UNIVERSITÀ DI PAVIA
DIPARTIMENTO DI SCIENZE DELLA TERRA E DELL'AMBIENTE
DOTTORATO DI RICERCA IN SCIENZE DELLA TERRA E DELL'AMBIENTE

FORM PER PROGETTI BANDO DOTTORATO

1. Project title

Imaging and Metallogenesis of Abyssal Georesources: Innovative NEtwork for Critical Raw Material (IMAGINE-CRM)

2. Proposer

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3. Research Unit

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4. Key words
(Max. 5 – at least 2)

Polymetallic nodules; Trace element mapping; LA-ICP-ToF-MS; Machine learning models

5. Abstract
(Max.1.500 characters with spaces)

This project aims at investigating the potential of polymetallic nodules as a strategic resource for Li, Rare Earth Elements (REE+Y) and siderophile elements (Au, PGE). It will focus on the use of cutting-edge analytical techniques of trace element mapping, i.e., LA-ICP-ToF-MS (Laser Ablation-Inductively Coupled Plasma-Time of Flight-Mass Spectrometry) and µXRD (micro X-ray diffraction). Processes and mechanisms leading to enrichments of Critical Raw Materials will be constrained through high-resolution quantitative geochemical mapping in key target areas (e.g., Philippine Sea, Atlantic and Pacific Oceans), with the aim of defining geochemical proxies (e.g., Y/Ho ratio) to be used as "genetic markers". Furthermore, the large amount of data produced during geochemical mapping will be used to develop machine learning models, with the final objective of producing predictive models which can optimize the exploration and identification of these critical and noble metals, essential in the societal endeavor of energetic transition.