2 PhD positions in Rock Magnetism, Institute of Geological Sciences, University of Bern

Project:

These PhD positions are part of the project '*Magnetic pore fabrics: Predicting pore geometry, permeability anisotropy and preferred flow directions based on magnetic anisotropy data*'

Understanding the migration of fluids through the subsurface is essential for maintaining clean sources of water, using geothermal energy, and modeling the flow of petroleum and emplacement of ore deposits. These fluids move from pore to pore at micrometer scales. When pores are elongated and preferentially aligned, flow will be easier and faster in some directions than in others, giving rise to preferred flow directions. The aim of this project is to develop the use of magnetic methods to rapidly characterize pore fabrics. These new methods also have the potential for higher resolution than traditional methods, and can be applied to studies in geology, environmental, and material sciences.

Description of work:

This 4-year project offers positions for 2 PhD students, starting in November 2018:

One student will concentrate on understanding the influence of experimental conditions (e.g. ferrofluid type, impregnation procedures, and measurement frequency) on the observed magnetic pore fabric, and design experiments to separate the contribution of different pore sizes.

The second student will focus on comparing the orientation, degree and shape of magnetic pore fabrics with other measures of pore fabric on the same samples, to further our understanding how different pore space properties are reflected by the magnetic measurements.

Both students will have the opportunity to work in the Laboratory for Natural Magnetism and the Rock Deformation Laboratory at ETH Zurich, and the X-ray Computed Tomography at the University of Fribourg. They will use a variety of methods to describe the rock's pore space, and compare the results obtained with different methods to each other.

Requirements:

We are looking for motivated and independent candidates with strong mathematical skills and a desire to work in the laboratory who hold MSc degrees in Earth Sciences, Geophysics, Geology, or related areas. Experience with pore fabric characterization and anisotropy methods is an advantage. The PhD students will write their theses based on the research results obtained during this project.

Application:

Please send a cover letter describing your motivation and research background, CV, academic transcripts, and the contact details of at least two references (all in one pdf file) to Andrea Biedermann (andrea.regina.biedermann @gmail.com). Applications will be accepted until the positions are filled.