Understanding Induced Seismicity related to Geo-Energy Operations

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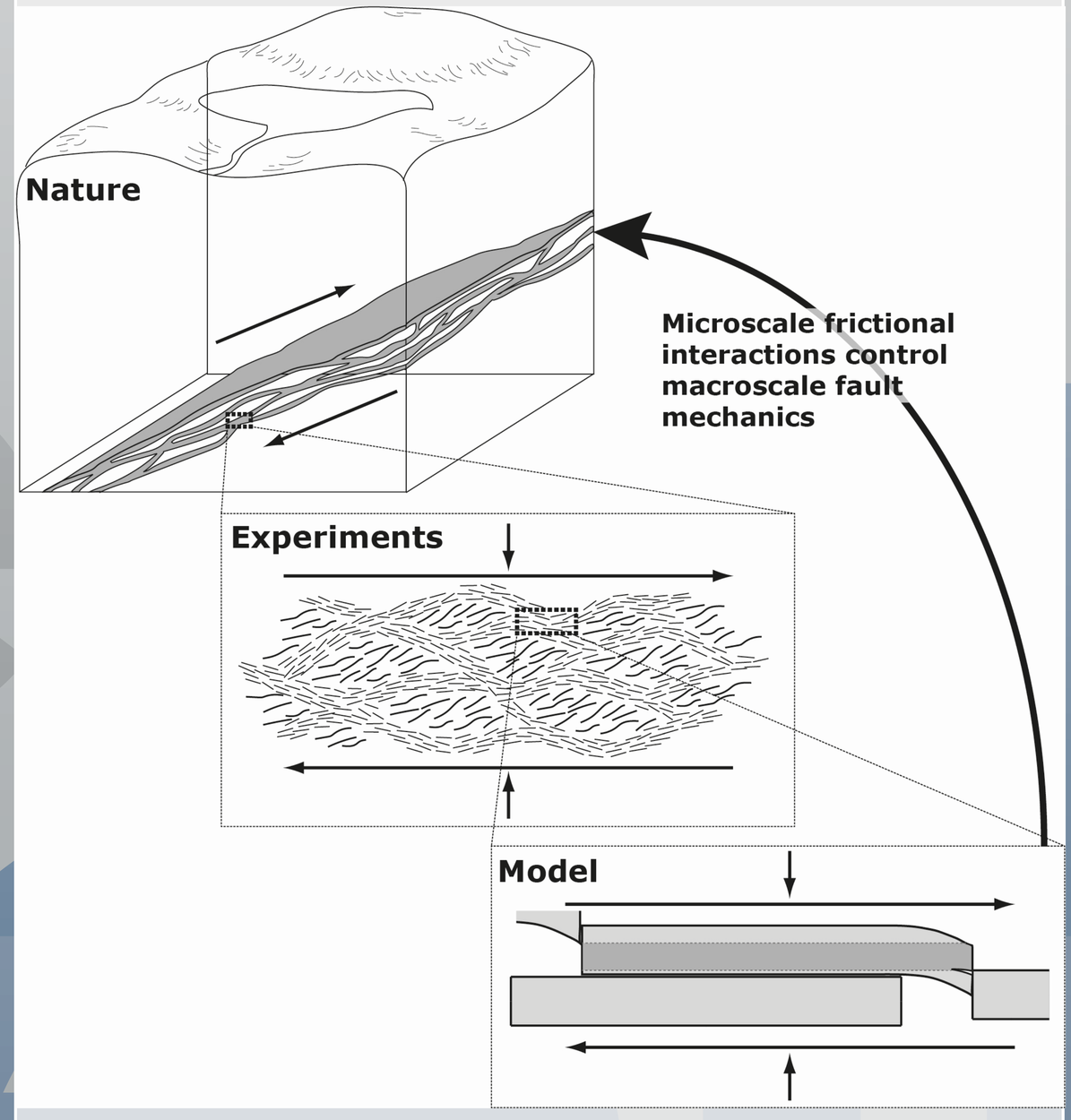
Induced Seismicity due to Subsurface Operations

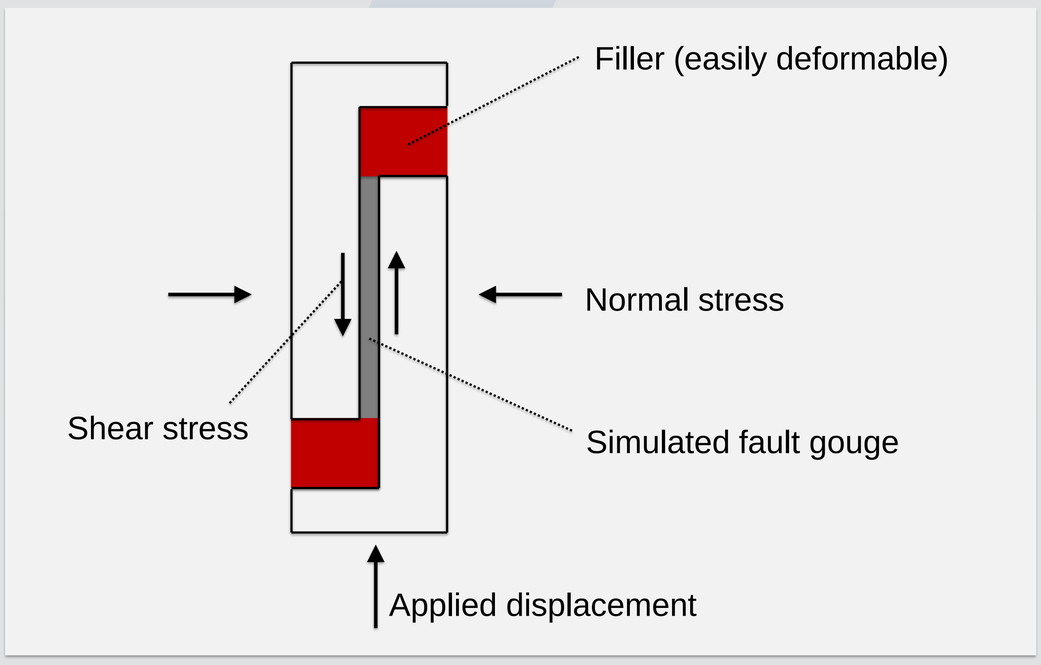
- Subsurface fluid injection during Enhanced Geothermal System (EGS) operations, Carbon Capture and Storage (CCS), hydrofracturing and energy storage result in a change in the in-situ stress state.
- This change in stress state could reactivate pre-existing faults.
- In the case of unstable fault slip, this generates induced seismicity.
- In the Geo-Energy lab, we simulate fault behaviour to better understand stable vs. unstable fault slip.

From Microscale to Macroscale



Experiments in Geo-Energy Lab

- Crushed natural or simulated fault rocks.
- In-situ conditions.
- Fault frictional strength.
- Fault frictional stability.



Integration of Output

- Experimental output: quantitative understanding of fault frictional properties in the context of subsurface operations.
- Conditions of stable vs. unstable fault slip.
- Experimental data can be used as input for numerical models predicting induced seismicity.
- This helps to make numerical models more realistic and thus improve their (ultimately) predictive capability.