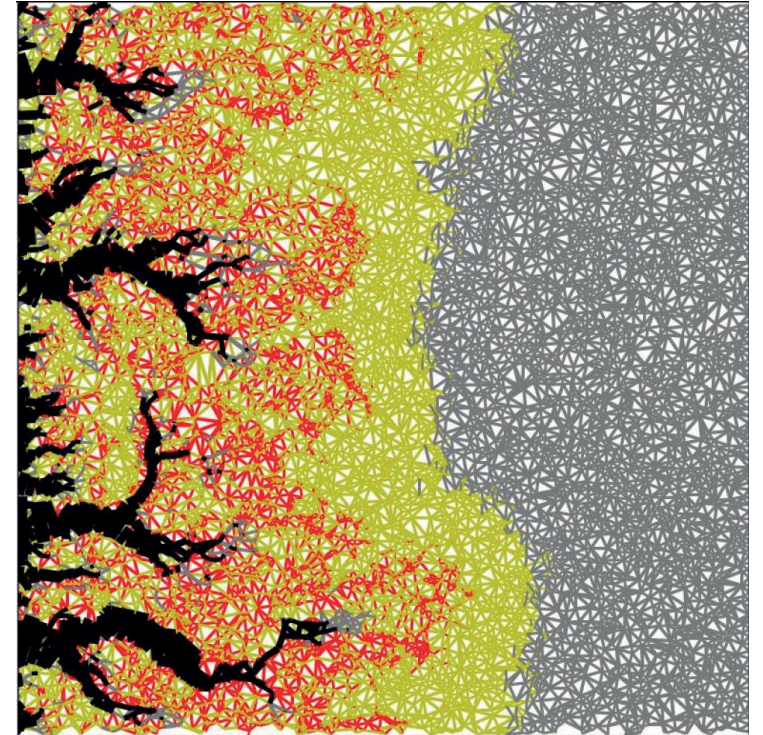
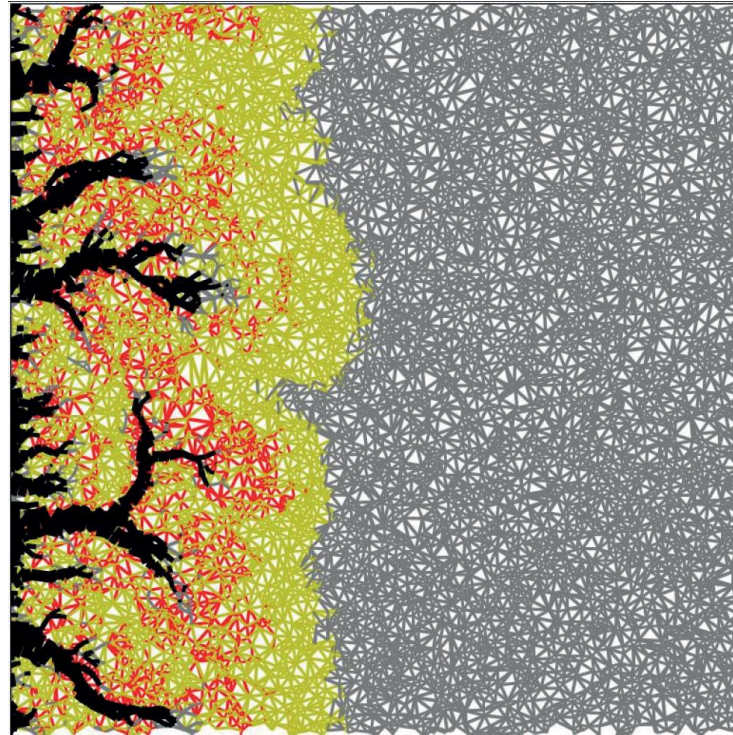
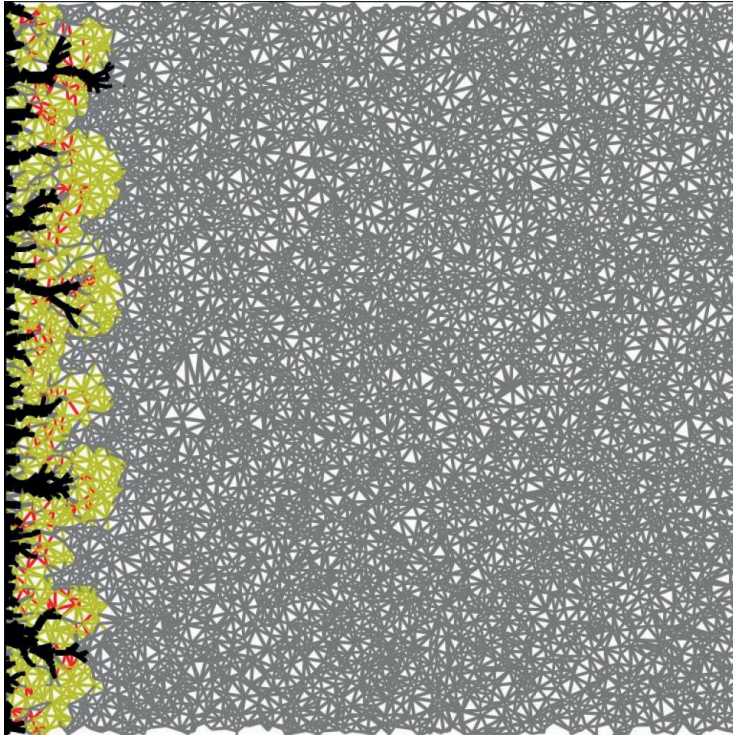
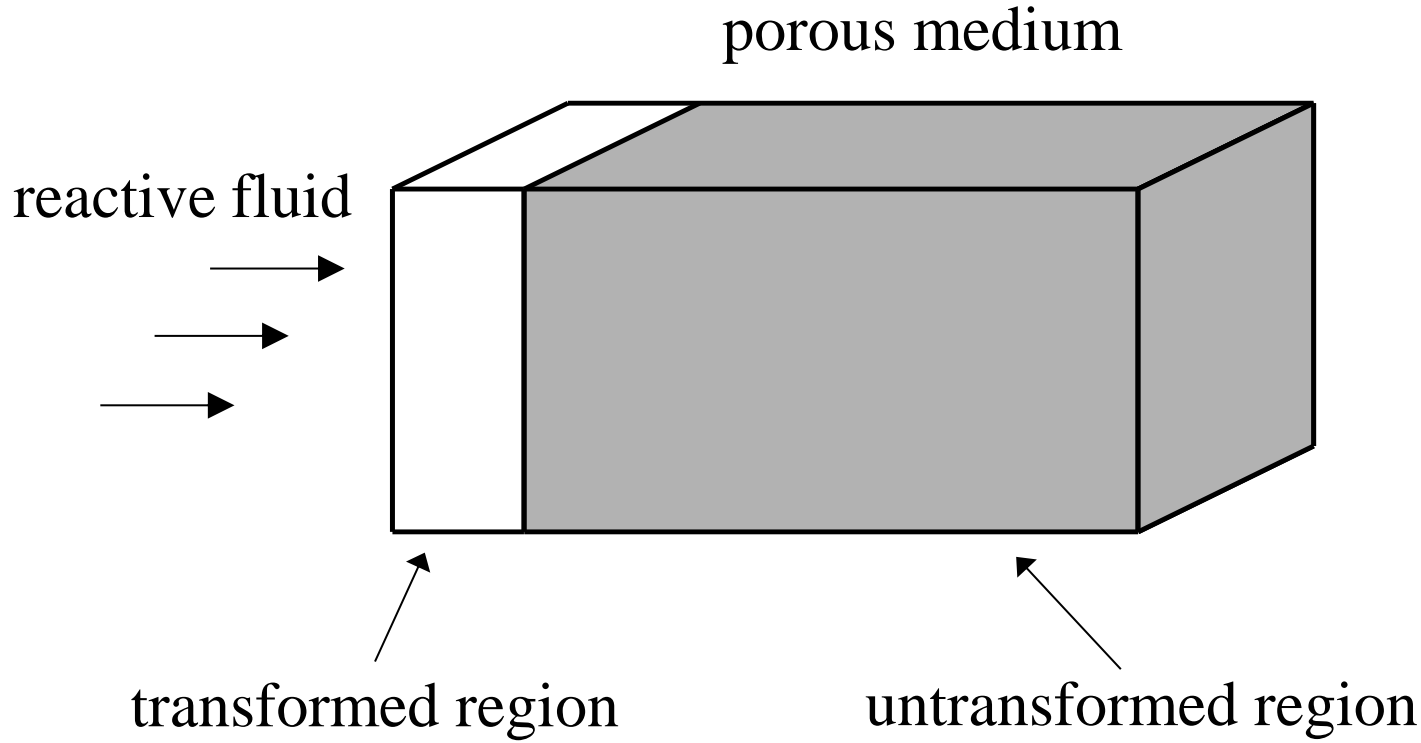


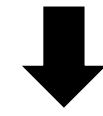
Injection parameters control the dynamics of flow pathway formation in porous media



Tomasz Szawełło and Piotr Szymczak

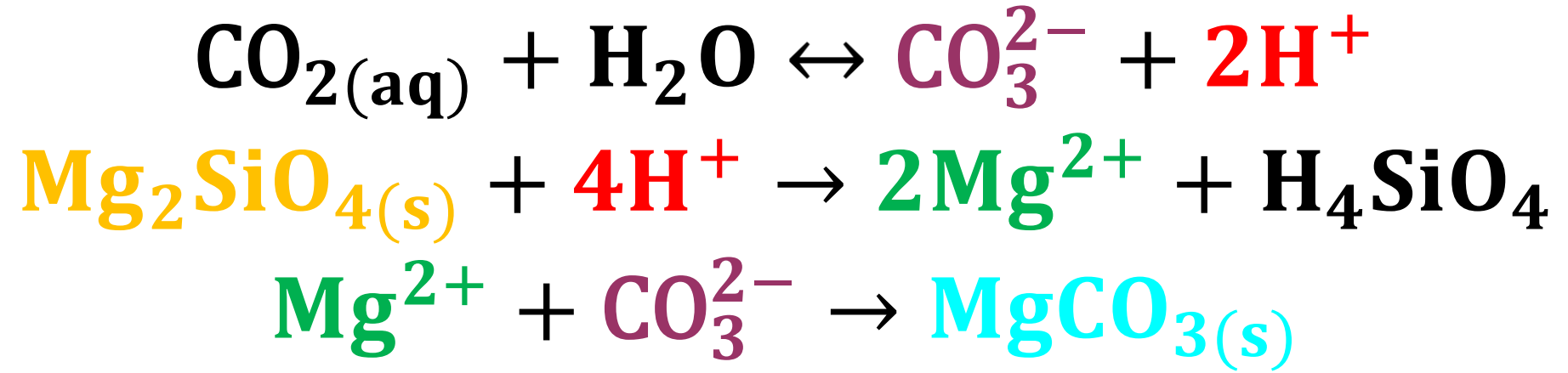


reactive transport
in porous media

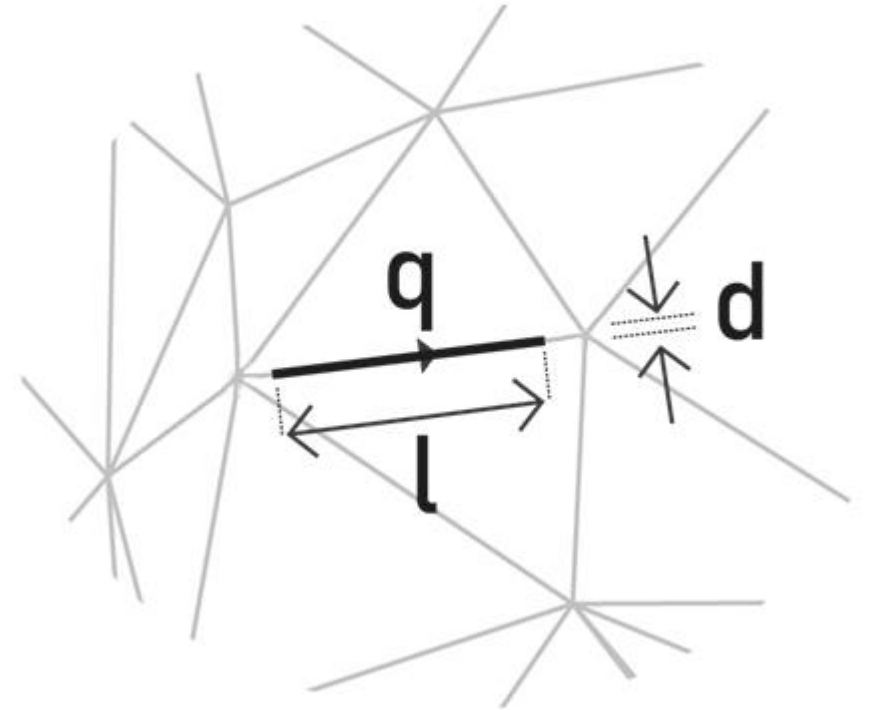
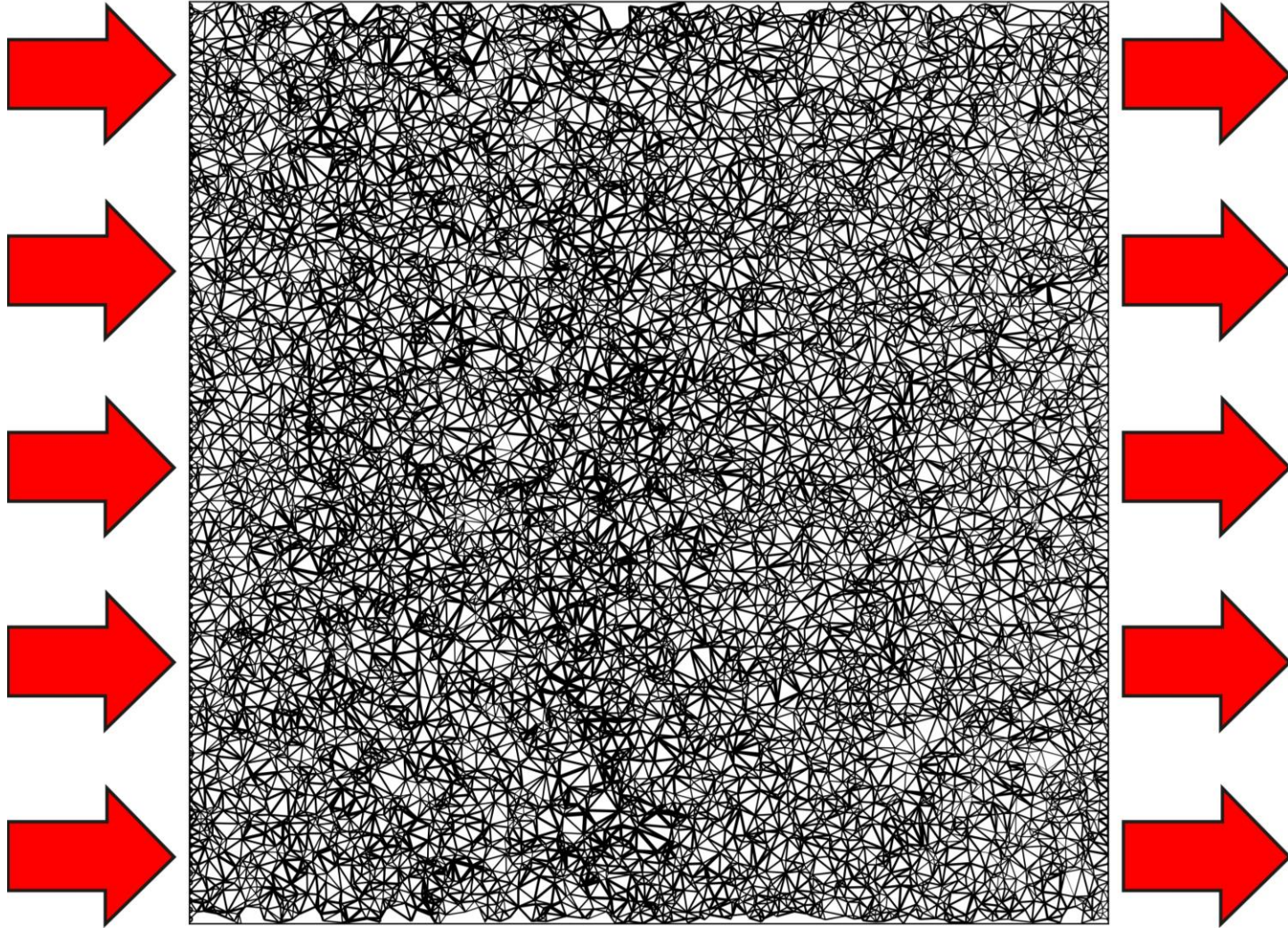


emergent structures
dependent on the interplay
of flow, reactant transport
and chemical kinetics

mineral
carbonation



porous medium \rightarrow network of interconnected pipes

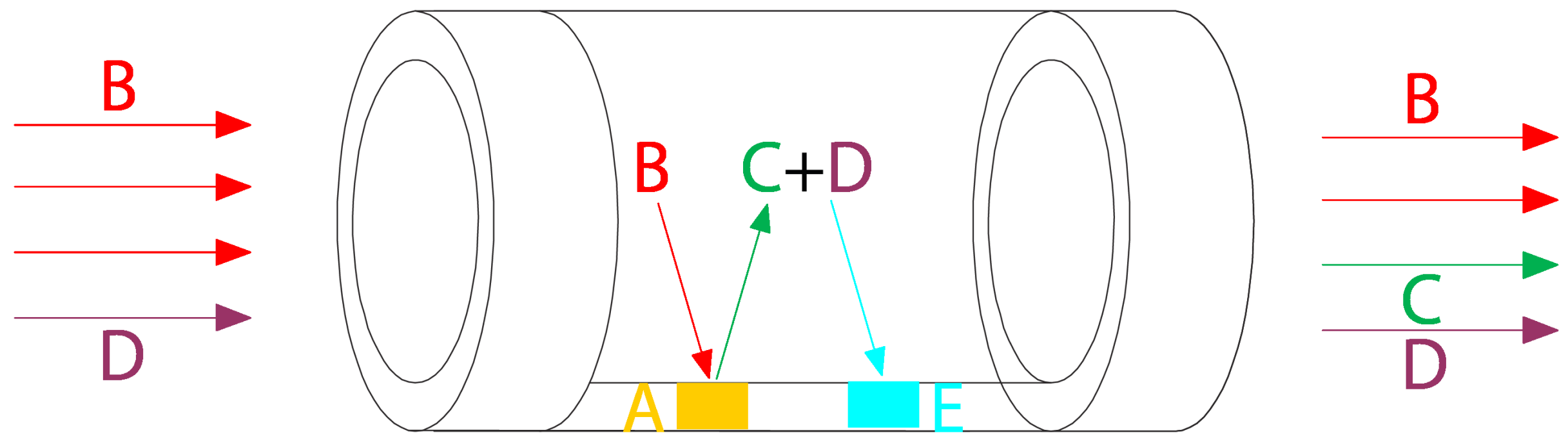
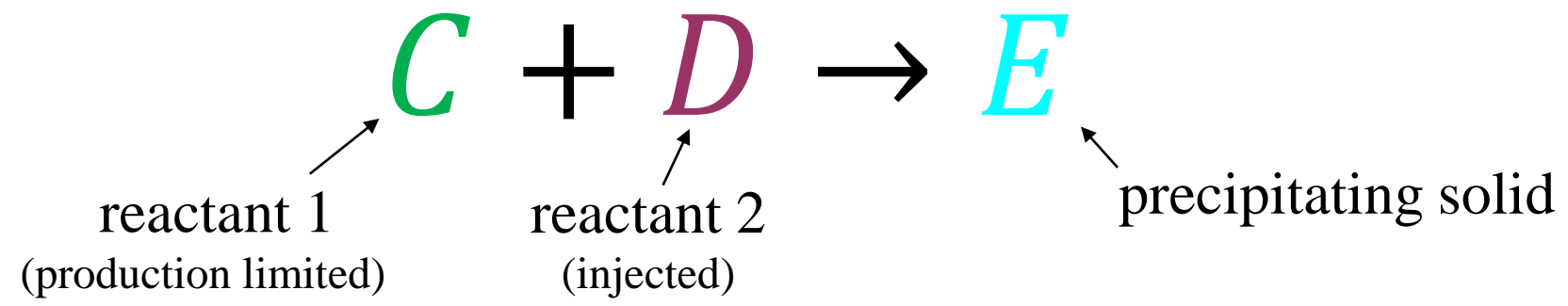
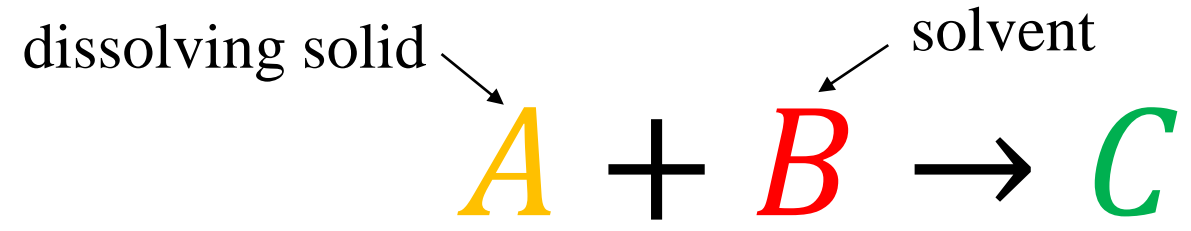


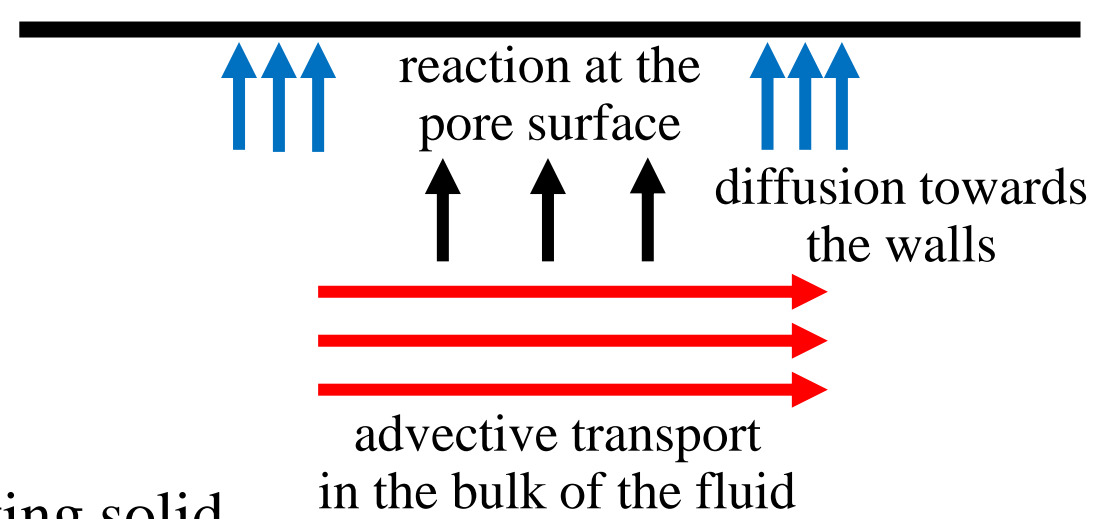
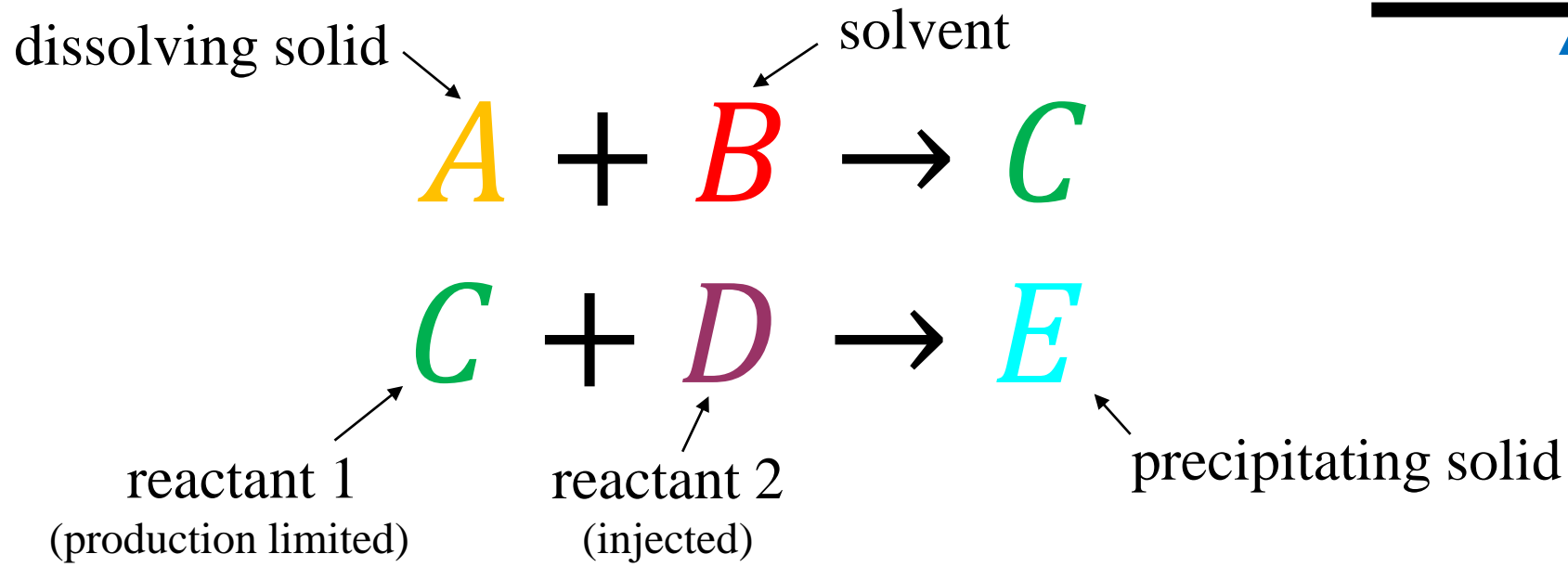
dissolution

(solid → liquid)

precipitation

(liquid → solid)





$$q = \frac{-\pi d^4}{128 \mu} \nabla p$$

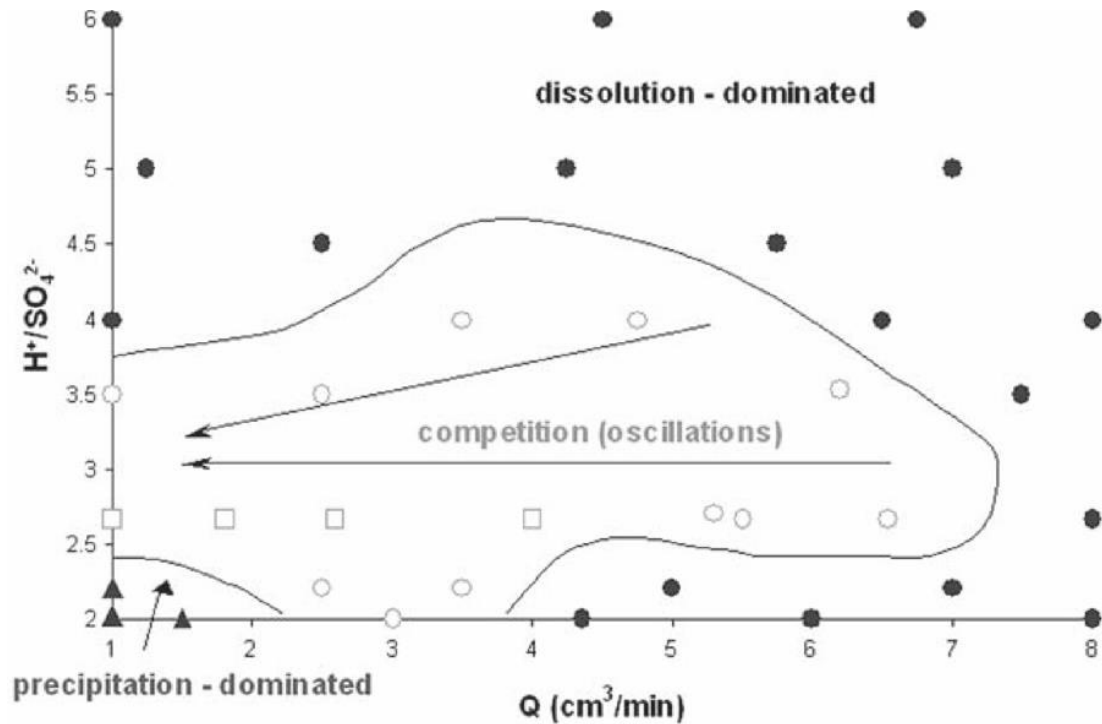
$$q \frac{\partial c_B}{\partial x} = -\pi d k c_B$$

$$q \frac{\partial c_C}{\partial x} = \pi d R(c_B, c_C, c_D)$$

$$q \frac{\partial c_D}{\partial x} = \pi d R(c_C, c_D)$$

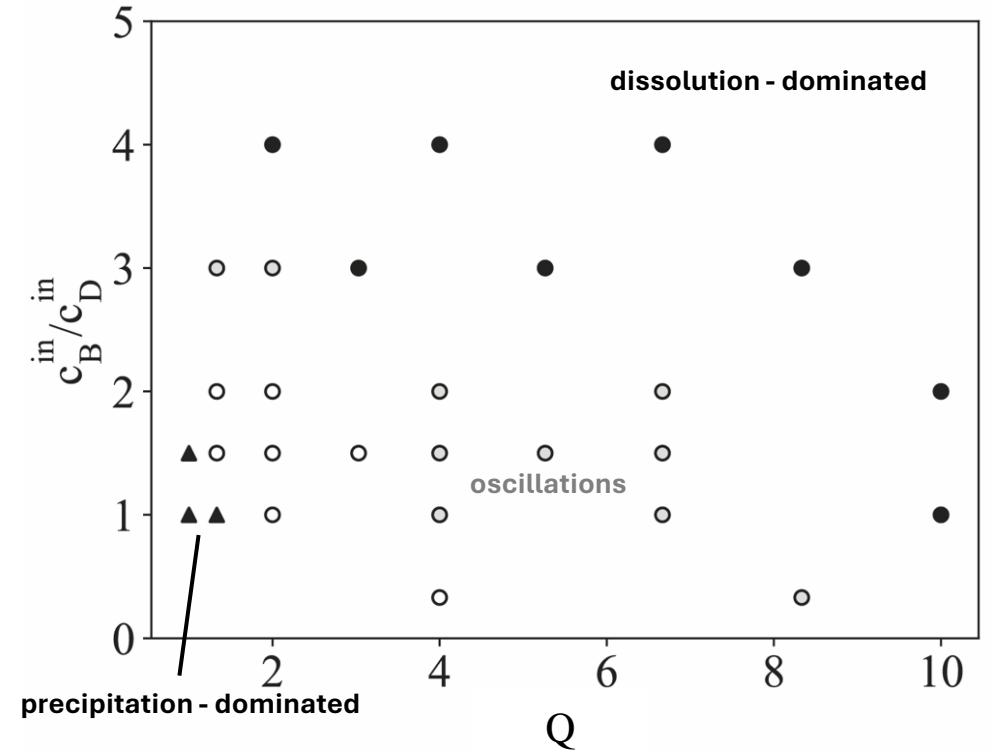
$$\frac{\partial d}{\partial t} = f(c_B, c_C, c_D)$$

calcium carbonate dissolution, gypsum precipitation

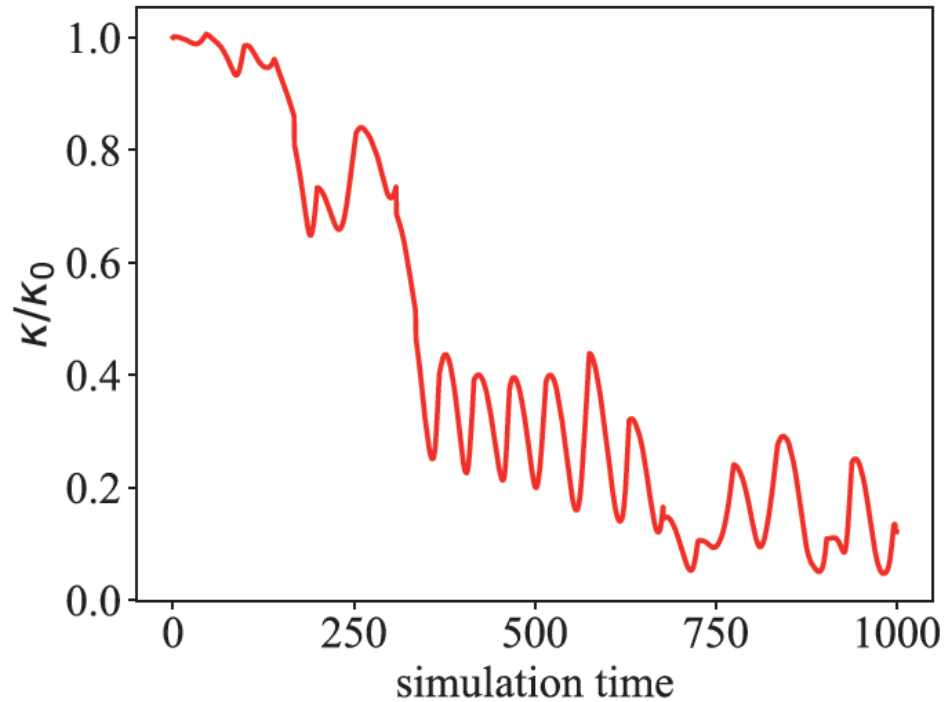
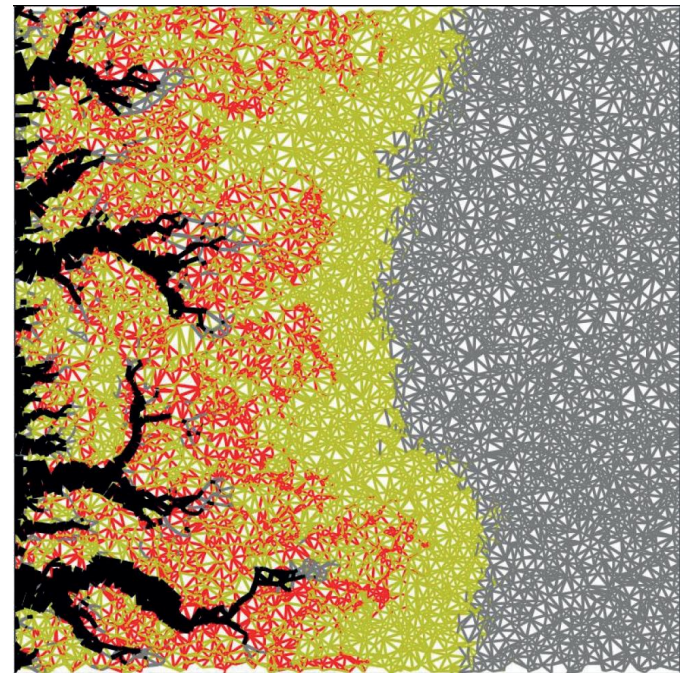
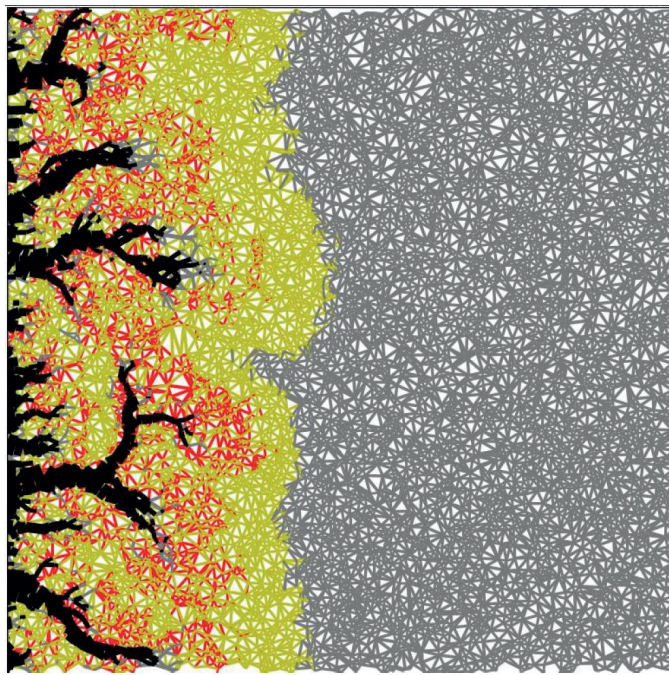
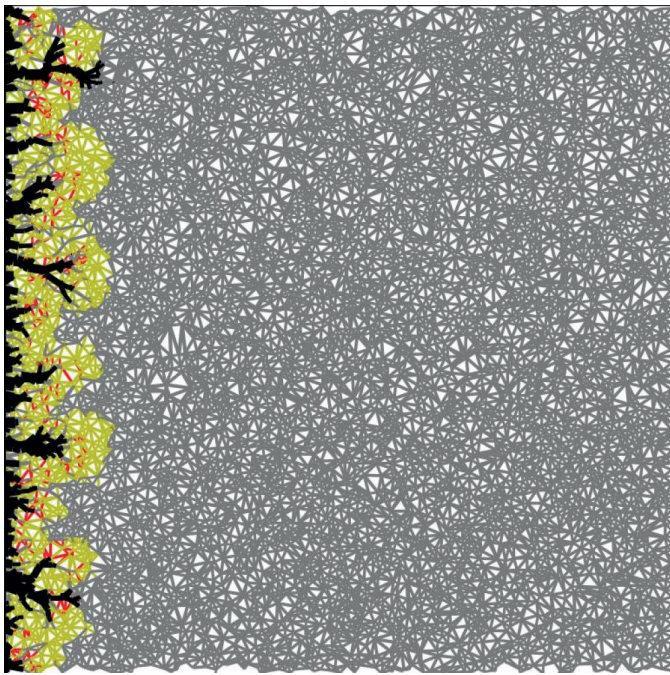


experiments

Singurindy & Berkowitz (2003)



simulations



Permeability oscillations
create favorable conditions
for mineral replacement.