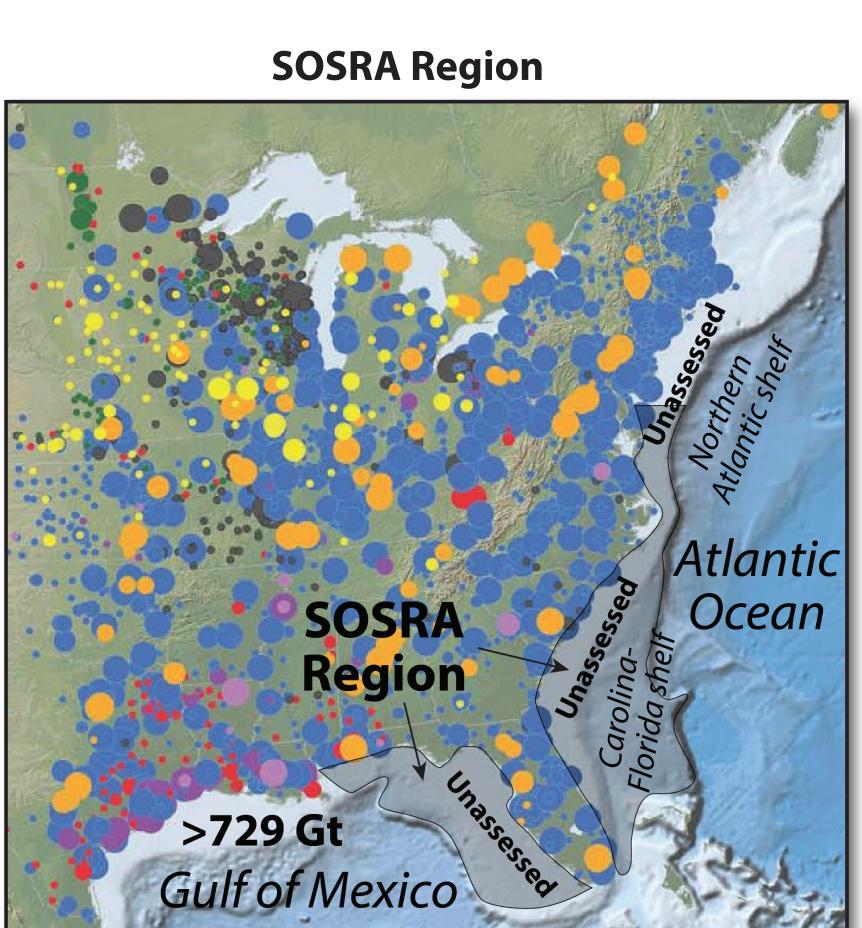


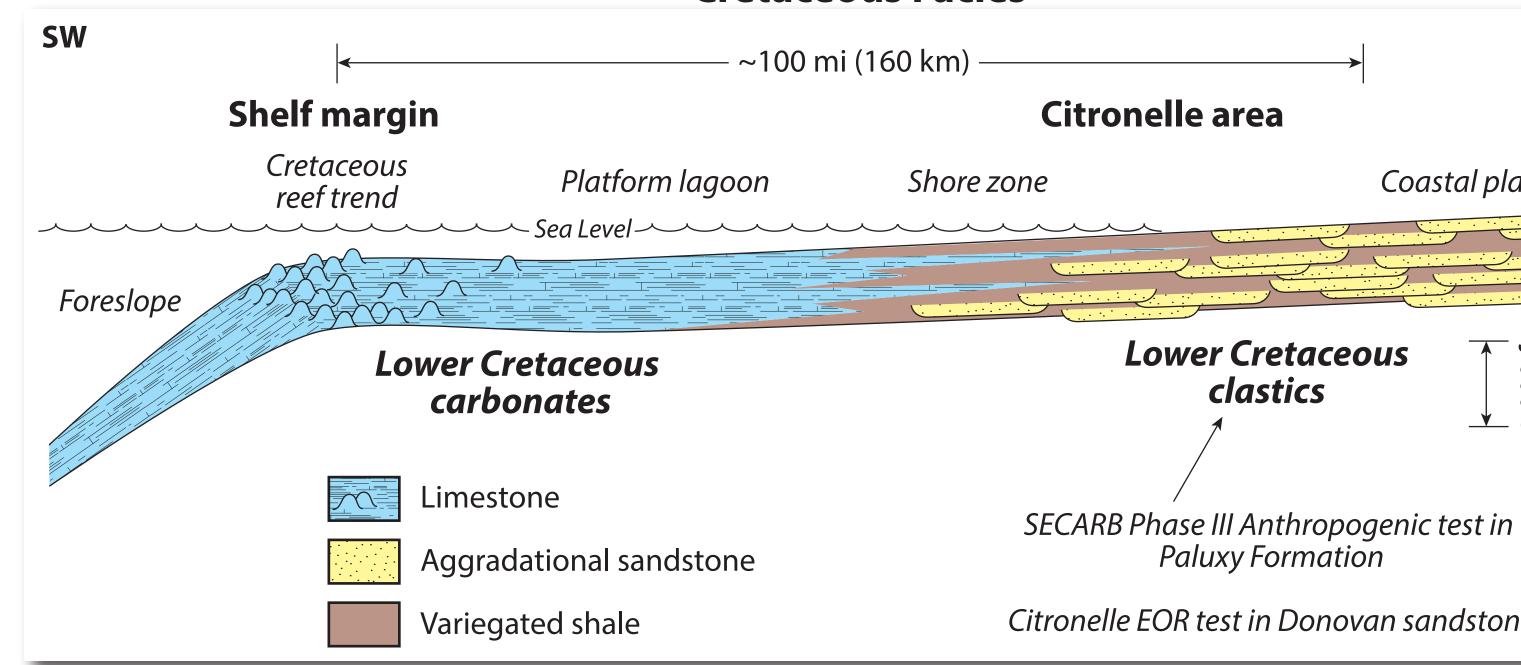


INTRODUCTION **DESOTO CANYON SALT BASIN** Lithologic Logs Mobile Arec Viosca Knoll Area Destin Dome Area **3D Model, DeSoto Canyon Salt Basin** Block 117 Block 991 Salt Diapir Miocene Sandstone Top Tampa Limestone Stratigraph Base Marine Quaternary-Miocene Tuscaloosa Shale Oligocene-Paleocene and depth-converted Top, TKpu Hosan cross section showing structural style of Time (s) ³ Top Lower Cretaceous A - 4 (Ferry Lake Anhydrite) Lower Cretaceous A the northeastern DeSoto Canyon Salt Ferry Lake Cotton Valley Group Basin. **STUDY AREA** Haynesville and **Jhs** Smackover Formations Smackover Formation **SOSRA** Region **Eastern Gulf of Mexico Focus Area** 16000 — D visualization of the top of the Ferry Lake Anhydrite showing major Norphlet Formation Marker DCSB DeSoto Canyon structural features of the DeSoto Canyon Salt Basin. Salt Basin MGA Middle Gro Structural Style, Northwestern Salt Basin Arch **TE** Tampa TWT (s) Southwest Northeas Embayment SA Sarasota Arc Interpretation Shale Marker SFB South Florida liocene clastic **QTm** Quaternary-Miocene Basin Distally Top Oligocene-Paleocene Lithologic logs showing rock types steepened shelf and major mappable stratigraphic **TKu** Paleocene-Upper Cretaceous units in the DeSoto Canyon Salt **KIb** Lower Cretaceous B Regional half grabens Kla Lower Cretaceous A **KJcv** Cotton Valley Group WEST FLORIDA SHELF SOSRA Ocean Jhs Haynesville and Smackover Formation^r Region Lithologic Column JI Louann Salt Seismic profile and depth-converted exico КІр Klb TKpu cross section showing structural style of Base-Paleozoic and Mesozoic basement Storage Assessment Unit (SAU) Notes the northwestern DeSoto Canyon Salt Normal fault; arrow indicates Vicksburgian Suwannee Limestone relative motion >729 Gt 1^t 0 25 50 100 Miles Ocala Limestone Horizontal weld LIIIII Avon Park Formation rces: Esri, GEBCO, NOAA, National Geographic, DeLorme Claibornian Shelf Bathymetry 220 Kilometers HERE Geonames and other contributors Oldsmar Formation Map of eastern Gulf of Mexico focus area showing major geologic Map showing location of SOSRA region in relation to point Cedar Keys and Lawson Formations SAU Sabiniar Cedar Keys Formation provinces. Green lines show reflection seismic control, yellow circles source CO₂ emissions in the eastern United States (after NETL, Seal: middle Cedar Keys Formation Midwaya **Structural Style, West Florida Shelf** Tallahassee کسور Reservoir: Upper member of Lawson n Upper Rebecca Shoal and shaded area indicate well control. Offshore limit of study area 2012; SSEB, 2014). Navarroan Pine Key Formation defined largely by location of Cretaceous reef trend. SW Pine Key Formation H Austinian West Florida Shelf Card Sound Dolomite Atkinson Formation **Cretaceous Facies** Cretaceous Reef Trend Corkscrew Swamp Formation / Dollar Bay Formation SAU SW NE Rookery Bay Formation Panther Camp Formation River West Florida Escarpment C50500104 ~100 mi (160 km) -Seal: Panther Camp Formation Washitan-Fredericks-Reservoir: Dollar Bay Formation Dollar Bay Formation Continental Rise Shelf margin Citronelle area 3 km Gordon Pass and Marco Junction Formations SAU C50500103 Gordon Pass Formation Cretaceous Seal: upper Gordon Pass Formation Coastal plain Shore zone Marco Junction Formation Reservoir: Marco Junction and Gordon Pas Contraction of the second reef trend Rattlesnake Hammock Formation Sunniland Formation SAU Lake Trafford Formation C50500102 Seal: Lake Trafford Formation **Basement** unniland Formati Reservoir: Sunniland Formation Foreslope Able Member Lower Cretaceous Lower Cretaceous Twelve Mile Member clastics carbonates *QT* - Quaternary-Tertiary 9 km Pre-Punta Gorda SAU K - Cretaceous Seal: Punta Gorda Anhydrite Pumpkin Bay Formation Reservoir: Wood River, Bone Island, J - Jurassic Pumpkin Bay, and Lehigh Acres Formation Bone Island Formation Limestone Durangoan SECARB Phase III Anthropogenic test in Vertical exaggeration ~4x ¹ Aggradational sandstone Paluxy Formation Wood River Formation Lacastian Constant of the second Pre-stack, depth-converted seismic profile showing geologic architecture along a transect from the West Florida Shelf to the *Citronelle EOR test in Donovan sandstone* Variegated shale Zuloagan Unnamed volcanic complex continental rise (after Roberts and Erickson, 2009). Note major carbonate platform bounded by Cretaceous reef trend and Limestone 2222 Dolostone Anhydrite Salt ____ Shale Sand and shale Sand and shale overlain by prograded shelf. Structures southwest of platform include apparent Mesozoic minibasins below subhorizontal Cenozoic strata of the continental rise. Cretaceous facies in the region are dominated by siliciclastic coastal plain deposits that pass basinward into Bathymetric map of the West Florida Shelf (source: USGS). Note Stratigraphic column of the onshore South Florida Basin showing reef-rimmed carbonate platform deposits. Siliciclastic strata include formations that have been tested for CO₂ storage predominance of carbonate formations (after Roberts-Ashby et progressive steepening of the continental slope, culminating in nployees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any inform

The southeast accounts for about 40% of anthropogenic CO₂ emissions in the United States. The Gulf of Mexico Basin contains a thick (5-20 km) succession of Mesozoic and Cenozoic sedimentary rocks, and the region boasts giant capacity for storage of CO₂ in saline formations and mature hydrocarbon reservoirs. Mature onshore reservoirs host commercial CO₂-EOR operations, and the potential for storage in saline formations and mature reservoirs has been proven in multiple field tests in Alabama and Mississippi. However, access to onshore saline formations may be limited by a range of ownership, infrustructure, and regulatory issues. Offshore formations may provide even larger capacity, and governmental ownership may facilitate broader access than is available onshore. No comprehensive assessment of offshore CO₂ storage capacity is available in the eastern Gulf of Mexico, and this study is designed to fill this need. This effort is part of a larger project sponsored by the U.S. Department of Energy through the Southern States Energy Board that is assessing the storage potential of the continental shelf in the Gulf of Mexico from Mississippi to South Florida, as well as the Atlantic shelf from Florida to Maryland. The project is in the early stages, and the current focus is geological characterization. This poster summarizes the geology of the eastern Gulf of Mexico from the DeSoto Canyon Salt Basin to the South Florida Basin. Numerous coal-fired power facilities exist near the Gulf of Mexico shoreline, with most emissions concentrated in Mississippi, Alabama, the western Florida Panhandle, and southern Florida. Numerous opportunities exist for storage in siliciclastic strata of the DeSoto Canyon Salt Basin, which include the same formations that have been tested onshore. However, less is known about the reservoir characteristics of the carbonate formations that are present in the bulk of the study region. Multiple reservoir seals that can help ensure safe, permanent storage are widespread in the region and include anhydrite, chalk, and shale.



the West Florida Escarpment.

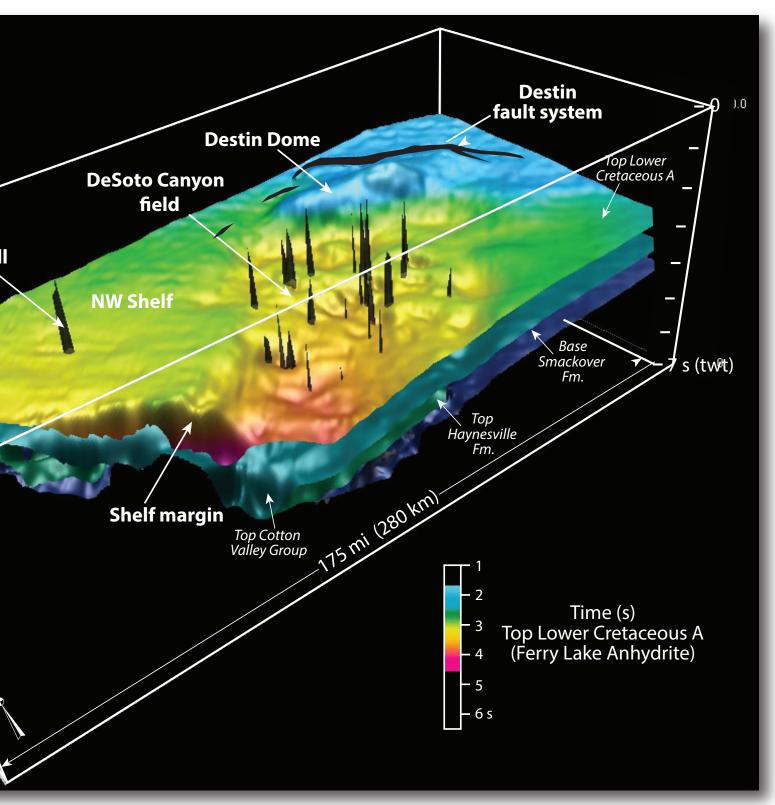


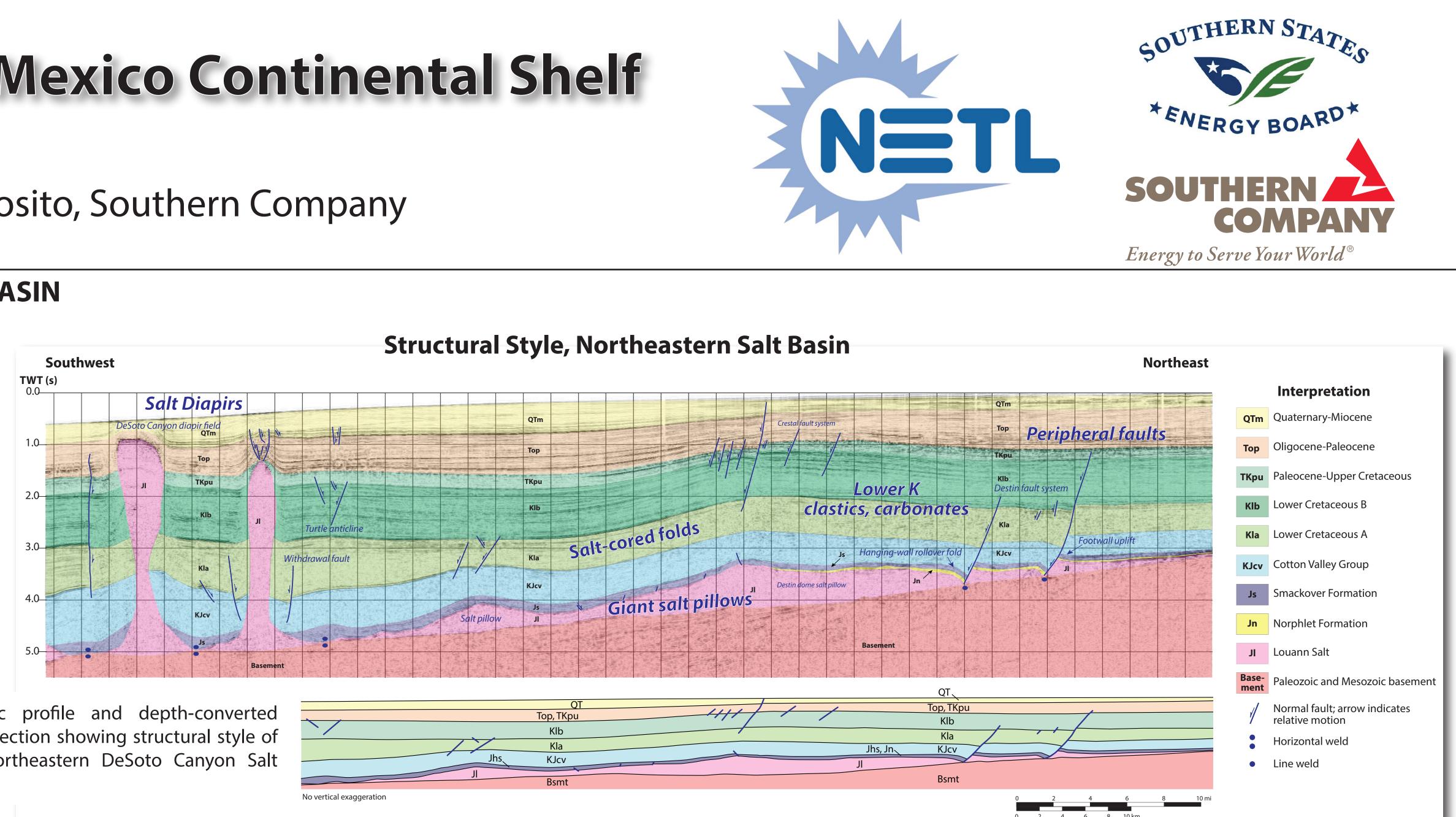
potential onshore, whereas the storage potential of carbonate formations is less certain.

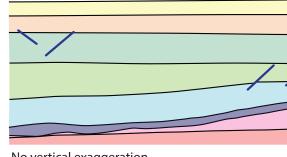
Geologic Framework and CO₂ Storage Potential of the Eastern Gulf of Mexico Continental Shelf

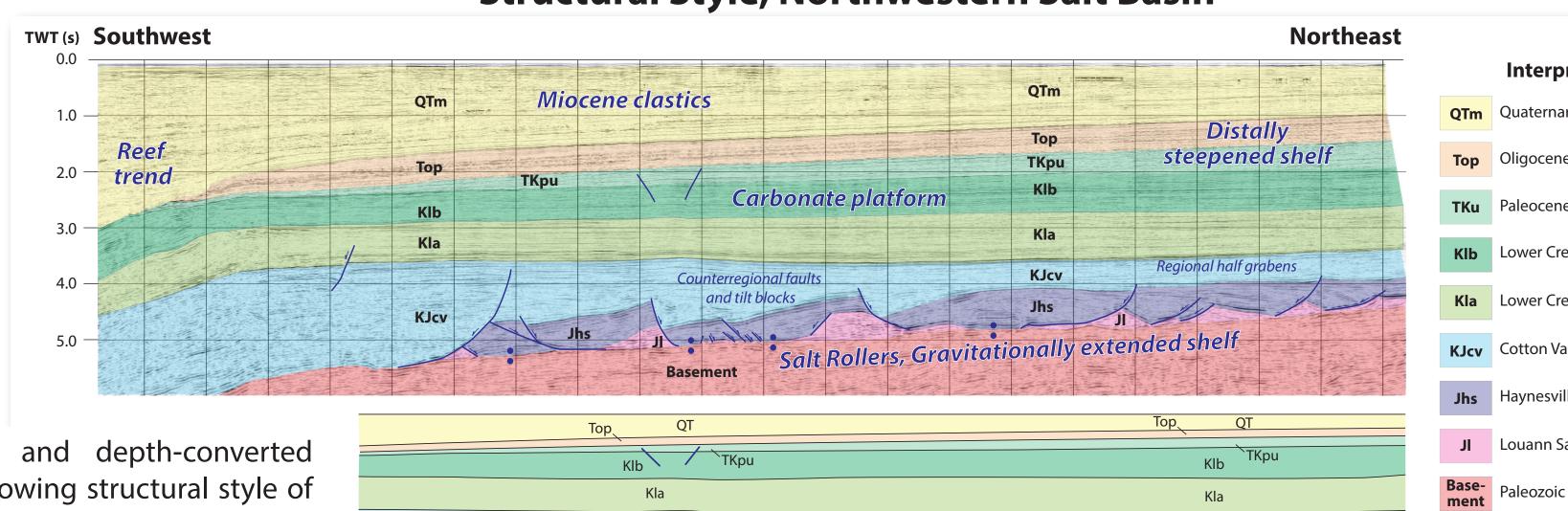
Jack C. Pashin and Jingyao Meng, Oklahoma State University Denise J. Hills, Guohai Jin, and Marcella R. McIntyre, Geological Survey of Alabama; Richard A. Esposito, Southern Company

al., 2015). Prospective CO₂ sinks in red; evaporite seals in blue.

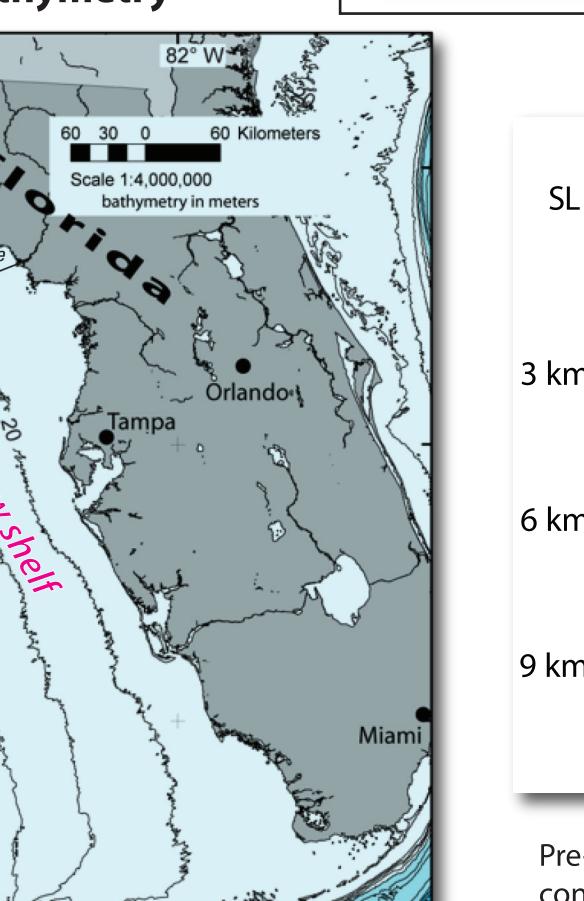


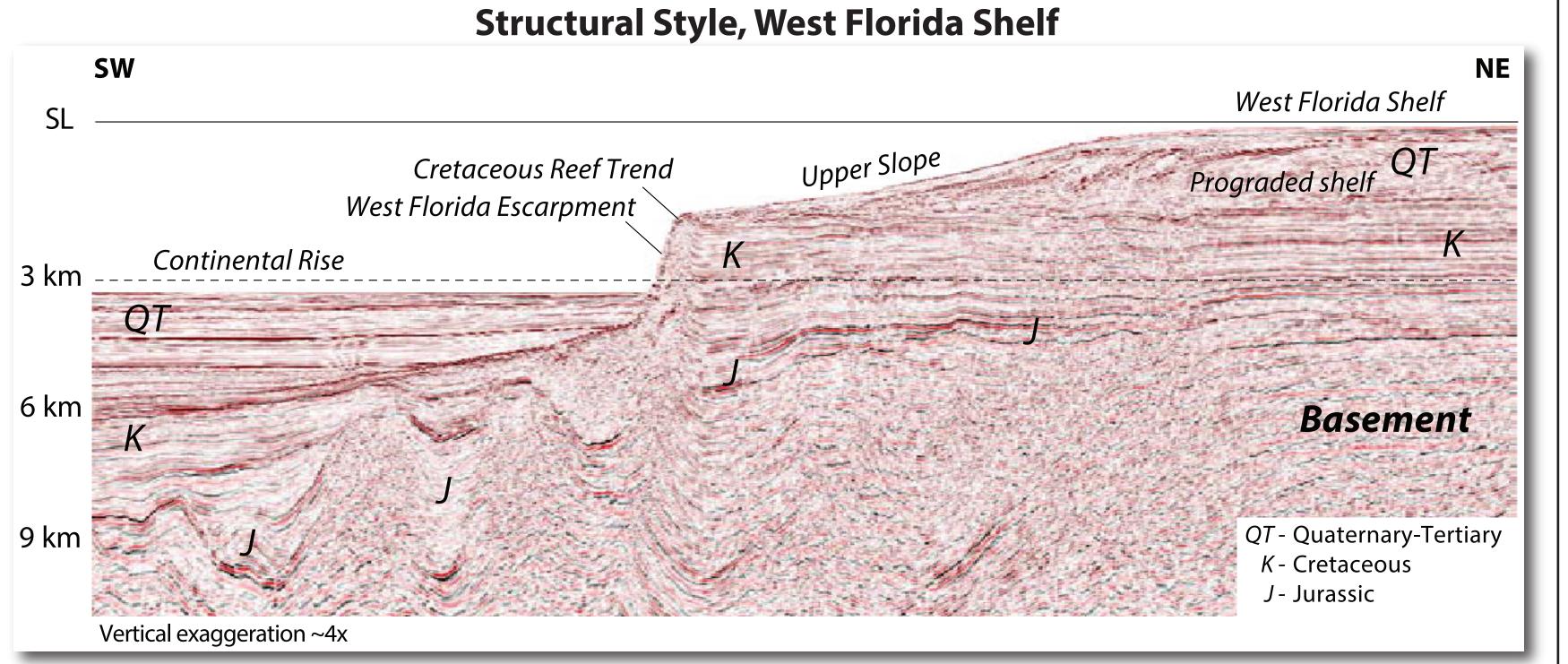




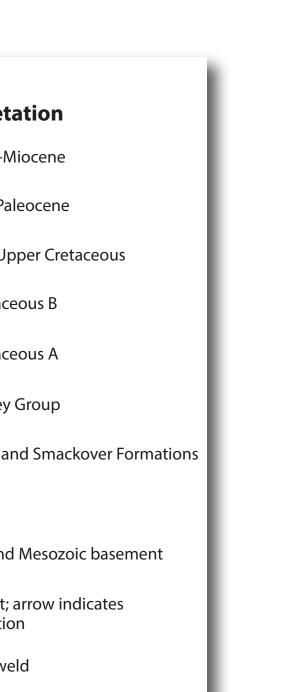


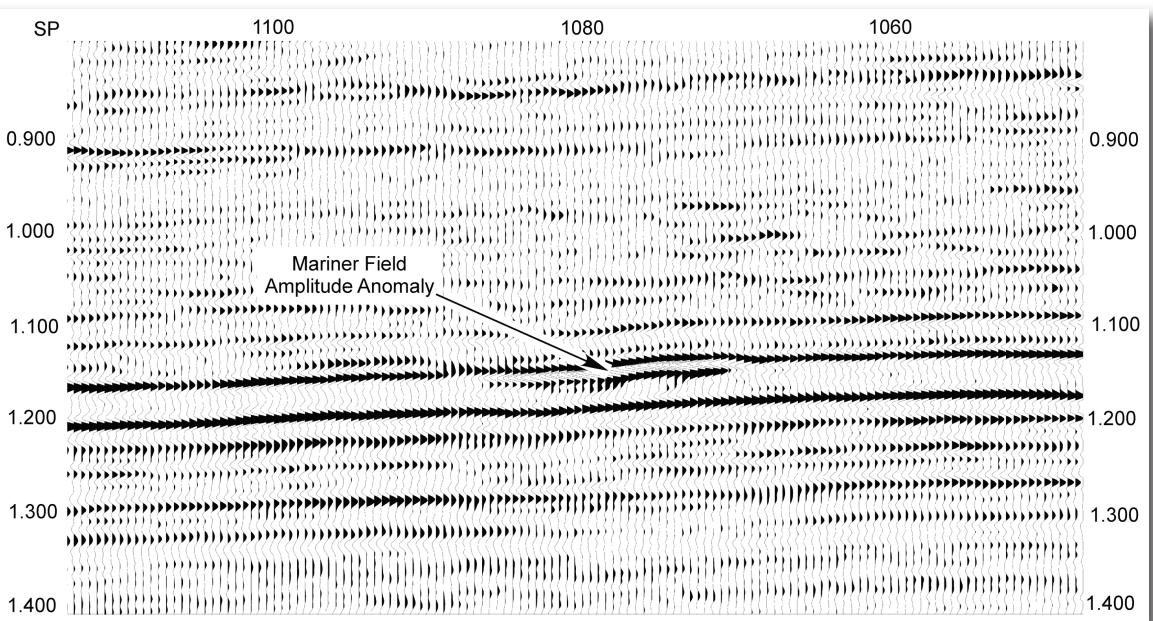












Seismic profile from Mariner Field, southern Mississippi showing amplitude anomaly (bright spot) associated with natural gas accumulation (after Handford and Baria, 2003). Preliminary analysis indicates that the bulk of the storage capacity in Miocene sandstone resides in saline formations below the commercial gas accumulations.

OBSERVATIONS AND ISSUES

- Large portfolio of potential sinks and seals in eastern Gulf of Mexico focus
- Seismic and well data being compiled for assessment of capacity and preliminary screening for feasibility.
- Geophysical log coverage variable; diverse log suite focuses on proven hydrocarbon reservoir intervals.
- Complex stratigraphic and structural architecture in DeSoto Canyon Salt
- Relatively simple Cretaceous carbonate platform and distally steepened prograded shelf in West Florida.
- How does reservoir quality in siliciclastic formations with proven onshore storage potential compare wth that in the same formations offshore?
- Is sufficient porosity, permeability available in carbonate units to support commercial offshore storage?
- How robust are Miocene reservoir seals outside of proven gas production areas?

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