Expl ing Together

Advancing Innovation in Deep-Land Critical Raw Materials Exploration

UNDERCOVER PROJECT

19TH November, 2025.

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The UNDERCOVER project has received funding from the European Union's Horizon Europe Research and Innovation Programme under Grant Agreement No.101177528.

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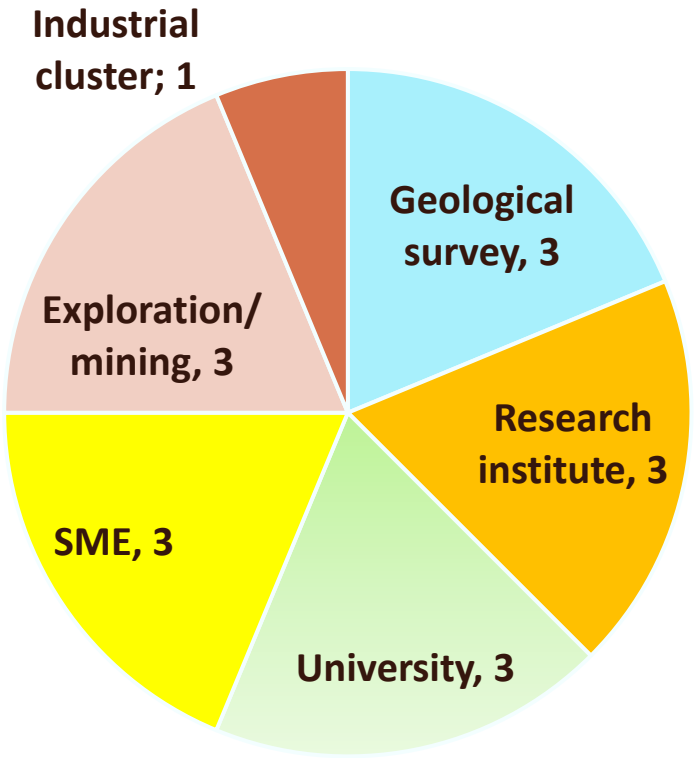
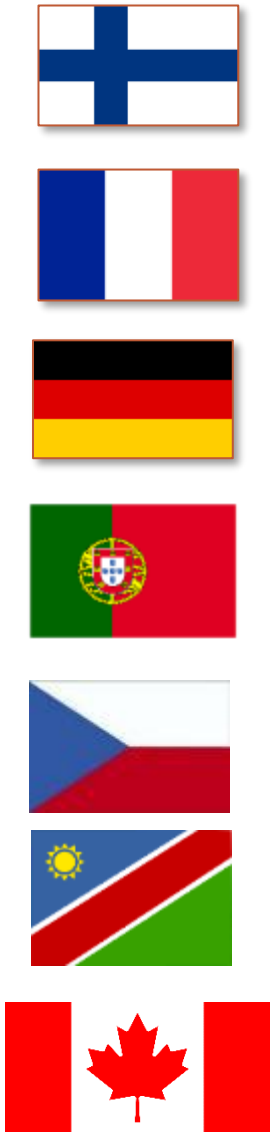
UNDERCOVER – basics

- **Funding programme:** Horizon Europe
- **Call & topic:** HORIZON-CL4-2024-RESILIENCE-01: Resilient Value Chains 2024; HORIZON-CL4-2024-RESILIENCE-01-01: **Exploration of critical raw materials in deep land deposits**
- **Type of action:** HORIZON-RIA, Research & Innovation Action
- **Duration:** 1.1.2025 - 31.12.2027
- **Total budget:** 4 999 987.50 €
- **Total person-months:** 452
- **Consortium:** sixteen partners from 7 countries





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UNDERCOVER – Consortium

INDUSTRY & SME´s (7 partners, 26% of the budget)

- ASSOCIACAO CLUSTER PORTUGAL MINERAL RESOURCES (ACPMR), PT
- SUPRACON AG (SUPRA), DE
- LGI SUSTAINABLE INNOVATION (LGI), FR
- ONGWE MINERALS (PTY) LTD (ONGWE), NA
- LATITUDE 66 COBALT OY (LAT66), FI
- SMART SEISMIC SOLUTIONS (S3), FR
- REDCORP, LDA (REDCORP), PT

RESEARCH (6 partners, 58%)

- GEOLOGIAN TUTKIMUSKESKUS (GTK), FI
- BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES (BRGM), FR
- GEOFYZIKALNI USTAV AV CR, V.V.I. (IG CAS), CZ
- LEIBNIZ-INSTITUT FUER PHOTONISCHE TECHNOLOGIEN E.V. (IPHT), DE
- LABORATORIO NACIONAL DE ENERGIA E GEOLOGIA I.P., (LNEG), PT
- INSTITUT NATIONAL DE LA RECHERCHE SCIENTIFIQUE (INRS), CA

UNIVERSITIES (3 partners, 16%)

- UNIVERSITAT MUNSTER (UM), DE
- UNIVERSIDADE DE EVORA (UDE) (Affiliated Entity), PT
- TECHNISCHE UNIVERSITAT BERLIN (TUB), DE

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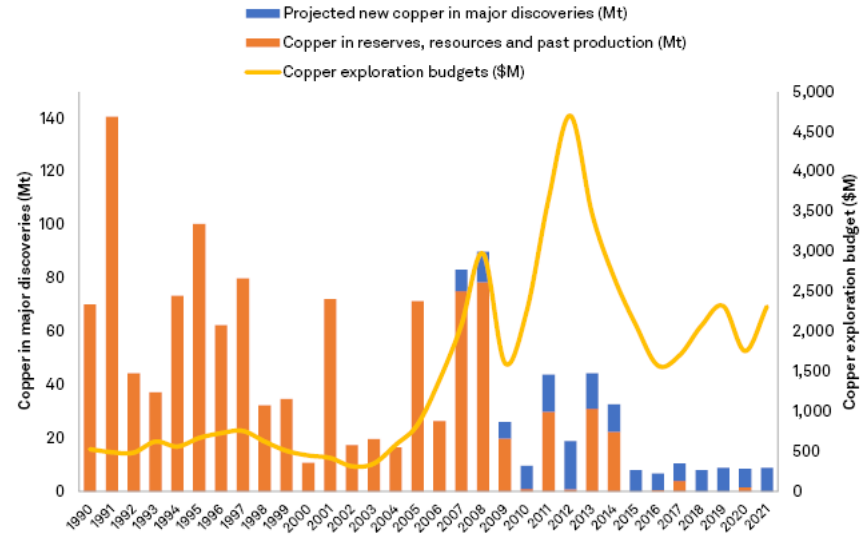
THE PROBLEM

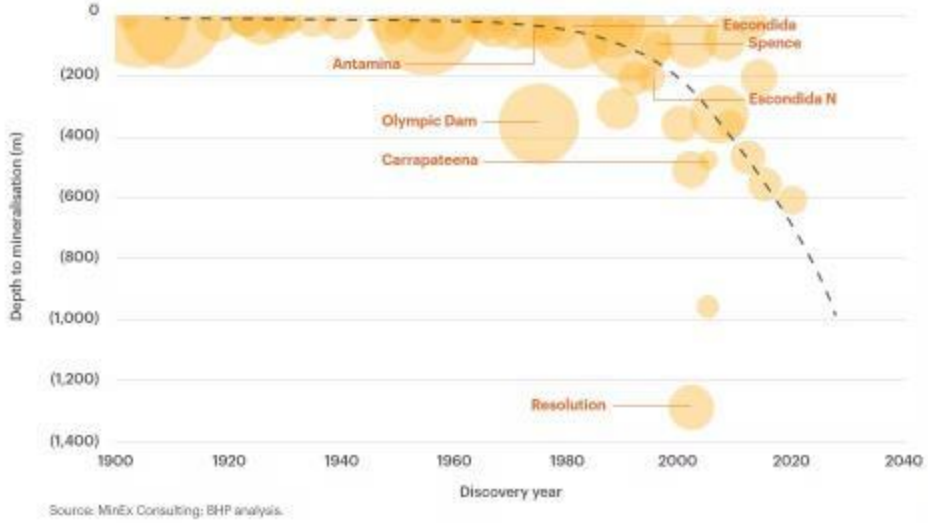
- New mineral deposit discoveries are becoming scarcer despite increasing exploration expenditures
- Increasing depth of new discoveries
  - Exploration moves to deeper levels especially in brown fields areas
- At the same time demand is expected to drastically increase
- New, cost-effective, efficient exploration models and techniques are needed

Major Cu discoveries vs. exploration expenditures



Data as of May 10, 2022.
* Annual average London Metal Exchange Copper Grade A cash price.
Source: S&P Global Market Intelligence

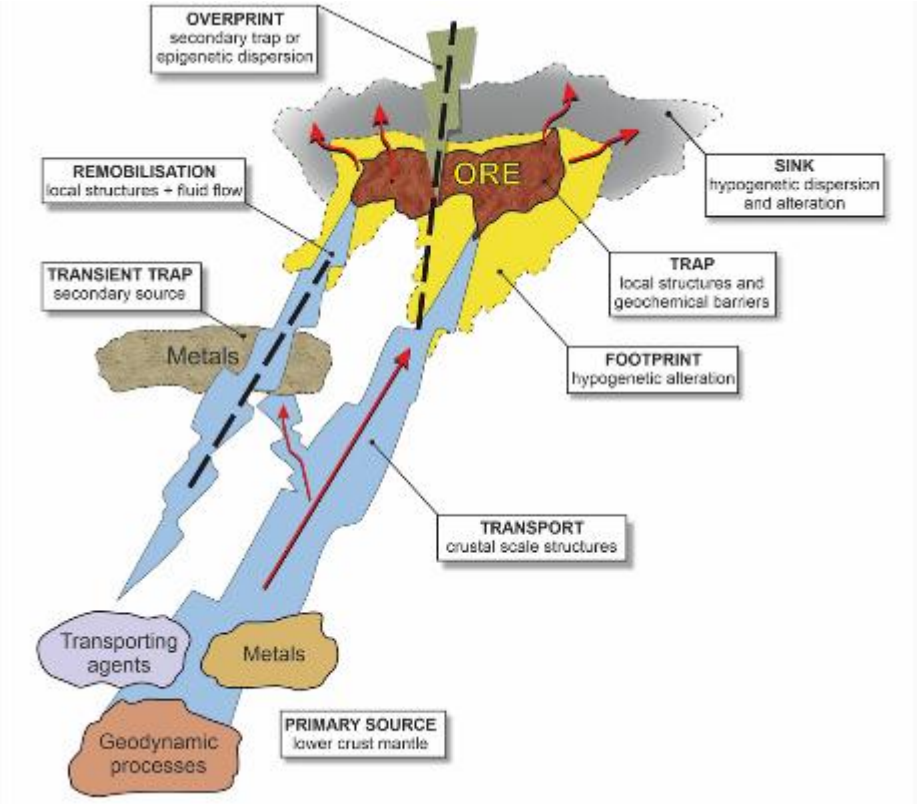
Major (>3 Mt Cu) discoveries vs. depth



Source: MinEx Consulting; BHP analysis.

UNDERCOVER – Application of mineral system approach

- Define the relevant **mineral system** (and refine it to fit local environment)
- Define *the critical mappable components* (vectors to ore)
- Map the critical components in 2D/3D/4D space
  - **Signals from geology, geophysics, geochemistry**
  - **Data integration** using e.g. machine learning and AI methods
- Generate **prospectivity maps** for target or target area generation (scale dependent)
  - Knowledge-driven vs. Data-driven approaches
  - Machine learning (& AI) used when applicable



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Main objectives

- Transform deep CRM exploration, introducing a paradigm shift by **extending the mineral systems concept**, currently underutilized in quantitative exploration, to deep exploration relevant spatial scales
- **Integrate** novel, cost-effective, and low-impact technologies and **methods for data collection and integration, including AI-based geological mapping and geophysical joint inversion.**
- Address and mitigate **environmental, social, and governance (ESG) aspects of mineral exploration at all stages**.
- **Map primary raw materials potential** in EU and non-EU countries across three major mineral belts
- Promote **the use of UNFC** for innovative and effective exploration strategies.
- **Advance deep mineral exploration technologies**, stimulate R&D, and ensure exploitation by EU stakeholders, inspiring confidence among policy makers and stakeholders.

The development of a comprehensive CRM exploration workflow suitable for exploration in both developed and remote areas.

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Case study areas

FINLAND: Kuusamo Schist Belt

- Orogenic Au-Co ± Cu, REE mineral system

PORTUGAL: Iberian Pyrite Belt

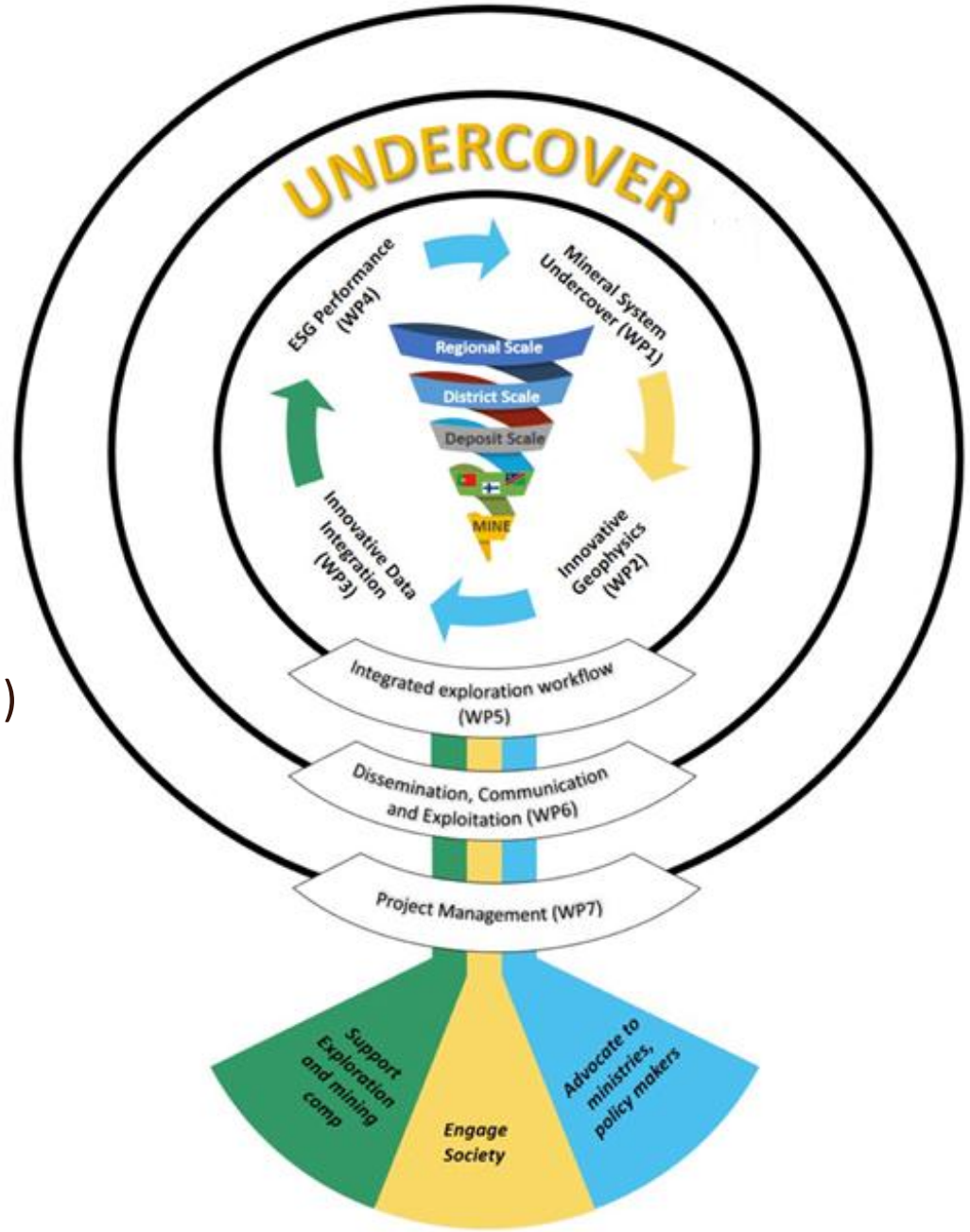
- VMS Cu-Zn-Pb ± Sn, Ag, Au, In, Ga, Ge, V and Se mineral system

NAMIBIA: Kalahari Copper Belt

- Sediment hosted Cu mineral system

Work packages (WP lead)

- WP1. Mineral Systems under Cover (GTK)
- WP2. Innovative Geophysics (IG CAS)
- WP3. Innovative Data Integration (BRGM)
- WP4. Environmental, Social and Governance (LGI)
- WP5. Integrated Exploration Strategy (UM)
- WP6. Communication, Dissemination & Exploitation (LGI)
- WP7. Project Management (GTK)



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