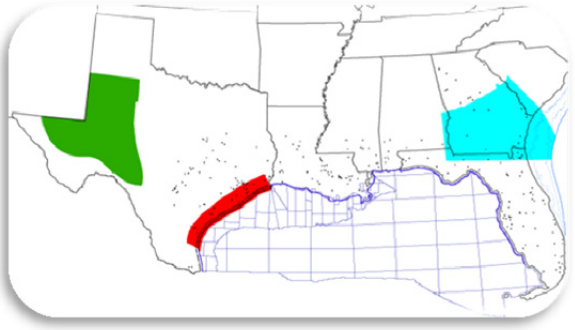
Reliable Capacity Estimation: Regional Capacity

2011–14 Goal

Accurate regional capacity estimation is critical for CO_2 sequestration to have an impact on global warming. Very large volumes of captured CO_2 must be efficiently and cost-effectively injected and stored in underground reservoirs. Most CO_2 storage is likely to occur as volumetric trapping (capacity in available pore volume at in situ reservoir conditions) in deep saline aquifers in regions having favorable source-sink relationships. Our goal was to provide static CO_2 storage capacity estimates in such regions.

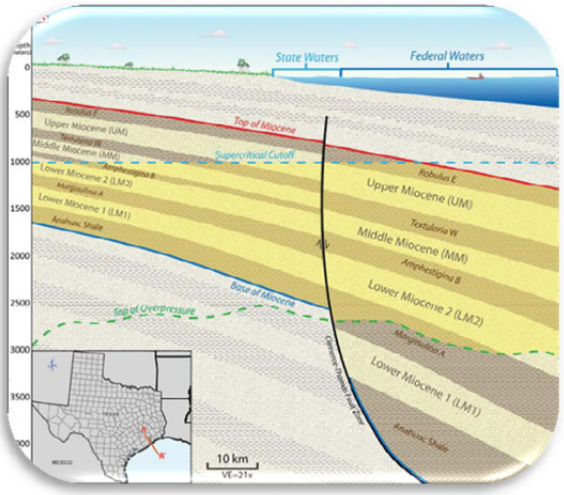


Regional capacity project areas: Permian, Permian Basin (green); Miocene, Gulf of Mexico Basin (red); Mesozoic, Georgia (blue); coastal CO_2 point sources (dots)

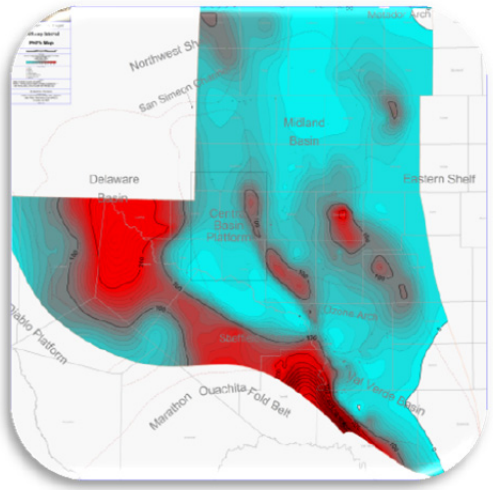
Accomplishments

We completed regional, static CO_2 capacity estimates or pore volume for

- 2014 – Miocene sandstones, Offshore Texas State Waters (static CO_2 capacity estimate) (Wallace et al., 2014)
- 2011 – Major Permian reservoirs, West Texas portion, Permian Basin (pore volume) (Carr et al., 2012)
- 2011 – Jurassic and Cretaceous sandstones, onshore and offshore Georgia, U.S.A. (Smyth et al., 2011)



Schematic cross section showing regional Miocene CO_2 capacity interval, Gulf of Mexico Basin (Wallace et al., 2014)

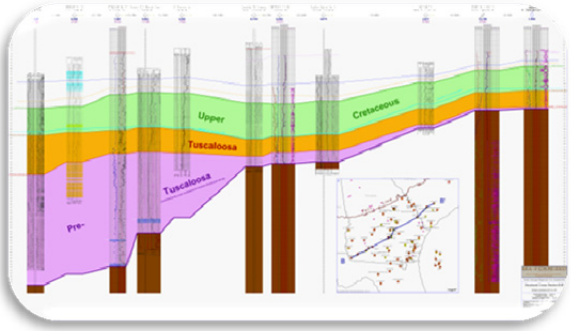


Regional pore volume estimate Permian, Permian Basin

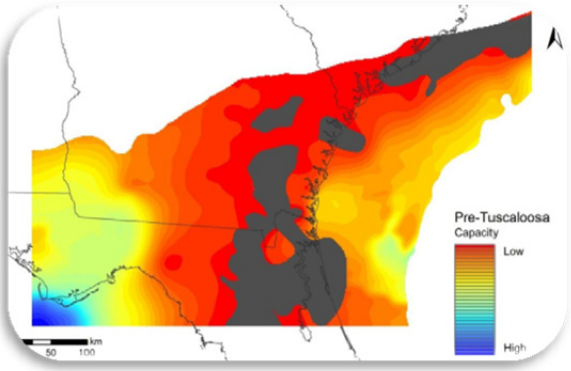
Reliable Capacity Estimation: Regional Capacity

Impacts

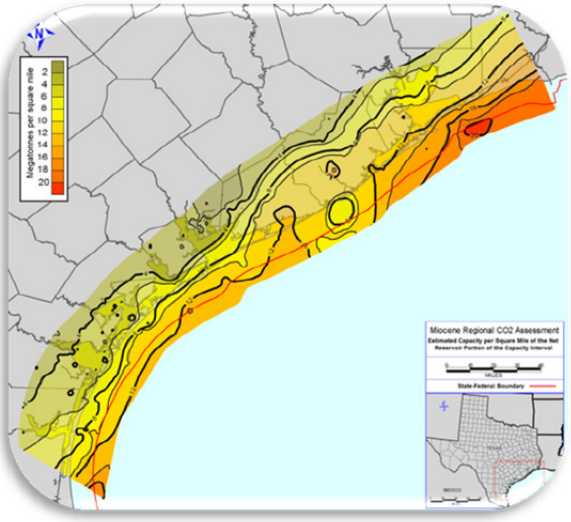
- First quantitative regional geologic analysis (of any kind) for the subsurface Mesozoic sedimentary section of south Georgia, U.S.A. and adjacent offshore Federal Outer Continental Shelf (OCS).
- Systematic and quantitative regional analysis for CO_2 potential of Permian reservoirs in a world-class petroleum basin.
- Initial quantitative regional analysis of CO_2 potential in a portion of the highly prospective Gulf of Mexico Basin. Introduction of "Net Storage CO_2 Capacity" concept (Wallace et al., 2014).



Structural/stratigraphic cross-section, Georgia, U.S.A.



Static CO_2 map, pre-Tuscaloosa Mesozoic, Georgia, U.S.A.



Map of net regional CO_2 static capacity estimate, Miocene capacity interval, Gulf of Mexico Basin (Wallace at al., 2014)

Significant Citations

Carr, D. L., Brown, T. O., Zahid, K. M., and Hovorka, S. D., 2012 Permian Basin CO_2 sequestration potential of Permian strata, Permian Basin, West Texas: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for U.S. Geological Survey–Capacity COTSA, 13 p.

Smyth, R. C., Carr, D. L., Hovorka, S. D., Coleman, S., Breton, C. A,. and Miller, E. N., 2011, Continued evaluation of potential for geologic storage of carbon dioxide in the southeastern United States: The University of Texas at Austin, Bureau of Economic Geology, contract report prepared for Southern States Energy Board, Duke Energy, Santee Cooper Power, and Southern Company, 39 p.

Wallace, K. J., Meckel, T. A., Carr, D. L., Treviño, R. H., Yang, C., 2014, Regional CO_2 sequestration capacity assessment for the coastal and offshore Texas Miocene interval: Greenhouse Gases: Science and Technology, v. 4, no. 1, p. 53–65.

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