

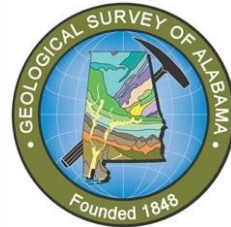
SOUTHEAST OFFSHORE STORAGE RESOURCE ASSESSMENT (SOSRA)

PROJECT NUMBER: DE-FE0026086

SOUTHEAST OFFSHORE STORAGE RESOURCE ASSESSMENT: OPPORTUNITIES IN THE EASTERN GULF OF MEXICO FOR CO₂ STORAGE

Denise J. Hills¹, Jack C. Pashin², and Marcella R. McIntyre-Redden¹

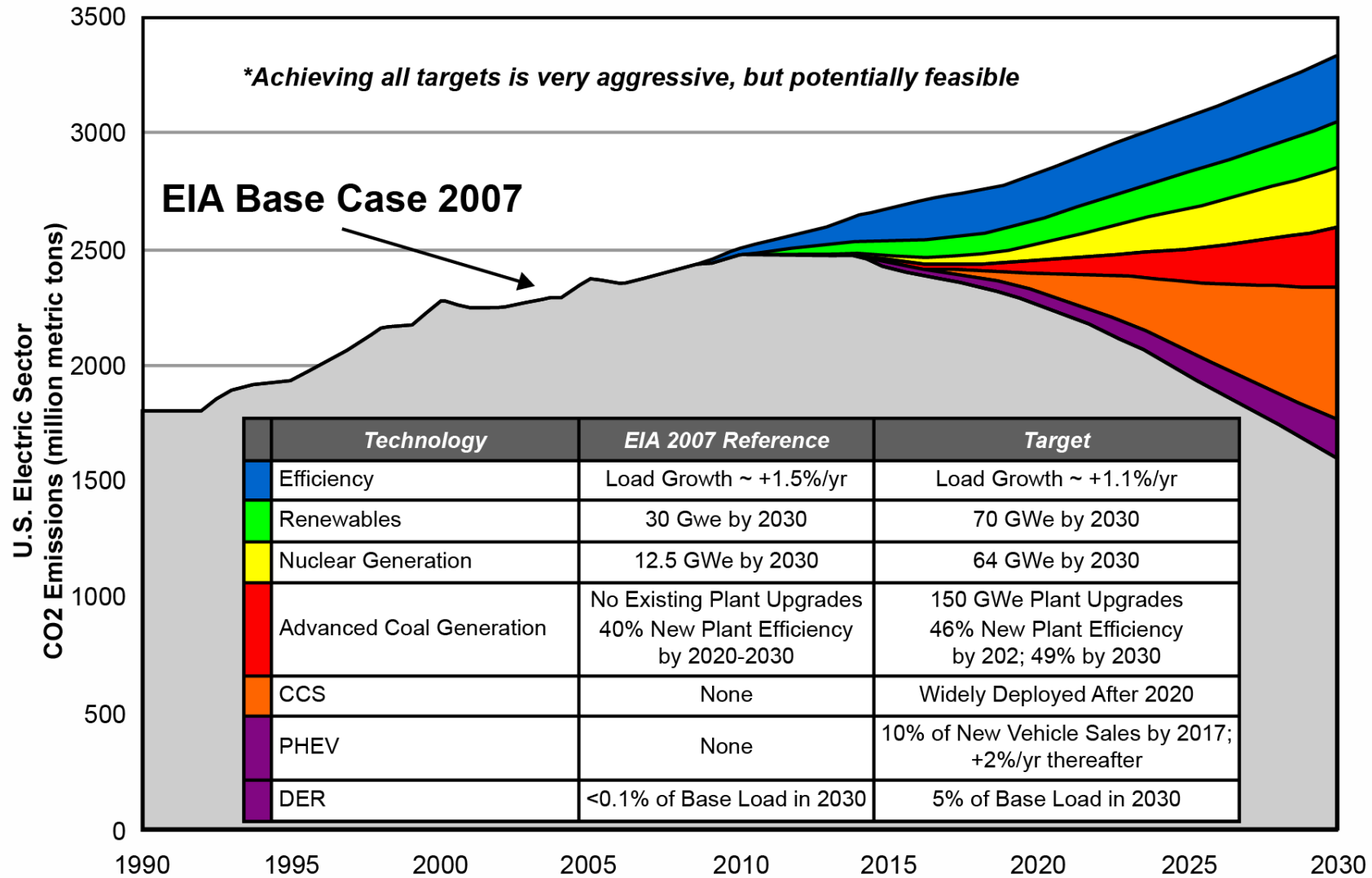
¹Geological Survey of Alabama, ²Oklahoma State University



American Association of Petroleum Geologists
Annual Convention and Exhibition 2016
20 June 2016

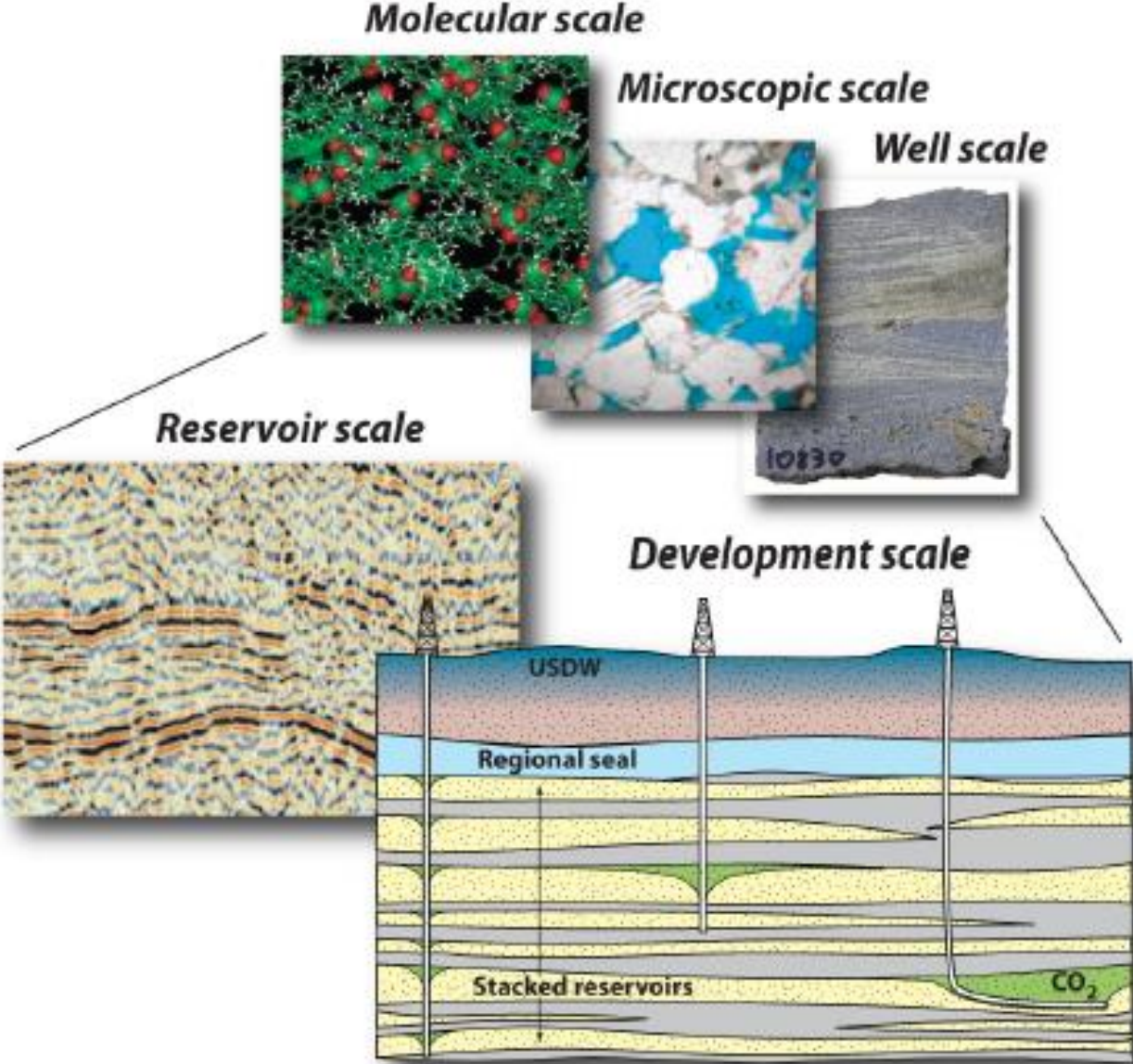
*This material is based upon work supported by the U.S. Department of Energy National Energy Technology Laboratory.
Cost share and research support are provided by the Project Partners and an Advisory Committee*

WHY CCUS?



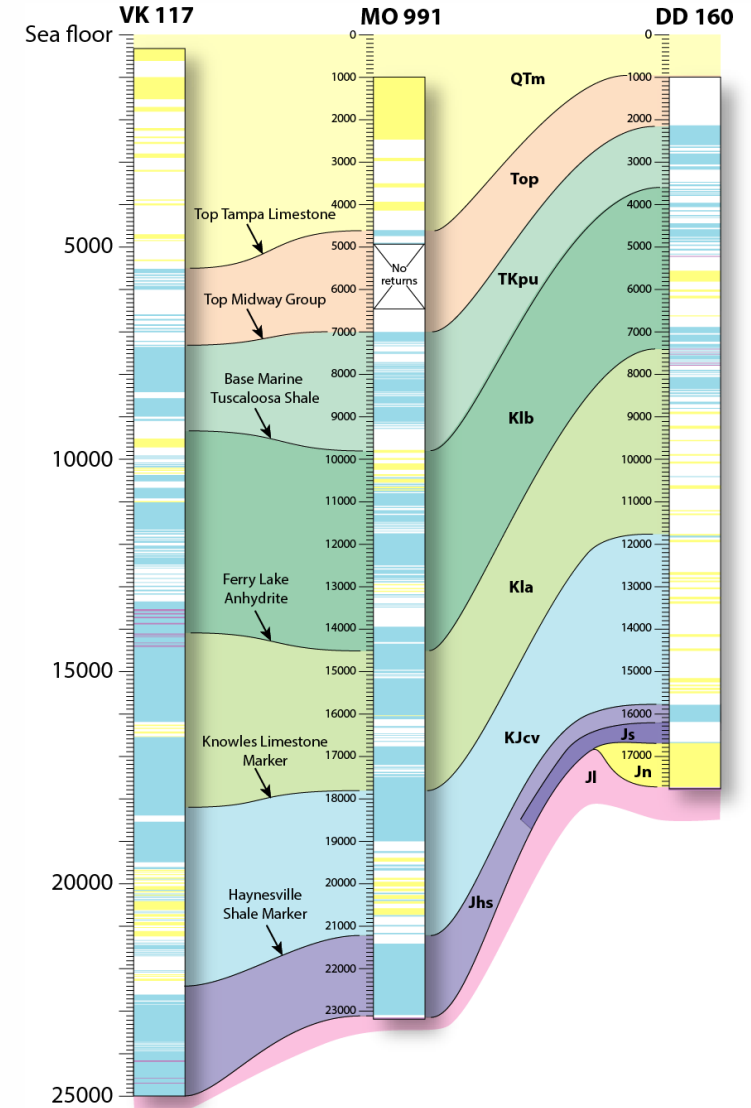
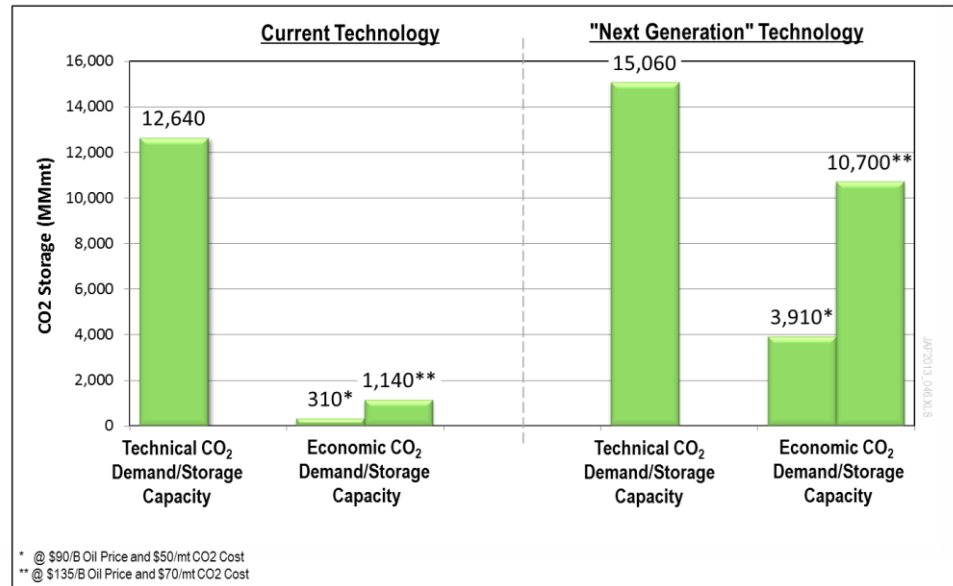
EPRI "Prism" report: <http://mydocs.epri.com/docs/public/DiscussionPaper2007.pdf>

GEOLOGICAL CONSIDERATIONS

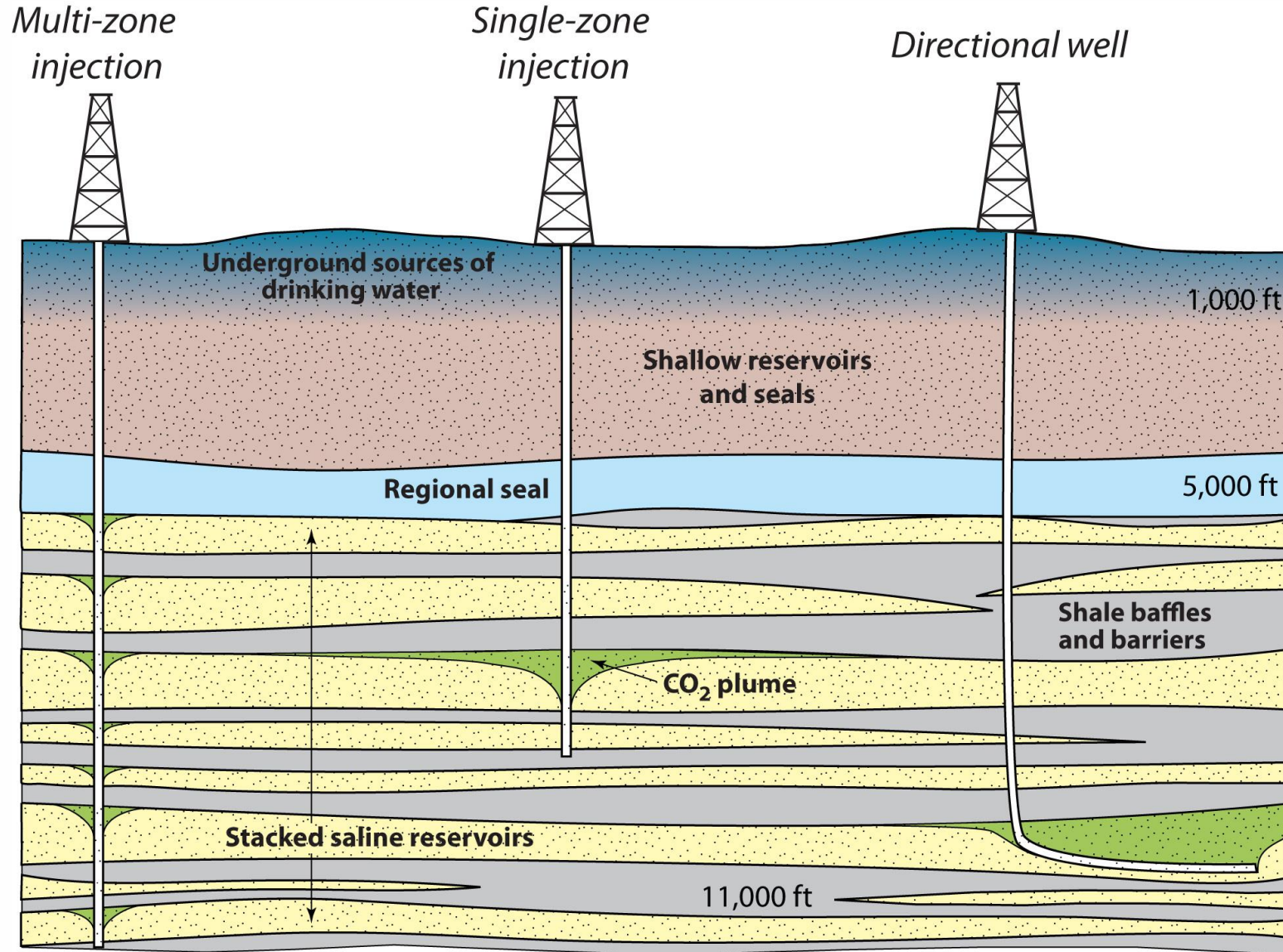


WHY OFFSHORE RESERVOIRS?

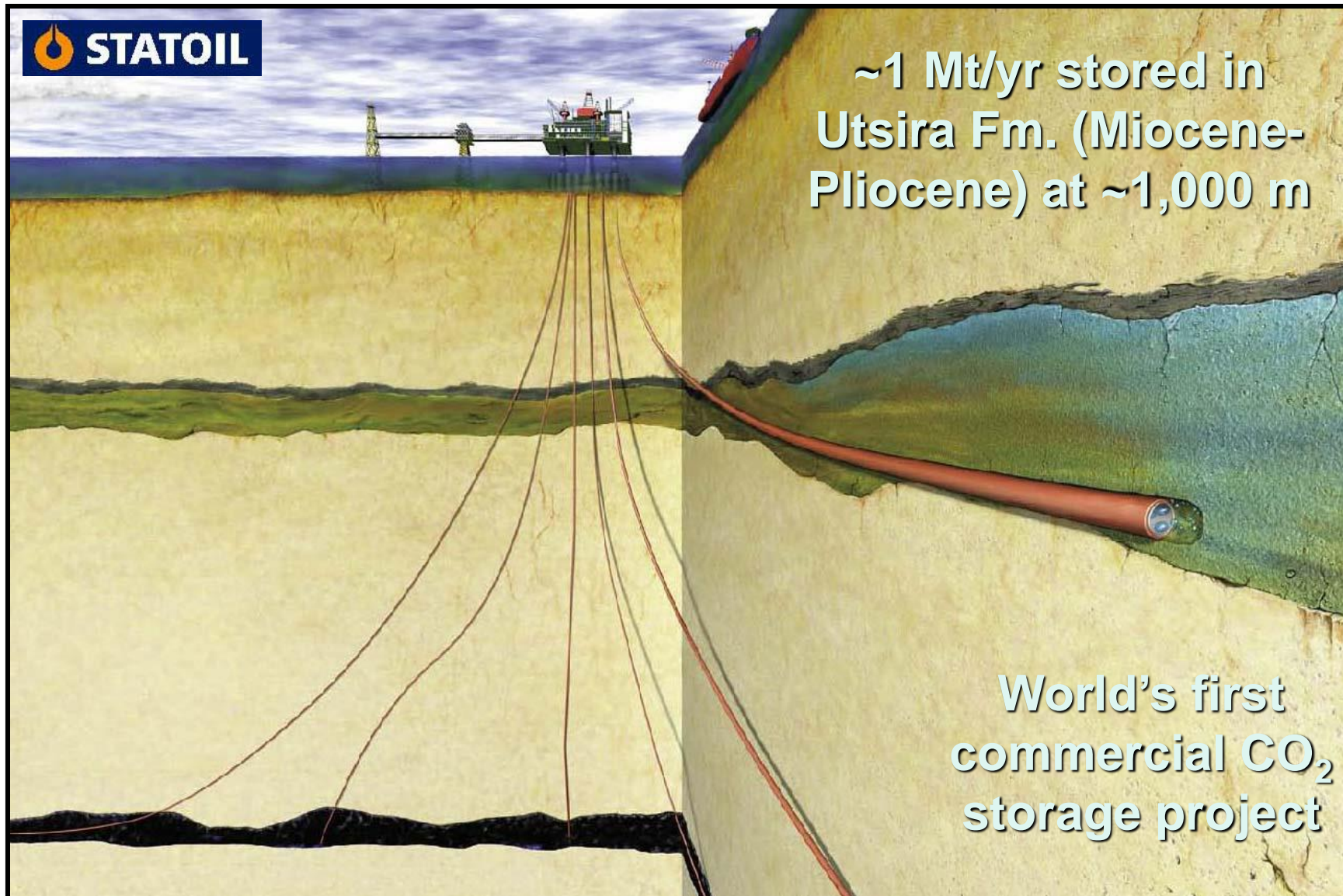
- Potentially giant CO₂ capacity
- Abundant stacked saline formations and depleted oil and gas reservoirs
- Significant infrastructure in place
- Proven offshore sequestration technology
- Favorable ownership and access



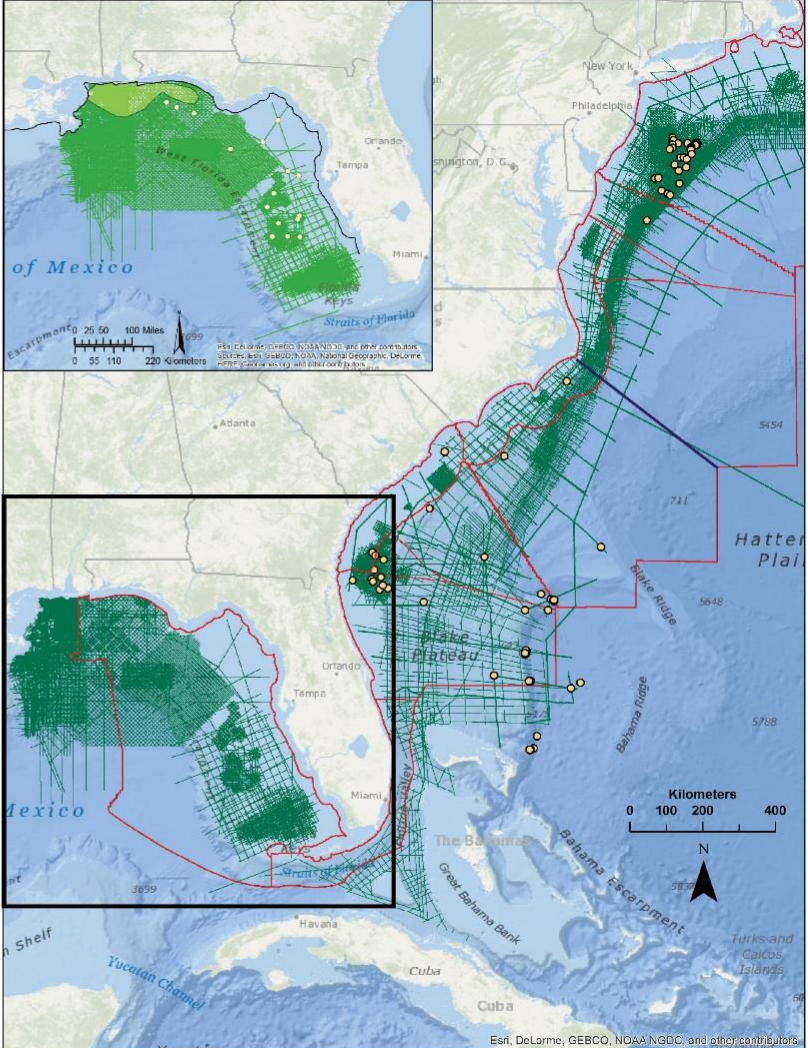
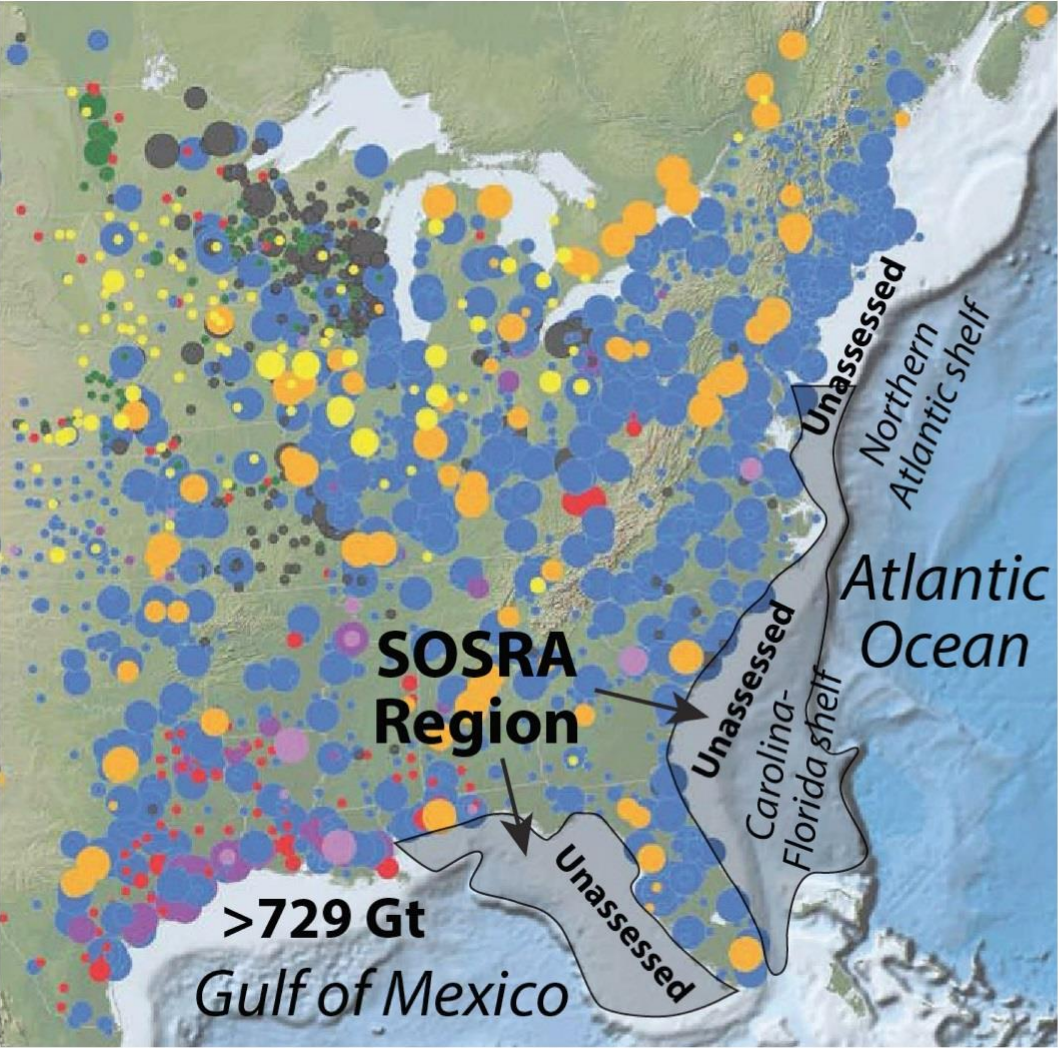
HOW DO WE ADAPT PROVEN STORAGE STRATEGIES?



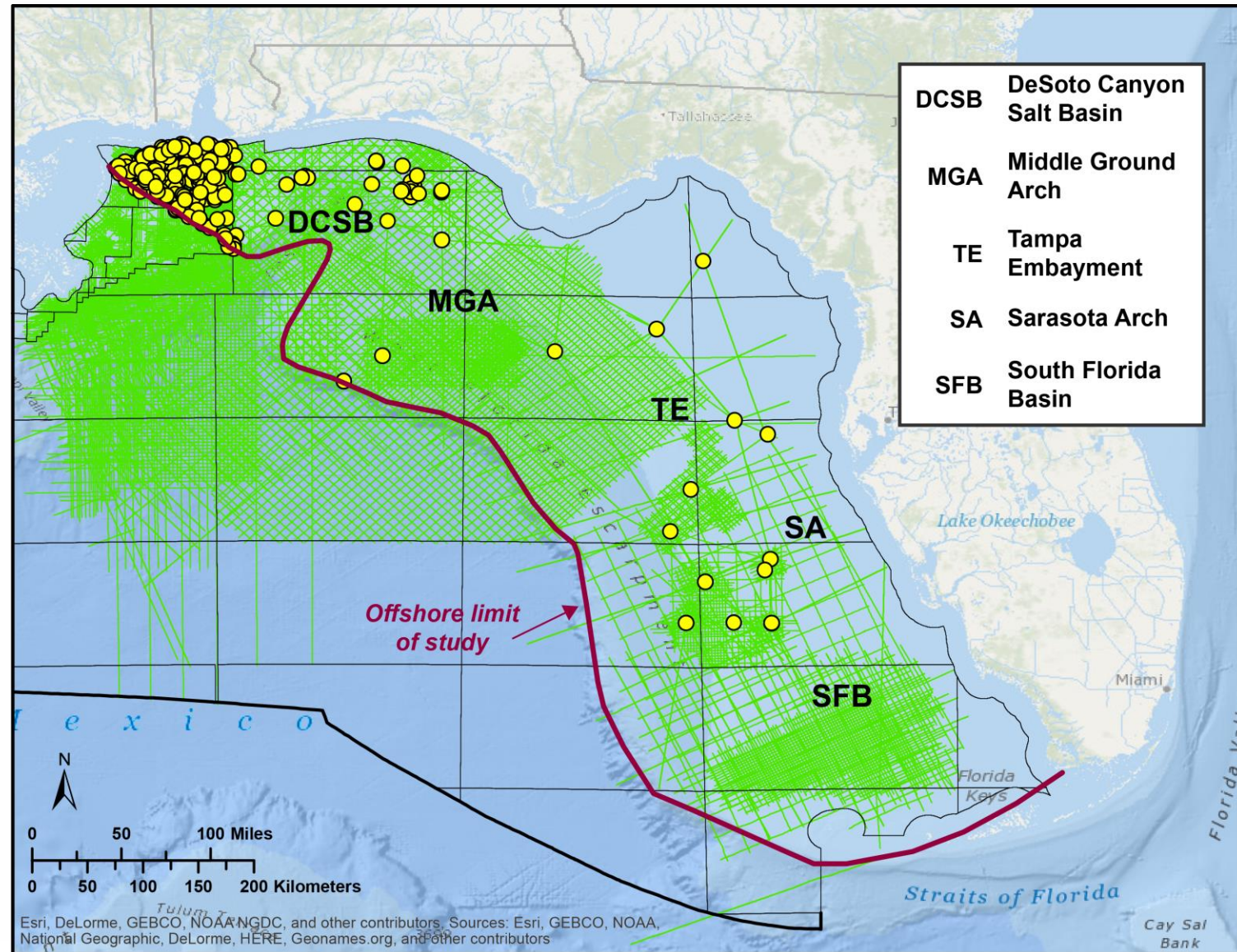
OFFSHORE CO₂ STORAGE: SLEIPNER, NORTH SEA



SOUTHEAST OFFSHORE STORAGE RESOURCE ASSESSMENT (SOSRA)



STUDY AREA AND SUBREGIONS



A TALE OF TWO PLATFORMS

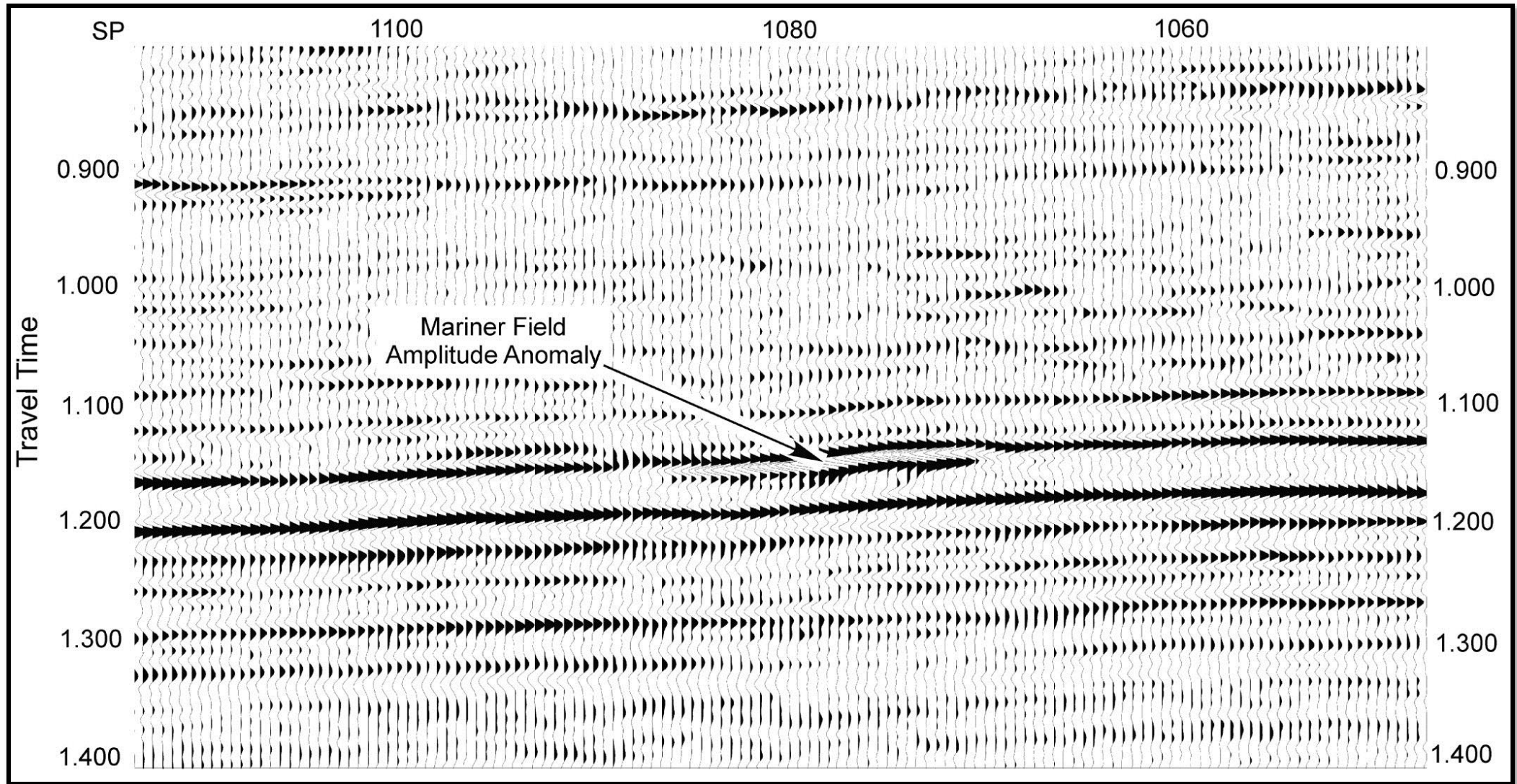
Ultradeep gas platform



Shallow gas well

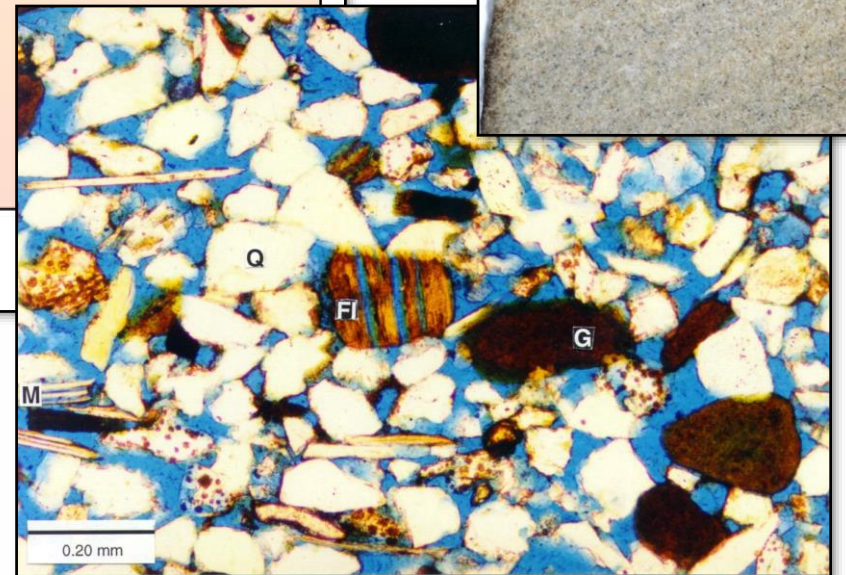
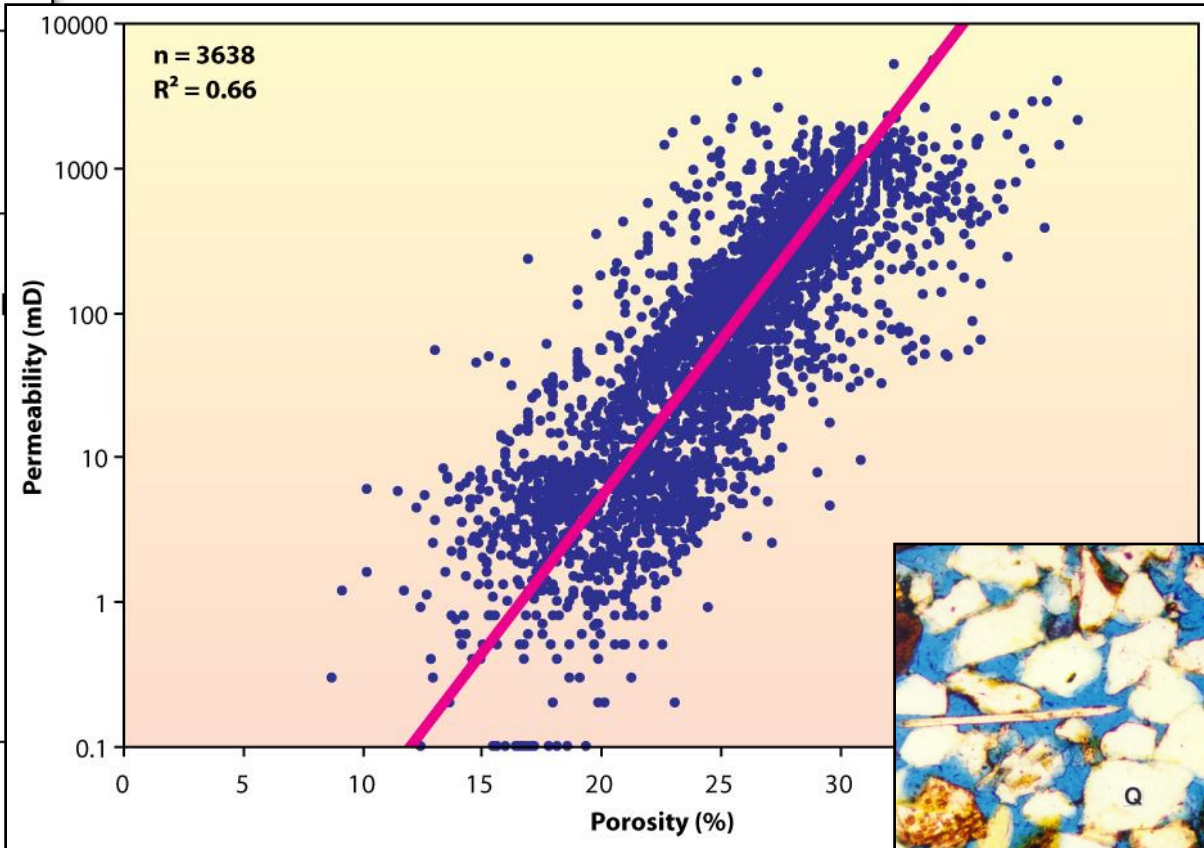
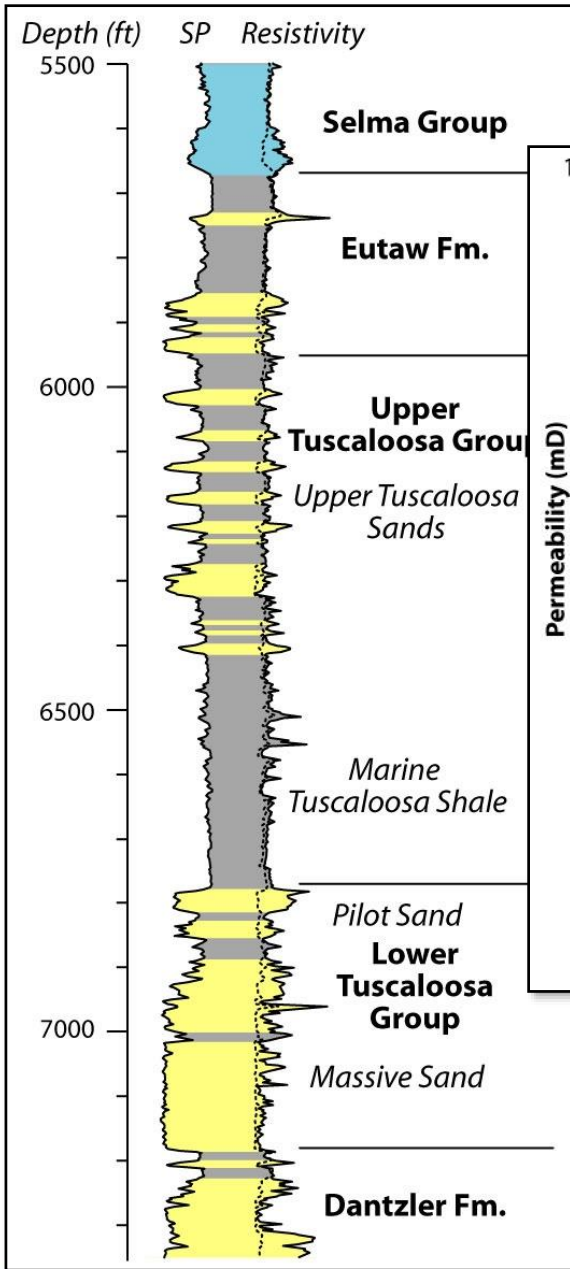


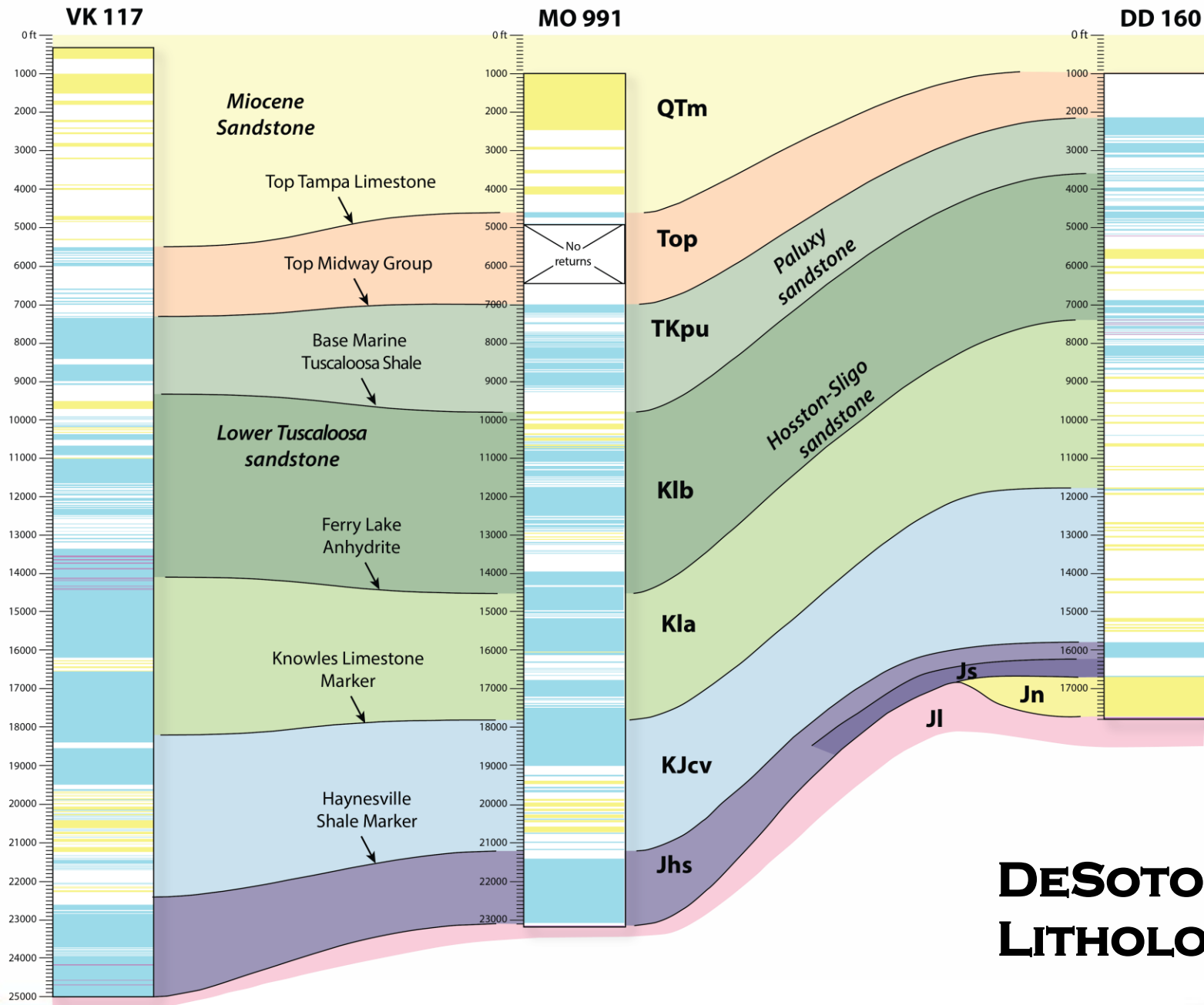
MIOCENE GAS SANDS



Handford and Baria (2003)

CRETACEOUS SANDSTONE





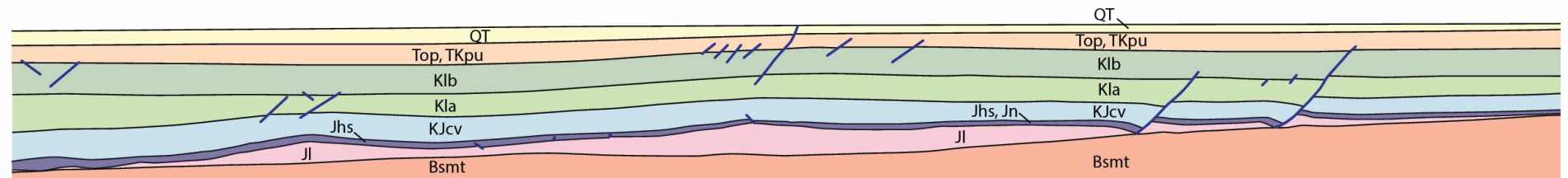
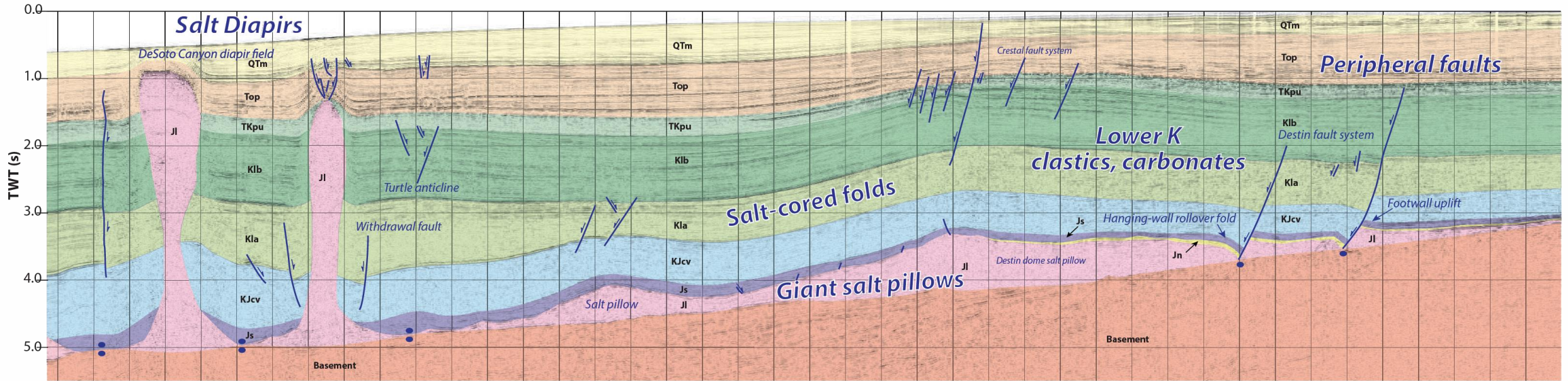
Lithology

- Shale
- Sandstone
- Limestone
- Anhydrite, Salt

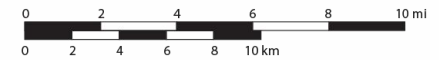
Scale in feet

DESOTO CANYON SALT BASIN LITHOLOGIC COLUMNS

DCSB DESTIN DOME

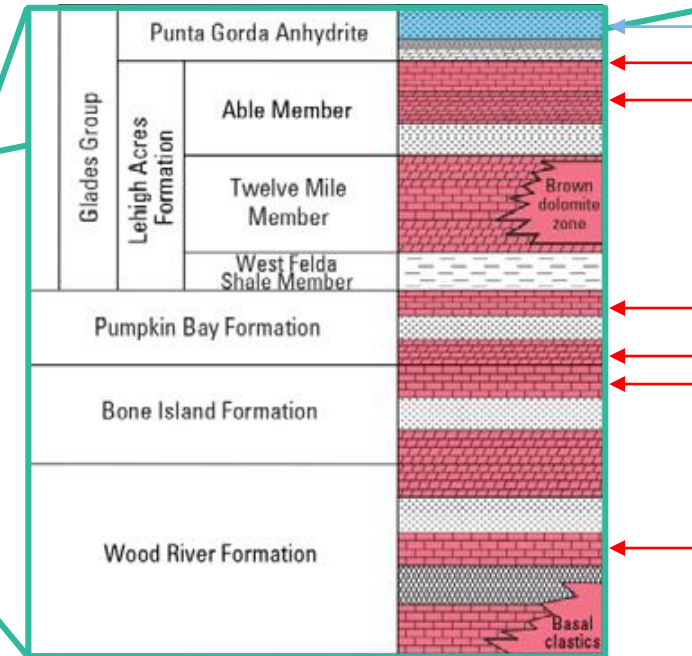
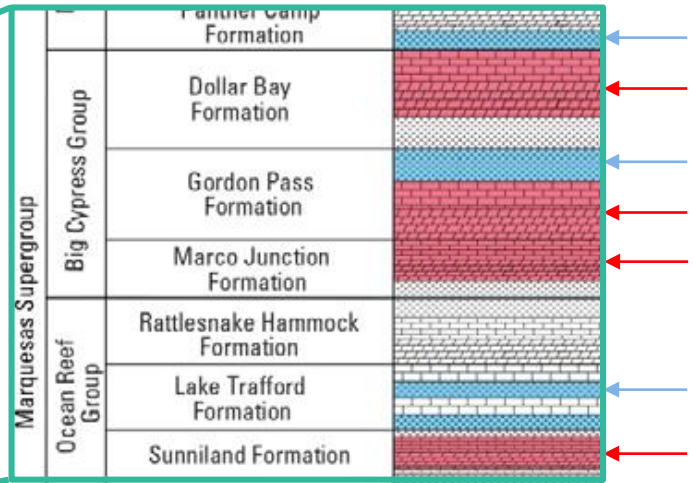
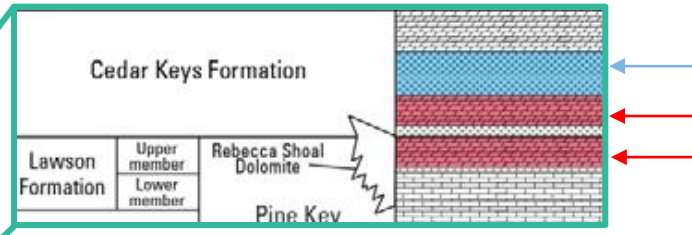


No vertical exaggeration

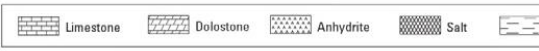


FLORIDA – LITHOLOGIC COLUMN

Subsystem/Series/Stage		Stratigraphic Unit	Lithology	
Paleogene (part)	Oligocene (part)	Vicksburgian	Suwannee Limestone	
		Jacksonian	Ocala Limestone	
	Eocene	Claibornian	Avon Park Formation	
			Oldsmar Formation	
		Sabinian	Cedar Keys Formation	
	Paleocene	Midwayan		
	Upper Cretaceous	Gulfian	Navarroan	Lawson Formation
			Tayloran	Pine Key Formation
			Austinian	
Eaglefordian				
Woodbinian			Atkinson Formation	
Lower Cretaceous	Comanchean	Washitan-Fredericksburgian	Angles Bay Group	
		Cenomanian	Marquesas Supergroup	
			Ocean Reef Group	
			Big Cypress Group	
	Trinitian	Glades Group	Lehigh Acres Formation	
		Cochitlan		
Upper Jurassic	Lacastian	Wood River Formation		
	Zuloagan	Unnamed volcanic complex		

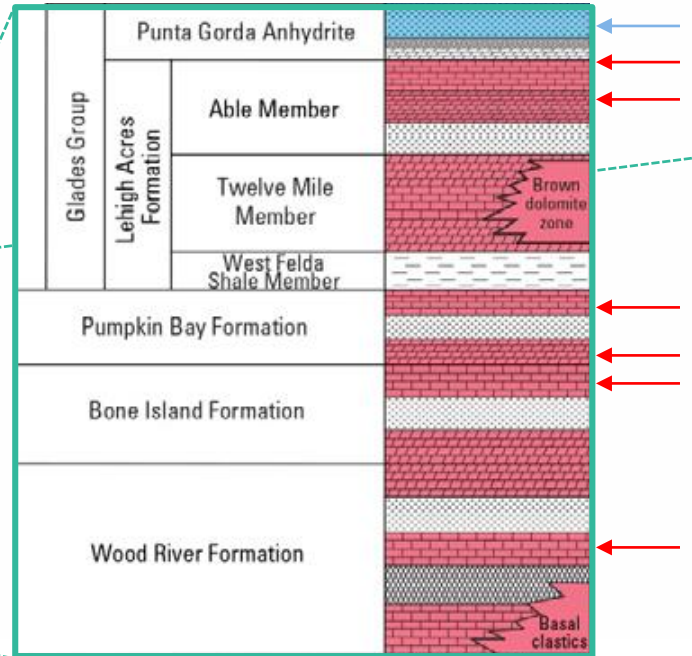
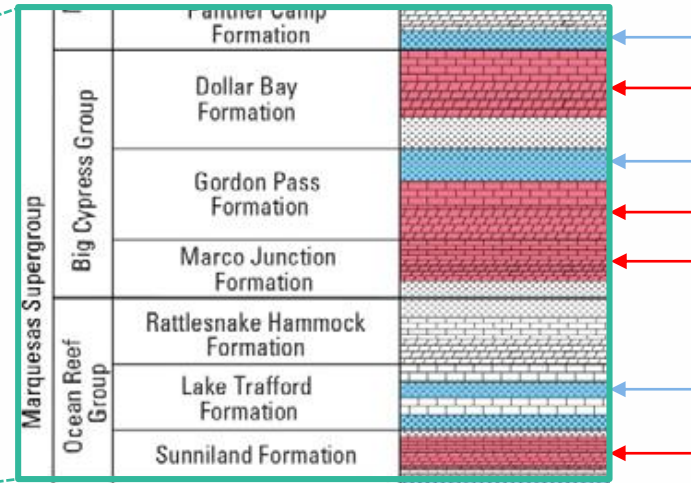
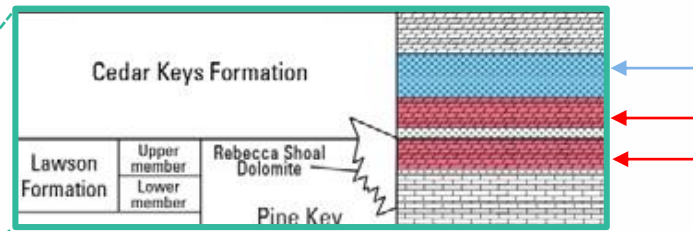


Blue - Seal
Red - Sink



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Paleogene (part)	Oligocene (part)	Vicksburgian	Suwannee Limestone		
		Jacksonian	Ocala Limestone		
	Eocene	Claibornian	Avon Park Formation		
			Oldsmar Formation		
	Paleocene	Sabinian			
Upper Cretaceous	Bullian		Cedar Keys Formation		
		Navarroan	Lawson Formation		
		Tayloran	Pine Key Formation		
		Austinian	Card Sound Dolomite		
		Eaglefordian	Atkinson Formation		
	Woodbinian				
	Washitan-Fredericksburgian	Palms Bay Group		Corkscrew Swamp Formation	
				Rookery Bay Formation	
		Marquesas Supergroup	Big Cypress Group		Panther Camp Formation
					Dollar Bay Formation
					Gordon Pass Formation
					Marco Junction Formation
			Ocean Reef Group		Rattlesnake Hammock Formation
					Lake Trafford Formation
					Sunniland Formation
				Punta Gorda Anhydrite	
Lower Cretaceous	Comanchean		Punta Gorda Anhydrite		
		Glades Group		Able Member	
			Lehigh Acres Formation		Twelve Mile Member
					West Felda Shale Member
			Trinitian		Pumpkin Bay Formation
		Bone Island Formation			
		Wood River Formation			
	Coahuilan	Nuevoleonian	Pumpkin Bay Formation		
Durangoan		Bone Island Formation			
Upper Jurassic	Lacastian	Wood River Formation			
	Zuloagan	Unnamed volcanic complex			

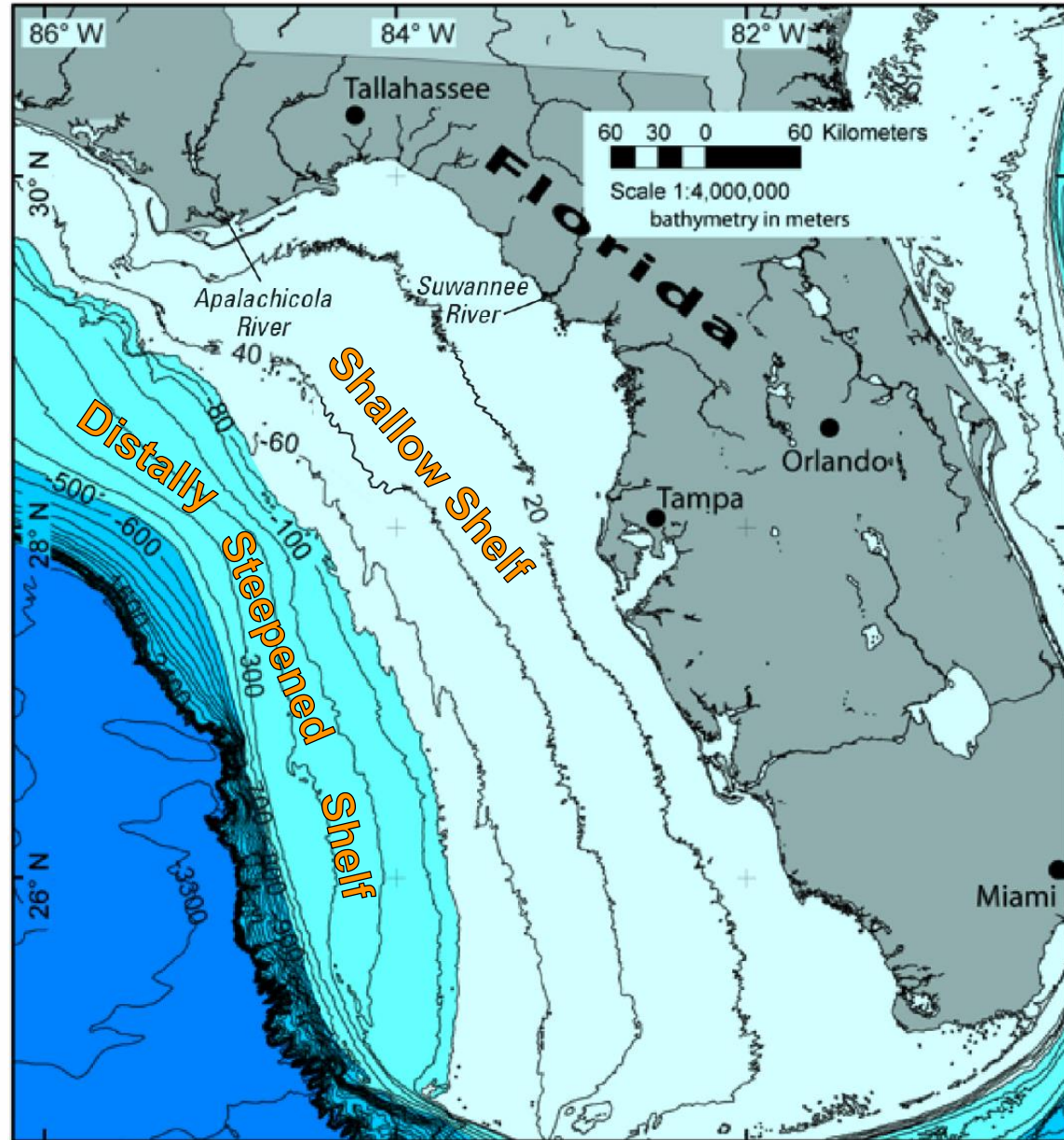


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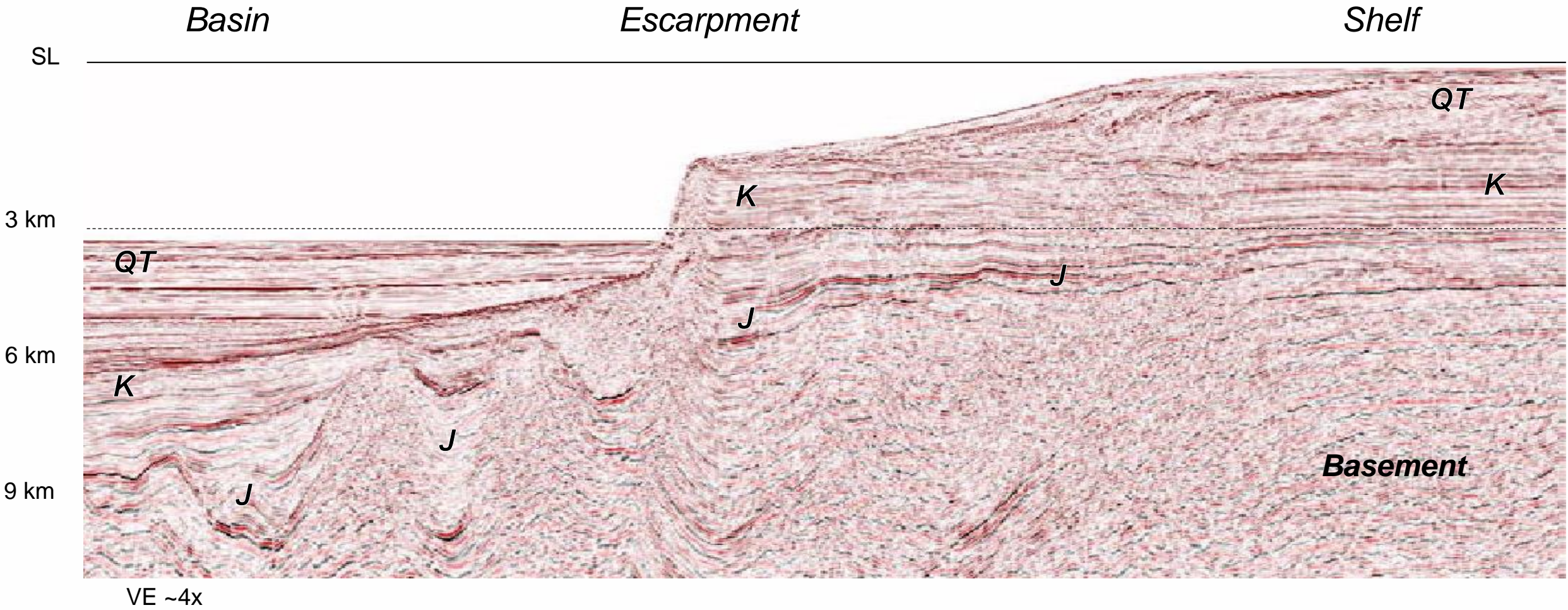


WEST FLORIDA SHELF BATHYMETRY

- Broad, shallow, region near shore (NE of 80 m contour).
- Distally steepening outer shelf leading to West Florida Escarpment.



WEST FLORIDA SHELF-ESCARPMENT



OBSERVATIONS AND FURTHER QUESTIONS

- Large portfolio of potential sinks and seals in eastern Gulf of Mexico region.
 - Complex structural chronology, stratigraphic architecture in DeSoto Canyon Salt Basin.
 - Relatively simple Cretaceous carbonate platform and distally steepened Cenozoic shelf in West Florida.
 - Geopressure >12,000 ft; main storage prospects in Cretaceous-Miocene section.
- Seismic and well data currently being compiled and analyzed to address questions:
 - Is sufficient porosity, permeability available in carbonate units to support commercial offshore storage?
 - Are robust reservoir seals developed above Miocene sand units?

