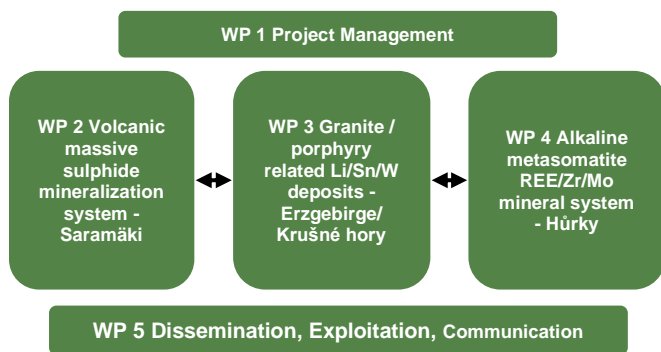


The DeepBEAT project advances exploration of critical raw materials in the EU by developing innovative geochemical technologies. Plants, treetops, resin, mushrooms, soil, stream sediment or altered rock samples capture geochemical signals from deep sources. Portable tools like X-ray Fluorescence (XRF) and Laser Induced Breakdown Spectroscopy (LIBS) enable rapid, on-site mineral analysis, while Triple Quadrupole Inductively Coupled Plasma Mass Spectrometry (TQ-ICP-MS) supply high resolution data on the elements. UAV and LIDAR-assisted sampling design and sampling protocols streamline data collection of tree canopies. Furthermore, AI-driven 3D modelling reveals deeply buried or hidden deposits. These methods minimize environmental impact, promote sustainability, and prioritize community engagement to ensure socially responsible resource management.



Number of partners: 11
Total Budget: 4 886 982.50€
Duration: 01.10.2024 – 30.09.2027

DEEPBEAT PARTNERSHIP

Coordinator



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Partners



Associated Partners



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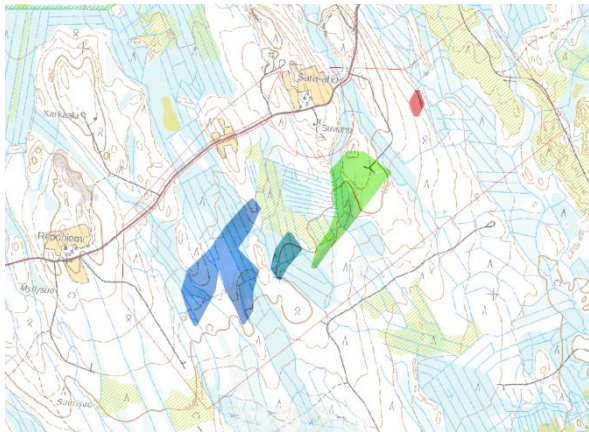
Funded by the European Union

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SARAMÄKI TEST SITE

The Saramäki volcanogenic massive sulphide (VMS) deposit is situated in the historic Outokumpu mining district in eastern Finland. The district is characterized by four past-producing mines and seven Cu-Zn-Co-Ni deposits of the Outokumpu-type. The ophiolite-hosted Co-Ni enriched VMS deposits in the Outokumpu region stands out as a distinctive deposit type in Europe hosting critical and strategic raw materials.

The deposit was discovered by the Outokumpu company which conducted extensive exploration from the 1960s to the early 1980s, employing drilling, geophysics, and limited till and soil geochemical sampling on the outcropping part of the deposit. The Saramäki deposit, with 3.4 Mt of ore, exhibits concentrations of 0.71% Cu, 0.63% Zn, 0.09% Co, and 0.05% Ni. Currently the exploration permit at Saramäki is held by FinnCobalt Oy. The Saramäki deposit is an excellent test site for testing new exploration methodologies as it sub-outcrops under glacial sediments but also plunges to the depth of 700 meters.



ERZGEBIRGE/KRUŠNÉ HORY TEST SITE

The Erzgebirge/Krušné hory is locus-typicus for the large Variscan belt and thus could serve as blueprint for large areas in Europe. Through centuries of exploration and mining this area is very detailed studied and well understood in numerous aspects. This makes it an excellent case study to develop ML tools and workflows including AI to predict 3D geochemical models based on surface geochemistry. Although the complex geological setting challenges the prediction of fertile granite intrusions, we expect that profound geochemical study of the relationships of spatial and structural aspects will provide new insights that can be used for predicting the concealed mineral potential within the Erzgebirge/Krušné hory, but also in less investigated areas throughout the entire Variscan belt or similar geological settings like the Damara Belt in Southern Africa. Full geochemical subsoil data sets will provide the basis for developing variance-based sampling strategies for targeting the subtle geochemical expression of concealed fertile granites at the surface.



The expected output are methods for prospectivity evaluation of large orogenic areas with similar geology using commonly existing datasets as stream sediment data and airborne geophysical data, supported by specialized investigations of host rock mineral-traps for selected fluid components and selected host rock types and plant data sets for vegetated areas.

HŮRKY TEST SITE



The Hůrky test site with REE-Zr-(Mo) mineralization developed in shear-zone associated with sodium alkaline metasomatism is located in the NW part of the Czech Republic. REE mineralization related to alkaline complexes represents interesting exploration potential outside more 'traditional' carbonatite related REE mineralization. A more than 20 REE mineral phases were identified in the mineralized metasomatites from Hůrky site which makes it a suitable site for the research of this type of REE mineral system.

Planned research on the site of Hůrky can benefit from information and samples gathered from past exploration activities that included diamond drilling and long-term geochemical, petrological and mineralogical research. DeepBEAT project aims 1) to test biogeochemistry exploration methods designed for this type of alkaline REE mineralization and 2) to produce metallogenetic model for alkaline REE-Zr-(Mo) mineralization using set of geological, geophysical, drilling datasets and detailed geochemical, mineralogical, isotope research.