Geophysical Research Abstracts
Vol. 15, EGU2013-12880, 2013
EGU General Assembly 2013

Temporal evolution of a drainage fracture network into an elastic medium with internal fluid generation

Maya Kobchenko, Andreas Hafver, Dag Kristian Dysthe, and Francois Renard
University of Oslo, Physics department, Physics of Geological Processes, Oslo, Norway (kobchenko.maya@gmail.com)

Escape of internally generated fluids from low permeability rocks plays an important role in several geological systems. Primary migration of hydrocarbons, dehydration of sediments and hydrated mantellic rocks in subduction zones in the Earth's crust are geological examples where the existing permeability cannot accommodate transport of generated fluids in low permeability rocks and fluid pressure build-up may alter the permeability by fracturing. Fractures form and propagate in the rock due to internal pressure build-up. We develop an easy and reproducible analog experiment to simulate fracture formation in low permeability rock during internal fluid/gas production. This work aims to describe the physical mechanism of fracture network growth and temporal evolution of created fractures. A tight elastic gelatin matrix is used as a rock analog. The nucleation, propagation and coalescence of fractures within the solid matrix occurs due to CO_2 production by yeast consuming sugar and is followed using optical means. We quantify first how an equilibrium fracture network self-develop, and then how the intermittent fluid transport is controlled by the dynamics of opening and closing of fractures, with a well-defined time frequency.