ECOLE LEMANIQUE DES SCIENCES DE LA TERRE
DES UNIVERSITES DE GENEVE ET DE LAUSANNE

Master ès Sciences
in Earth sciences

Hydrous magmatism / hydrothermal alteration in a fossil oceanic core complex. The Aiguilles rouges gabbros (Val d'Hérens - Arolla- Evolène)

Contact persons: Prof. *Othmar Müntener ISTE, (othmar.muntener@unil.ch)*

Context

The Aiguilles rouges ophiolite complex in the upper Val d'Hérens has recently been identified as an oceanic core complex. The gabbros preserve a wealth of fresh textures and range from coarse-grained gabbros to mylonites. Numerous hornblende-bearing veins cut the gabbros. These origin of these veins are poorly constrained..
The exposures of the Aiguilles rouges gabbros are excellent, partly glaciar-polished between about 2200 and 3000 meters a.s.l. in a beautiful landscape and are easily accessible from Arolla/Evolène and the Cabane des Aiguilles rouges in the heart of the terrain. All outcrops are accessible in walks of 1 – 3h. Excellent maps exist and a recent regional study provides the basics for a better understanding of the petrogenesis of these gabbros. 1-2 Masters thesis on different subjects possible

Objectives and Methods

The planned work will include detailed field work (July to mid-october possible) on hornblende veins and their relations with the petrology and textures of the gabbros and intruding basaltic dikes, analytical work and tectonic interpretation and modelling.
(1) Recognition and mapping of primary relationships hornblende-bearing veins and gabbros. Development of a structural framework. (2) Thin section work, geochemical analysis (bulk rocks, minerals) (3) Trace element study of clinopyroxene, hornblende and accessory apatite (4) Development of models of oceanic versus Alpine fluid flow. links to ultra-slow spreading ridges

Literature

Decrausaz et al. (2021) Swiss Journal of Geoscience 114, 3, 119-143, , Stampfli and Marthaler (1990), Geodynamica Acta 4, 159-184, Tribuzio et al. (2019) J Petrology, 60, 2483-2508

Hornblende-bearing veins and gabbros in the Aiguilles rouges gabbros

Sites WEB

https://www.unil.ch/geoleman
/en/home/menuinst/memoires/sujets-rentree-2021.html

Choice of orientation :

Orientation GATO (Geochemistry, Alpine tectonics, Ore Deposits): Modules: Isotope Geochemistry, Modeling, Magmatic Petrology, Fluids in the Earth crust, etc