Geologic Sequestration in the Gulf Coast: Subregional Considerations

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Abstract

The need for large-scale injection of carbon dioxide (CO^2) into subsurface formations (geologic sequestration) of the Gulf Coast may exceed the capacity of favorable sites in oil and gas reservoirs. Brine-bearing units are potential sites for additional sequestration projects. Information from existing structure maps of the upper Texas Gulf Coast was used to tabulate potential CO2 trap size and closure, fetch area, fault throw, and potential leaks.

The study area covers 13,308 mi^2, stretching from Victoria and Calhoun Counties in the south to the Texas-Louisiana border. The southern and northeastern region is characterized by slightly sinuous gulfward-dipping growth faults trending northeast-southwest, whereas the central region is characterized by abundant salt domes. These two regions, with their different faulting styles, will have different sequestration behavior and potential. Four-way, and fault-bounded three-way, closures represent 17.2% of the study area and have mean potential column heights of 365 ft. Fetch areas that feed those closures constitute 58.2% of the area. Salt domes are considered areas of potential leakage because of greater extensional stress on associated normal faults. Salt domes and their fetch areas represent 15.8% of the study area. Other potential leaks include wellbores in oil fields (13.3% of the area) and gas fields (8.8% of the area).

These statistics are used to model the long-term fate of sequestered CO2 and the maximum volume available for sequestration. This dataset can also be used to site large projects.