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

Master ès Sciences in Earth sciences

Modeling fluid flow and reactive transport in rocks
Title

Contact persons

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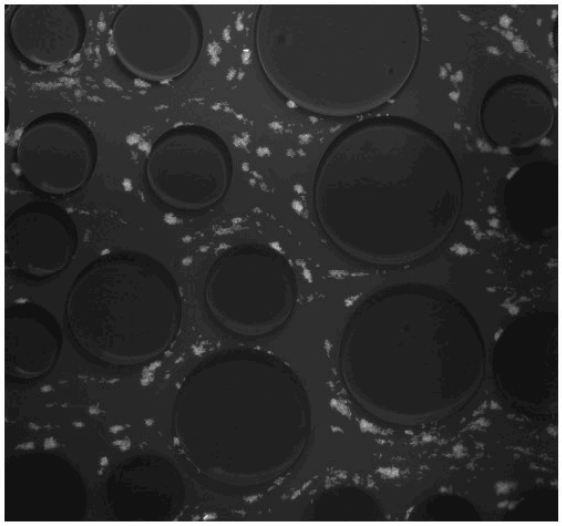
Context

Mineral dissolution in rocks is an important process that arises from reactive fluid flow processes but also alters the fluid flow itself. Basically, the system permeability will increase due to such a reactive flow, as the solid structure of the rock will gradually lose mass at the solid-liquid interface. As a consequence, the flow through an aquifer, a geothermal system, a hydrocarbon reservoir, or a contamination site may be dramatically increased. This may have important practical consequences, that can be positive or negative, for the corresponding applications.

Aims and Methods

This project aims at the investigation of mineral dissolution in rocks due to reactive fluid flow that alters the medium permeability. We will use the software COMSOL Multiphysics, that is a user-friendly environment for numerical simulations, to simulate fluid flow based on the solution of Navier-Stokes equations through a pore structure that will be modified as the flow evolves driving a dissolution reaction that can be modelled with a first- order kinetics relationship. Once this numerical scenario is set and working correctly, the simulations could aim at explaining laboratory observations in collaboration with a PhD student or based on published images. The main goal of this project is to better understand how mineral dissolution affects the permeability of a sedimentary rock such as a carbonate.

References



Website

Prerequiste