UNIVERSITÀ DI PAVIA

Corso di Dottorato in Scienze della Terra e dell'Ambiente

FORM PER PROGETTI BANDO DOTTORATO

1. Project title

Linking rates of oceanic spreading with geochemical heterogeneity of the lower oceanic crust: a case study from the ultra-slow spreading Gakkel Ridge

2. Proposer

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4. Key words

(Max. 5 – at least 2)

In-situ geochemical mapping, gabbros, radiogenic isotopes, Gakkel Ridge

5. Abstract

This PhD project aims at characterizing the compositional variability of the lower crust exposed at the ultra-slow spreading Gakkel Ridge, in the Arctic Ocean. The Gakkel Ridge represents the end-member of ultraslow-spreading ridges (i.e., half spreading rate of 6mm/yr) being characterized by very low melt production and discontinuous magmatic activity; despite this the gabbroic rocks from Gakkel Ridge have never been investigated. We here propose a petrographic and geochemical characterization of gabbros recovered during several expeditions, already available to the group. We will document the geochemical and isotopic compositions of the main mineral phases composing the gabbroic crust, thereby defining the end-member of the igneous crust formed at the slowest-spreading ridge on Earth. The composition of the oceanic crust accreted at the Gakkel ridge will be compared to other well-documented gabbroic sections in slow-spreading environments (Mid Atlantic Ridge, South West Indian Ridge) and fast-spreading ridges (Hess Deep). This will allow assessing the global impact of spreading rate and geodynamic spreading environment on the modal and chemical composition of the gabbroic crust. Parallelly, cutting-edge trace element geochemical mapping will be used to target the best locations for *in-situ* isotopic analyses of Sr, Nd and Hf. The project will allow to track the geochemical and isotopic heterogeneity of the melts crystallizing at depth at Gakkel Ridge, where we could reasonably expect inefficient aggregation of primary melts during their migration in the cold and thick ultra-slow spreading oceanic lithosphere.

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