Testing Efficiency of Storage in the Subsurface: Frio Brine Pilot Experiment

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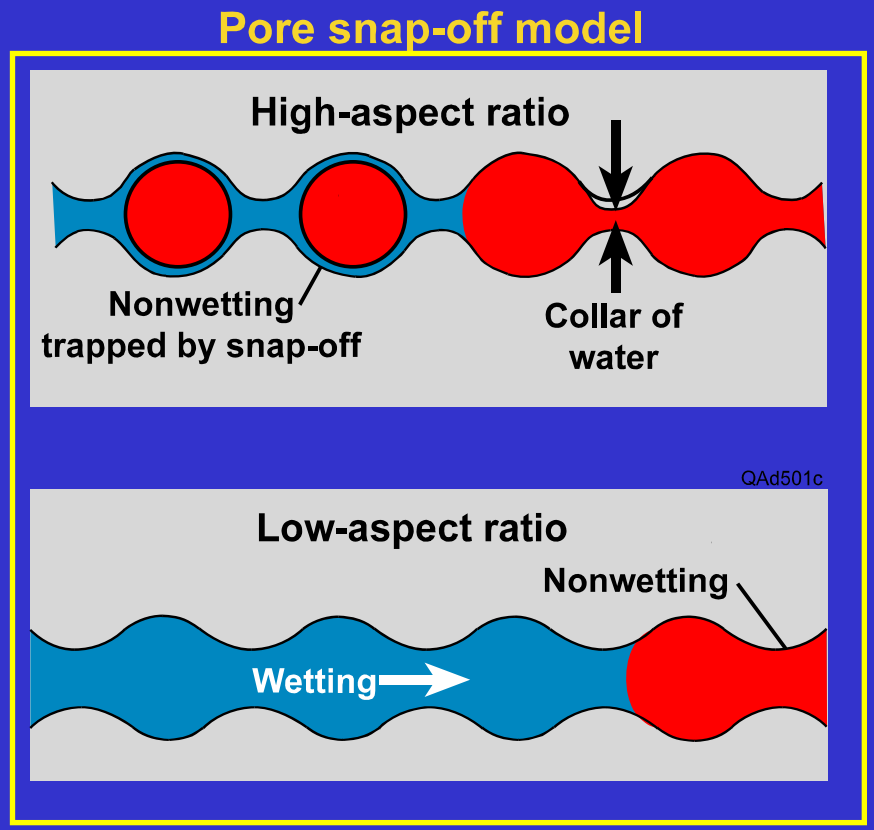
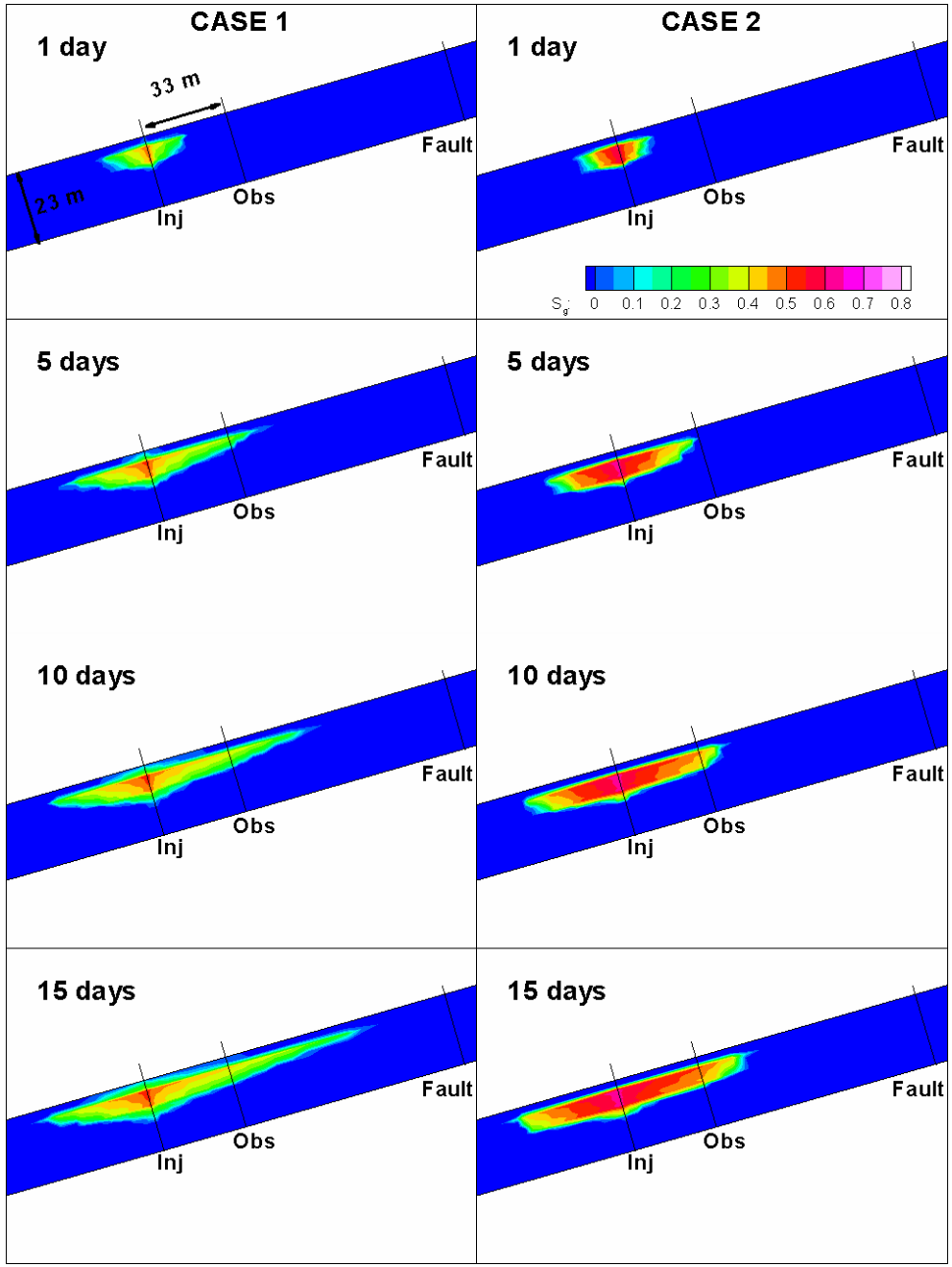
Pore-Scale Gas Trapping Snap-off

- Oh and Slattery, 1976
  - Snap-off model

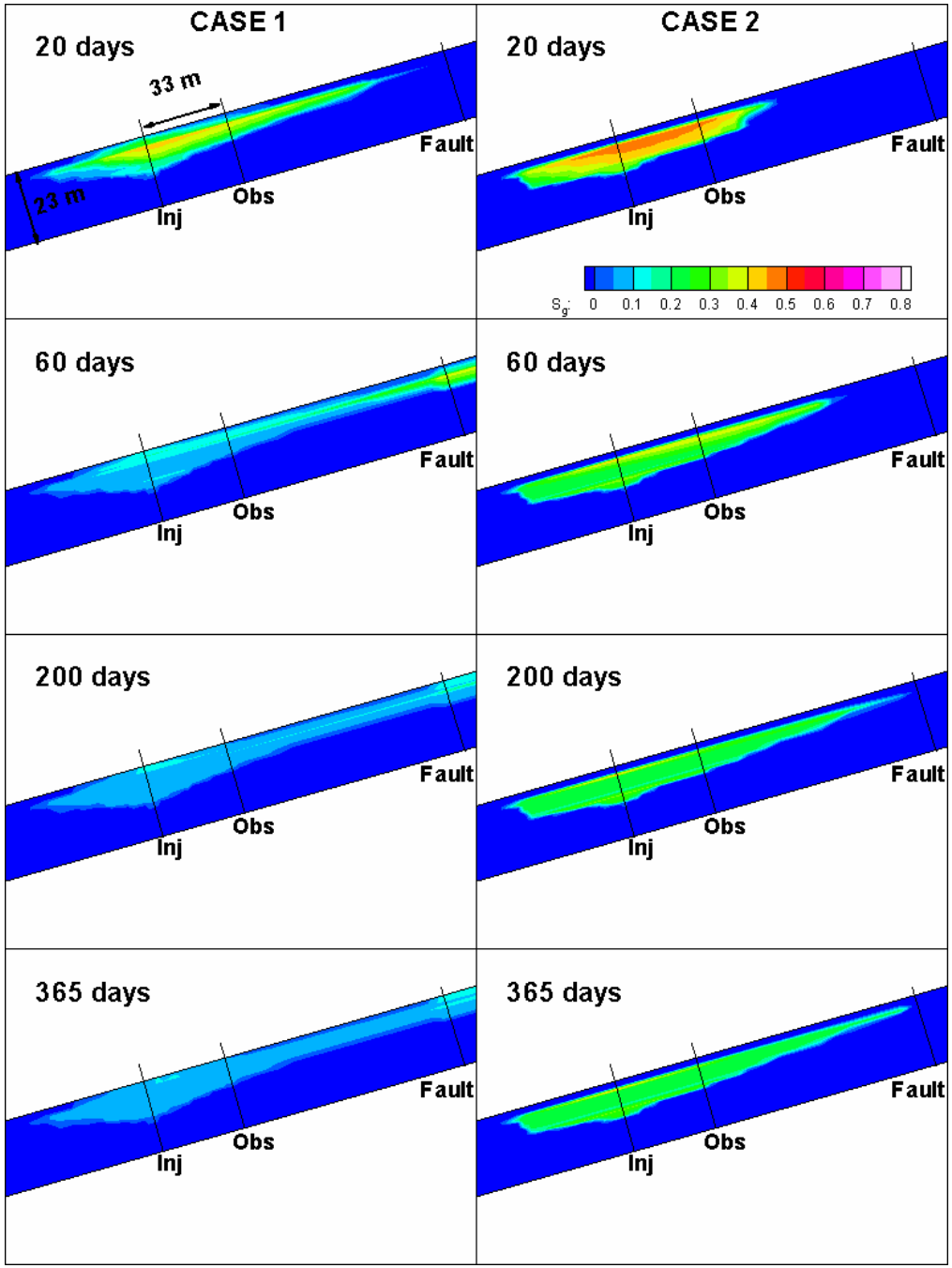
$$\text{Aspect ratio} = \frac{\text{Pore radius}}{\text{Pore throat radius}}$$

Capillary force cause non-wetting phase to snap-off into pore



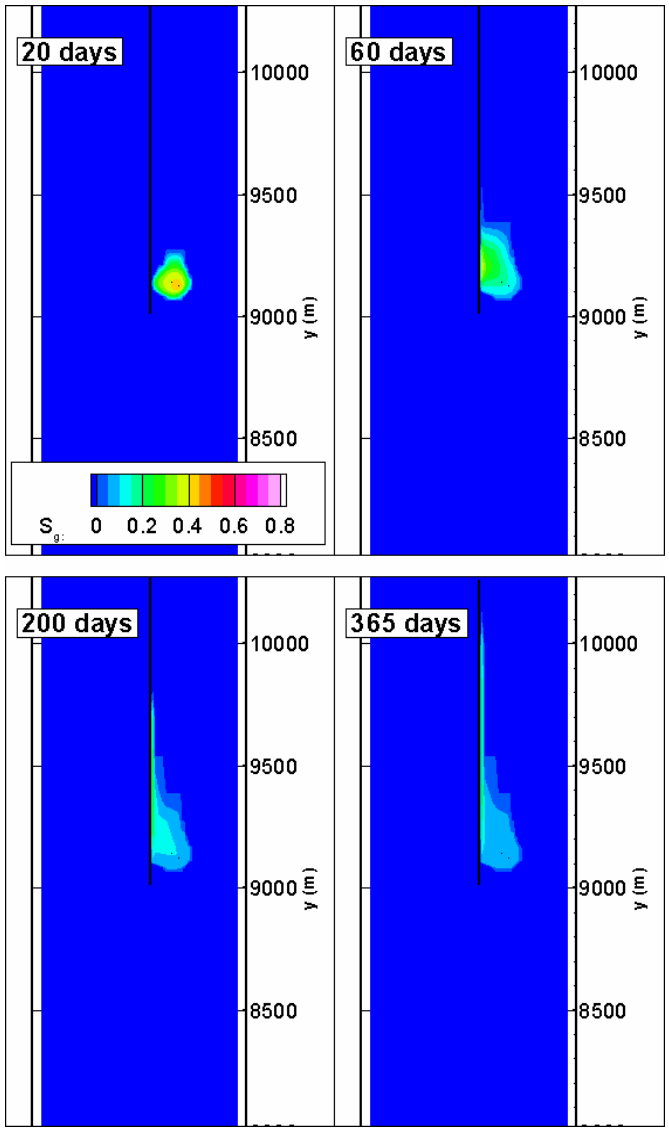


Residual Saturation - key parameter

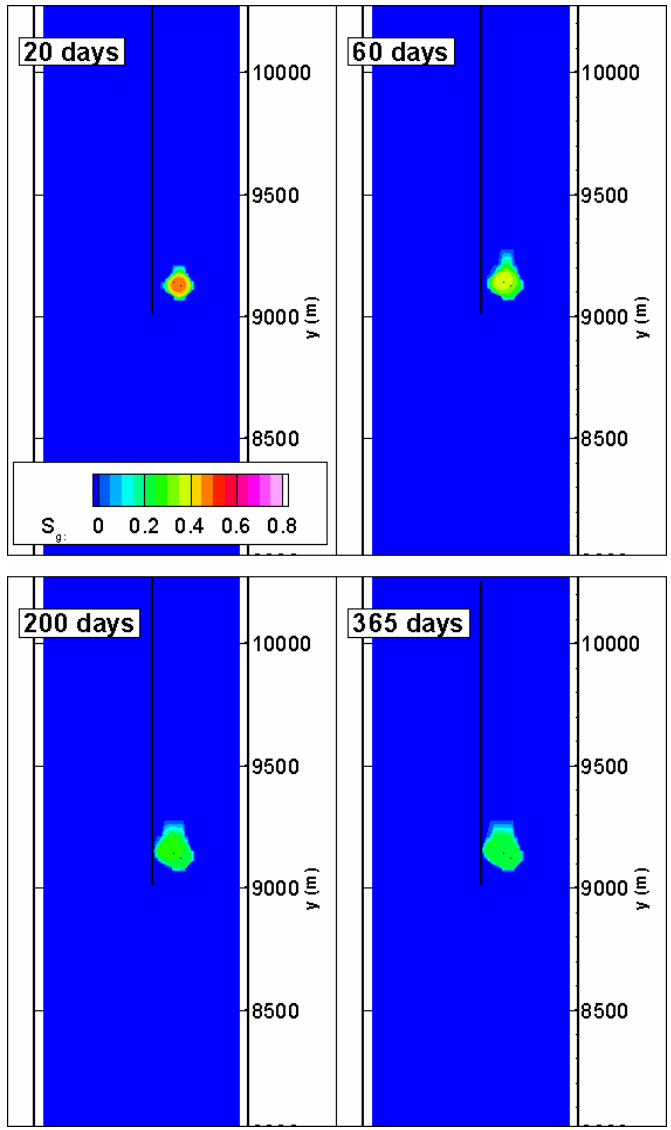

CASE 1
20 days
33 m
23 m
Fault
Inj
Obs
CASE 2
20 days
Fault
Inj
Obs
S_g: 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
60 days
Fault
Inj
Obs
60 days
Fault
Inj
Obs
200 days
Fault
Inj
Obs
200 days
Fault
Inj
Obs
365 days
Fault
Inj
Obs
365 days
Fault
Inj
Obs

Impact of Residual Saturation on CO_2 Distribution

Case 1



Case 2



Frio Brine Pilot Summary

- MMV demonstration in high permeability sandstone
- Comparison of diverse MMV technologies
- Better understanding of CO_2 behavior though model matching
- Invitation for participation
- Updates: www.gulfcoastcarbon.org