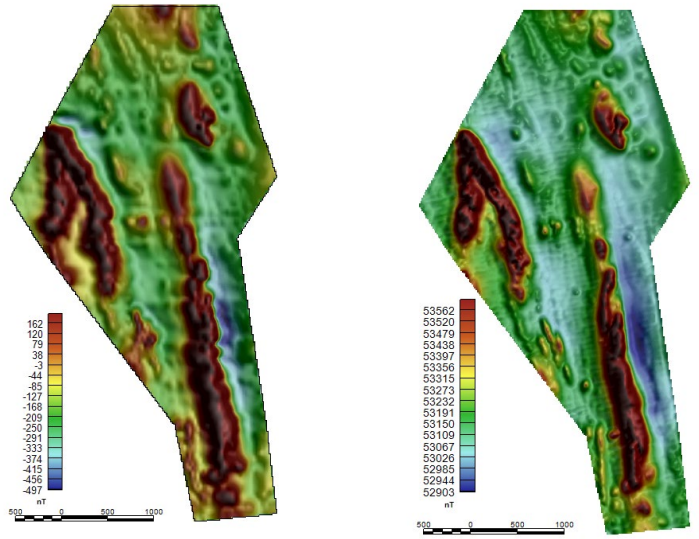
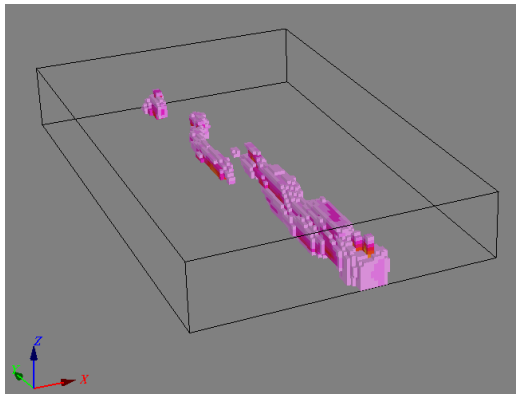
Pilot survey in Kupukka

www.kupukangrafiitti.fi/en/home/

- Magnetic survey, one day
- Area 29 km^2
- Line spacing 50 m
- 646 line-km
- 135-140 magnetic readings per second
- Down-sampling to ca. 28 Hz (0.8 m)



Left: Old aeromagnetic data, survey year 1987. Right: New drone magnetic data



3D magnetic model based on new data.

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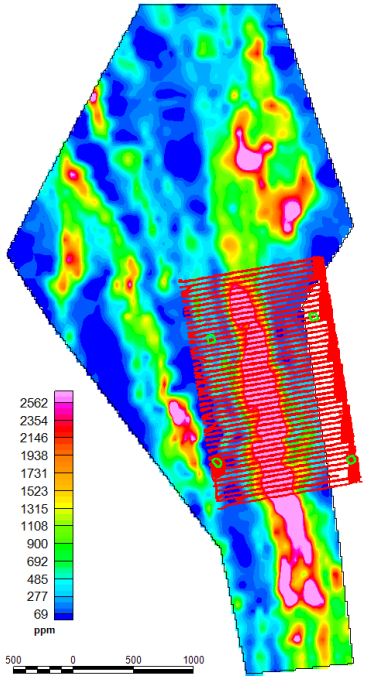
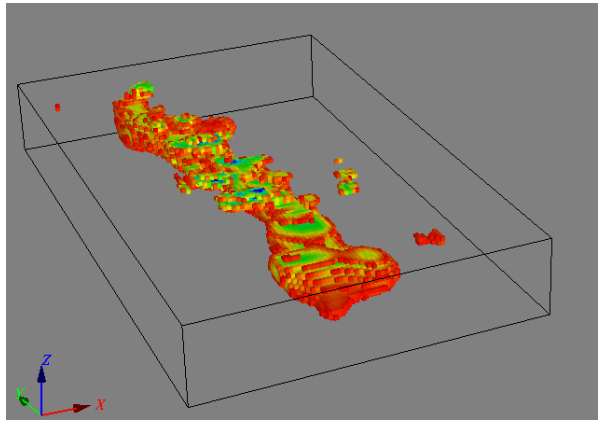
- Electromagnetic survey, three days
  - Area 4.7 km^2
  - Line spacing 75m
  - 45 lines, 1.4 km each.
  - Total 377 line-km was flown.
  - Flights were repeated for four different transmitter loop locations.





Left: Drone EM-survey area, red lines. Background: GTK airborne EM-data.
Right: 3D conductivity model obtained from drone-EM data using GTK's 3D EM inversion.

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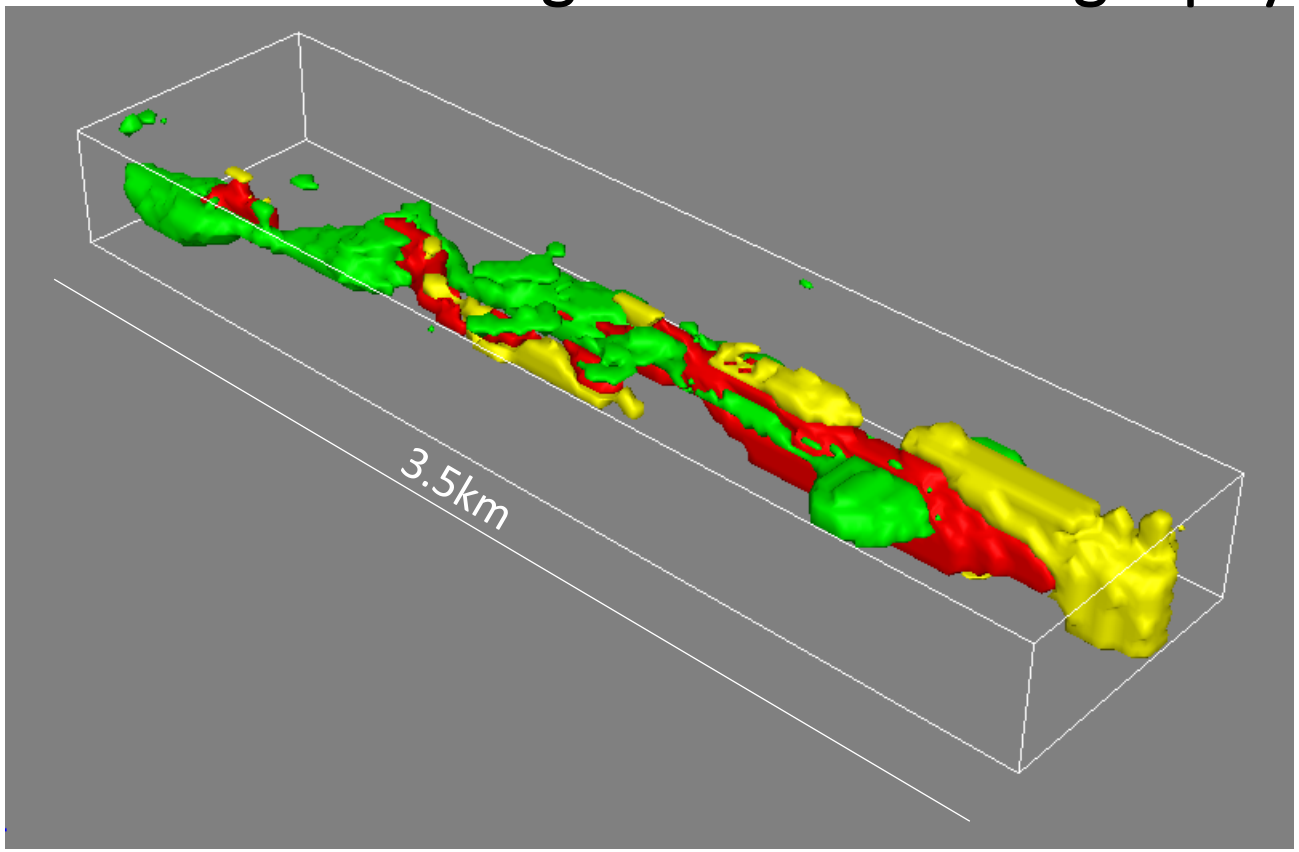
3D SOM-clustering results based to geophysical models



High magnetic susceptibility
High conductivity
High conductivity and high mag susceptibility

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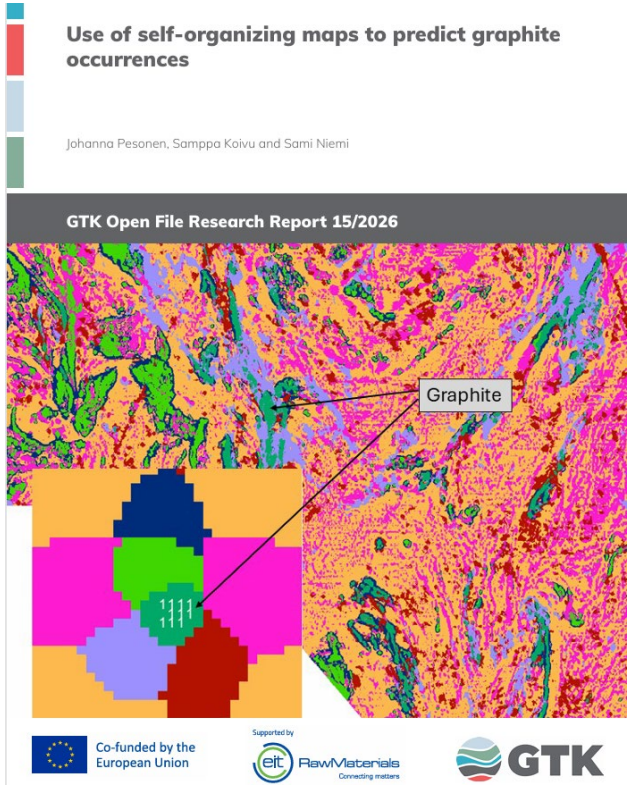

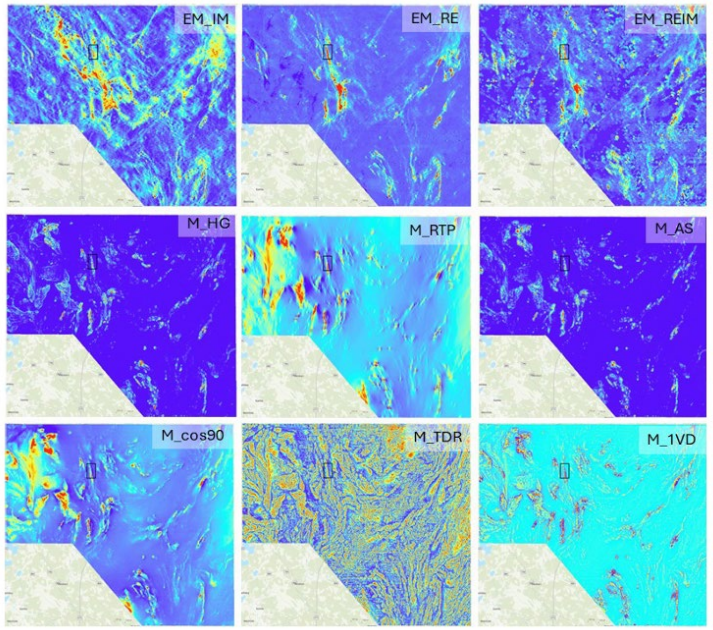

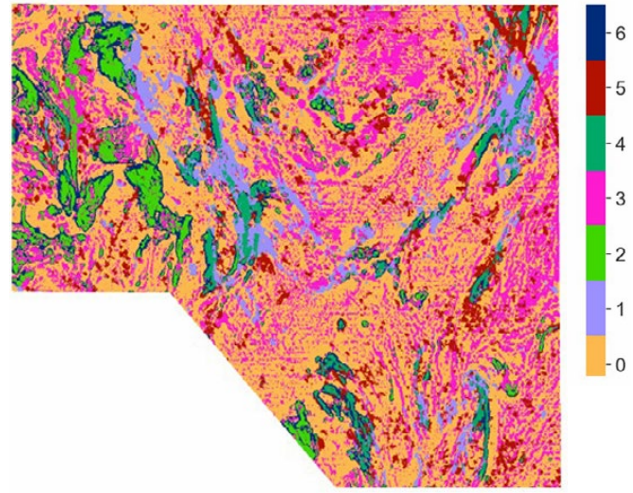

Cluster 4: favourable for graphite occurence

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- EIT-Raw Materials

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Kiitos

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