Nucleation and arrest of aseismic fault slip, during and after fluid pressurization

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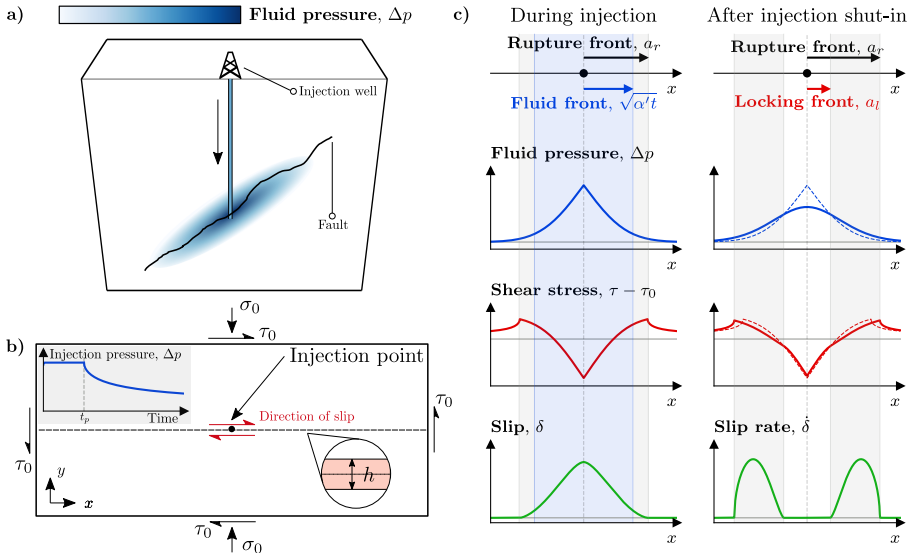
Fluid-induced fault aseismic slip



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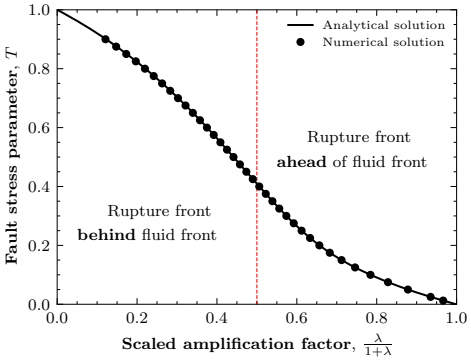
Rupture and fluid fronts during injection



- Fault stress parameter:

$$T = \left(1 - \frac{\tau_0}{f\sigma_0'}\right)\frac{\sigma_0'}{\Delta p} = \frac{\text{Stress criticality}}{\text{Pressurization magnitude}}$$

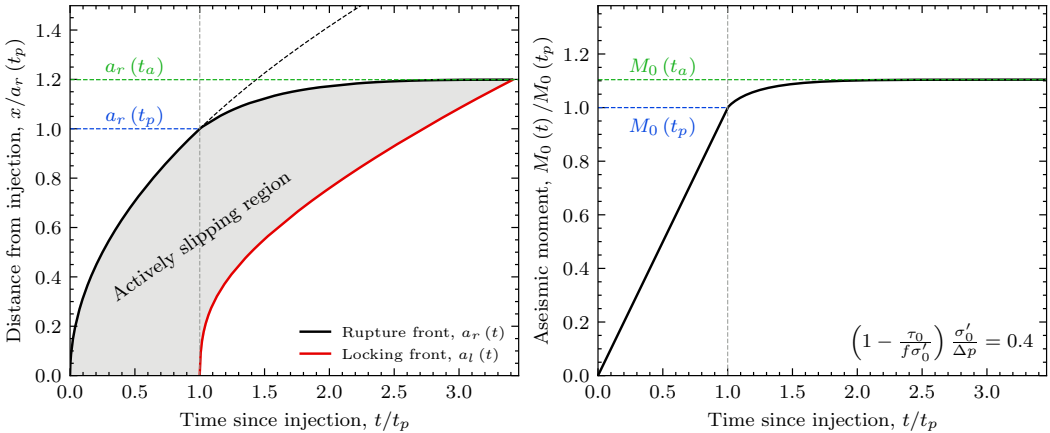
- Amplification factor:

$$\lambda = \frac{a_r}{\sqrt{\alpha' t}} = \frac{\text{Rupture front}}{\text{Fluid front}}$$

Rupture front ahead of fluid front for criticality stressed faults

Bhattacharya and Viesca (2019), *Science*
Viesca (2021), *J. Fluid Mech.*
Sáez et al. (2022), *J. Mech. Phys. Solids*

Front evolutions after injection shut-in



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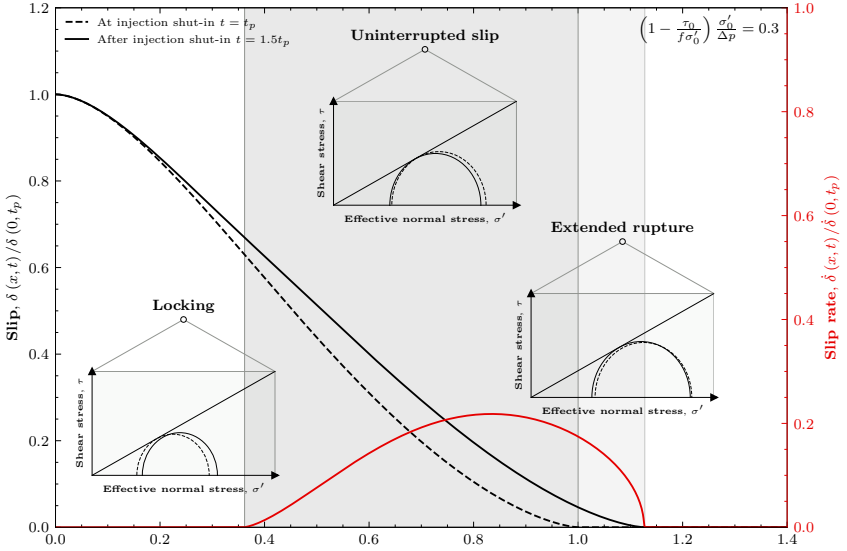
Driving mechanisms



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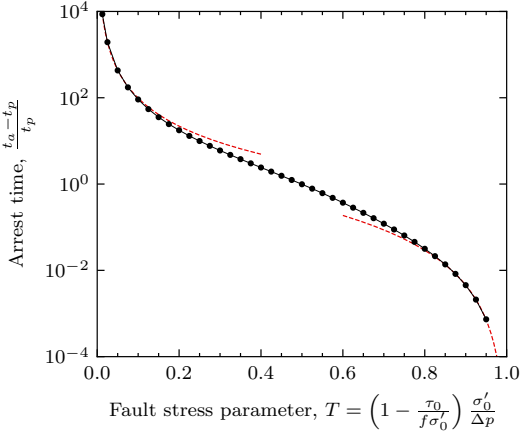
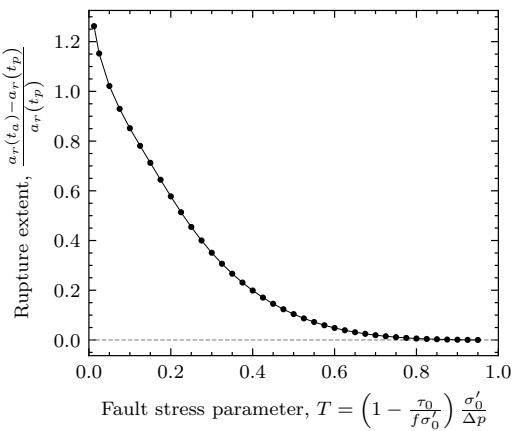
Influence of the fault stress parameter





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