

# **Thermo-geochemical modeling of fluid-rock interactions under greenschist facies conditions: Implications on fault formation in metagabbros (Cap Corse, France)**

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Alpine deformation in the ophiolitic Morteda-Farinole nappe of Corsica occurs under greenschist facies conditions. It is characterized by a series of exhumation-related regional scale shear zones in metagabbros. These ductile faults are cm- to dm- in width and are filled by tremolite ± chlorite schists. This occurrence offers a unique opportunity to study mechanisms of low-grade shear zone formation and weakening processes controlled by mineralogical changes in the metamorphosed upper oceanic crust in the shallow part of the subduction system.

A detailed field study allowed us to sample undeformed metagabbros, foliated metagabbros as well as schists recording different degree of deformation within the fault system. Petrological observations associated to thermo-geochemical modeling indicate that the metagabbros to tremolite-, chlorite-bearing schist transformation occurred under open system conditions. The main feature of this metasomatic process is a drastic gain in MgO accompanied by a significant decrease of Al<sub>2</sub>O<sub>3</sub>.

Based on these data, we discuss the role of inheritance from the early evolution of the oceanic crust as well as its fate during the Alpine orogeny. Deciphering softening processes controlled by the transformation of metagabbros into tremolite-schist is of major importance in order to understand the rheological/seismogenic behaviour of the upper mafic crust in general.