

SOUTHEAST OFFSHORE STORAGE RESOURCE ASSESSMENT (SOSRA)

SOUTH ATLANTIC

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SECARB
12th Annual Stakeholders' Meeting
Atlanta, GA

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South Atlantic Team Members

- ▣ USC School of the Earth, Ocean, and Environment
 - Prof. James H. Knapp
 - Prof. Venkat Lakshmi
- ▣ USC Earth Sciences and Resources Institute
 - Prof. Camelia C. Knapp
 - Dr. Duke Brantley
- ▣ South Carolina Geological Survey
 - Dr. Scott Howard

Time and Effort Update

- ▣ 3 Full time PhD students not on project funds; grant had 2 full time PhD students in the budget
- ▣ Institutional issues affecting invoicing
 - staff turnover in Contract and Grant Accounting Office
 - introduction of new accounting system
- ▣ Extensive data conditioning to create a robust 3D Petrel project incorporating all available data into one cohesive project for seismic interpretation, structural modeling and volumetric calculations

Petrel 2-Day Short Course

- ▣ Petrel is industry standard for subsurface interpretation
- ▣ Held 2-day short course at USC, taught by Schlumberger staff member and USC alum
- ▣ Six SOSRA team members were among 25 course participants

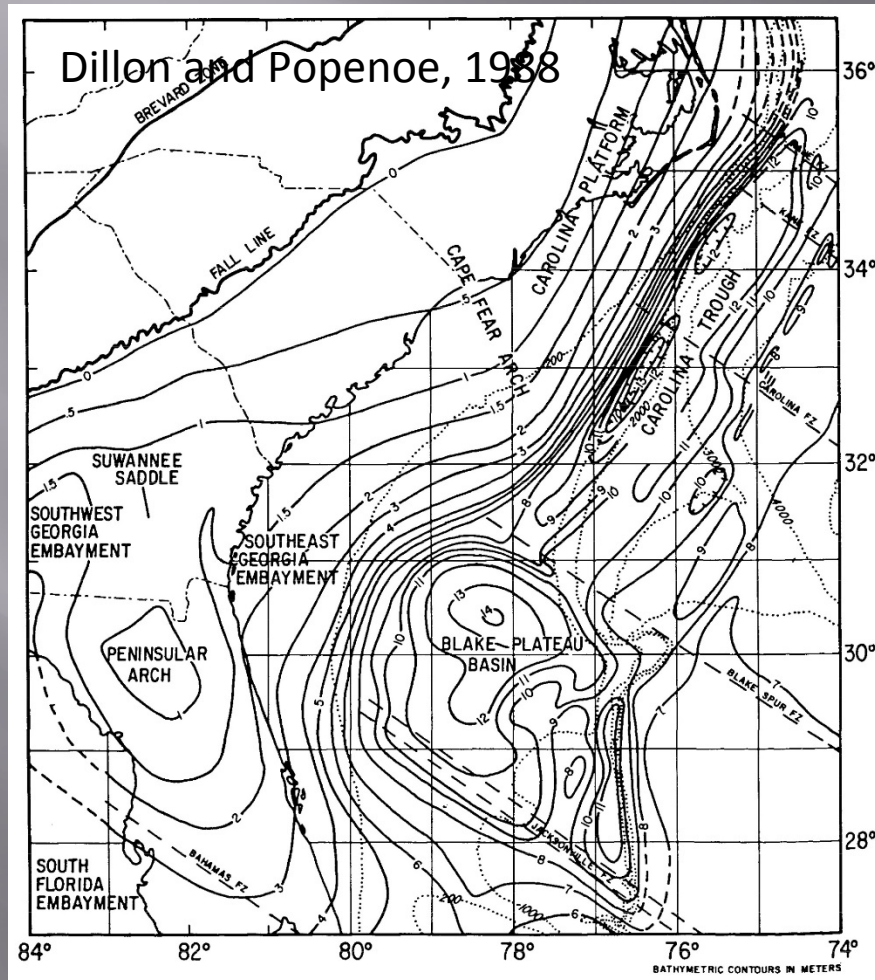
Overview

- ▣ Project Overview
- ▣ Geologic Overview
- ▣ Data Summary
- ▣ Data Assimilation and Clean-up
- ▣ Phase 2 work, SCGS contribution
- ▣ Conclusions

Brief Geologic History

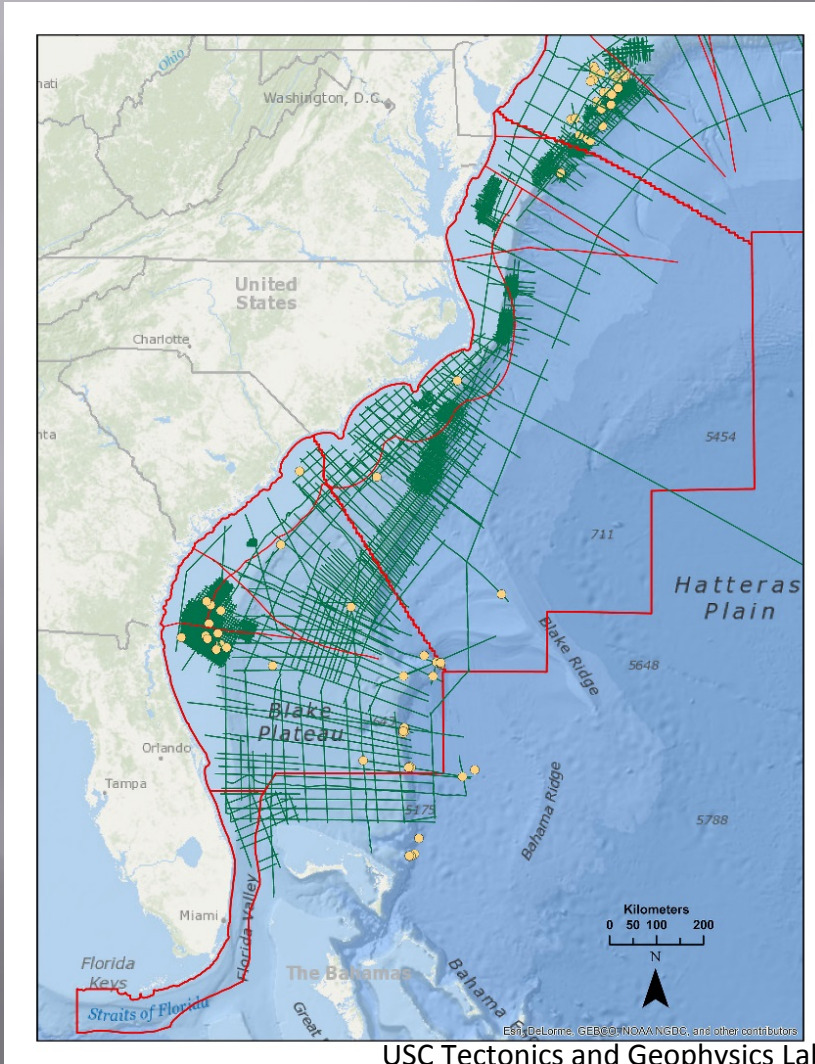
- ▣ Continental collision between Gondwanan and Laurentian continents in Late Paleozoic
- ▣ Rifting and associated magmatism beginning in early Triassic, and continuing through early Jurassic
- ▣ Extensive carbonate platform through most of Jurassic and Cretaceous
- ▣ Clastic margin through most of Cenozoic
- ▣ Storage resource assessment focused on Cretaceous and Cenozoic stratigraphic sections

Major Geologic Features



- ▣ Carolina Platform
- ▣ Carolina Trough
- ▣ Southeast Georgia Embayment
- ▣ Blake Plateau Basin
- ▣ Cape Fear Arch
- ▣ Peninsular Arch

South Atlantic Database

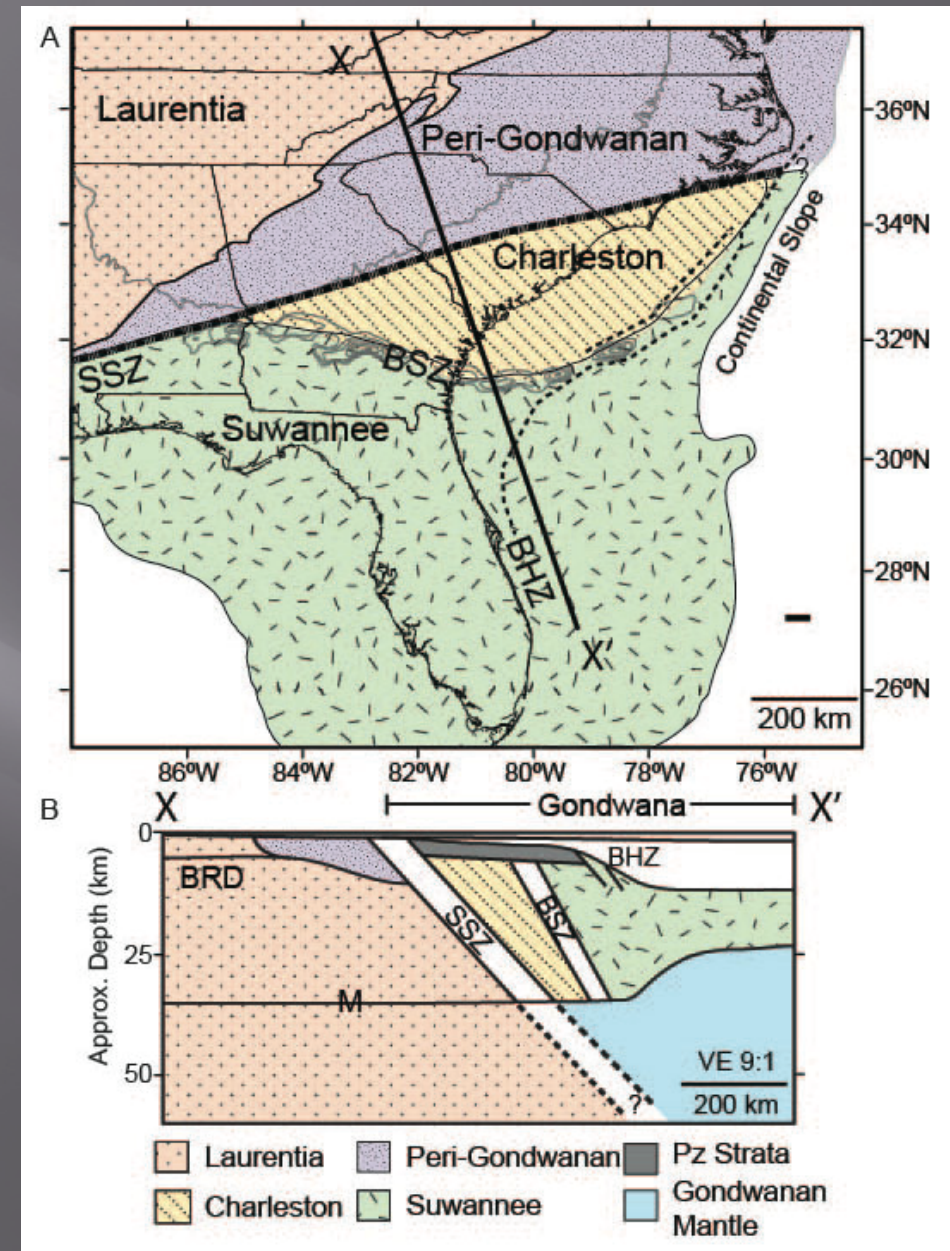


USC Tectonics and Geophysics Lab

- ▣ > 200,000 line km 2-D seismic reflection data
- ▣ 6 exploration wells plus COST-GE well
- ▣ ODP / DSDP / IODP scientific drilling
- ▣ Seismic refraction data

Gondwanan Crust

- Entire southeast U.S. offshore underlain by crust of Gondwanan origin (Africa-South America)
- Boundary with former Laurentia (North America) projects offshore between South and Mid-Atlantic planning areas
- Potential for significant changes in geologic history

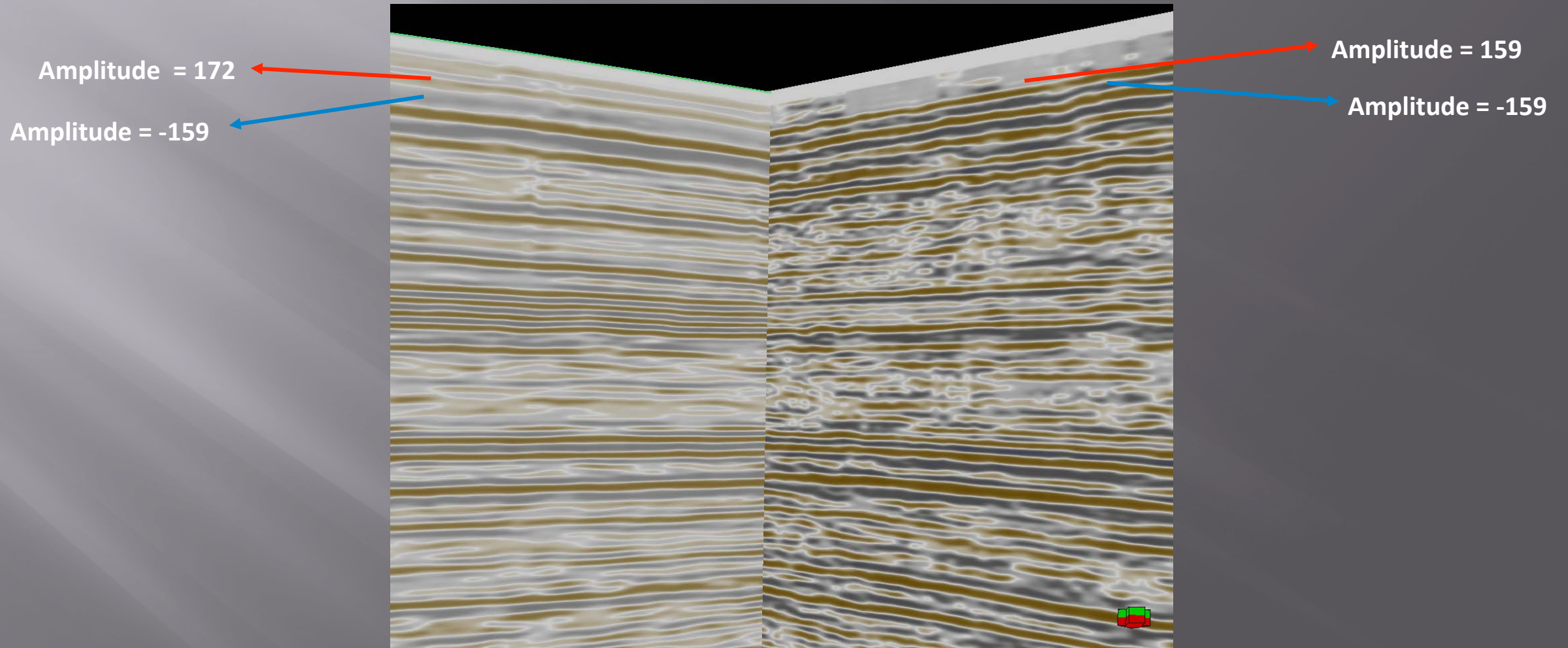


Data Assimilation and Clean-up

- ▣ Significant Phase 1 time and effort dedicated to tying all of the well and seismic data together into one cohesive Petrel geologic project
- ▣ Effort included but is not limited to:
 - Seismic-Well Ties
 - ▣ Loading checkshots and QC
 - ▣ Sonic calibration
 - ▣ Creation of synthetic seismograms
 - Amplitude Scaling
 - Matching formation tops using well logs

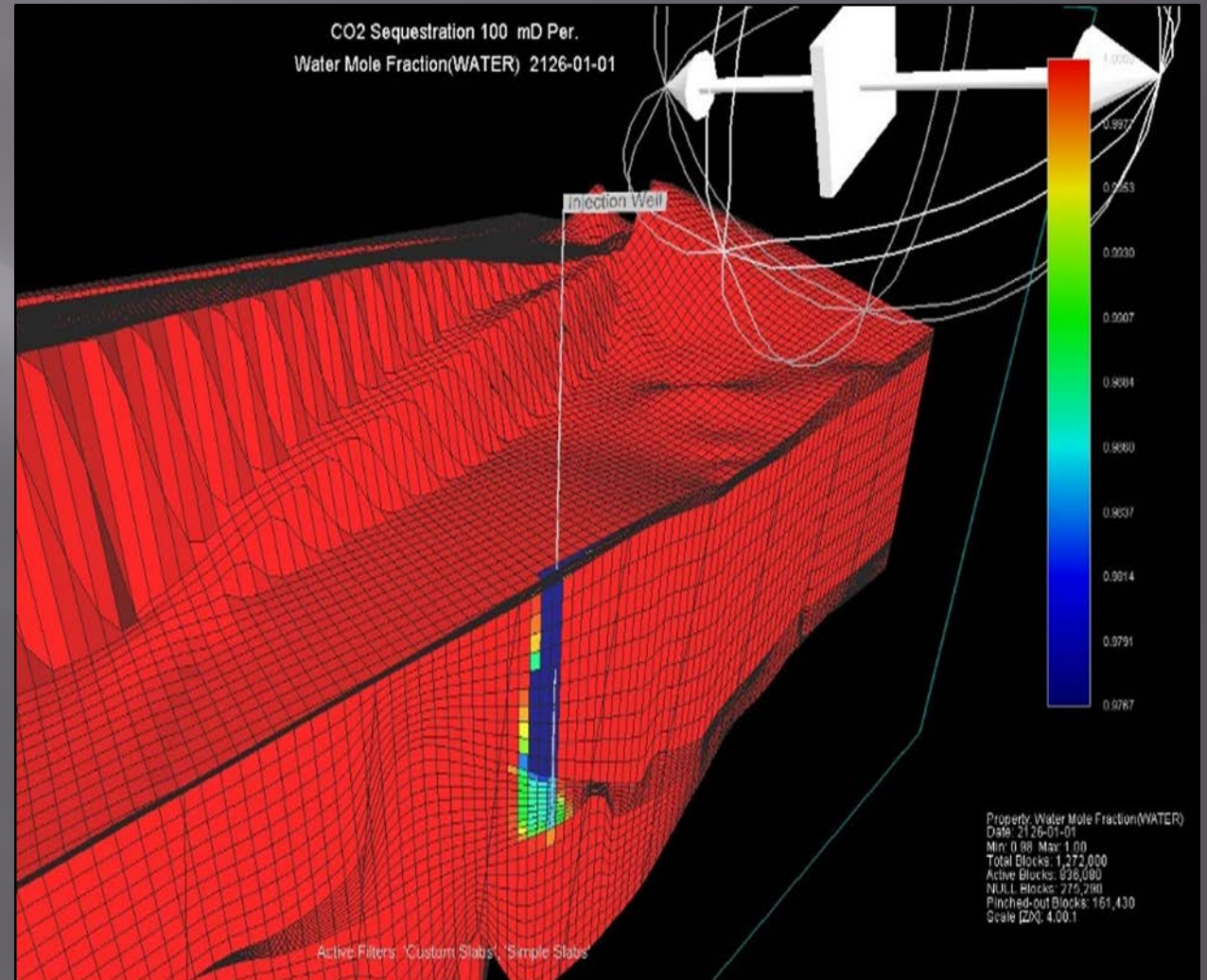
Amplitude Scaling

Line name: MME-101_stk



Task 5.0 Volumetric Calculations

- ▣ Preliminary CO₂ injection simulation modeling
- ▣ Studying phase behavior to better understand:
 - Fluid dynamics
 - CO₂/carbonate interaction
 - How these change as PVT conditions change



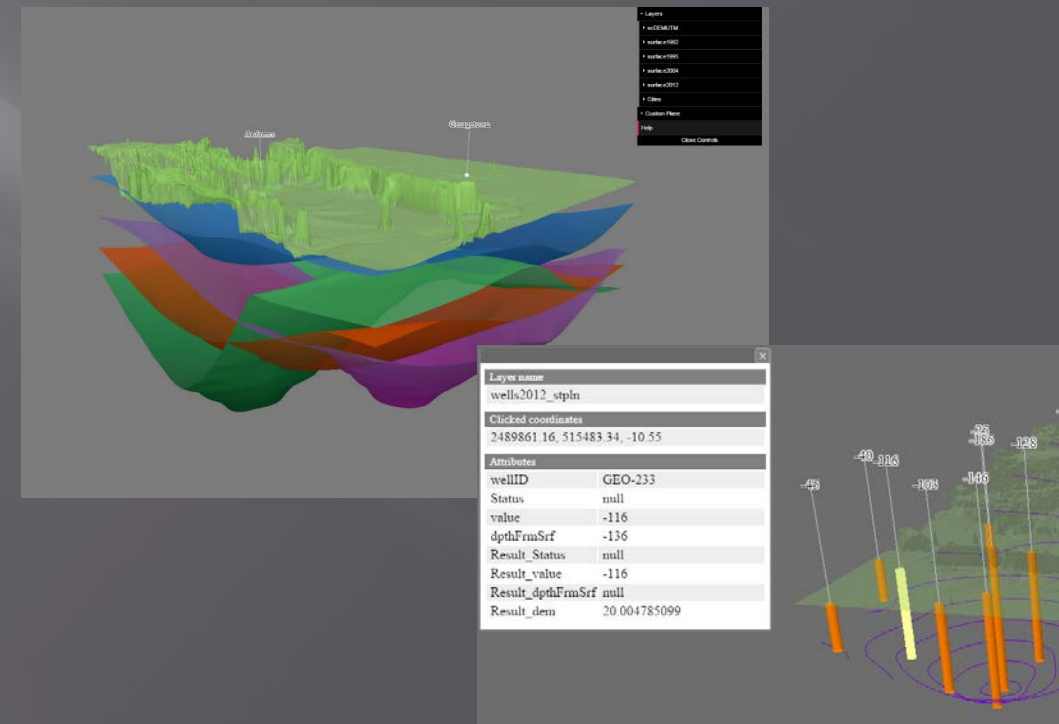
South Carolina Geologic Survey: Task 8.0 Outreach

- ▣ Subtask 8.1 Public Outreach
 - Design and Implement Webpage for SOSRA Project with USC Partners
 - Story Map detailing project progress and goals



South Carolina Geologic Survey: Task 8.0 Outreach

- ▣ Subtask 8.2 Knowledge Sharing and Technology Transfer
 - Design Web Tools to work with project data on web site
 - Data visualization and analysis = information to stakeholders



Conclusions

- ▣ South Atlantic is a major frontier area despite decades of data acquisition and an earlier phase of hydrocarbon exploration
- ▣ Extensive conditioning of the data seismic-well ties completed
- ▣ Robust geologic project created in Petrel for seismic interpretation, structural modeling and volumetric calculations (Next Steps)
- ▣ Preliminary CO₂ injection simulation modeling begun; Phase 2 will incorporate structural model created in Petrel
- ▣ SCGS will build an interactive online storybook for public dissemination of project information

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