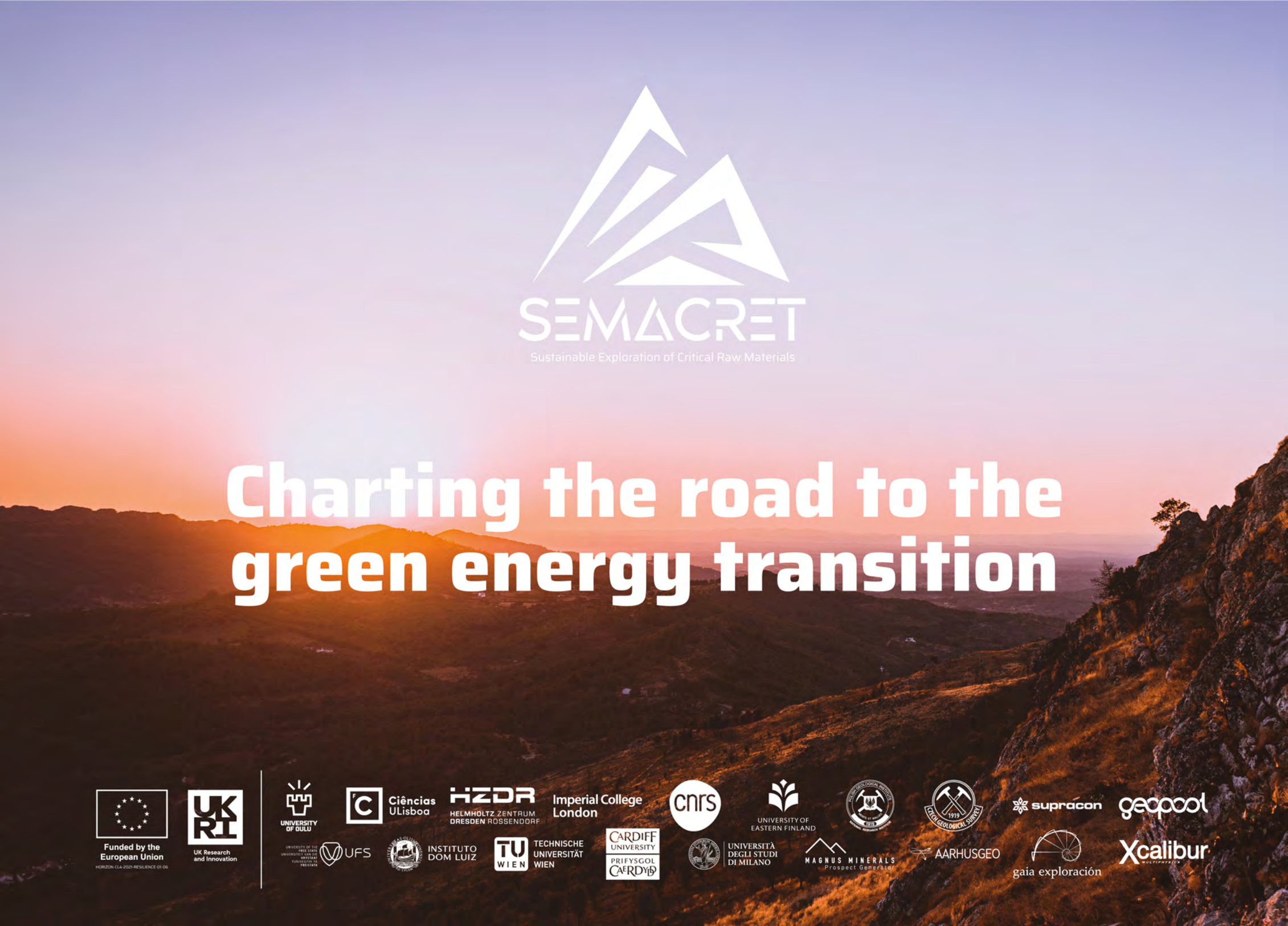
SEMACRET
Sustainable Exploration of Critical Raw Materials
Charting the road to the green energy transition
Funded by the European Union
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MAGNUS MINERALS Prospect Generator
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Our Motivation

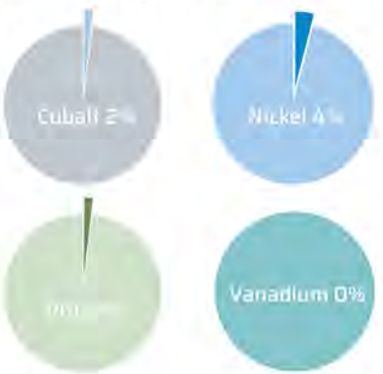
Critical Raw Materials (CRM) are fundamental to feed the EU industrial value chains, strategic sectors and the green energy transition.

Less than 3% of CRM are sourced in EU countries, which leaves the EU in a vulnerable position depending mostly on imports from third countries. The EU aims to boost the internal production of Critical Raw Materials to secure its autonomy and ensure responsible sourcing of these commodities for the environment and populations.

Metals such as **Nickel** (Ni), **Copper** (Cu), **Cobalt** (Co), **Vanadium** (V), **Titanium** (Ti), **Chromium** (Cr) and **Platinum-Group Elements** (PGE) are formed from matic mantle-derived magmas in orthomagmatic deposits. There are currently only 2 mines in operation producing these metals in the EU, though there is potential for additional mining in several EU countries.

Self-supply of EU for some (Critical) Raw Materials

Source: CRM list 2020_final report (European Comission)

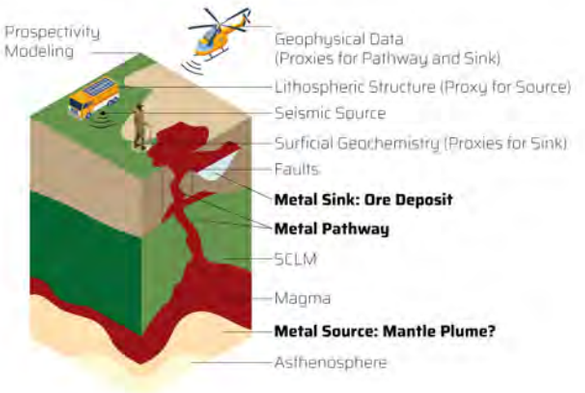


Methodology

This project will apply the Mineral Systems Approach to guide exploration, deliver our goals and identify prospective areas. This method aims at identifying the major ingredients necessary to form an ore deposit.

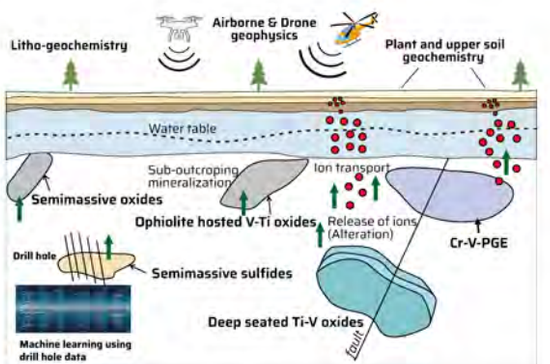
1 - The SOURCE of the magmas. This can achieved using geochemical data to differenctiate mantle sources.

Translating the **Mineral Systems Approach** to large scale regional exploration.



2 - The PATHWAY of the magmas through the crust. This implies identifying the most favourable locations for magmatic sulfide mineralization, such as conduits and feeders, which can be achieved with geophysical methods to detect lithosphertic weakness zones, and geochemistry of cumulates. These also allow identifying anomalous oxide and sulfide concentrations

3 - The SINK within the crust that will allow to trap the metals in high concentrated, exploitable amounts. For orthomamagmatic deposits this occurs during crystallyzation and crustal contamination of the magmas. Proxys for sink include surface geochemistry, comparative (isotopic) study of the geochemistry of barren vs mineralized intrusions and lab simulations to understand magma fluid dynamics, and sulfur assimilation processes.



Project Main Goals

SEMACRET project aims to promote sustainable exploration of Critical Raw Materials in the EU securing the continued supply for our industries

Generate improved ore models for orthomagmatic mineral deposits that can explain all the petrological features of known magmatic ore deposits in the EU (e.g., identify the key metal source, locate the pathway, and determine the processes controlling metal sink mechanism).

Apply the new ore models to design geochemical and geophysical vectors that can be applied at regional scale exploration to delineating high potential areas in the EU.

Apply the new vectors to generate drilling targets and delineate extensions to known magmatic ore bodies in the EU thereby enhancing the efficiency of local-scale exploration.

Promote social awareness of the significance and responsible sourcing of raw materials in the EU.

Generate comprehensive maps of the exploration and production potential of key metals hosted by orthomagmatic ore deposits (Ni, PGE, V, Ti, Cr, Cu) in the EU and key third countries (e.g., Canada, South Africa, Australia, Zimbabwe), in line with UNFC and UNRMS standards.

Location & Team

Research will be conducted at 5 reference sites in **Finland**, **Portugal**, **Poland** and the **Czech Republic** representing different environmental, geological and social conditions.

Our **team** gathers specialists from the academia and industry in the orthomagmatic deposit field, including geology, geophysics, geochemistry, mathematical and resource modelling, artificial intelligence, geoinformatics and social sciences.