

CO₂ source-sink matching in the lower 48 United States, with examples from the Texas Gulf Coast and Permian Basin

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Abstract:

Documenting geographic distribution and spatial linkages between CO₂ sources and potential sinks in areas with significant levels of CO₂ emissions is important when considering carbon-management strategies such as geologic sequestration or enhanced oil recovery (EOR). For example, the US Gulf Coast overlies a thick succession (>6,000 m [$>20,000$ ft]) of highly porous and permeable sandstone formations separated by thick, regionally extensive shale aquitards. The Gulf Coast and Permian Basin also have a large potential for EOR, in which CO₂ injected into suitable oil reservoirs could be followed by long-term storage of CO₂ in nonproductive formations below reservoir intervals. For example, >6 billion barrels (Bbbl) of oil from 182 large reservoirs is technically recoverable in the Permian Basin as a result of miscible-CO₂ flooding. The Gulf Coast also contains an additional 4.5 Bbbl of oil that could be produced by using miscible CO₂. Although the CO₂ pipeline infrastructure is well-developed in the Permian Basin, east Texas and the Texas Gulf Coast may have a greater long-term potential for deep, permanent storage of CO₂ because of thick brine-bearing formations near both major subsurface and point sources of CO₂.

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