Spatial intersection between critical raw material occurrences and protected areas in Europe

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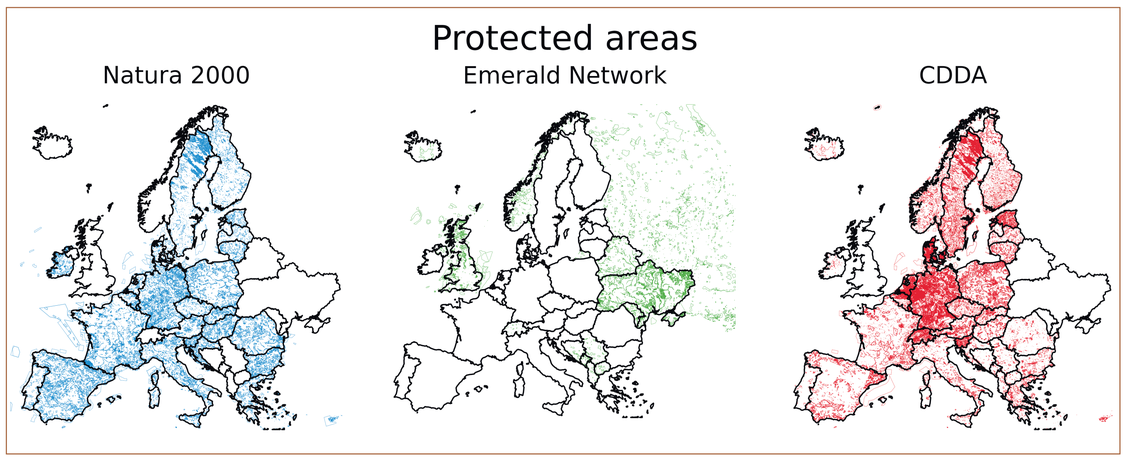
Introduction - competition between CRM extraction and protected areas

Land use issues have been identified as one of the main causes for mining and mineral exploration disputes (Valenta et al. 2019, Lèbre et al. 2020, Owen et al. 2022). These issues often arise in relation to protected areas (PAs). As part of the CIRAN (CrItical RAw materials extraction in enviroNmentally protected areas) project, we are conducting a Europe-wide assessment to gauge and scope the extent to which CRM may or do occur in environmentally protected areas across the EU.

Data & Methods - CRM occurrences and protected areas

The objective of this assessment is to spatially analyze the overlap between known CRM occurrences and PAs, such as the Natura 2000, Emerald Network, and nationally designated areas (CDDA). By analyzing the overlap, we can identify if and how widely CRMs have been found within or near PAs.

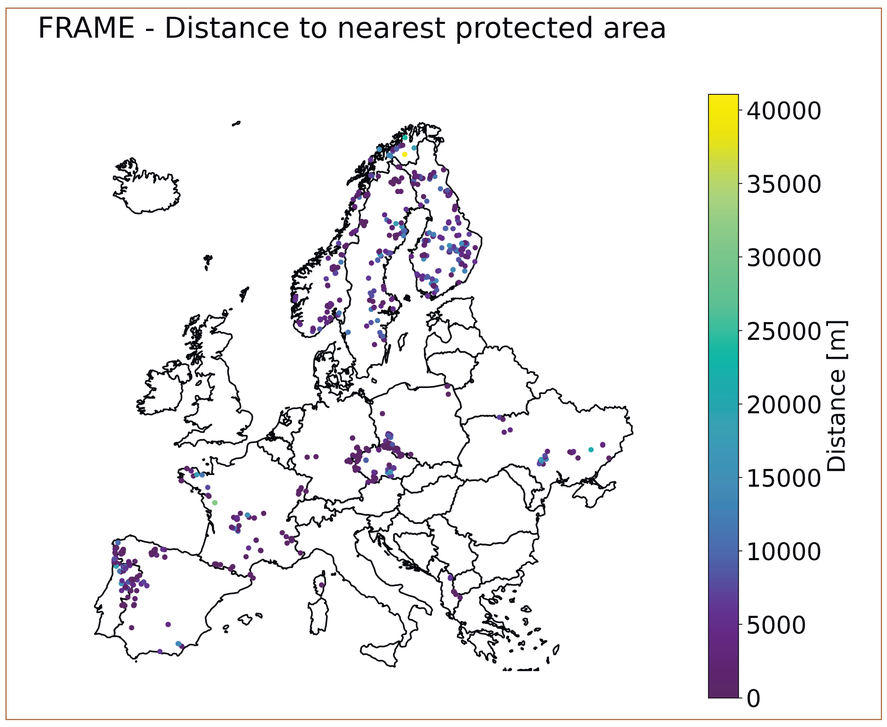


Proected area datasets Natura 2000, Emerald Network and nationally designated areas (CDDA)

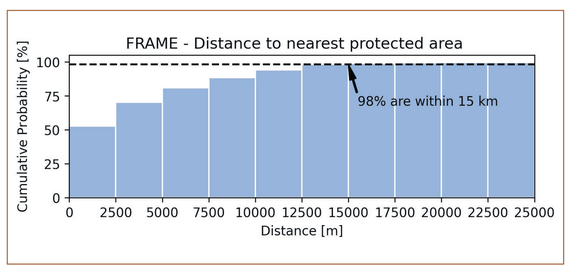
We used Europe-wide integrated datasets on CRMs from previous EU projects. In particular, dataset from the FRAME project (2022) is used for this poster. It is important to note that the datasets do not equally represent each country or area due to the heterogeneity of the country data. As individual countries improve their reporting and contribute to the Europe-wide data integration, the results of this kind of assessment will improve as well. Currently only 11 countries have representative data on CRMs (n > 5) in the FRAME dataset.

Preliminary Results - visualization of the competition situation

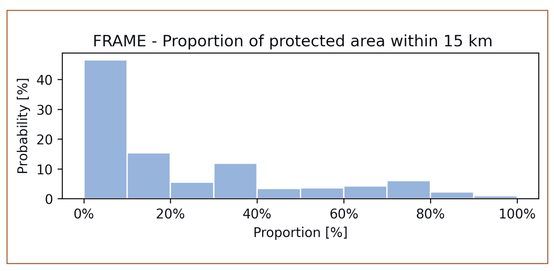
Disclaimer: All results presented here are preliminary and based on limited datasets in terms of mineral occurrences.



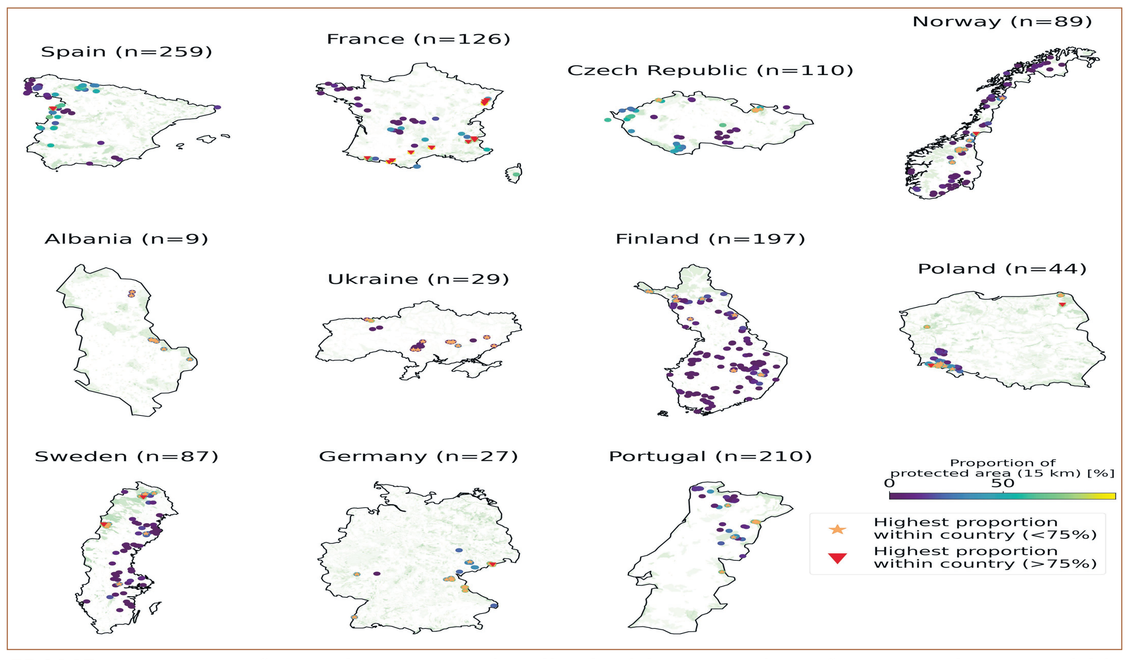
Map of FRAME occurrences colored by the distance to nearest protected areas.



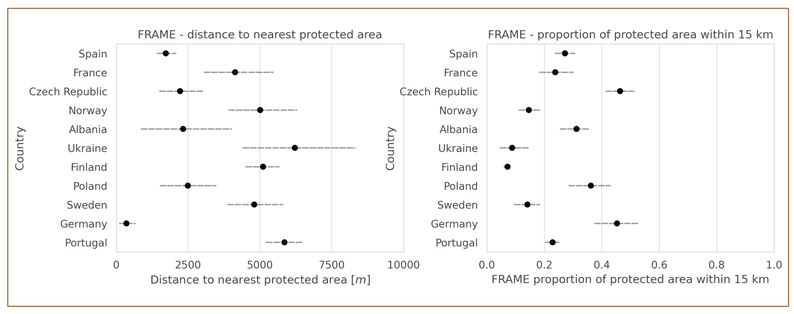
Histogram of cumulative frequency of occurrence distances to nearest protected areas. The overlap is large between critical raw material occurrences and protected areas. Approximately 98% of occurrences are within 15 km of the nearest protected area.



Proportion of protected area within 15 km buffer of occurrences.



FRAME occurrences for each country, visualized with proportion of protected areas within 15 km buffers.



Comparison of countries in terms of distance and proportion. For example Finland has somewhat high average distances to protected areas and the lowest average proportion of protected area within a 15 km buffer.

Future steps - how to potentially further investigate the situation

- Test other occurrence datasets including Minerals4EU and ProMine
- Use UNFC classified raw material occurrence data as it becomes available
- Use depth of occurrence to potentially better understand environmental risk potential
- Investigate catchment areas in relation to occurrences and protected areas

The findings of this assessment serve as the first steps in presenting and potentially predicting future conflicts between the exploitation of (critical) raw materials and the conservation of natural resources represented by different PAs. Further improvements in data collection and integration will enhance the accuracy and reliability of our results.

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