



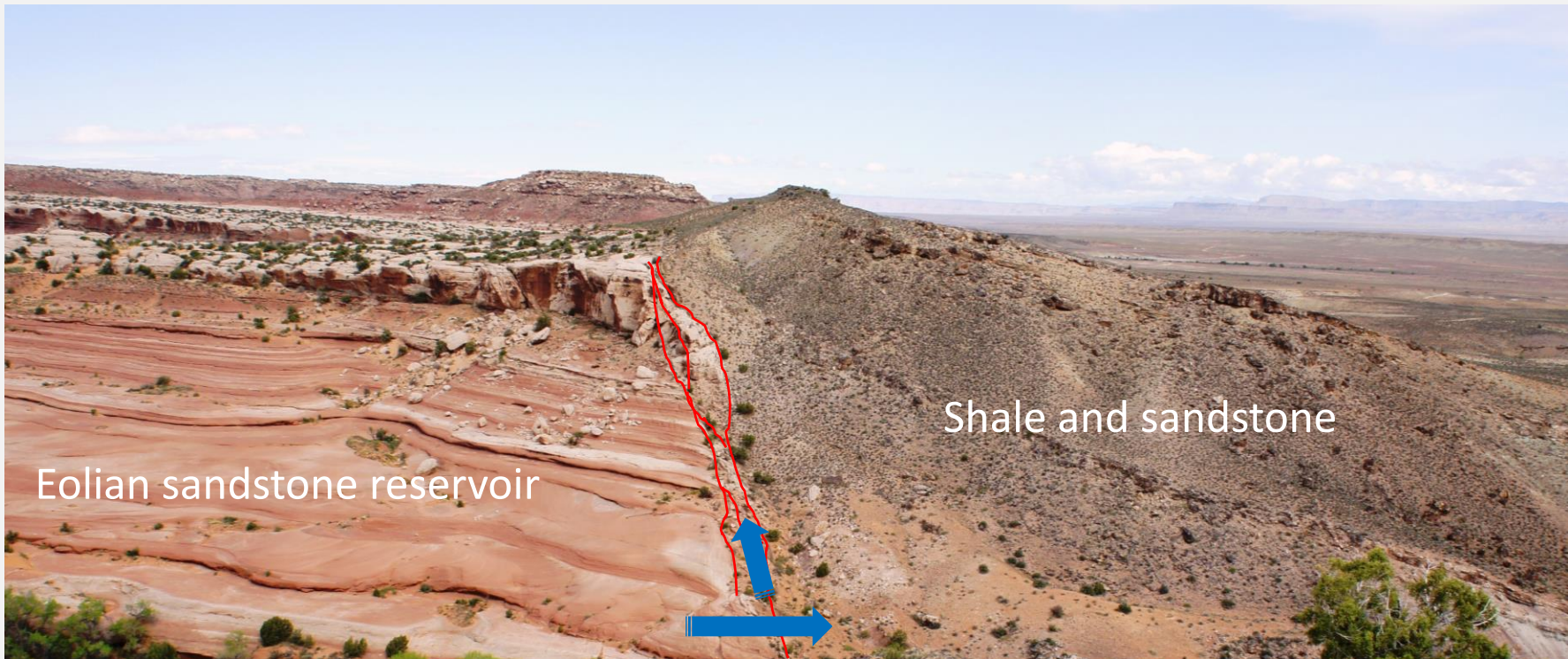
UiO • Universitetet i Oslo

Understanding faults

CLIMIT Summit 2019

Elin Skurtveit NGI/UiO





Eolian sandstone reservoir

Shale and sandstone

Bartlet Wash Fault, Utah, USA

Reservoir bounding fault, ~200 m throw

Internal fault structures



Slip surface



Deformation band clusters



Fractures and breccia

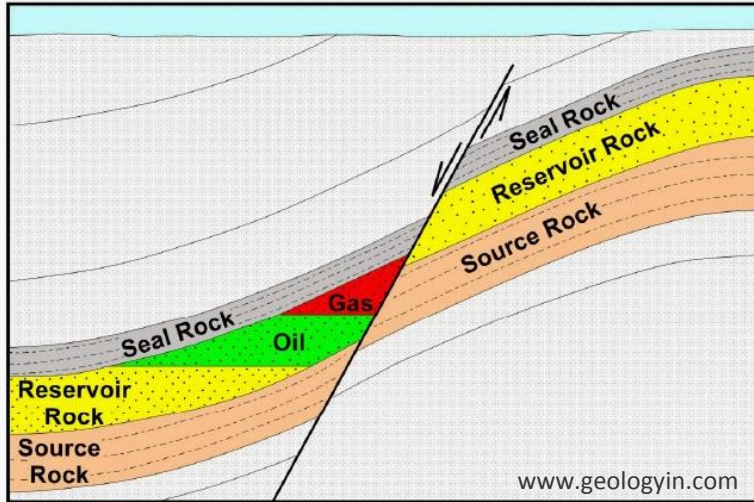


van der Zee and Urai, 2005

Clay smear

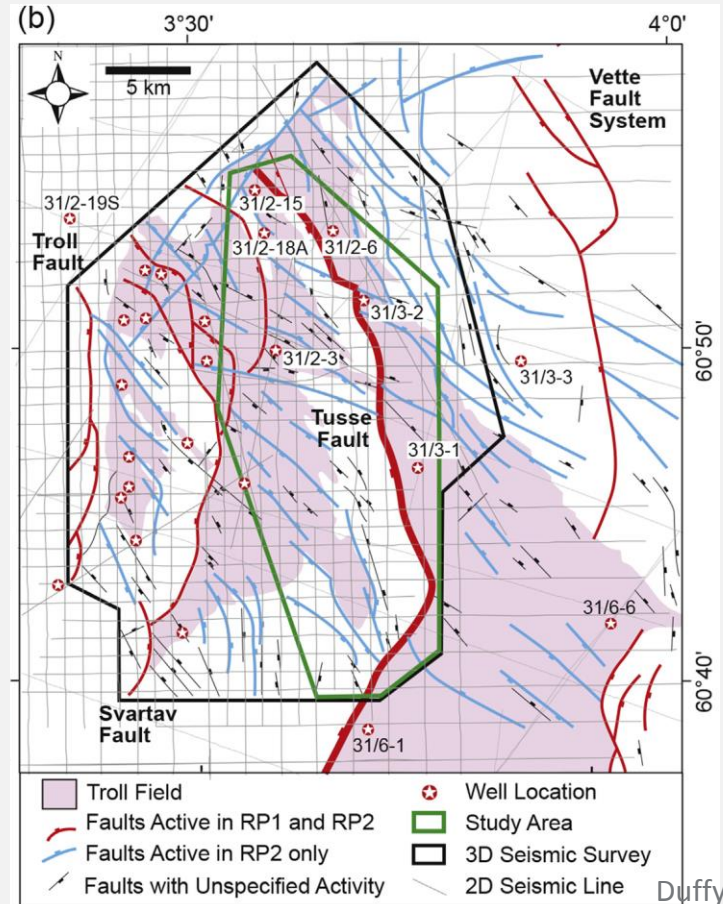
Do we need to store CO₂ in faulted reservoirs?

Normal Fault



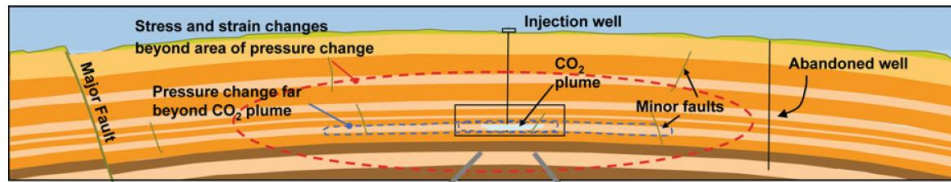
Out of 250 hydrocarbon finds in the northern North Sea (1990), 70% are in fault block traps.

Spencer and Larsen, 1990

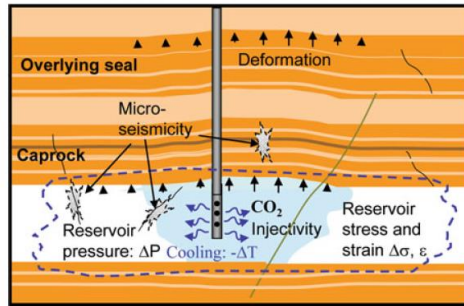


CO₂ storage is different from HC production

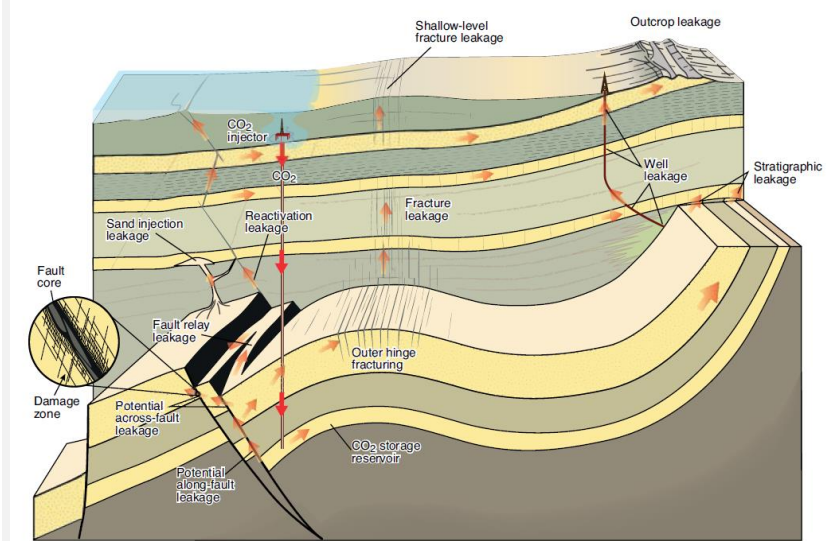
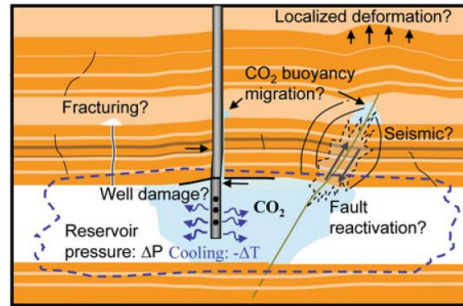
- No HC column to prove the sealing potential
- Increased fluid pressure
- Seeps and leaks not acceptable



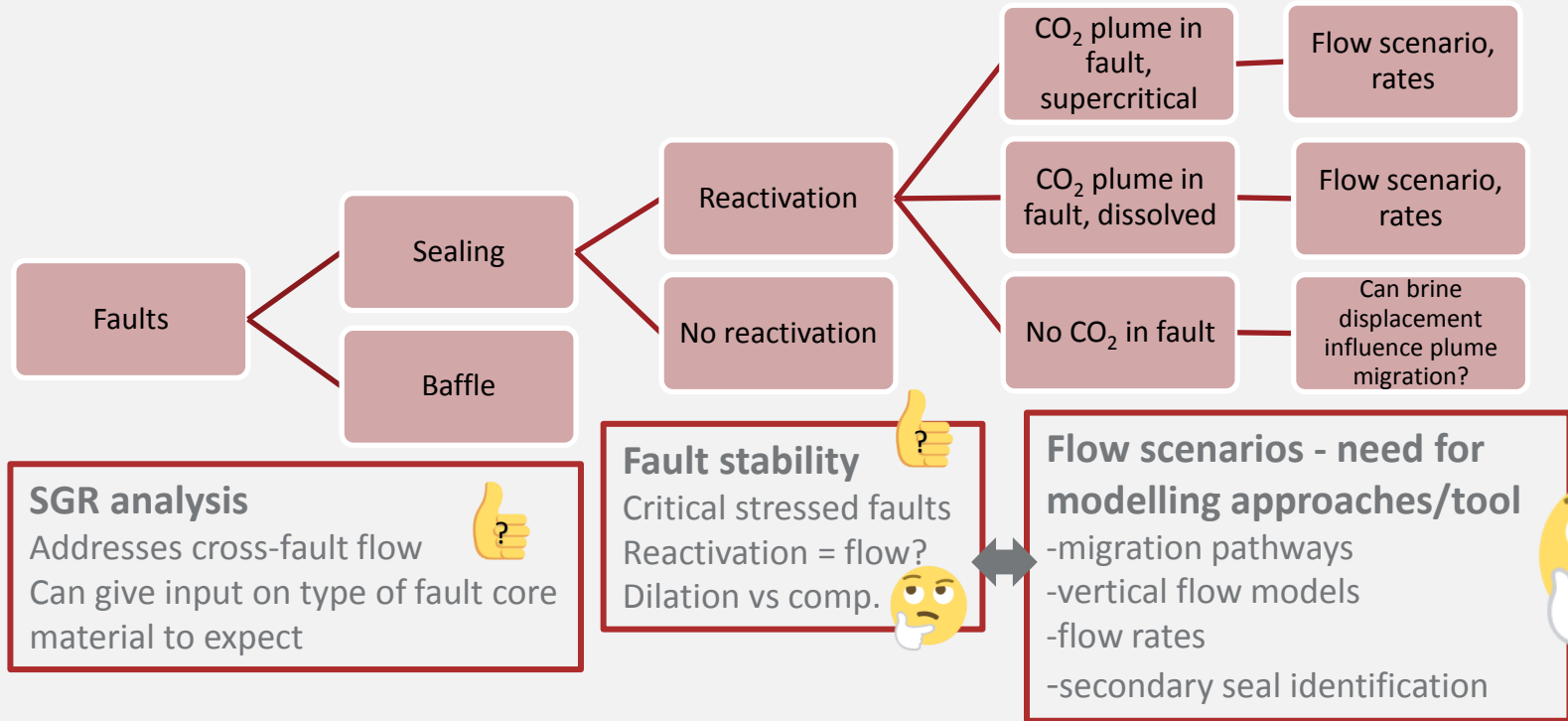
Injection-induced stress, strain and deformation



Unwanted mechanical changes

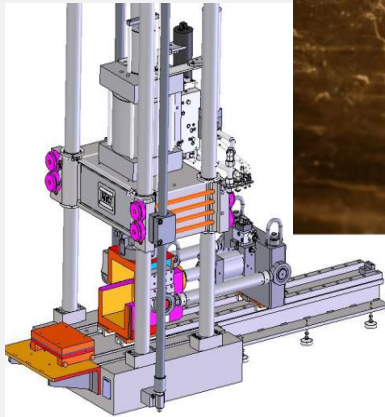


Example fault risk assessment scenarios and tools

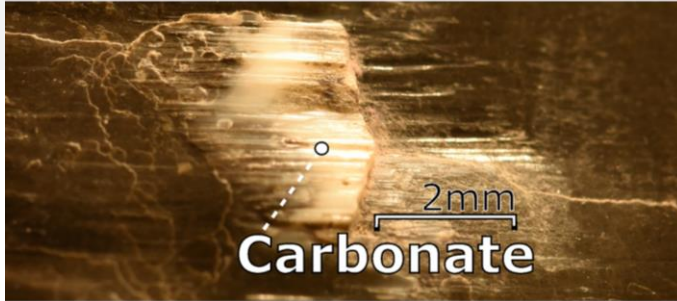


What to do?

- New experimental approaches for hydro-mechanical coupling

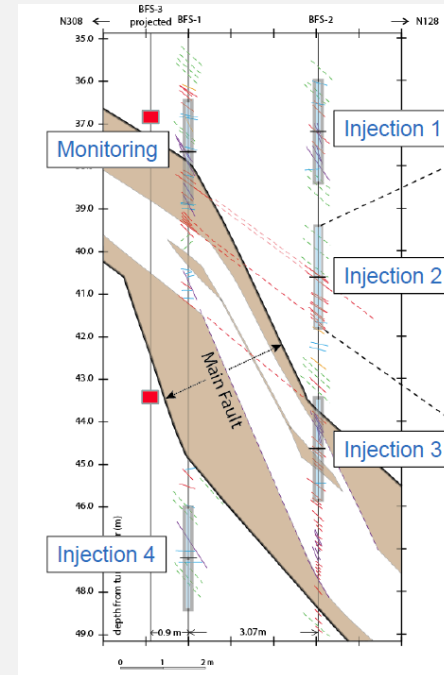


Direct shear tests



Halvard Smith Master work

- Large scale fault testing – Mont Terri Laboratory



Nussbaum, Mont Terri project



#onsafeground