UNIVERSITÀ DI PAVIA

Corso di Dottorato in Scienze della Terra e dell'Ambiente

FORM PER PROGETTI BANDO DOTTORATO

1. Project title

Chemical-physical parameters ruling the lower crust and upper mantle rheology project

2. Proposer

Surname	Zanetti
Name	Alberto

3. Research Unit

Surname	**Name**	**Institution**
Carafa	Michele Cosimo	Istituto Nazionale di Geofisica e Vulcanologia
Gola	Gianluca	Istituto di Geoscienze e Georisorse - CNR

4. Key words

(Max. 5 – at least 2)

Lower Crust, Upper Mantle, Geochemistry, Thermal State, Seismicity, Rheology

5. Abstract

(Max.1.500 characters with spaces)

The Ivrea-Verbano Zone (westernmost sector of the Southern Alps, Adriatic plate) represents a unique area in the world for directly characterizing the rocks of the lower continental crust on the

border between Africa and Europe. Together with the sequence of the Serie dei Laghi, it allows to study the entire continental crust sequence of the Adriatic Plate, from the superficial Mesozoic carbonate plateform, to the continental crust - mantle transition, which under the Po plain is located between 30 and 35 km deep.

In fact, what in the rest of the world can only be visualized by means of geophysical surveys or studied in rare xenoliths brought to the surface by magmas, in the sequence formed by the Ivrea-Verbano Zone and Serie dei Laghi can be studied directly, with enormous lateral continuity.

At present, there is little knowledge of the thermal characteristics of the rocks of the lower continental crust and of their ability to produce heat. This information is, indeed, fundamental in the modeling of thermal flows, in particular for geothermal prospecting. Furthermore, almost nothing is known about geothermal fluxes in the Alpine environment. Similarly, little is known about the rheology of rocks of lower continental crust.

Therefore, this PhD project aims to develop an interdisciplinary study, in the frame of which a detailed study of the characteristics and rheology of samples of the lower crust, mantle, and to a lesser extent of the crystalline basement of the upper crust, is carried out. These investigations will be associated with a complete petrographic, geochemical and geochronological characterization. Furthermore, the heat fluxes in wells derived from the DIVE-ICDP project, to which this PhD project is connected, will be measured.

The data produced by this PhD project will be essential to refine the predictive models of geothermal potential and seismic risk, throughout the rest of the planet.