

# Quantifying CO<sub>2</sub> capillary heterogeneity trapping through macroscopic percolation simulation

## Scientific Achievement

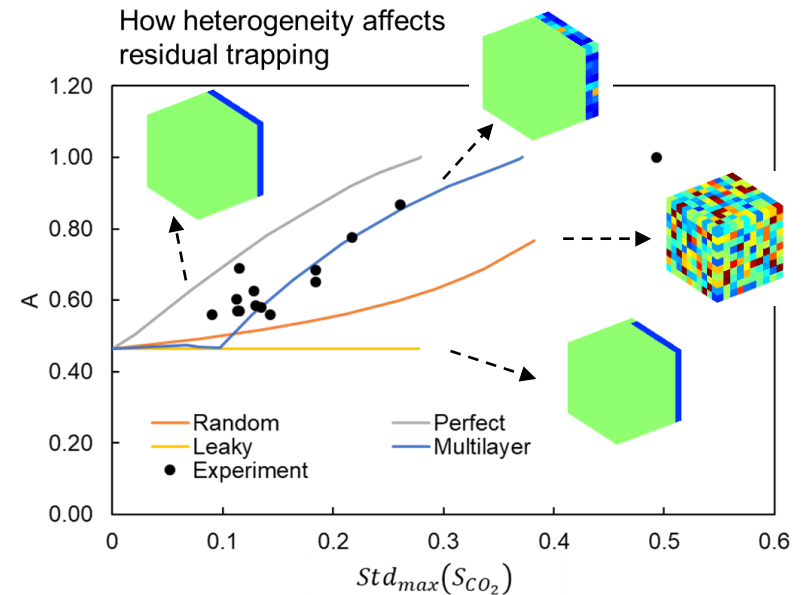
We built a macroscopic percolation (MP) simulator capable of rapidly quantifying post-imbibition capillary heterogeneity trapping.

## Significance and Impact

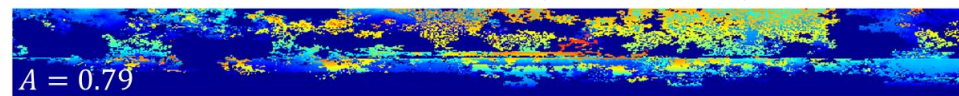
The MP simulator gives results 10 to 100 times faster than a conventional full-physics simulator, and can be applied to large, highly heterogeneous domains.

## Research Details

- A higher degree of mesoscale heterogeneity leads to more CO<sub>2</sub> capillary heterogeneity trapping, and the contribution can be significant.
- Even when the degrees of heterogeneity are the same, the type of heterogeneity significantly affects the amount of capillary heterogeneity trapping achieved.
- The MP simulator is applied to a realistic field-scale reservoir slice and demonstrates how the domain capillary heterogeneity trapping amount can be quantified.



Last imbibition MP stage  
With capillary heterogeneity trapping



No capillary heterogeneity trapping

