



# Improving the sustainability of critical raw materials extraction

Blandine Gourcerol, BRGM

With collaboration of P. Moreau, G. Bertrand, I. Duhamel Achin, L. Bailly, M. Picault, P. Negrel

15<sup>th</sup> March 2023

## ION RAW

Ionometallurgy of primary sources for an enhanced raw materials recovery



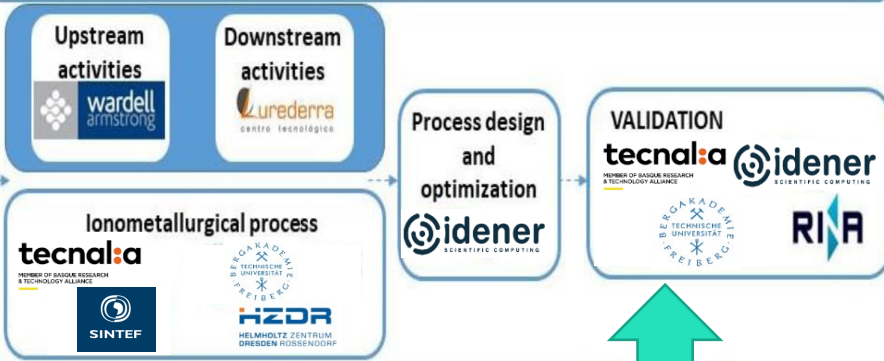
This project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No 815748. The content in this presentation reflects only the views of the authors. The European Commission is not responsible for any use that may be made of the information it contains.

# ION4RAW - Project Objectives

**Improve recovery of CRM as by-products during ore treatment processes:**

**Coordination :**  **idener**  
SCIENTIFIC COMPUTING

Communication, Dissemination and Civil society engagement  **LGI** sustainable innovation  **RIA**  **PNO** Sustainability assessment and exploitation



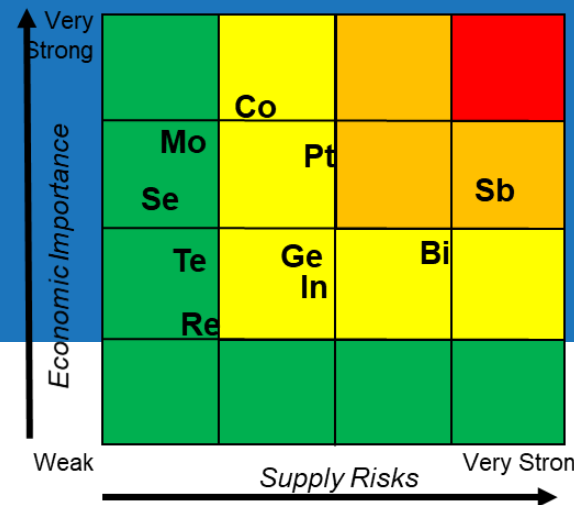
- Develop ionometallurgy processes
- Obtain reliable estimates of **by-products and CRM**
- Cu-Au-Ag ore deposits: Connonish, Scotland; CLC and El Valle Boinas, Spain; El Porvenir and Cerro Lindo , Peru

**13 partners and 8 countries**

**Total costs: 5,68 M€**

 **SCOTGOLD** RESOURCES LIMITED  **CLC**  **CUMBREX**  **nexa** resources  **OROVALLE**

# ION4RAW - Project Objectives



**Identify and assess the EU potential for the 10 targeted by-products**

**Te, Bi, Co, Re, Mo, Pt, Sb, Ge, Se, In**



Energy Generation & Storage



Transport



Electronics & Telecoms



Industry 4.0



Defence

	Energy Generation & Storage	Transport	Electronics & Telecoms	Industry 4.0	Defence
Antimony		X	X	X	X
Bismuth			X	X	X
Germanium	X		X		X
Indium	X		X	X	X
Cobalt	X	X	X	X	X
Tellurium	X			X	X
Selenium	X	X		X	X
Molybdenum	X	X		X	X
Rhenium		X			X
Platinum	X	X	X	X	X
Copper	X	X	X	X	X
Gold	X	X	X	X	X
Silver	X	X	X	X	X

**Economic growth**



**Energy and ecological transition**



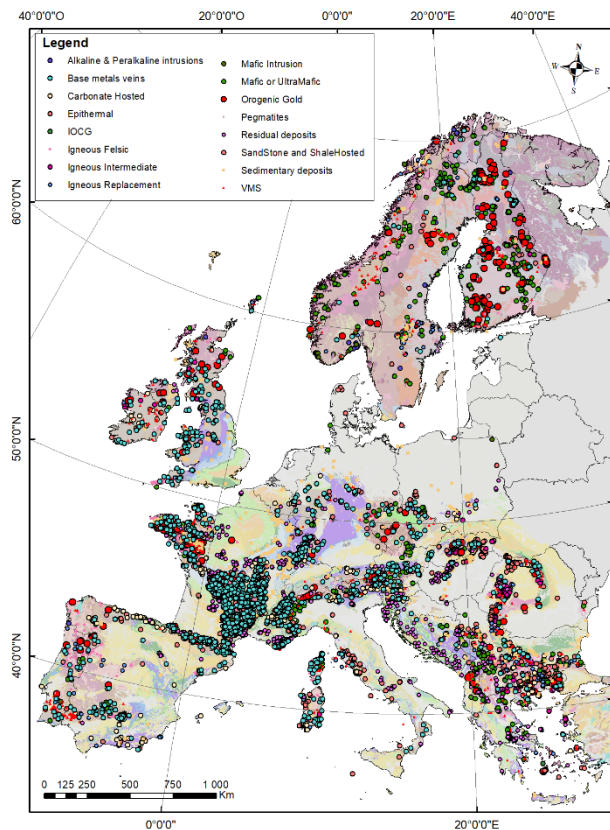
\*Robotics & 3D printing



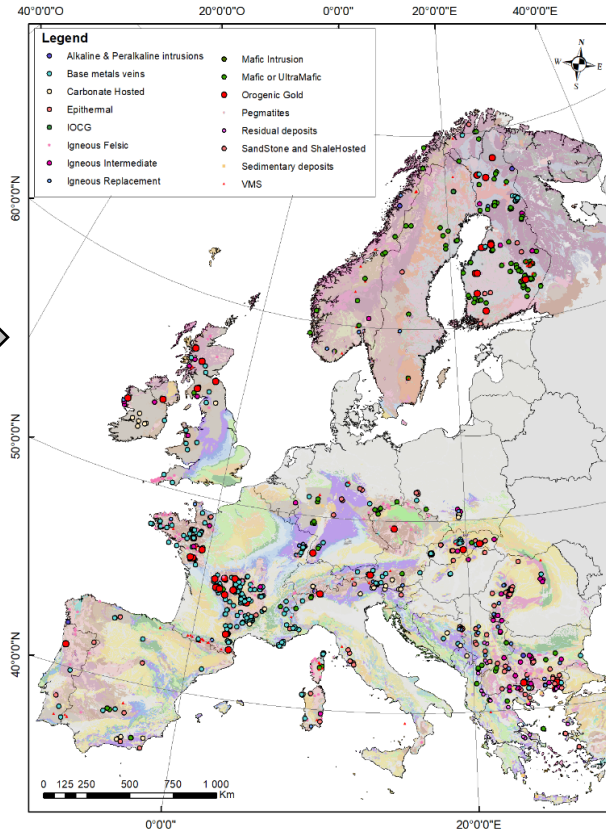
# Compilation of Geoscientific Data

- Production of a geographically-based compilation of the by-products occurrences and potential in EU

TOTAL of 8364 identified occurrences



'ONLY' 1400 identified occurrences for Cu, Au, Ag and Pb-Zn

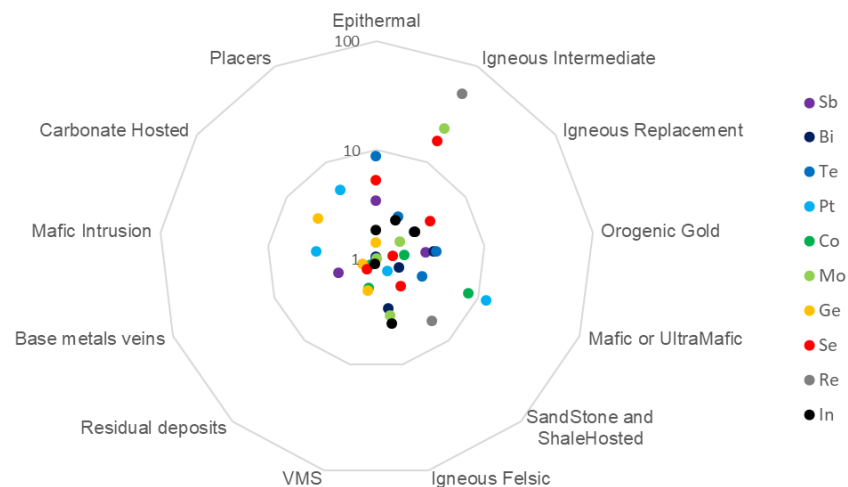


One of the key aspect is to perform a **predictive assessment** of the by-product elements as they are not usually or automatically identified through the EU database.

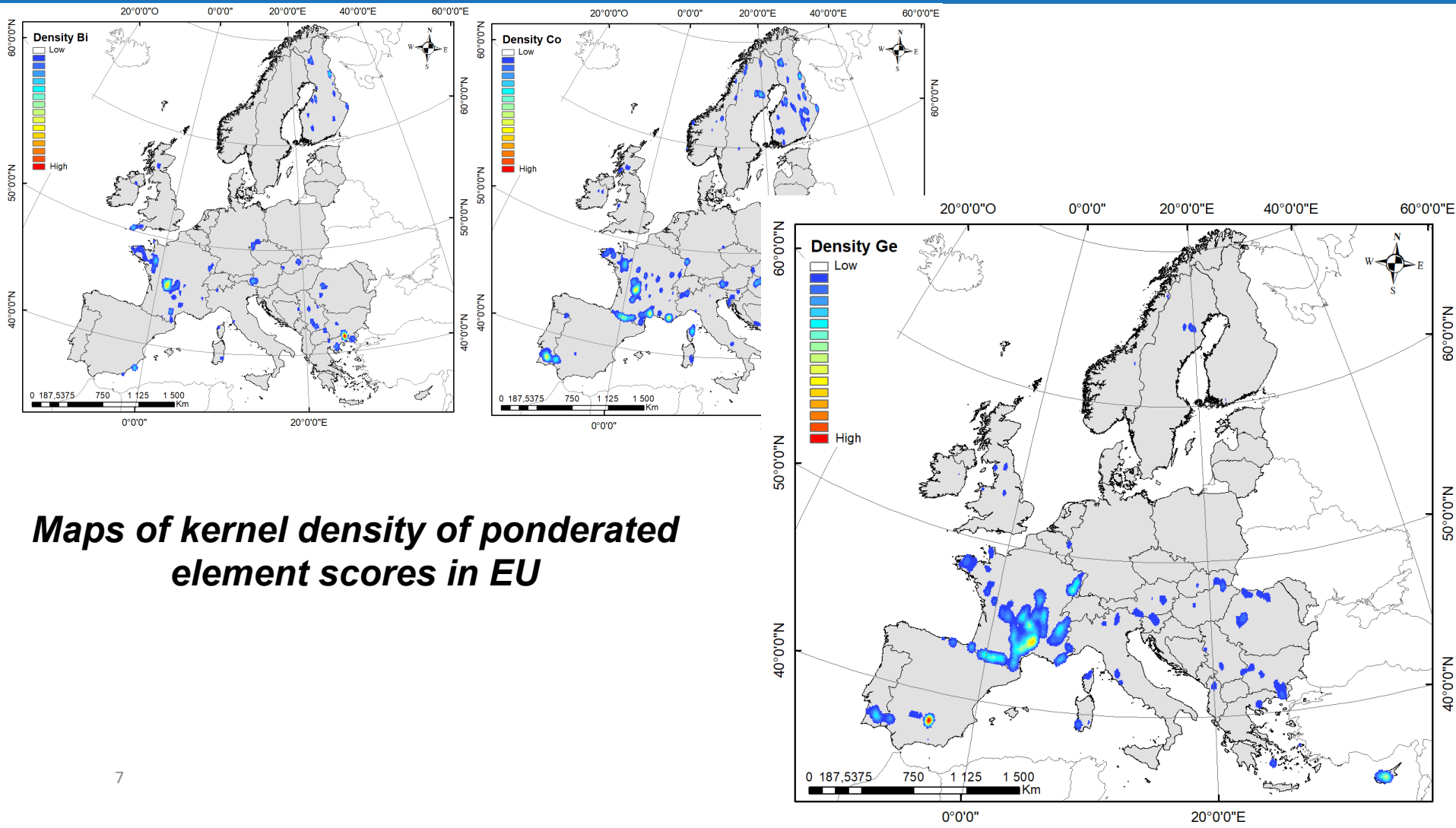
# DBQ method – favorability mapping

- **DBQ method** was developed to perform predictive assessment on datasets to identify the potential presence of target by-product elements **where they have not been searched or described**.
- **The favorability** is based on the similarity to a « **characteristic multi elements signature** » derived from deposits and mineral occurrences of a specific type (metallogenic family) that contain the targeted commodities.

	Sb	Bi	Te	Pt	Co	Mo	Ge	Se	Re	In	TOTAL
Epithermal	3,37	1,03	8,68				1,39	5,21		1,82	6,00
Igneous Intermediate			2,73			22,35		16,37	50,92	2,46	5,00
Igneous Replacement		2,67	1			1,85		4,01		2,71	5,00
Orogenic Gold	2,9	3,42	3,61		1,84			1,44			5,00
Mafic or UltraMafic		1,69	2,86	12,16	8,1						4,00
SandStone and ShaleHosted				1,44		1,01		2,2	5,86		4,00
Igneous Felsic		2,97				3,47				4,14	3,00
VMS					1,89		2,02			1,13	3,00
Residual deposits					1,2			1,35			2,00
Base metals veins	2,34						1,36				2,00
Mafic Intrusion				3,57							1,00
Carbonate Hosted							4,41				1,00
Placers				5,09							1,00
Alkaline & Peralkaline intrusions											0,00
IOCG											0,00
Pegmatites											0,00
Sedimentary deposits											0,00

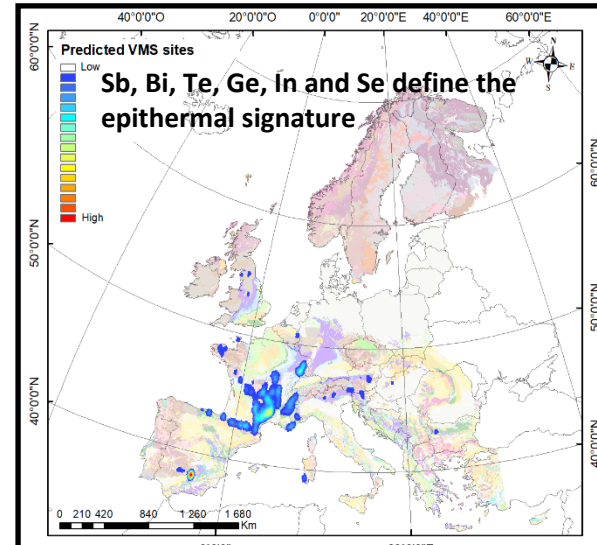
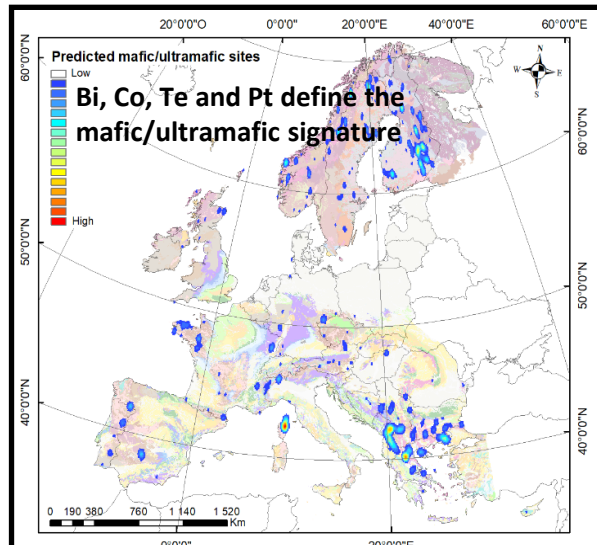
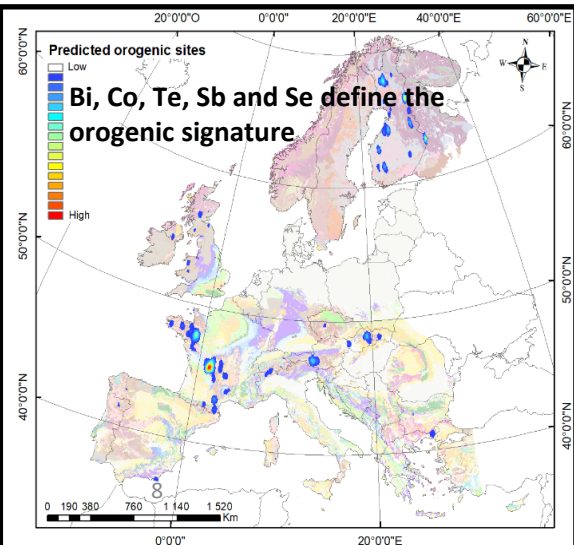
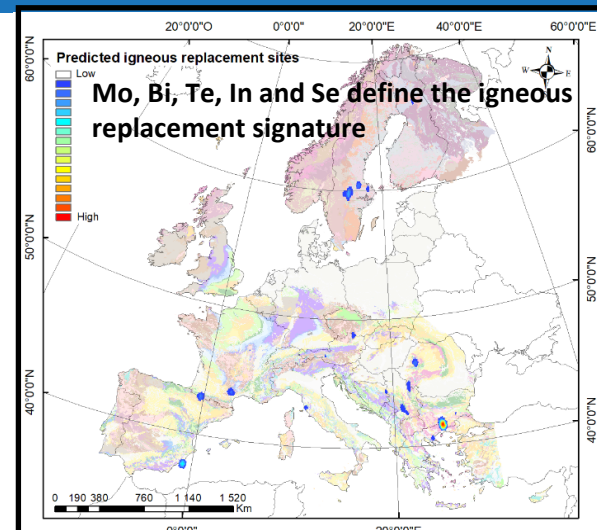
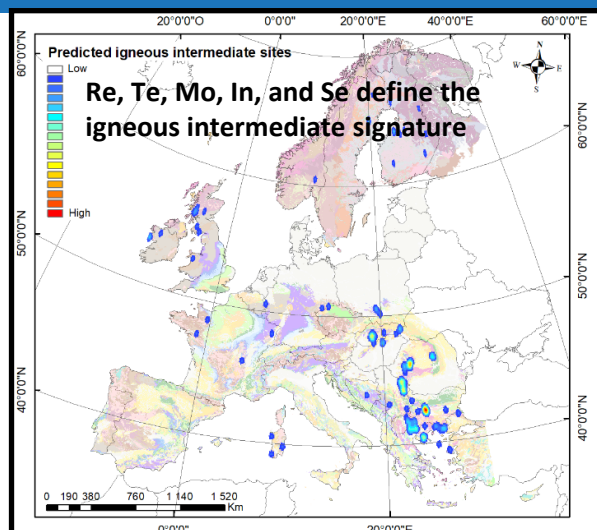
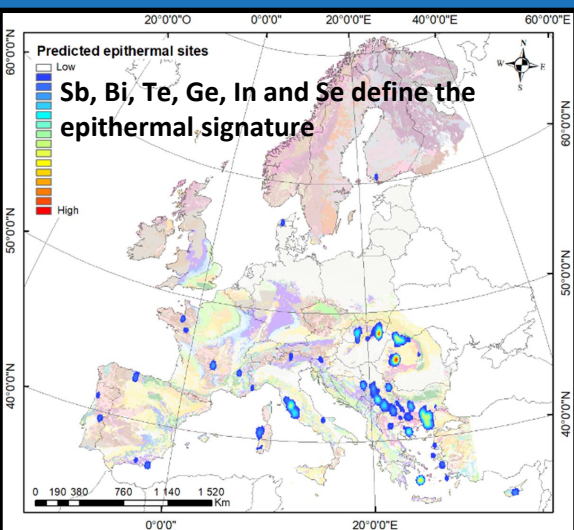


# Task 2.1 : Compilation of Geoscientific Data



***Maps of kernel density of ponderated element scores in EU***

# Task 2.1 : Compilation of Geoscientific Data





# Thank you. Get in touch for more information!



Follow the progress of the project on the ION4RAW website.



Project coordinator: Maria Tripiani, IDENER  
Contact us: [contact@ion4raw.eu](mailto:contact@ion4raw.eu)



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