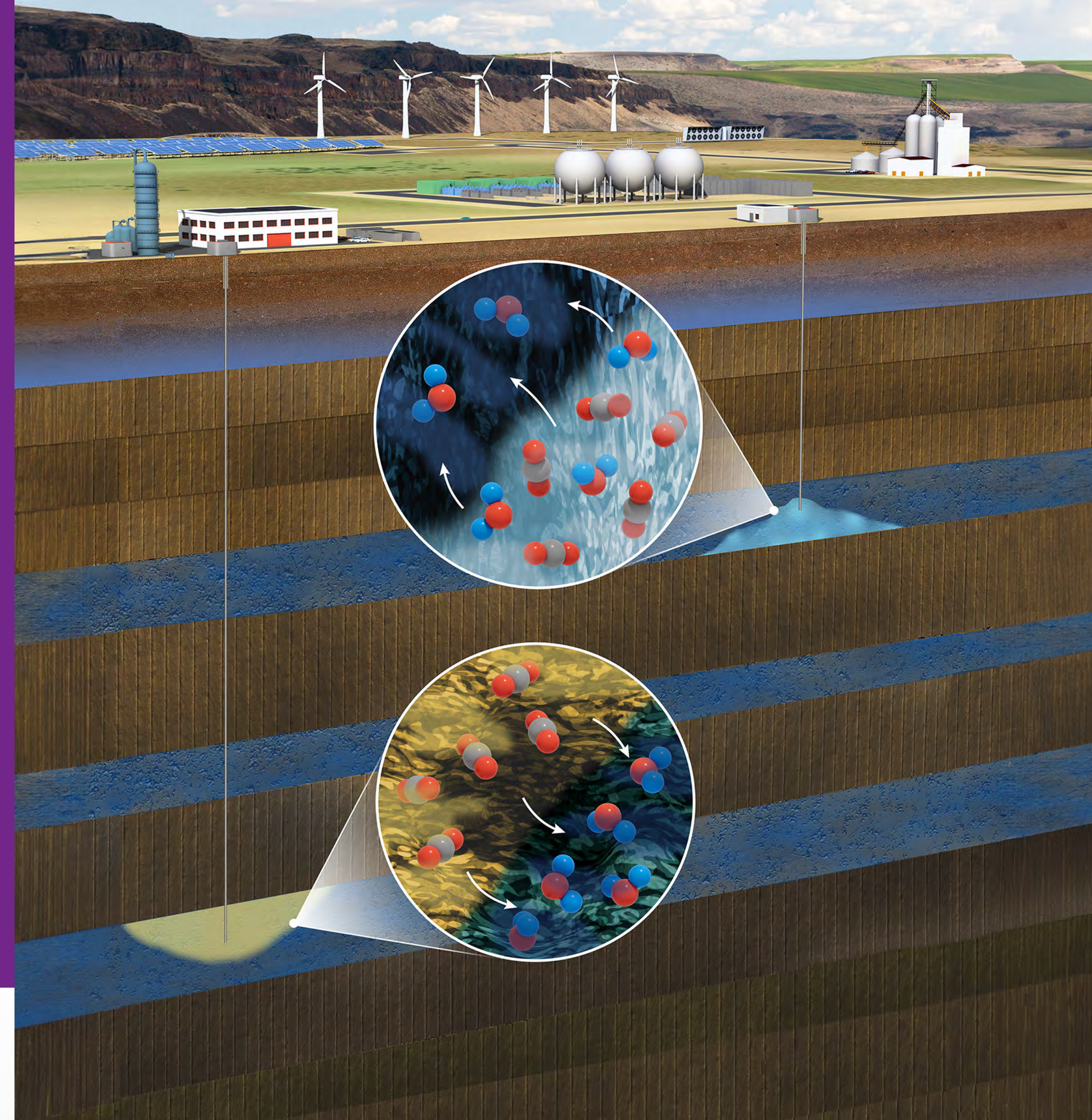


# Investigating the Influence of Injectant Properties on Plume Dynamics in Geologic Carbon Sequestration

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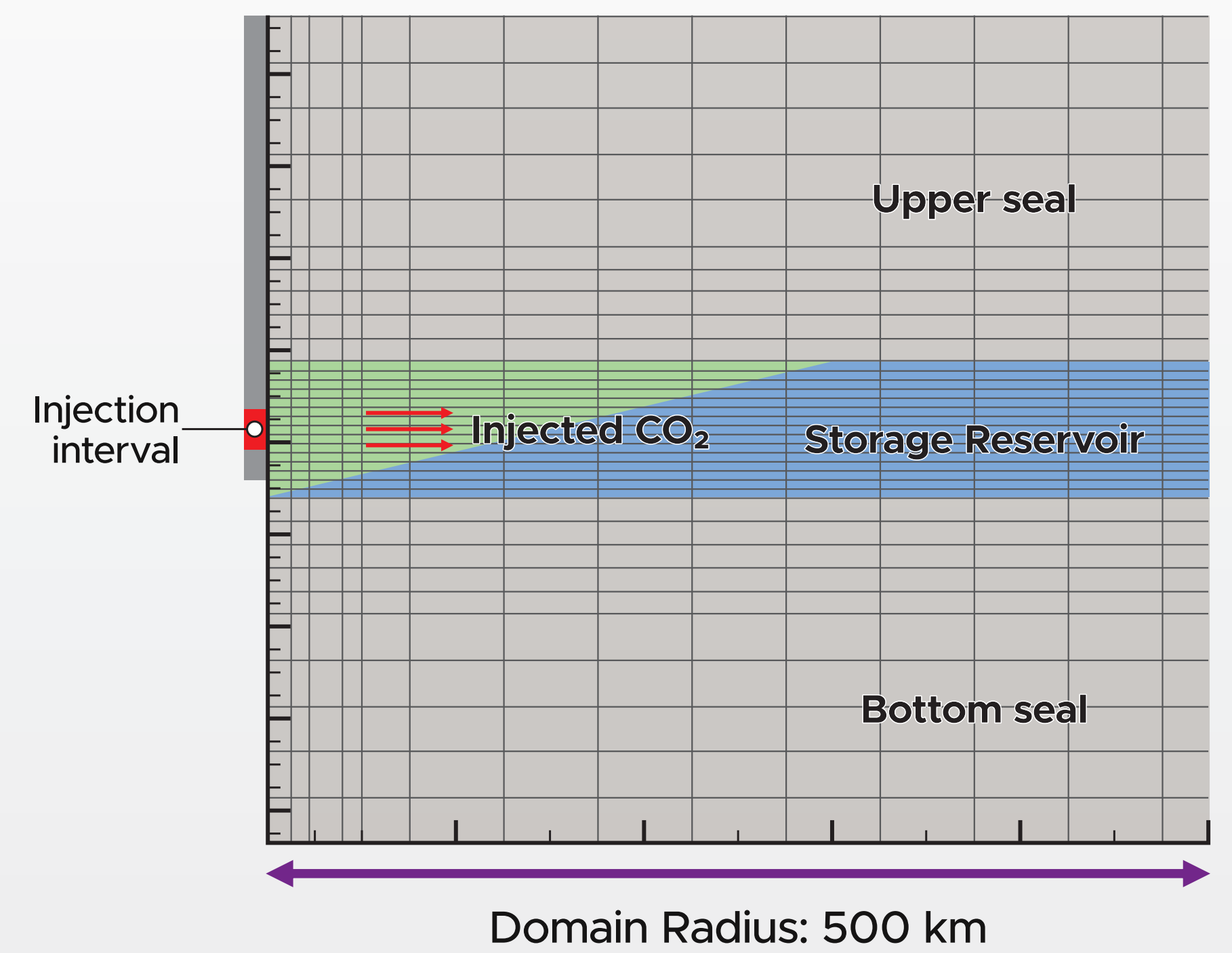
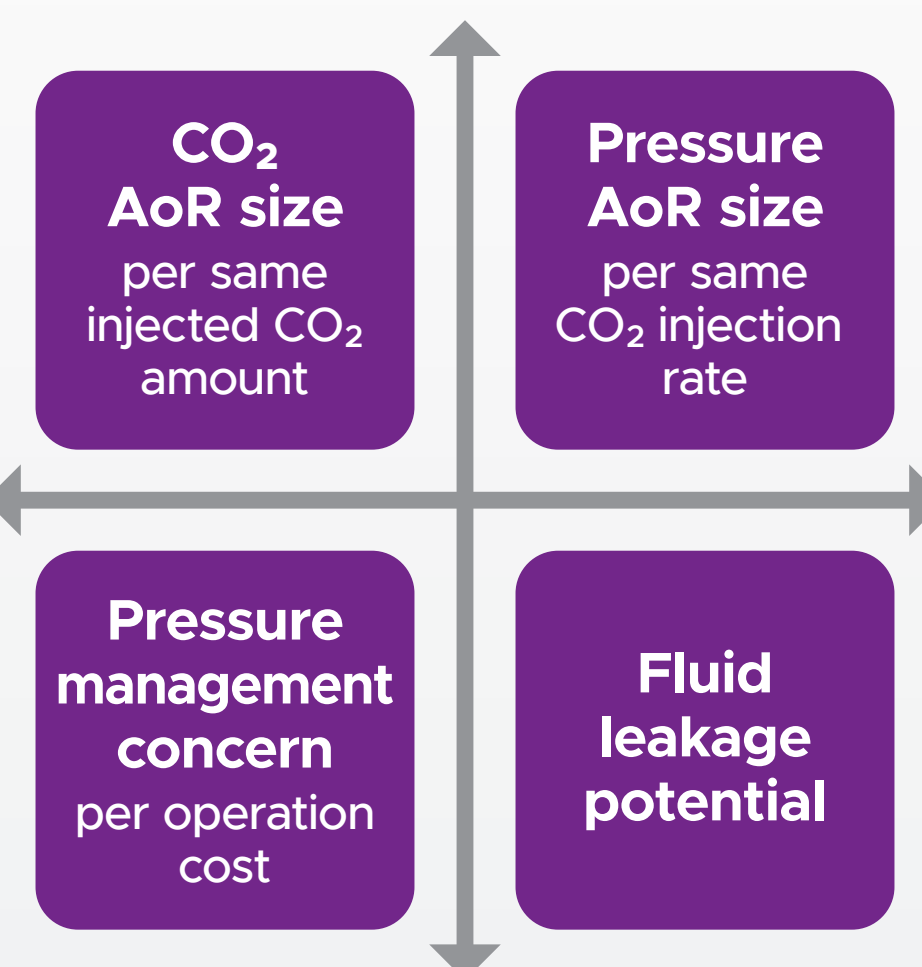


## Bridging the Knowledge Gap: Performance of CO<sub>2</sub> Phases

### Current Knowledge

	Mineralization with scCO <sub>2</sub>	Mineralization with aqCO <sub>2</sub>
CO <sub>2</sub> sequestration security	High	High
Site availability	Low	High
Static capacity	High	Low
Size of CO <sub>2</sub> footprint (per well)	High	Low
Well construction cost (per same CO <sub>2</sub> rate)	Low	High

### Future Insights



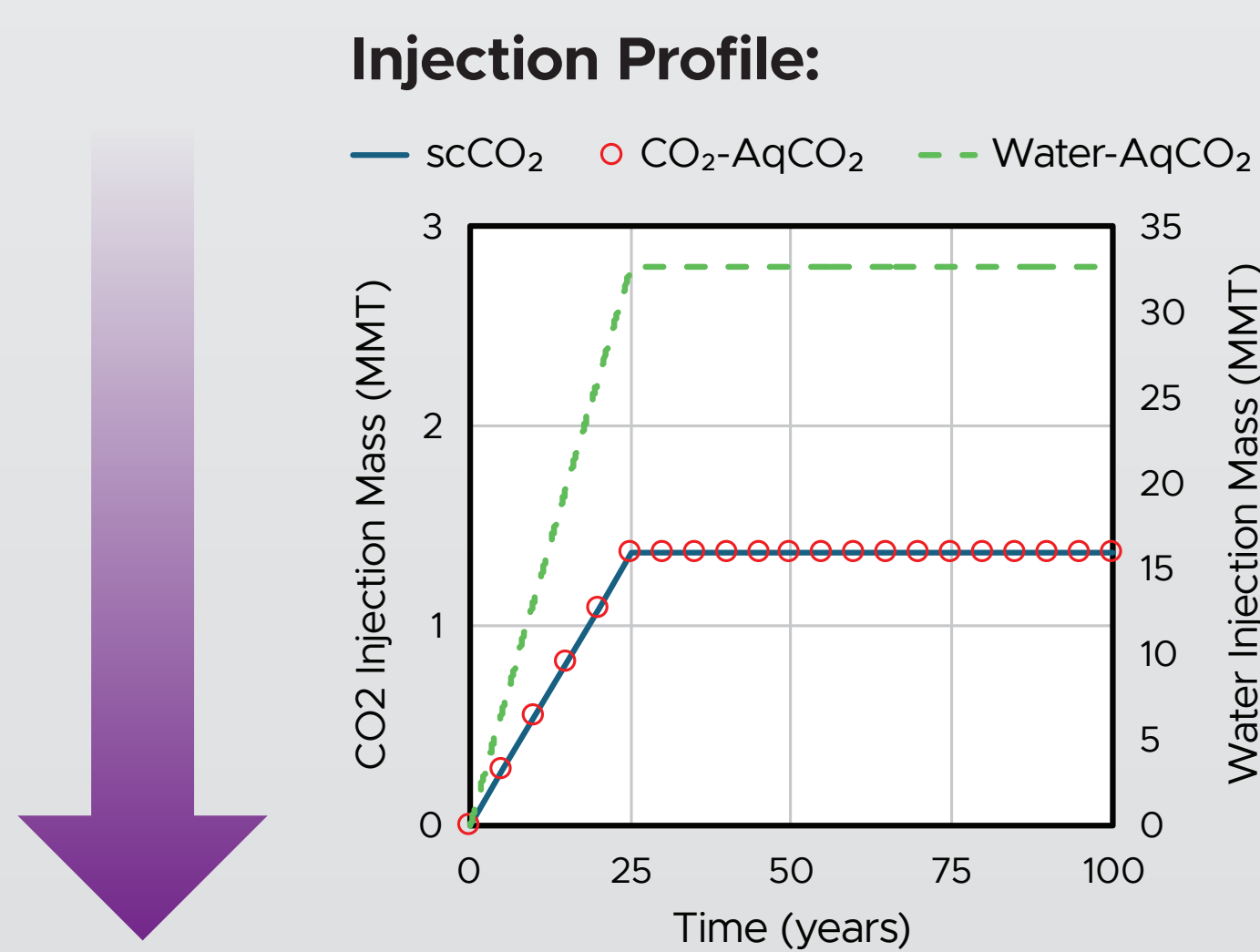
## Reservoir Scale Study Using Multiphysics Parallelized Simulator STOMPX-CO<sub>2</sub>

- Homogeneous reservoir model was considered, and it will be expanded to a heterogeneous reservoir.
- No reaction considered, and it serves as a baseline case.
- 500 km radius model was used to minimize the boundary effect.
- Tartan grid was employed to examine both near-well and far-field regions.

## Understanding the Influence of Injectant Properties on Plume Dynamics in Geologic Carbon Sequestration

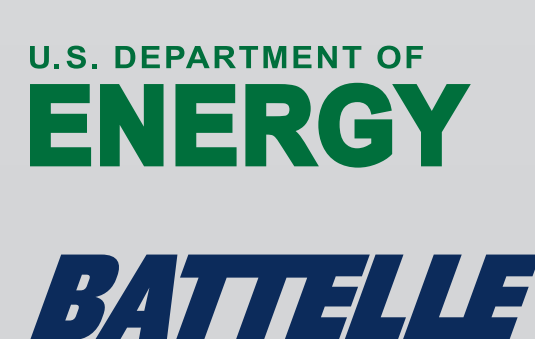
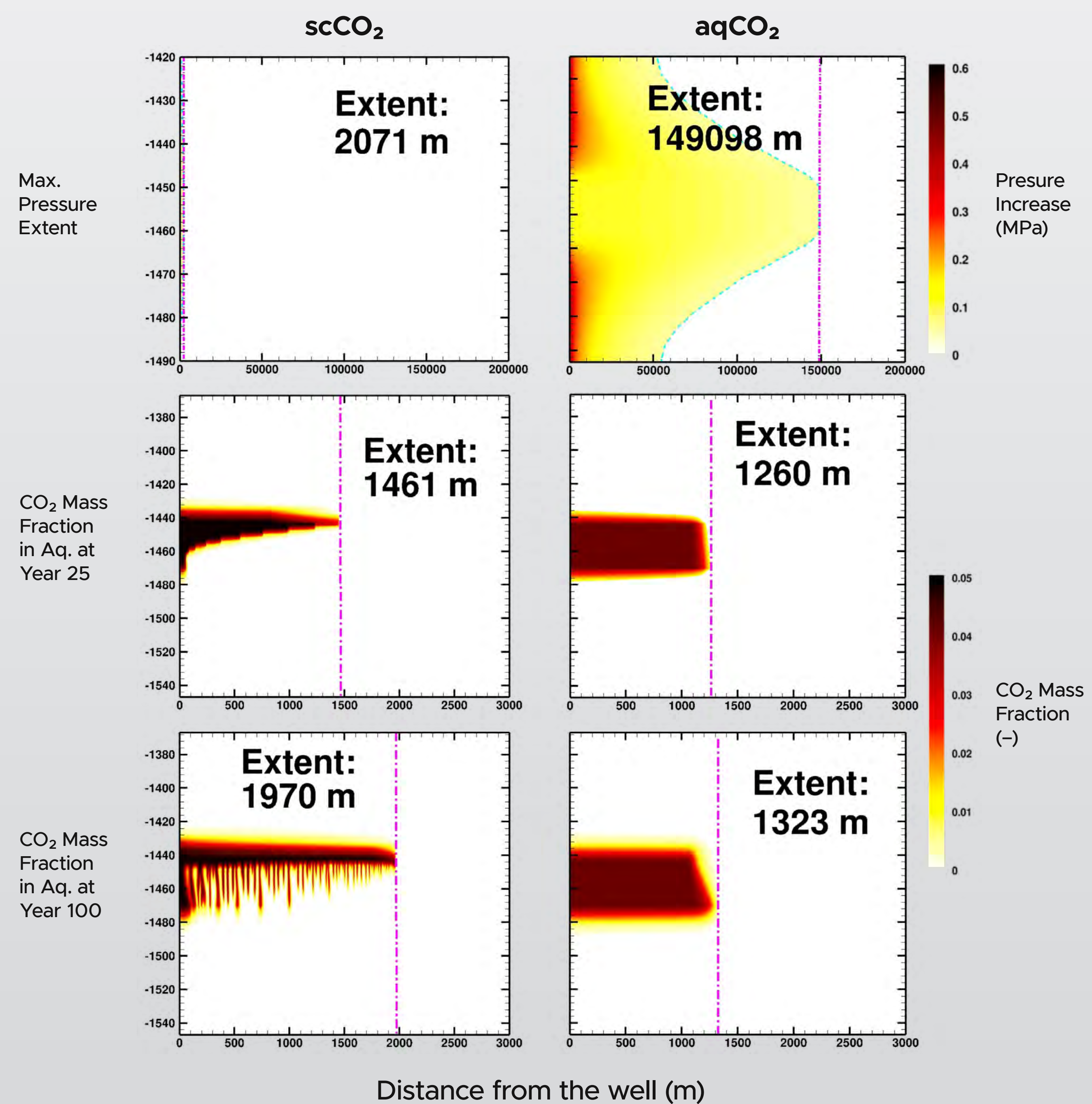
### Consideration:

- CO<sub>2</sub> Mass Fraction
- Injectant Salinity
- Formation Salinity
- Reservoir Depth
- Geothermal Gradient
- Injection Rate
- Injection Pressure

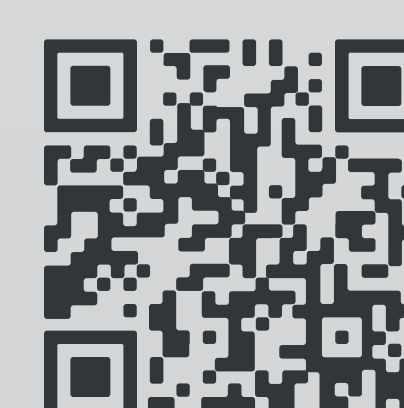


## Will Support Commercial-scale GCS Operation Optimization by:

- Quantitatively assessing potential risks while maximizing injection efficiency.
- Estimating storage capacity and efficiency for two different injection modes.
- Considering various site options, including water disposal sites in addition to conventional GCS sites.



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