

# **Sensitivity study of CO<sub>2</sub> storage in saline aquifers in the presence of a gas cap**

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**Abstract:**

A closed-boundary, generic reservoir model was used to simulate CO<sub>2</sub> injection in saline formations typical of the Gulf Coast area located near a hydrocarbon-rich region. Reservoir properties characteristic of two formations (a shallow reservoir and a deep reservoir) were used to evaluate the impact of a gas cap on CO<sub>2</sub> plume behavior under different reservoir conditions. The initial amount of native gas in the hydrocarbon area greatly impacts the plume maximum lateral extent in both instances. As the initial gas-cap volume increases and injector-gas-cap distance decreases, the CO<sub>2</sub> plume reaches farther. Compressibility was calculated for different gas-cap compositions, showing that the mix of injected CO<sub>2</sub> with native gas (CH<sub>4</sub>) is affected by pressure variations within the formation, causing compressibility values to be different for each case considered. This difference in turn impacts the plume lateral extent. Residual-gas-saturation conditions in the depleted gas cap are not expected to affect plume extent as much as in cases where water is residual. Reservoir simulations and compressibility calculations were performed by means of CMG-GEM and CMG-Winprop, respectively.

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