



SEMACRET

Sustainable Exploration of Critical Raw Materials



We aim to promote sustainable exploration of Critical Raw Materials in the EU securing the continued supply for our industries.



Current EU Raw Materials own supply

Our motivation


Critical Raw Materials are fundamental to feed the EU industrial value chains and strategic sectors and the green energy transition. Current supply of primary Critical Raw Materials is <3% for many important commodities 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.

An aerial photograph of a wide river valley. The river is a vibrant blue-green color, winding through a landscape of brown and green trees. In the distance, a bridge spans across the valley. The sky is a pale, hazy blue.

Finding New Mineral Ore Deposits

Where do metals come from?

The metals we use in everyday objects come from mineral deposits. The discovery of new deposits requires improving our understanding on their forming processes and the favourable locations to find them. **Orthomagmatic mineral systems** in mantle-derived magmas carry green (critical) raw materials including Nickel (Ni), Copper (Cu), Cobalt (Co), Vanadium. (V), Titanium (Ti), Chromium (Cr) and platinum-group elements (PGE). 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.



Applying the Mineral Systems Approach

Methodology

This project is designed to develop socially and environmentally sustainable means of finding (=exploration) orthomagmatic Critical Raw Materials applying the **Mineral Systems Approach** to guide exploration and deliver our 3 goals.

The Mineral Systems Approach aims at identifying the major ingredients necessary to form an ore deposit:

- The source of the magmas within the mantle.
- The pathway of the magmas to the crust.
- The sink within the crust that will allow to trap the metals in high concentrated, exploitable amounts.



Improve,
Innovate
& Educate

Main Goals

- 1) **Improved formation models** for orthomagmatic mineral deposits.
- 2) **New exploration methods** to identify areas of high exploration potential, from regional scale to local scale, increasing exploration efficiency, reducing exploration costs and minimizing environmental impact.
- 3) Methods to **promote social awareness** of the importance of raw materials for twin transitions, and responsible exploration and mining through collaboration between geosciences and social sciences.



Four different
research sites in
the EU

Location & Team

Our research will be conducted at four reference sites in **Finland, Portugal, Poland** and the **Czech Republic** representing different geological, social and environmental 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 (e.g., social geography, environmental policy).



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