

MINING ENVIRONMENTAL STUDIES IN LAPLAND

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MINING ENVIRONMENTAL PROJECTS IN LAPLAND 2012-

- SULKA - the environmental impact assessment of sulphur compounds
- Kaivos- ja tuotantoympäristöjen taustapitoisuuskartoitus - GTK baseline studies around mining and industrial sites
- Min-North - Geochemical and geophysical methods to determine the pathways of effluent waters from the waste rock piles at Saattopora closed mine
- Min-North - Substitutive cover materials for waste rock piles – a lysimeter study at Kevitsa mine
- Biopeitto – Utilization of biochar in dry cover material and landscaping on mine waste areas
- Lapin Kaiku – The evaluation and management project of the cumulative environmental effects of the mining cluster in Lapland

SULKA - THE ENVIRONMENTAL IMPACT ASSESSMENT OF SULPHUR COMPOUNDS

The impact of sulphur compounds, possibly originating from sulphide ore sources, on surrounding

- soils
- mosses
- surface waters
- groundwaters
- stream and lake sediments of the mine

Rikkiyhdisteiden vaikutusten arviointi -
Sulka-hankkeen loppuraportti

http://tupa.gtk.fi/raportti/arkisto/10_2015.pdf

- Case study at Kevitsa Mine, Sodankylä



KAIIVOS- JA TUOTANTOYMPÄRISTÖJEN TAUSTAPITOISUUSKARTOITUS - GTK BASELINE STUDIES AROUND MINING AND INDUSTRIAL SITES

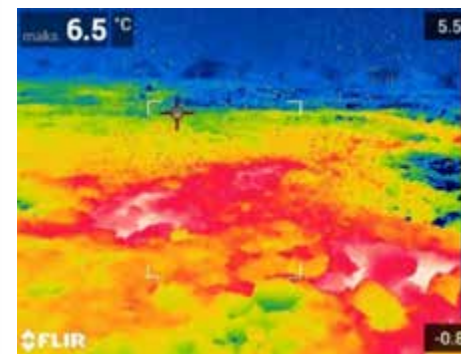
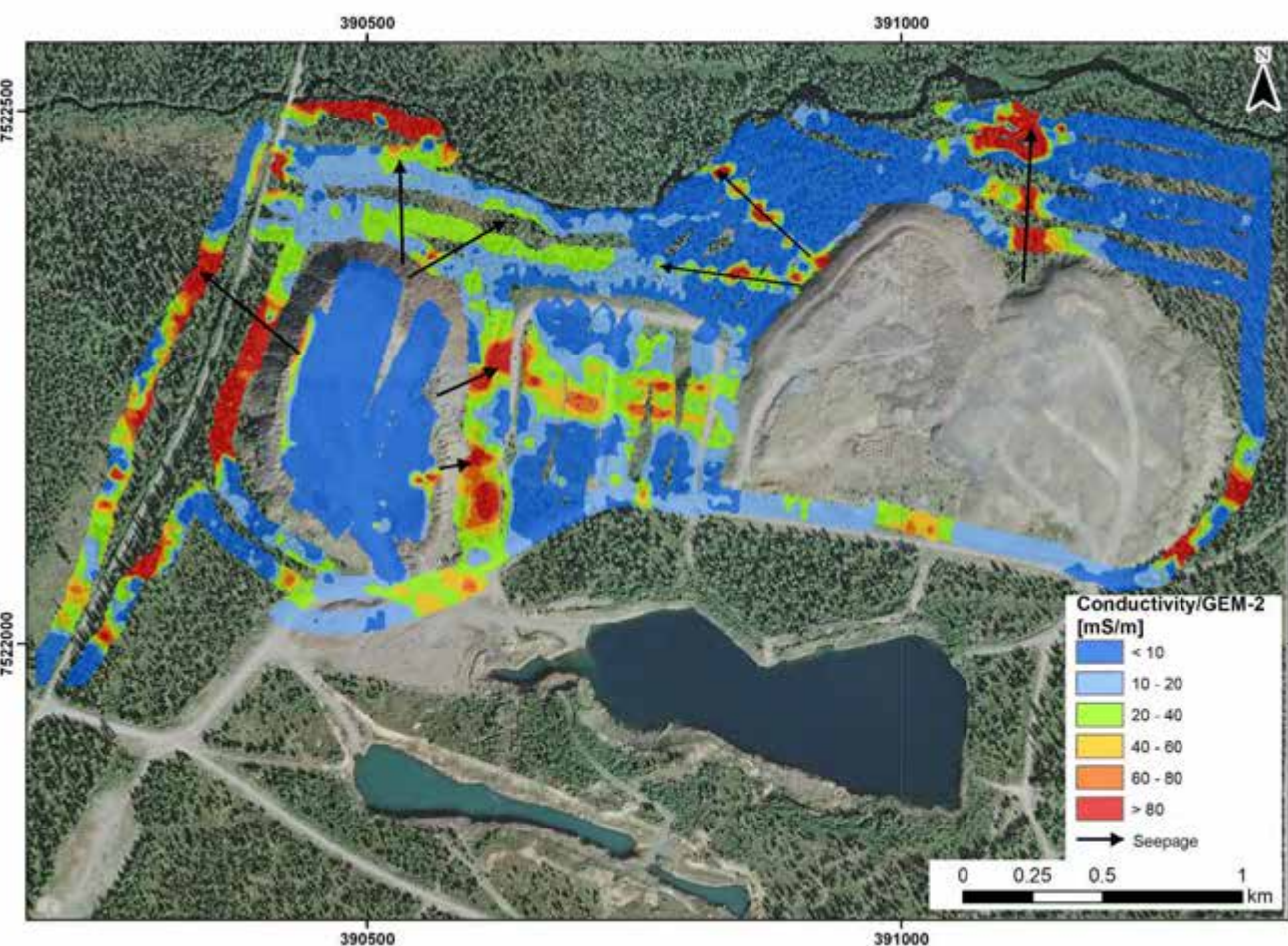
- **Valtioneuvoston asetus maaperän pilaantuneisuuden ja puhdistustarpeen arvioinnista 214/2007**
- The background concentration is regarded as the assessment threshold in areas with a background concentration higher than the threshold value.
- To provide information about the geological based concentrations of elements in soil and water around the mining or potential mining areas
- To serve planning and environmental authorities, decision makers as well as the local residents.
- Pilot study in 2016 in Sodankylä Kevitsa (Ni-Cu-PGE-mine) and Kittilä Kuotko (Au-mine) area.



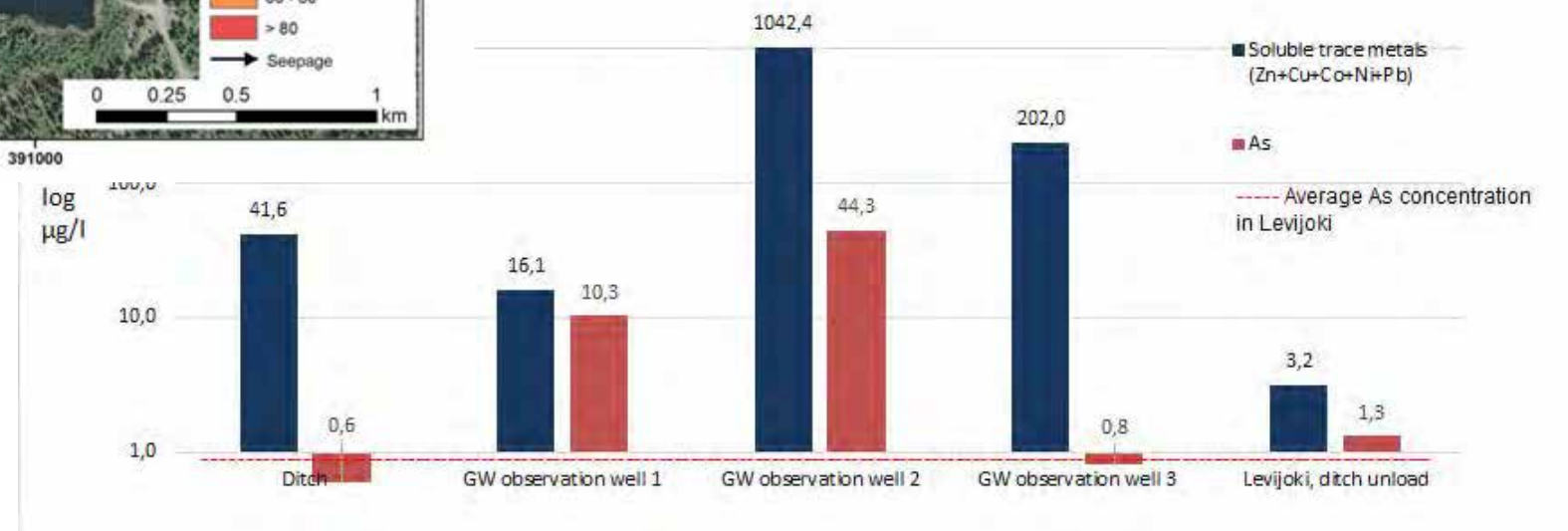
MIN-NORTH - GEOCHEMICAL AND GEOPHYSICAL METHODS TO DETERMINE THE PATHWAYS OF EFFLUENT WATERS FROM THE WASTE ROCK PILES AT SAATTOPORA CLOSED MINE

- concentrated on evaluating the suitability of different geophysical and geochemical methods to determine the water flow paths from the waste rock piles





Soluble trace metals (Zn+Cu+Co+Ni+Pb) and As



Reports in English and in Finnish coming this year

MIN-NORTH - SUBSTITUTIVE COVER MATERIALS FOR WASTE ROCK PILES – A LYSIMETER STUDY AT KEVITSA MINE

- The performance of potential cover materials and structures
- To enhance the use of secondary materials in cover structures



BIOPEITTO – UTILIZATION OF BIOCHAR IN DRY COVER MATERIAL AND LANDSCAPING ON MINE WASTE AREAS

The use of glacial till with variable thickness is the most common solution exploited in covering mine waste areas in Finland.

-> Till has low organic content. Landscaping is challenging due to extreme grow conditions and heavy erosion in tailings areas and waste rock piles.



New solutions for mineral waste cover structures and landscaping in northern climate conditions will be tested by using biochar (produced from wood and organic waste materials)

Field scale *in situ* tests in a tailings area at the Rautuvaara Mine in Kolari, northern Finland.

Kaivannaisjätealueiden peittomateriaalivalinnan koerakenteet ja -järjestelyt
http://tupa.gtk.fi/raportti/arkisto/79_2018.pdf



LAPIN KAIKU – THE EVALUATION AND MANAGEMENT PROJECT OF THE CUMULATIVE ENVIRONMENTAL EFFECTS OF THE MINING CLUSTER IN LAPLAND

- systematic analysis of mineral potential and environmental effects
- the overall point of view on geology, geochemistry, biology, and physical and chemical characters of water in Lapland
- Project added knowledge about the basic condition of the environment and took the steps to develop long-term monitoring methods and systems.

- Lapin Kaivoskeskittymän kumulatiivisten ympäristövaikutusten arviointi ja hallinta – Lapin Kaiku –projektin loppuraportti
http://tupa.gtk.fi/raportti/arkisto/66_2019.pdf
- Liitetiedostona kartat -
http://tupa.gtk.fi/raportti/aineistotalenne/66_2019.zip
- Uraani, torium, kalium ja maankäyttö lapissa sekä geofysiikka ympäristötutkimuksissa
http://tupa.gtk.fi/raportti/arkisto/65_2019.pdf

WHAT NEXT?

- **Biochar** – expand the utility possibilities to peat production, landfill or dumping ground areas and renew areas into a carbon-binding ecosystems
 - *Legislation?*
- Minimize the impacts on watercourses
- Circular economy – reuse of the organic waste material to produce biochar
- **Environmental monitoring** – need of current information of surface and ground waters
- Long-term monitoring equipment need development
- Microbiological samples for environmental purposes

KIITOS!