

# NovTecEx - Novel technologies for greenfield exploration

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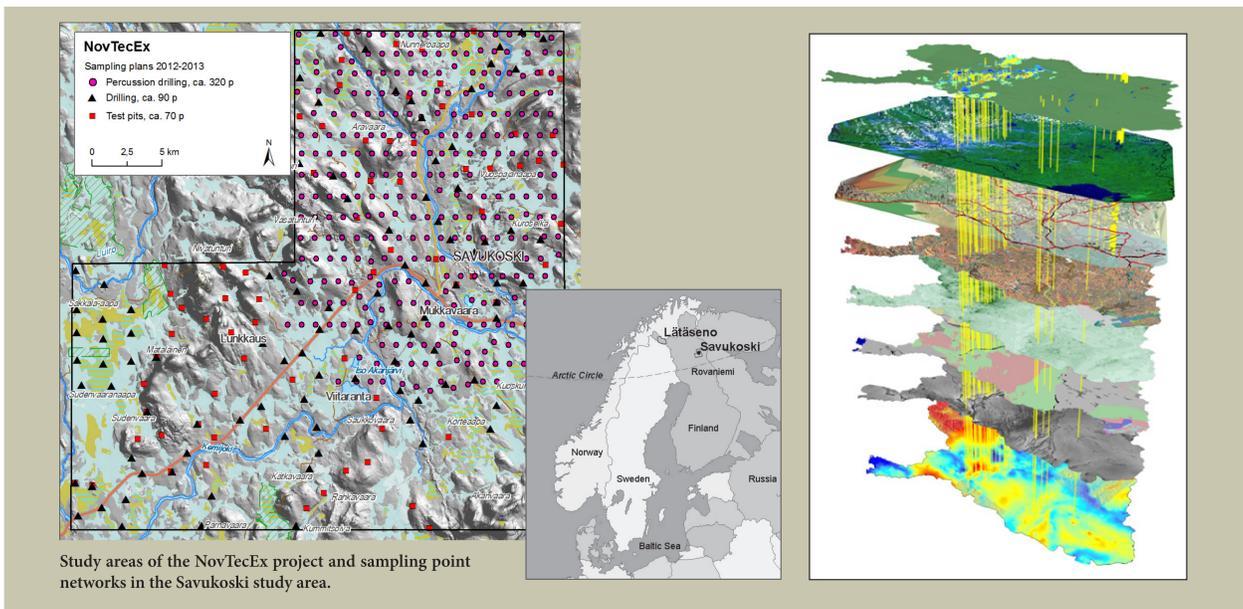
In the NovTecEx project (Novel technologies for greenfield exploration; funded by Tekes Green mining program; 2012-2014) new mineral exploration methods are developed. Mineral exploration within thick glacial overburden, peat lands and different conservation programs is very demanding, sensitive and expensive. The aim in this project is to find cost- and eco-effective best practices for mineral techniques and concepts. Research partners of the project are the Geological Survey of Finland and the University of Oulu.



Advanced ways to do mineral mapping and exploration are studied and developed in the eight tasks of the NovTecEx project:

- Task 1: Developing sampling techniques for till geochemistry
- Task 2: Indicator minerals, automated mineralogy
- Task 3: On-site field assay techniques
- Task 4: Spatial data mining and modeling
- Task 5: Object based recognition of bedrock fractures
- Task 6: AMT as a mineral exploration tool
- Task 7: Development of the 2D interpretation of airborne TEM measurements
- Task 8: Airborne gravity gradient surveys

Essential exploration techniques include concurrent use of geological, geochemical and geophysical surveys. These techniques allow us to locate and thoroughly investigate geological processes responsible for mineral deposits and the indications of ore forming processes. The same techniques can also be applied for direct identification of mineral deposits if the sampling density is high enough. However, the efficiency and success require also high quality data processing and interpretation.



Study areas of the NovTecEx project and sampling point networks in the Savukoski study area.

The arctic areas are sensitive and vulnerable to human activities of any kind. The environmental aspects will be taken into consideration when selecting the sampling methods, routes in the field and time of the sampling. Low-impact sampling techniques coincident with multiple sample material collection and on-site field analysis will be applied by testing the sampling vehicles and methods. Project will also produce a fast and consistent sample preparation and research procedure for indicator minerals. Geophysical surveys result data from the surface and from greater depths of the bedrock. This data can be used to create a regional geological 3D model. Application of spatial data mining and spatial analysis techniques on 3D data is new and creates possibilities to compile 3D prospectivity maps.

## Novel technologies for greenfield exploration NovTecEx

- User need
  - New mineral discoveries
  - Mineral exploration is challenged by thick glacial formations, peat bogs and weathered bedrock
  - Arctic areas typically exhibit a vulnerable environment
- Approach
  - Improve exploration concepts
  - New sampling techniques
  - Deep penetrating exploration geophysics
- Benefits
  - Mineral exploration with minimum impact on environment
- Users
  - Mining and exploration companies
  - Drilling companies



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### Results

Novel technologies for greenfield exploration project generates and develops mineral exploration concepts utilizing methods and best available practices to assess mineral potential or directly locate especially deep seated mineral deposits within northern vulnerable terrains. More effective processing, interpretation and modeling techniques of mineral exploration data enable even larger amounts of data being processed fast. This goal serves especially the companies and organizations conducting grass root mineral exploration on regional scale. Techniques are also adoptable into target scale exploration.

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