



## **Reaction-induced fracturing of low permeability solids**

Maya Kobchenko, Dag Kristian Dysthe, Francois Renard, Bjørn Jamtveit, and Anders Malthe-Sørensen  
University of Oslo, Physics department, Physics of Geological Processes, Oslo, Norway (kobchenko.maya@gmail.com)

Escape of internally generated fluids from low permeability elastic solids plays an important role in several natural environments. Primary migration of hydrocarbons, dehydration of sediments and hydrated mantle rocks in subduction zones are 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 have performed experiments on organic-rich shales and analogue gels using time-resolved X-ray microtomography, 2D imaging and pressure burst recordings. Fracture nucleation, propagation and coalescence as well as network evolution dynamics during internal fluid generation was described. The spatial organization of the fracture networks appeared as intermediate between tree networks and hierarchical fractures. The dynamics of intermittent fluid release via fracture pathways show both periodic,  $1/f$  and  $1/f^2$  behaviour of fluid release spectrum.