



PhD position in tectonics-metamorphic petrology-experimental deformation

A **PhD position** is opened at the **Institute of Earth Sciences of Orléans (ISTO)** at the **University of Orléans** on the topic: *"Phyllosilicate deformation and its effect on shear zone formation and fluid circulation in the upper and middle crust: an experimental study of the deformation mechanisms of mica-quartz assemblage"*. The project will be supervised by Laura Airaghi and will be carried out in close collaboration with Holger Stünitz, Hugues Raimbourg and Jacques Précigout. The start of the project is planned at the beginning of **October 2020** and the position is funded for **3 years**.

The mechanisms of strain localization within ductile shear zones in the Earth crust strongly control the dynamics of mountain belts, the nucleation of earthquakes and the formation of lithospheric structures. Fluid influxes during deformation play a major role in the development of these shear zones by means of mineralogical transformations such as the growth of phyllosilicates (as micas). The aim of this project is to investigate the role of micas in strain accommodation and development of shear zones within the upper to middle crust, from the scale of crystal defects to the polycrystalline aggregate.

The project will combine detailed microstructural and petrological study of the mica-quartz samples experimentally deformed under different temperature and strain rate conditions with the observation of naturally deformed samples. A major component of the project will be the characterisation of the deformation mechanisms of phyllosilicates (intra-crystalline, polycrystalline, two-phase mineral aggregate), their dependency on chemical composition as well as the role of mineral reactions in strain accommodation. The project will include the use of multiple techniques, such as the new generation Griggs apparatus, SEM and EBSD, microprobe and TEM.

This project is part of the Labex Voltaire, an interdisciplinary research program focused on fluid transfers in the upper envelopes of the solid Earth. The Voltaire program will provide both the salary for the Ph.D. student and the financial support for PhD research activities.

The Institute of Earth Sciences of Orléans (<https://www.isto-orleans.fr/en/home/>) at the University of Orléans (<http://www.univ-orleans.fr/en>) has a strong expertise in experimental geology and well-equipped experimental (Griggs and Paterson apparatus, autoclaves, etc.) and analytical laboratories (e.g. SEM, Raman and FTIR spectroscopy, EPMA, cathodoluminescence, LA-ICP-MS, MC-ICP-MS, Ar-Ar and TEM within the CNRS campus). This project is integrated in the Geodynamics research group of ISTO (<https://www.isto-orleans.fr/en/home-old/layout-and-structuring/research-teams/geodynamics/>) whose main focuses include the mechanical behavior of the lithosphere, the strain accommodation and localization processes, and the interplay between metamorphic reactions and deformation.

We are looking for a highly motivated student with a strong interest in deformation processes and/or metamorphic petrology. Experience with one of the analytical techniques mentioned above and/or

phyllosilicate-rich rocks will be appreciated. The applicant should hold a Master degree (or equivalent) in Earth Sciences.

Enquiries regarding the specifics of the project should be directed to Laura Airaghi: laura.airaghi@univ-orleans.fr.

The application should include a full CV, transcripts of academic degrees, a statement of research interests and the contact information of two potential referees. The application should be submitted to laura.airaghi@univ-orleans.fr as a single pdf. Evaluation of applications will **start on 15th of May 2020** and continue until the 30th of June 2020.