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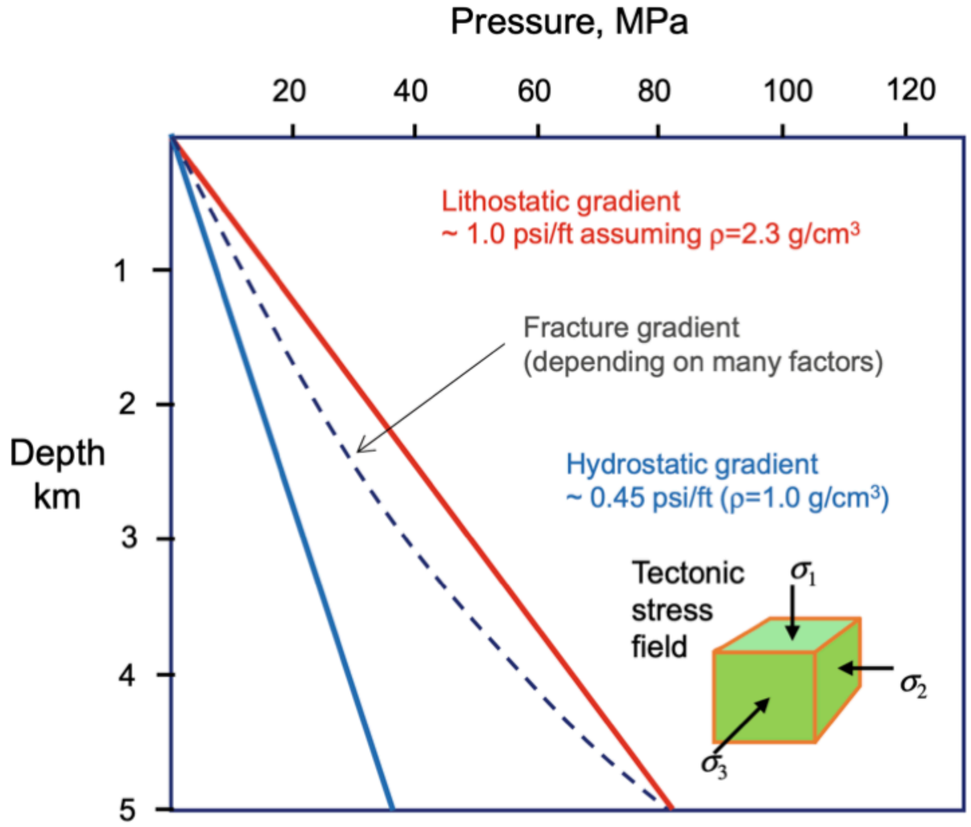
Mitigate
fracture risk

Develop a scheme to

- ensure *induced* reservoir *pressure* remains below the fracture *pressure* with *high* probability
- DT can *adapt* the *injection* rate to minimize risk

Make use of

- Jutul.jl's numerical reservoir simulations
- numerical approximation of the gradient
- samples from
  - prior on permeability $p(K)$
  - the *posterior* for the *state* $p(\mathbf{x}_{1:3} \mid \bar{\mathbf{y}}^{o}_{\mathbf{1:3}})$



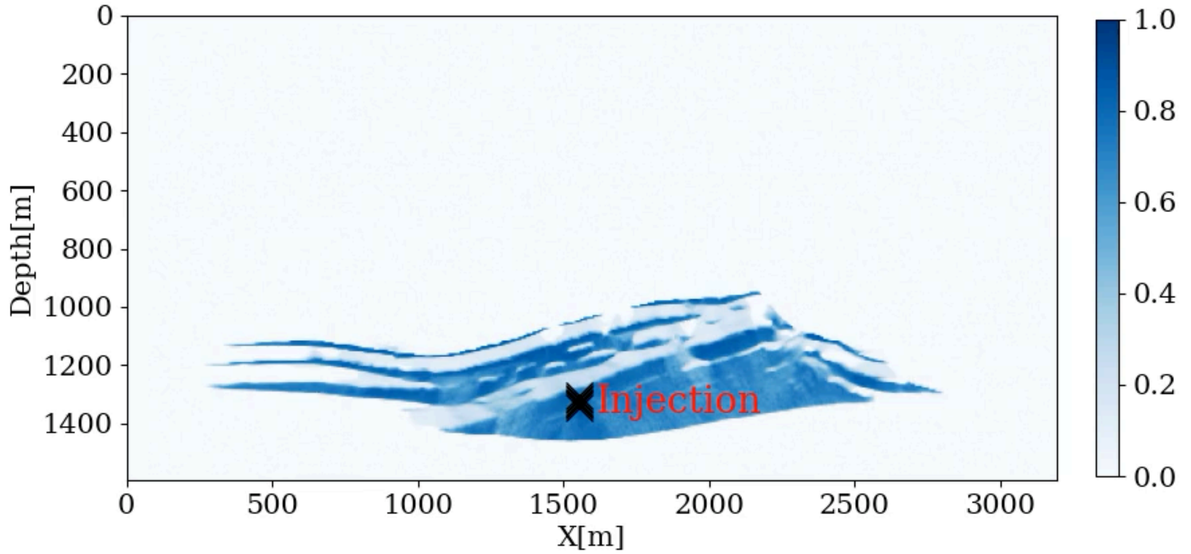
Ringrose, Philip. "How to store CO2 underground: Insights from early-mover CCS projects." (2020): 978-3.

Fracture risk

w/o *pressure* control

- **Initial** *injection* rate**:**
  $q = 0.05\mathrm{m}^3/\mathrm{s}$
- Leads to *over* pressure after 1920 days of injection
- Seal *fractures* due to *over pressure* denoted by **red** areas
- Unacceptable risk

$$\mathbf{x}_4 \sim p(\mathbf{x}_4 \,|\, \bar{\mathbf{y}}_4^o)['S']$$



$$\mathbf{x}_4 \sim p(\mathbf{x}_4 \,|\, \bar{\mathbf{y}}_4^o)['\delta p']$$