Barite scaling causes sealing of fractures within months and is strongly influenced by aperture

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Motivation: Barite scaling in fractured reservoirs pose a threat for a sustainable use of deep geothermal systems.

Methods: Sensitivity analysis of 1D reactive transport simulations coupled with PHREEQC kinetics and nucleation theory.

Results: Few large fractures are more favourable than many small ones with respect to sealing.
For the Groß-Schönebeck site, 70 °C injection temperature is the worst case scenario.

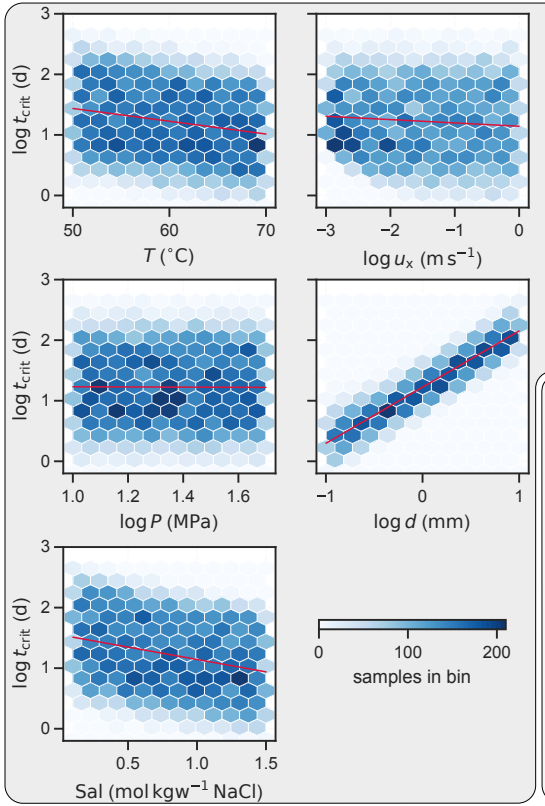

Fig. 1: Sensitivity analysis of parameters influencing the time for a fracture to decrease by one order of magnitude (t_{crit}) if saturation state is 30.

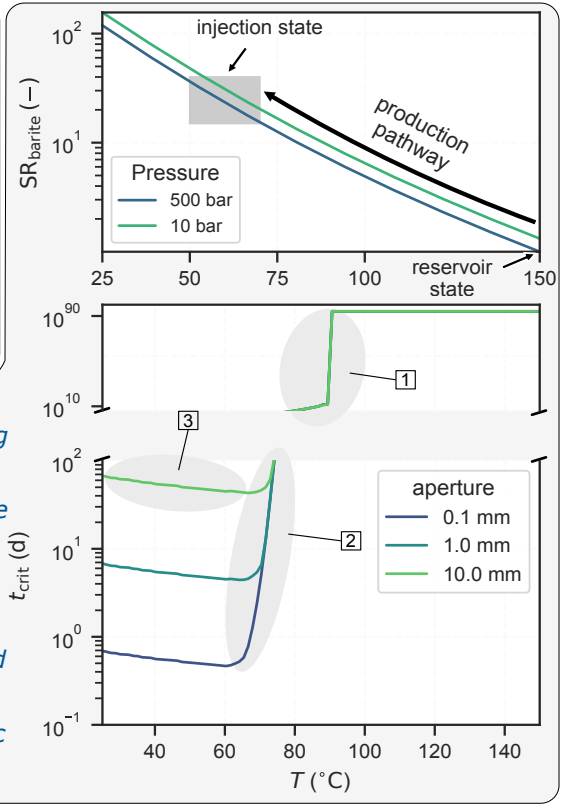

Fig. 2: Barite scaling for the Groß-Schönebeck test site at varying inj. temperatures. (1) Nucleation begins (2) increased supersaturation (3)decreased kinetic rate constant.

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