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

Master ès Sciences in geology

Ky-Cld assemblages in the Dent-Blanche: Jurassic isobaric cooling following Permian granulite-facies metamorphism or Alpine high-pressure event?

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Context

The Valpelline Series in the Dent Blanche Tectonic System (Western Alps) is a piece of Permian lower continental crust, made of amphibolite- to granulite-facies metapelites, mafic and meta-carbonate rocks. The most penetrative fabric affecting all lithotypes developed at amphibolite- to granulite-facies conditions during Permian times. The Alpine imprint is weakly developed and mainly at greenschist facies, but a few occurrences of kyanite-chloritoid assemblages have been interpreted as evidence of relatively high pressure conditions (e.g. 7-8 kbar) during the Alpine orogeny (Kiénast and Nicot 1971). Alternatively, the kyanite-chloritoid assemblages may have been developed through isobaric cooling. Both hypotheses need to be tested and they require the hydration of the lower continental crust.

Objectives and Methods

The work will include field work (maximum 3 weeks) and analytical work. The area of study is located in Valpelline (Aosta valley), along the Place Moulin lake, between 2000 and 2500 metres a.s.l.. The main aims of the work are:

1. *Geological mapping of the Place Moulin area (where kyanite and chloritoid have been found) and collecting samples*
2. *Thin section characterization (deformation/mineral growth relationships)*
3. *Mineral chemistry of major minerals, with particular attention to hydrous (potentially Cl-rich) minerals*
4. *Metamorphic evolution of the studied samples (P-T modeling)*
5. *Tectonic consequences*

Literature

Kiénast J.R. & Nicot E. (1971) – Présence d'une paragenèse à disthène et chloritoïde (d'âge alpin probable) dans les gneiss à sillimanite, grenat et cordiérite de Valpelline (Val d'Aoste, Italie). C. R. Acad. Sci. Paris, D-272, 1836-1840.

Manzotti P. & Zucali M. (2013) – The pre-Alpine tectonic history of the Austroalpine continental basement in the Valpelline unit (Western Italian Alps). Geol. Mag., 150, 153-172.

Place Moulin Lake

Garnet amphibolite

Choice of orientation : Geochemistry, Alpine tectonics, Ore Deposits