Southeast Offshore Storage Resource Assessment (SOSRA)
Project Number: DE-FE0026086

Assessing CO_2 Storage Potential in the Eastern Gulf of Mexico Continental Shelf

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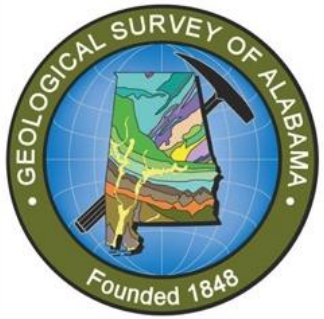
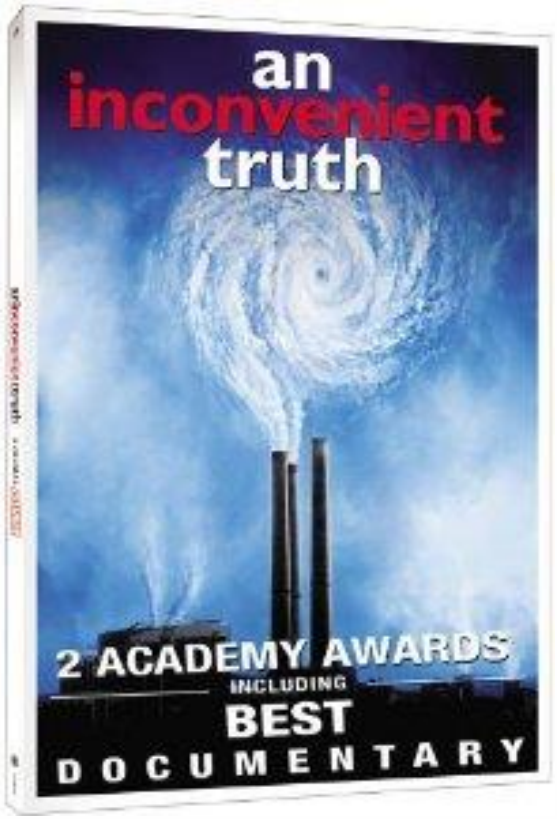


Boone Pickens School of Geology Colloquium
Stillwater, OK
September 1, 2017

Clean Coal Technology

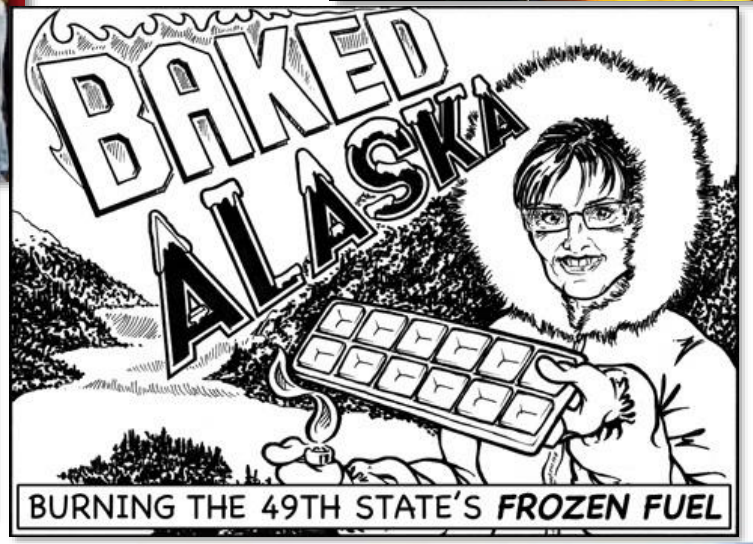
Air quality
Water quality
Energy efficiency
Greenhouse gas control

Turned a Scientific Debate into a Political One

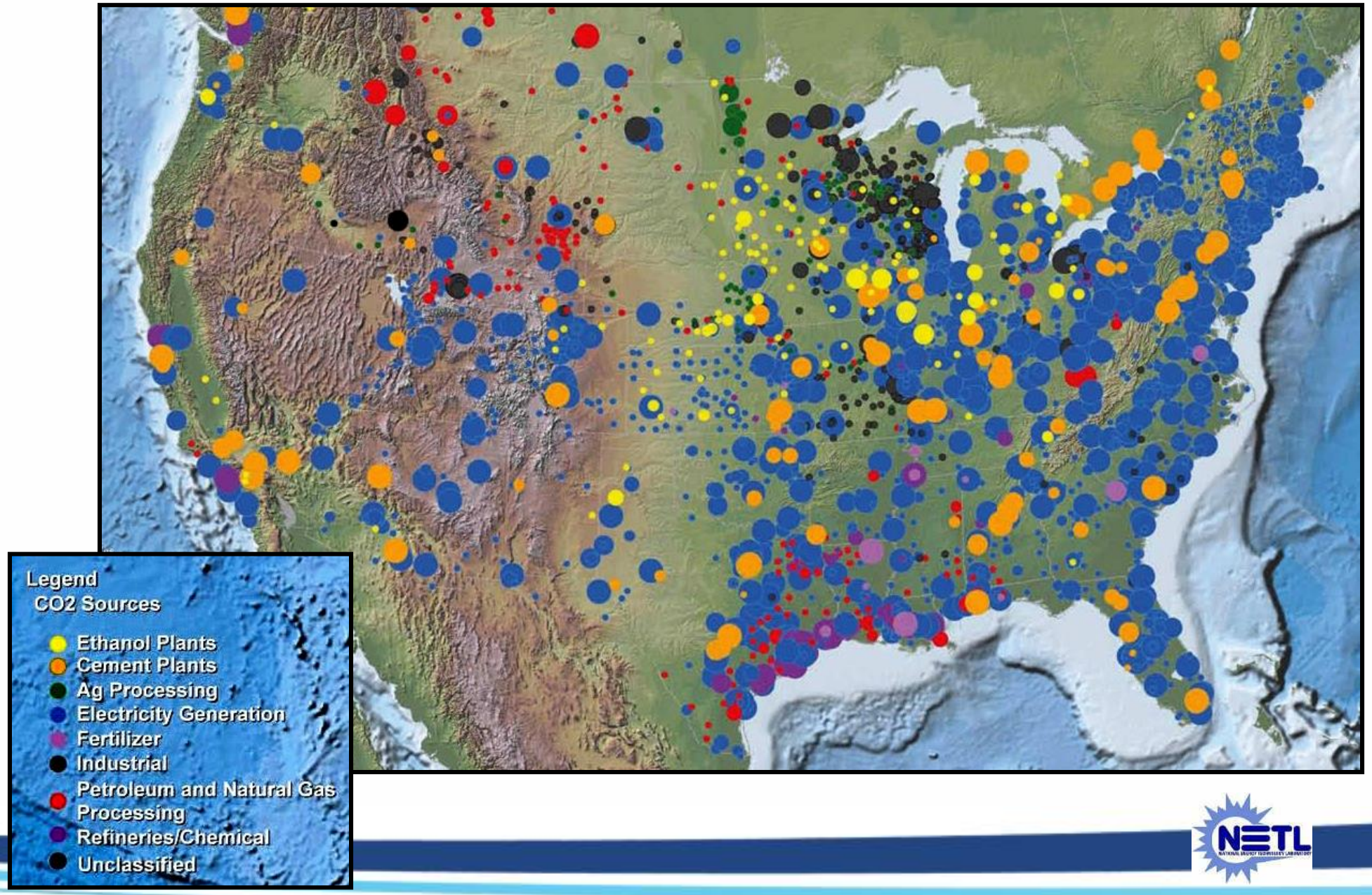


Who is this guy, and what is he pointing at?

Balancing Societal Need with Perception



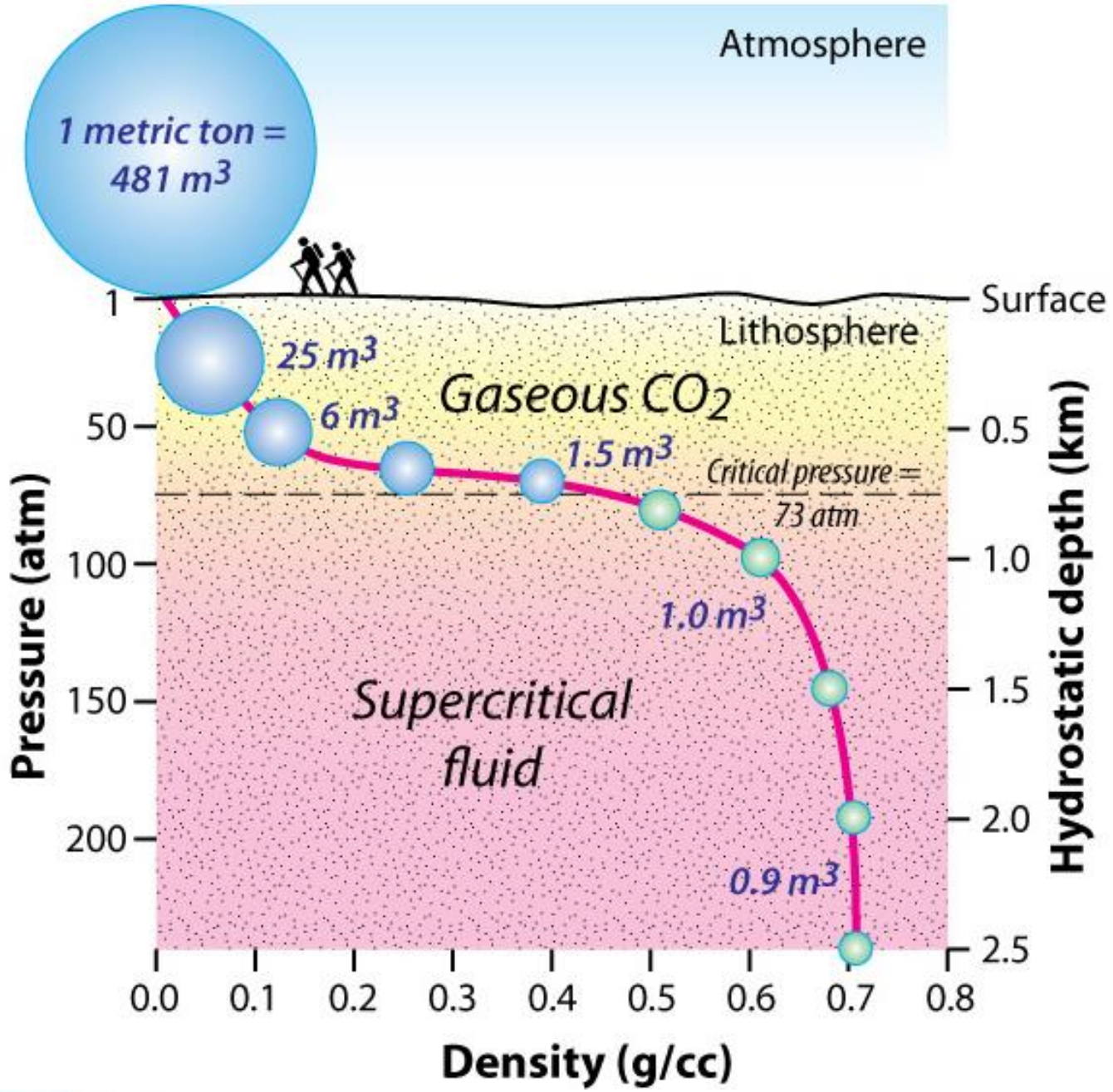
CO_2 Emission Sources



HOW MUCH IS A TON OF CO_2?

USA emits 7 billion tons/year.

20 of these are yours!



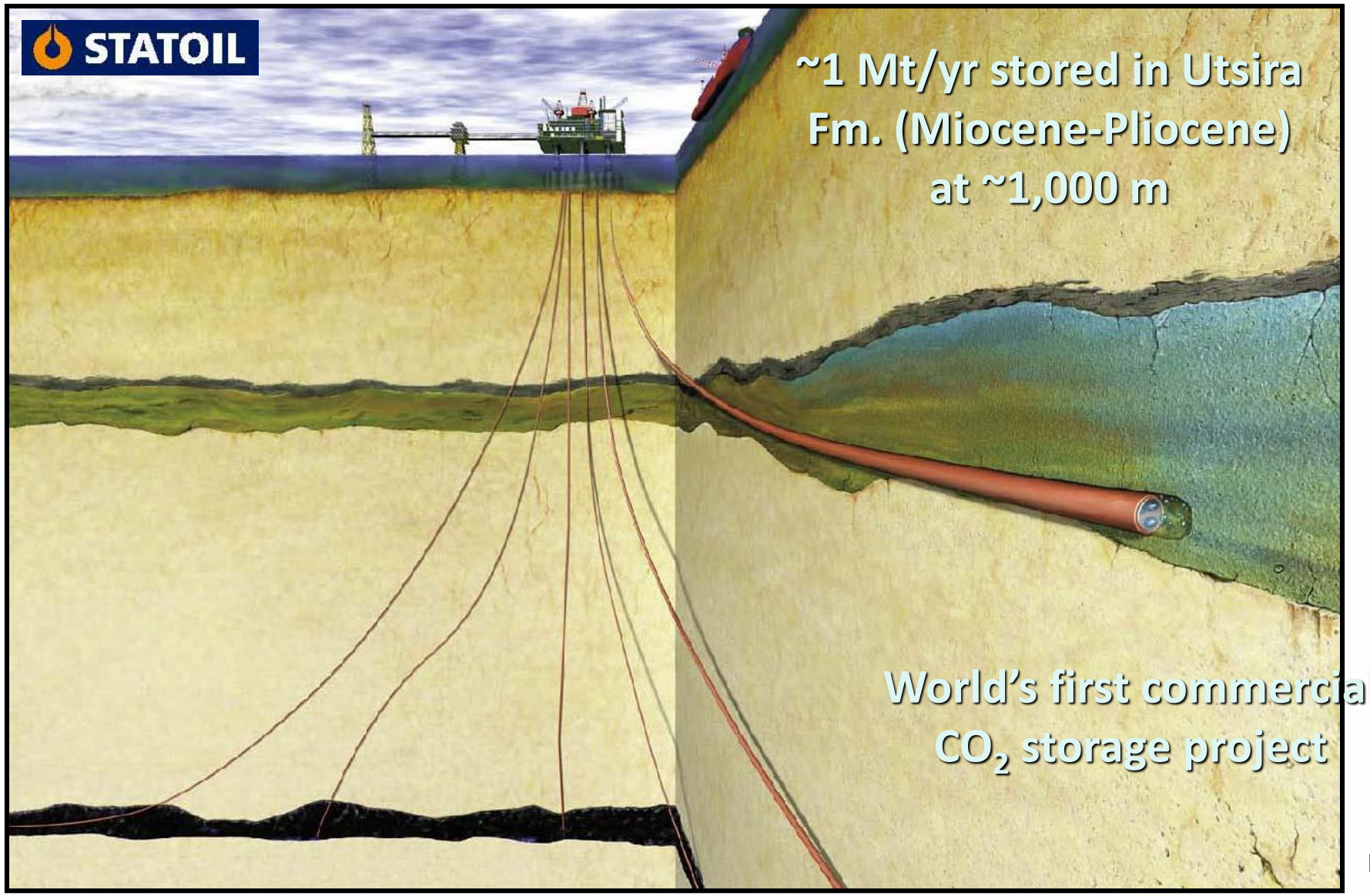
CO_2 PVT RELATIONSHIPS

OFFSHORE DEVELOPMENT

Sleipner gas platform, North Sea

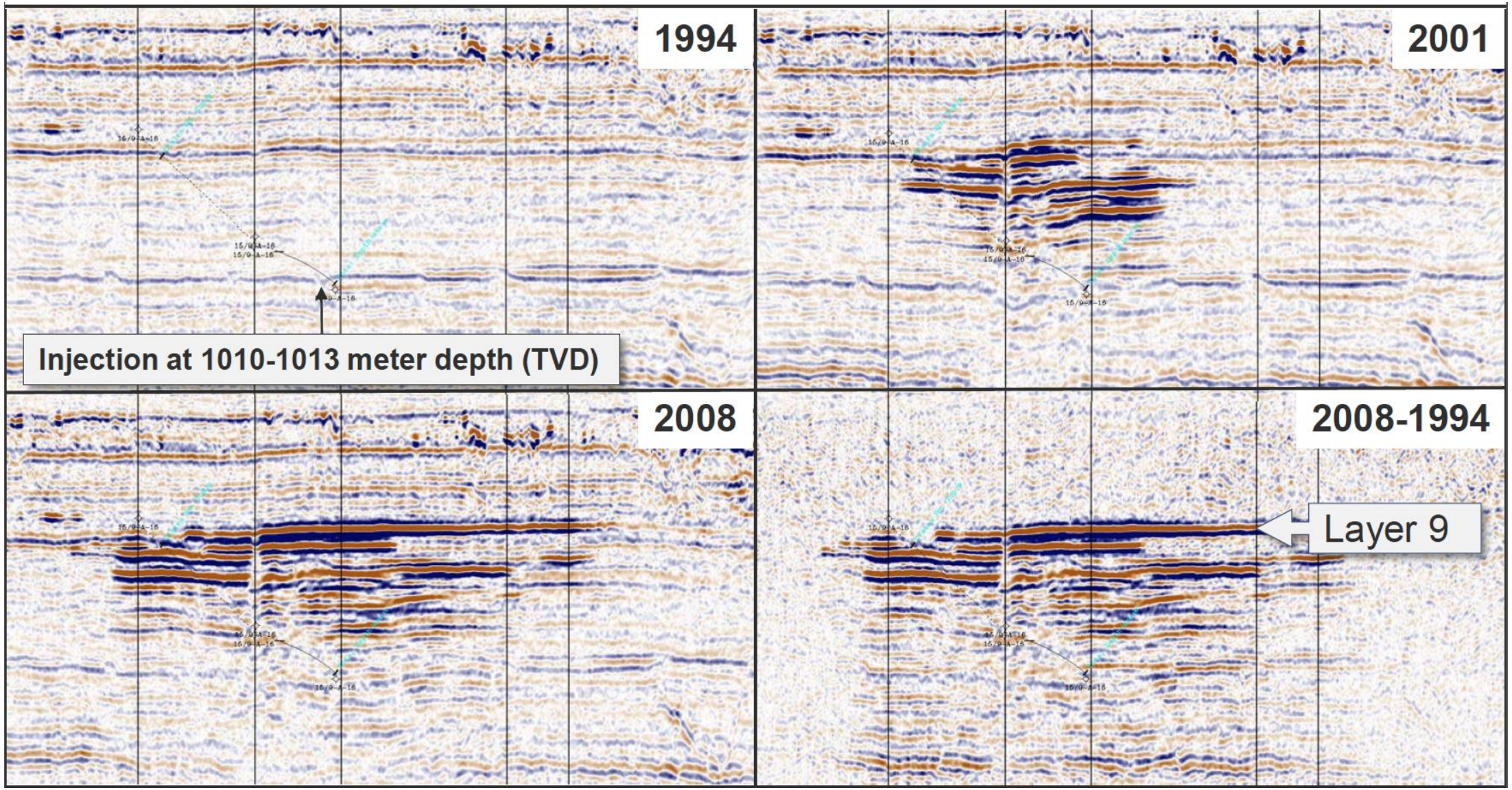
Source: Statoil

Offshore CO_2 Storage: Sleipner, North Sea

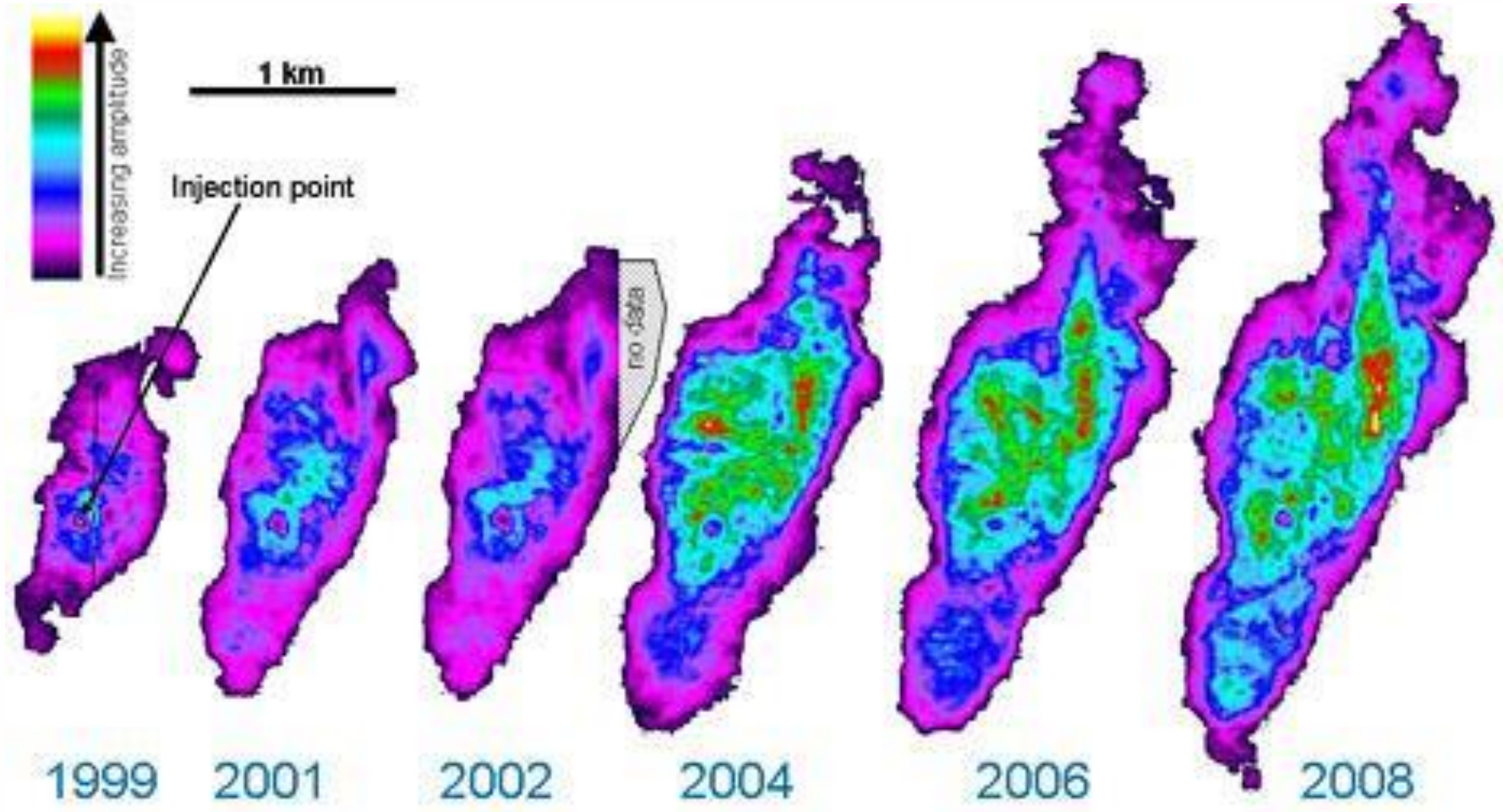


Kaarstad (2004)

Sleipner Time-Lapse Seismic



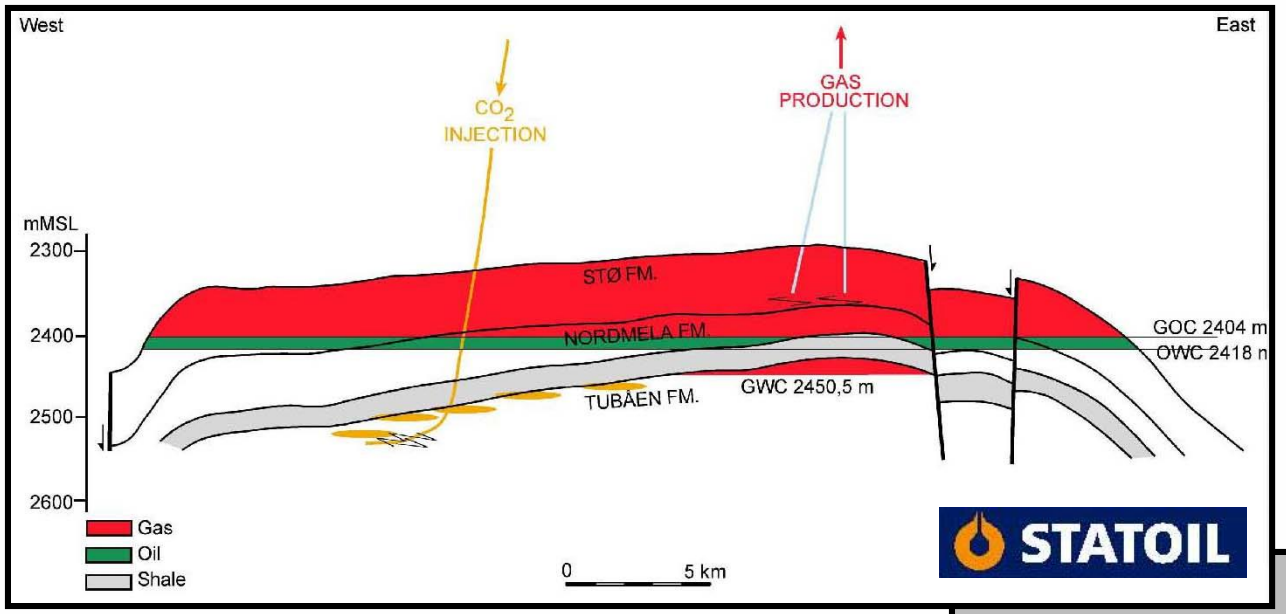
Sleipner Plume Footprint



Images of the dispersal of stored carbon dioxide through the Utsira formation since injection began more than 12 years ago. The colour scale shows seismic amplitudes, which correspond approximately to vertically summed thicknesses of carbon dioxide in the sandstone.

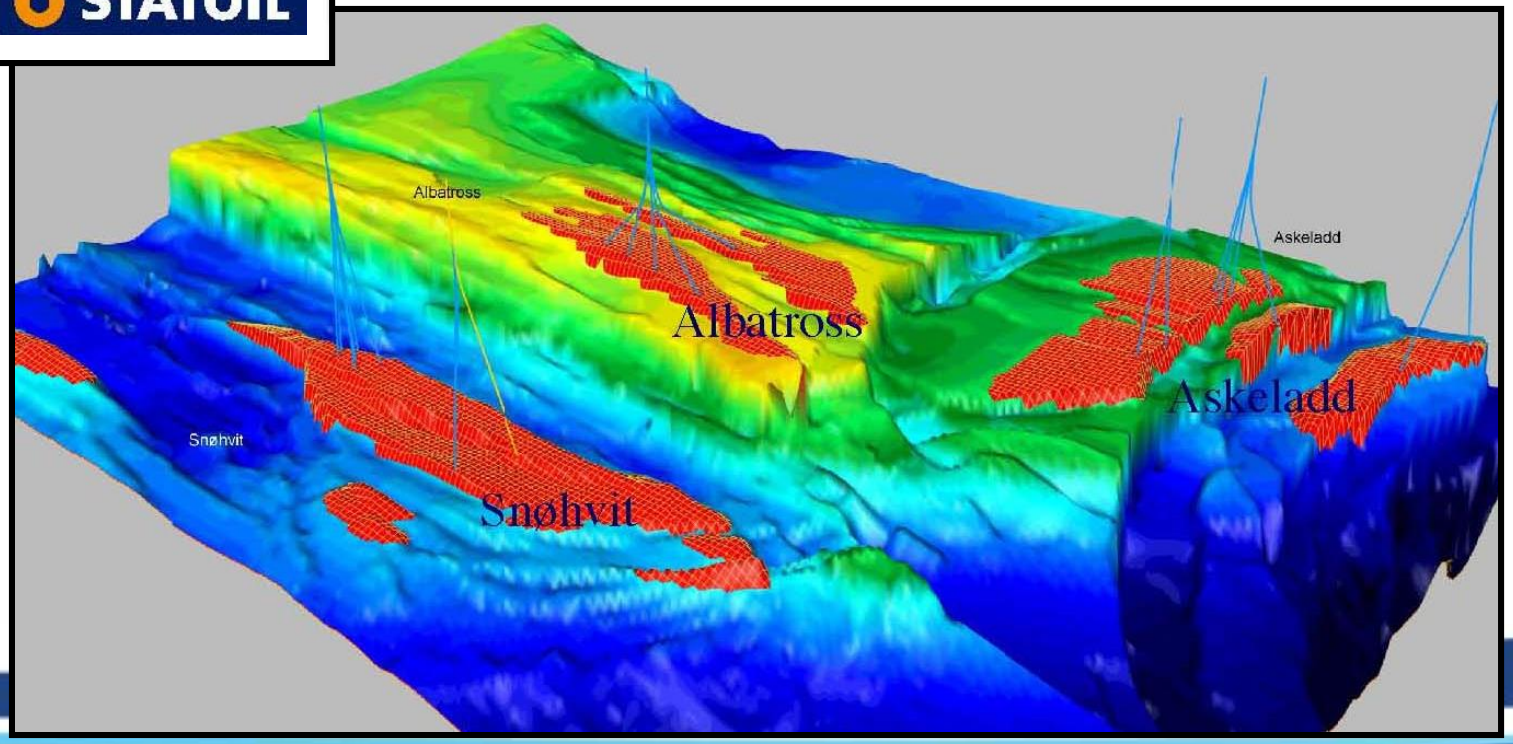
Source: Statoil

Snøhvit Area, Barents Sea

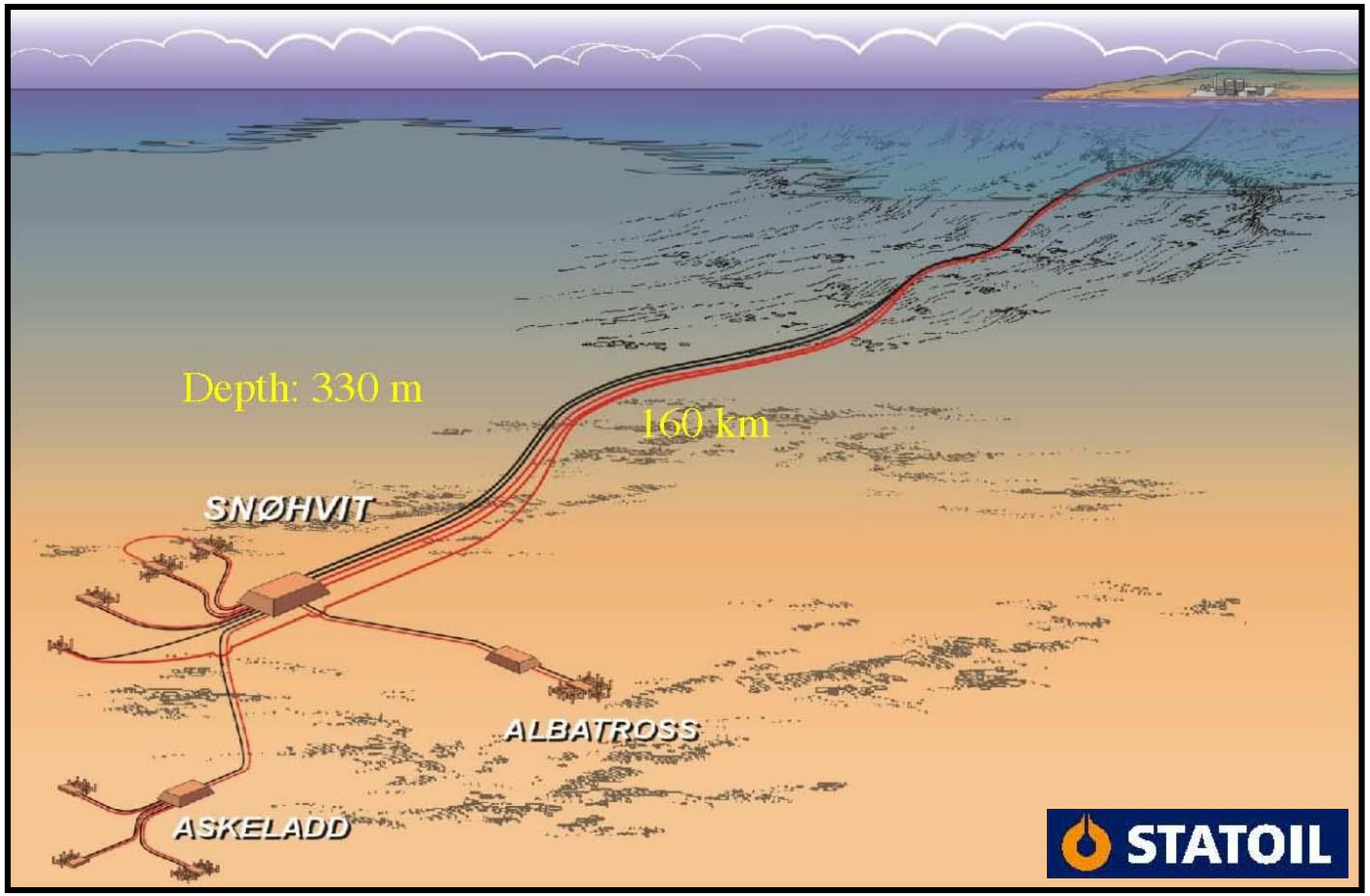


~0.7 Mt/yr stored in Tubaen Fm. (Jurassic) at ~2,600 m

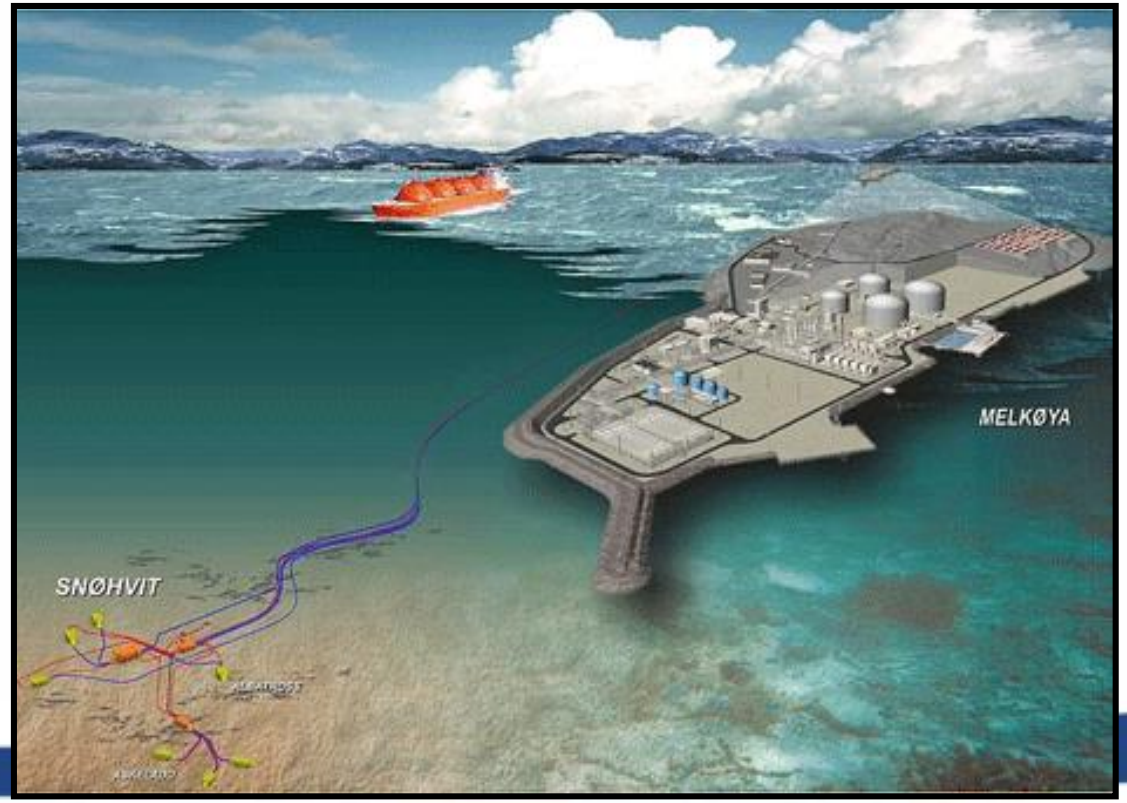
Kaarstad (2004)



Snøhvit LNG Infrastructure



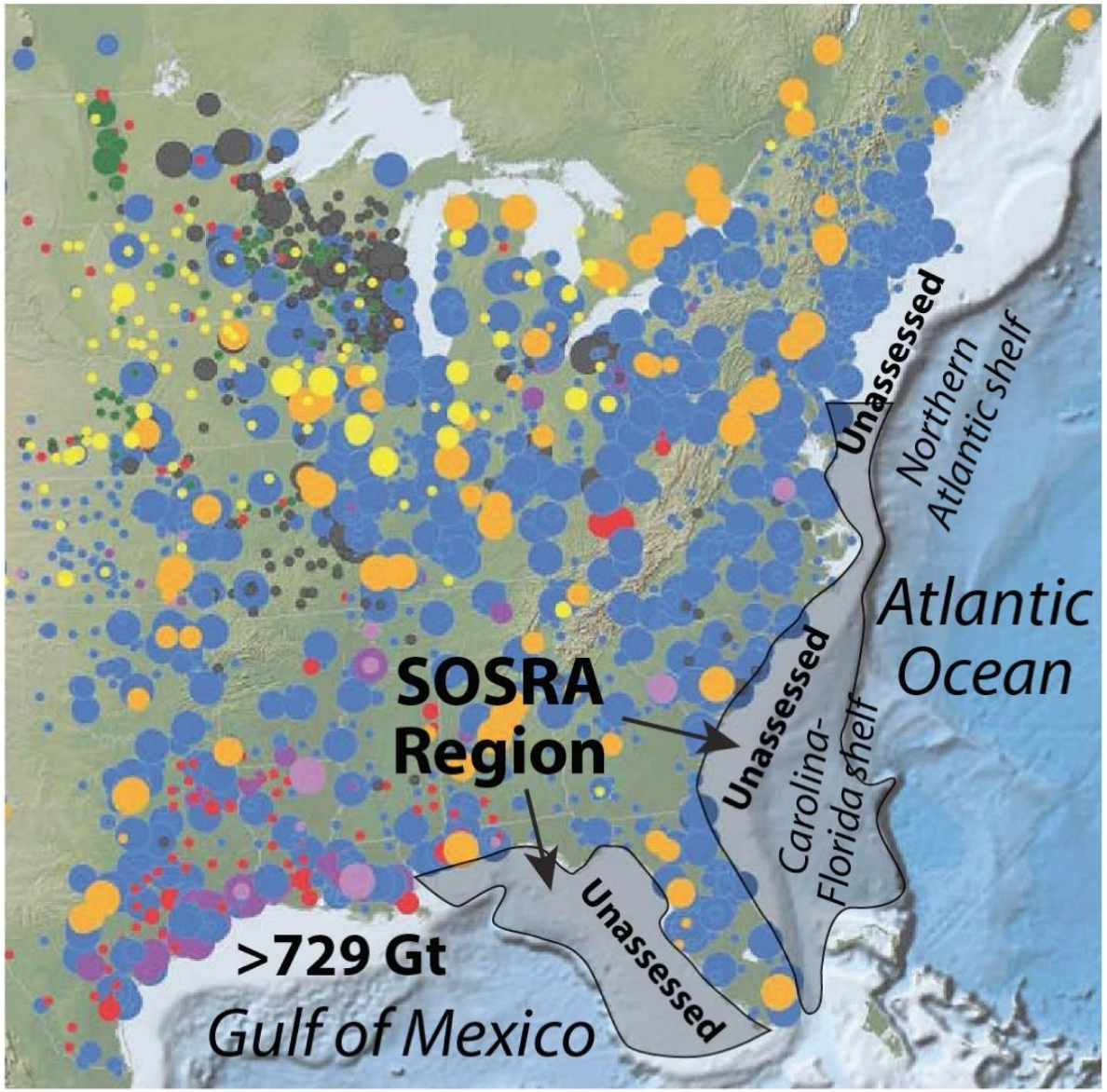
Kaarstad (2004)

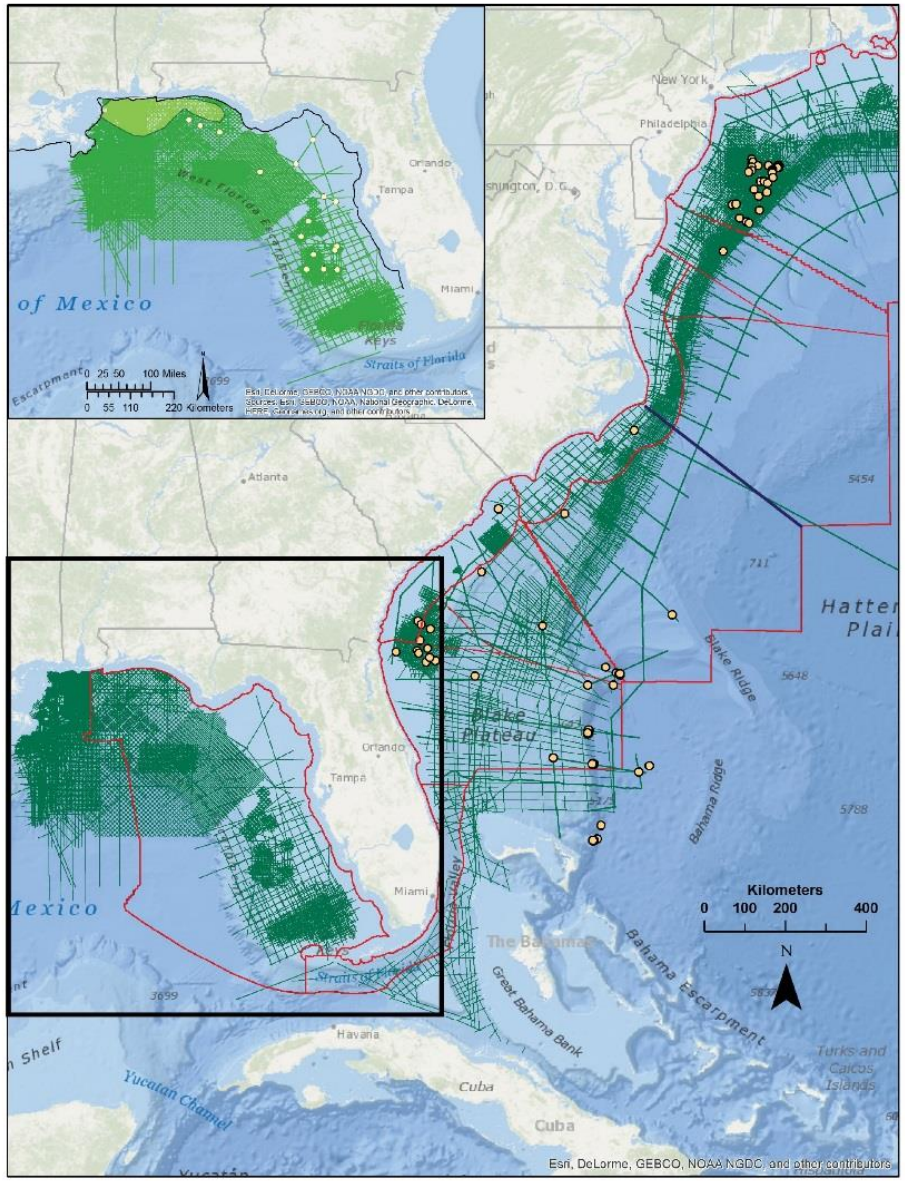


Why Offshore Reservoirs?

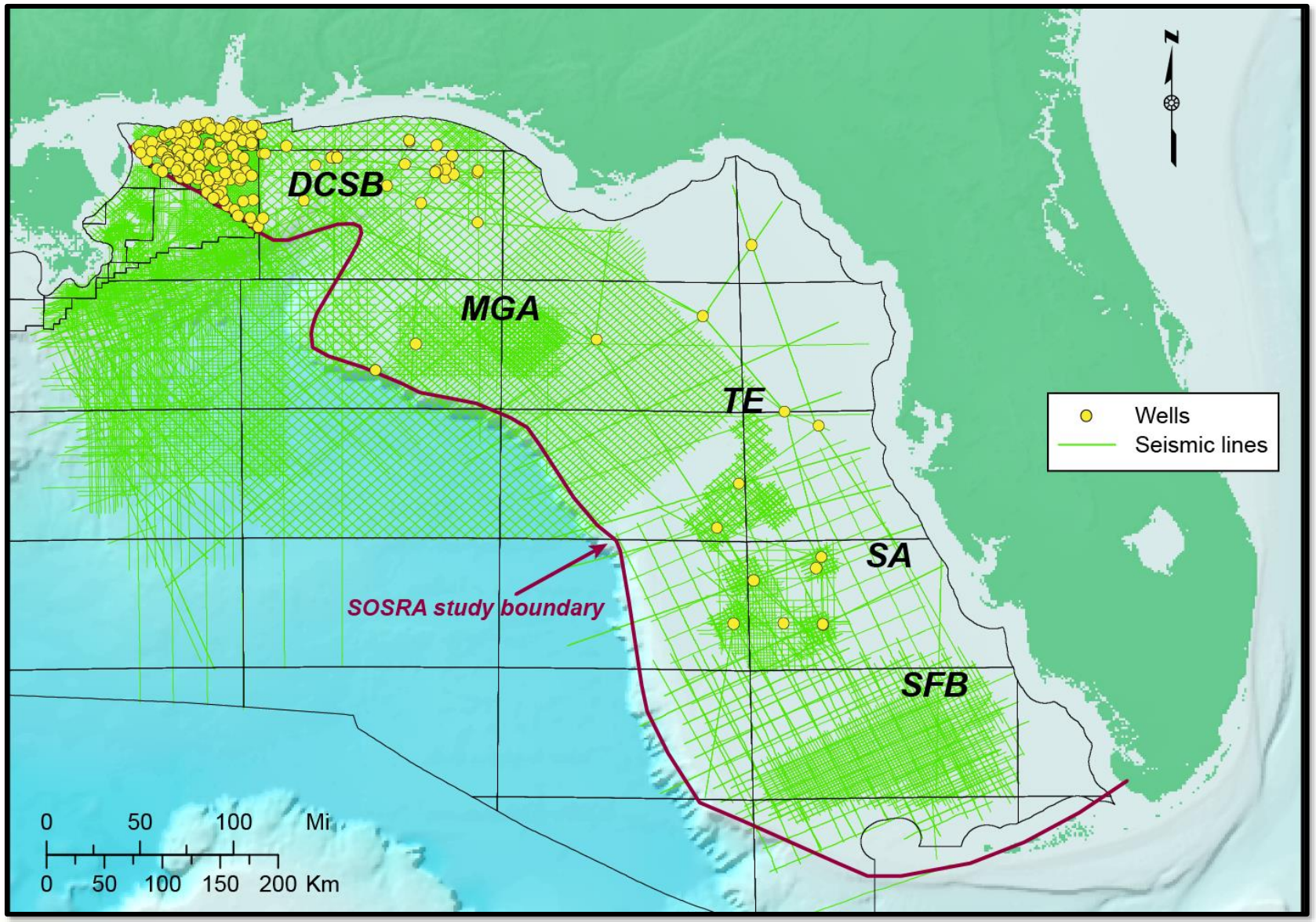
- Potentially giant CO_2 capacity
- Abundant stacked saline formations and depleted oil and gas reservoirs
- Significant infrastructure in place
- Proven offshore sequestration technology
- Favorable ownership and access

Summary – SOSRA





Study Area and Subregions



DCSB DeSoto Canyon Salt Basin

MGA Middle Ground Arch

TE Tampa Embayment

SA Sarasota Arch

SFB South Florida Basin

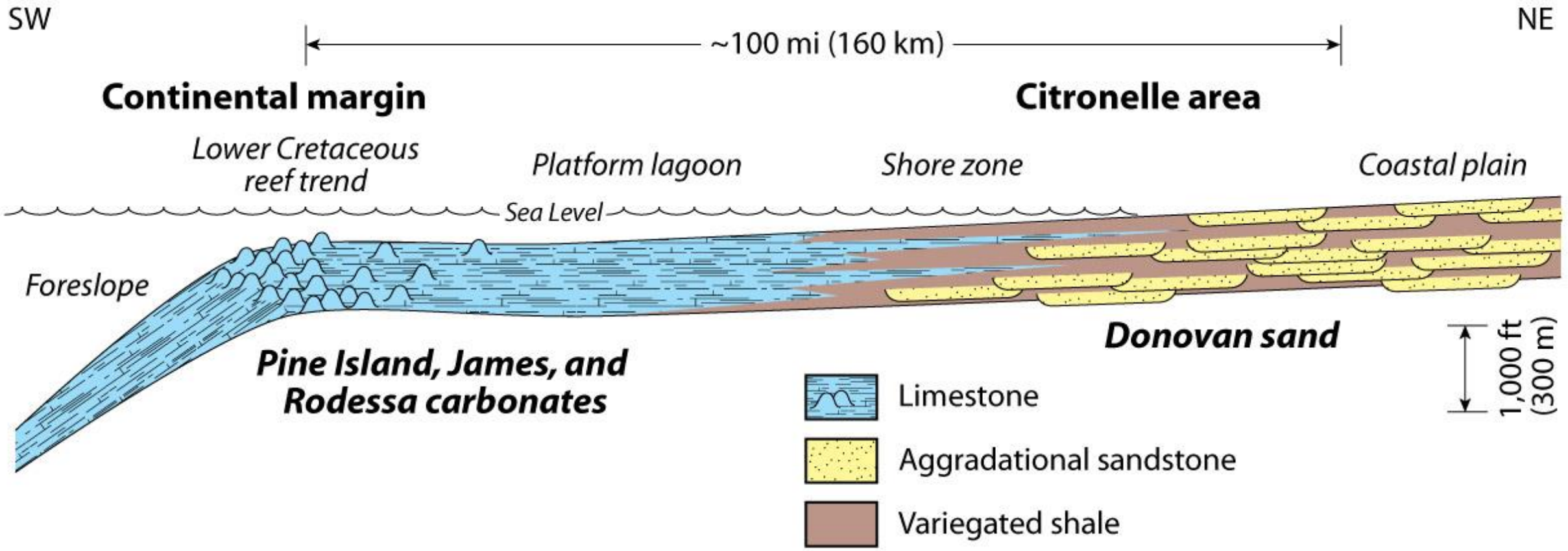
This material is based upon work supported by the U.S. Department of Energy National Energy Technology Laboratory.

Cost share and research support are provided by the Project Partners and an Advisory Committee

Cretaceous Facies

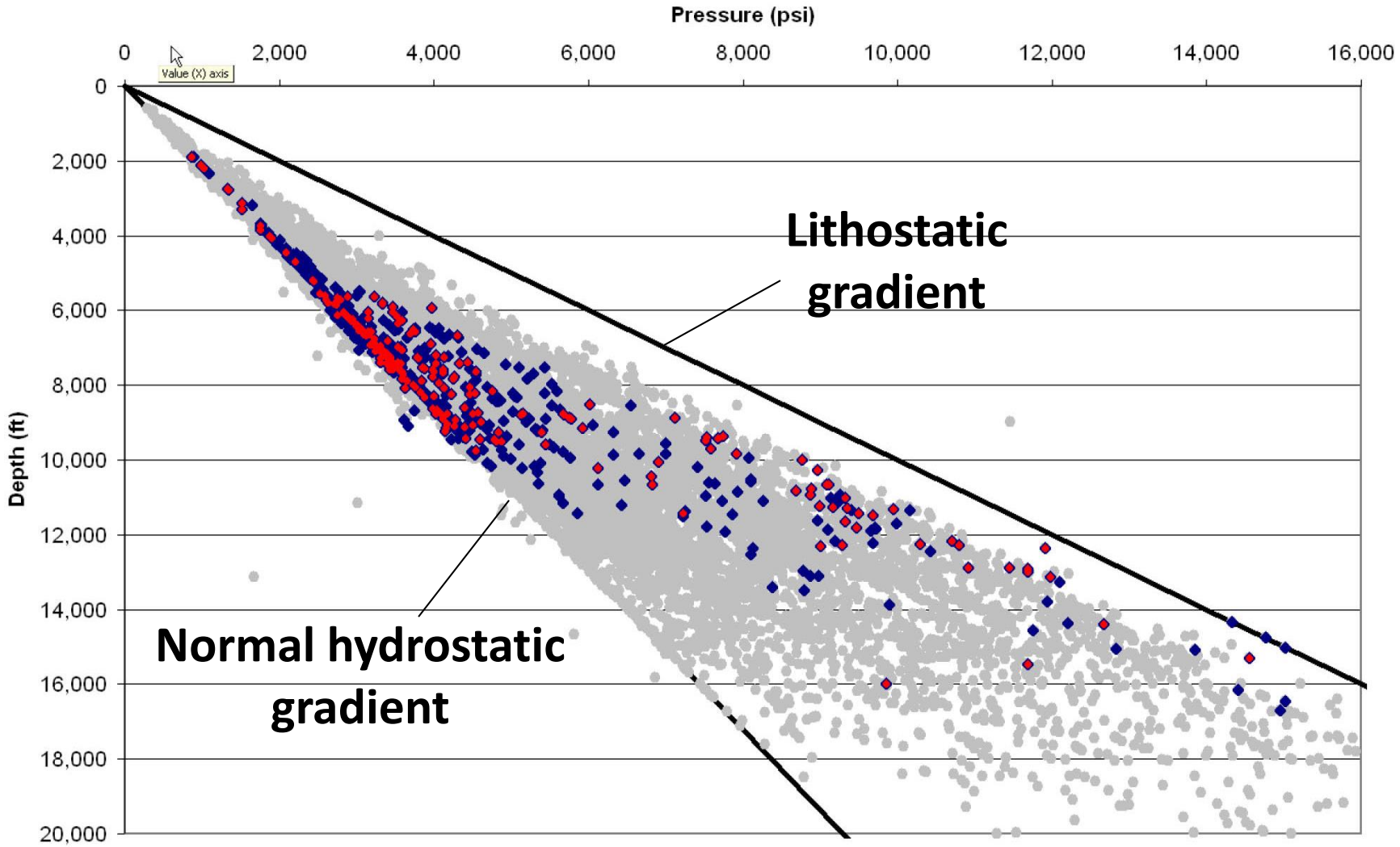
SOSRA REGION

NETL EOR TEST
SECARB ANTHROPOGENIC TEST



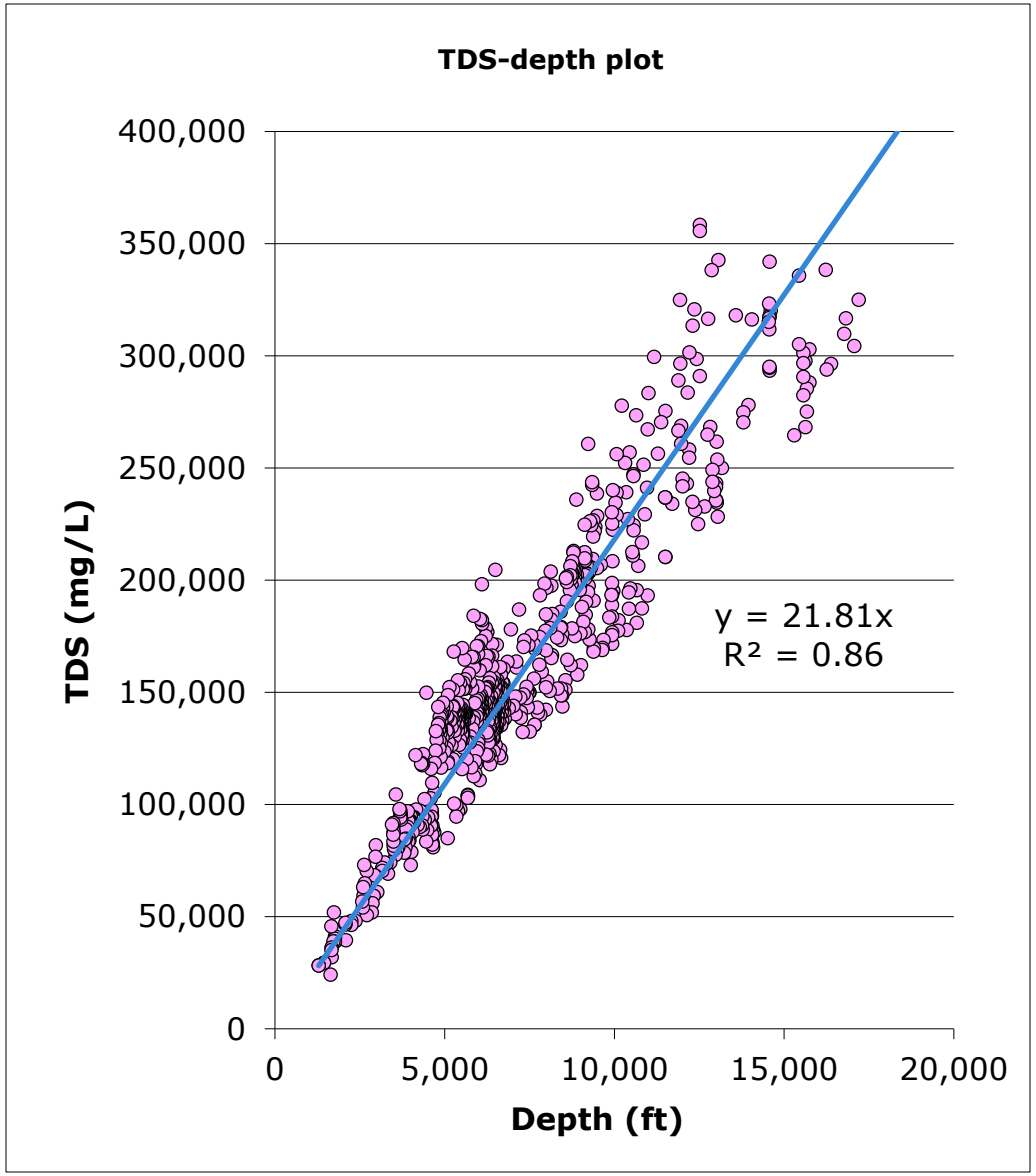
Pashin et al. (2014)

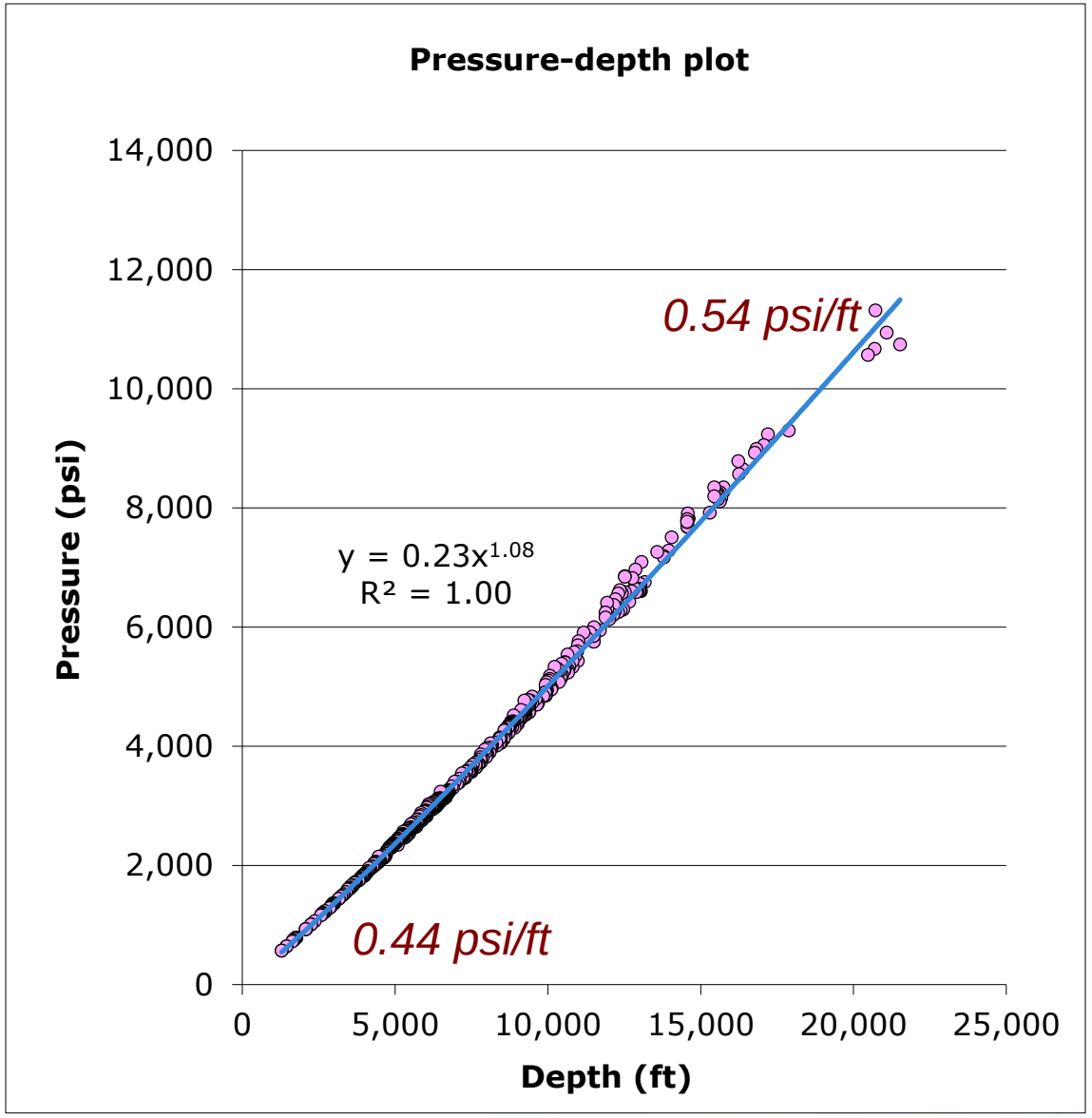
Miocene Pressure Data, Gulf of Mexico



Meckel (2010)

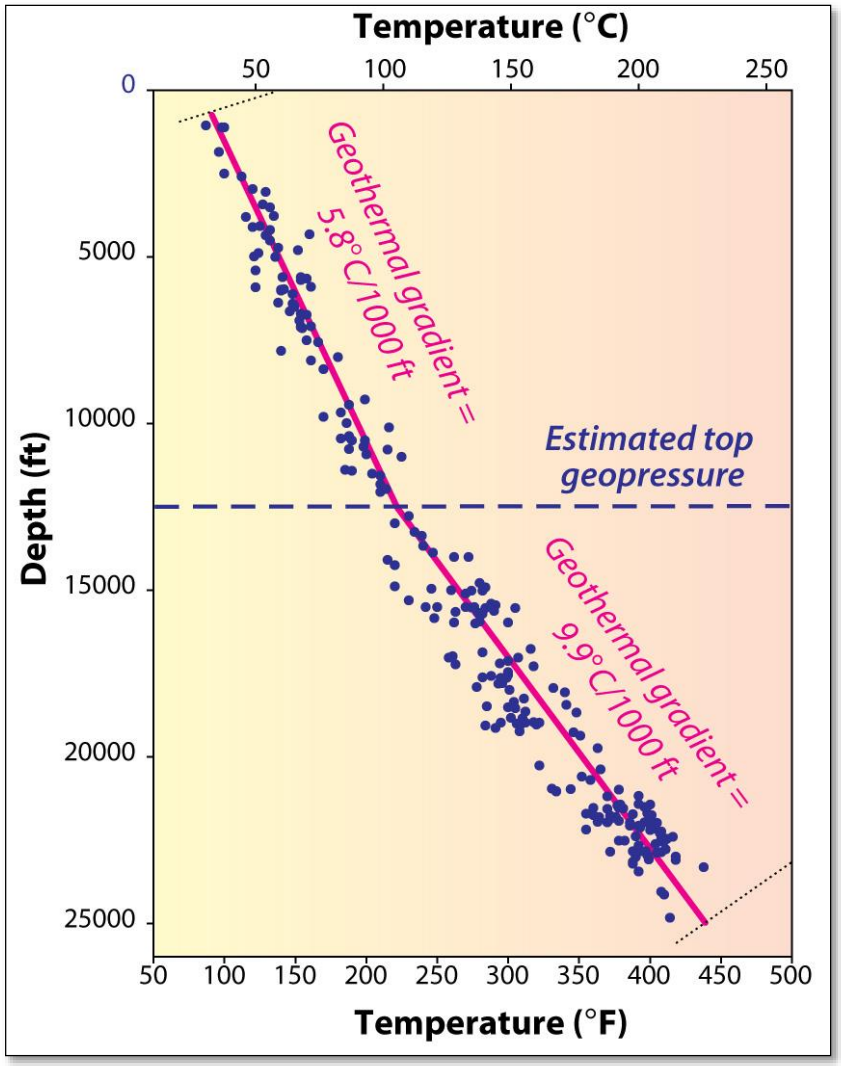
Normal Brine, Pressure Gradients, Onshore Eastern Gulf



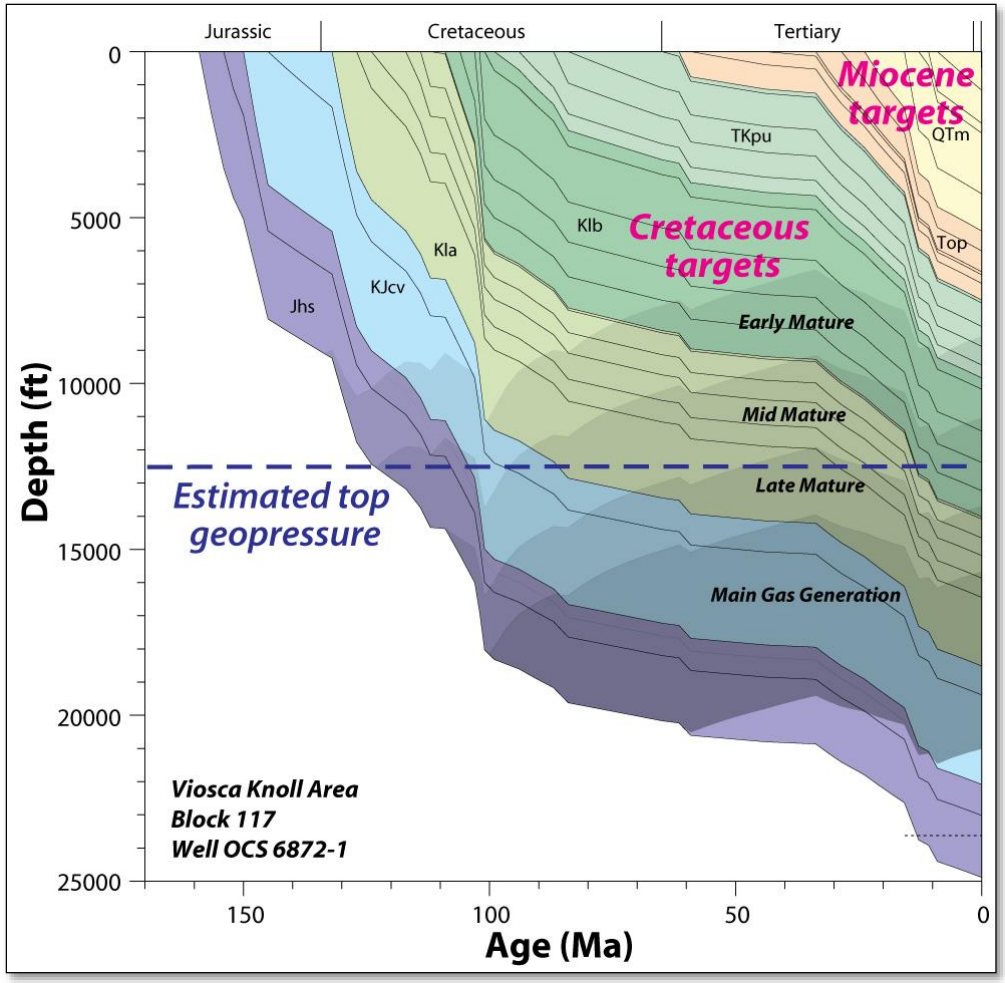


Geothermal and Burial Data, DCSB

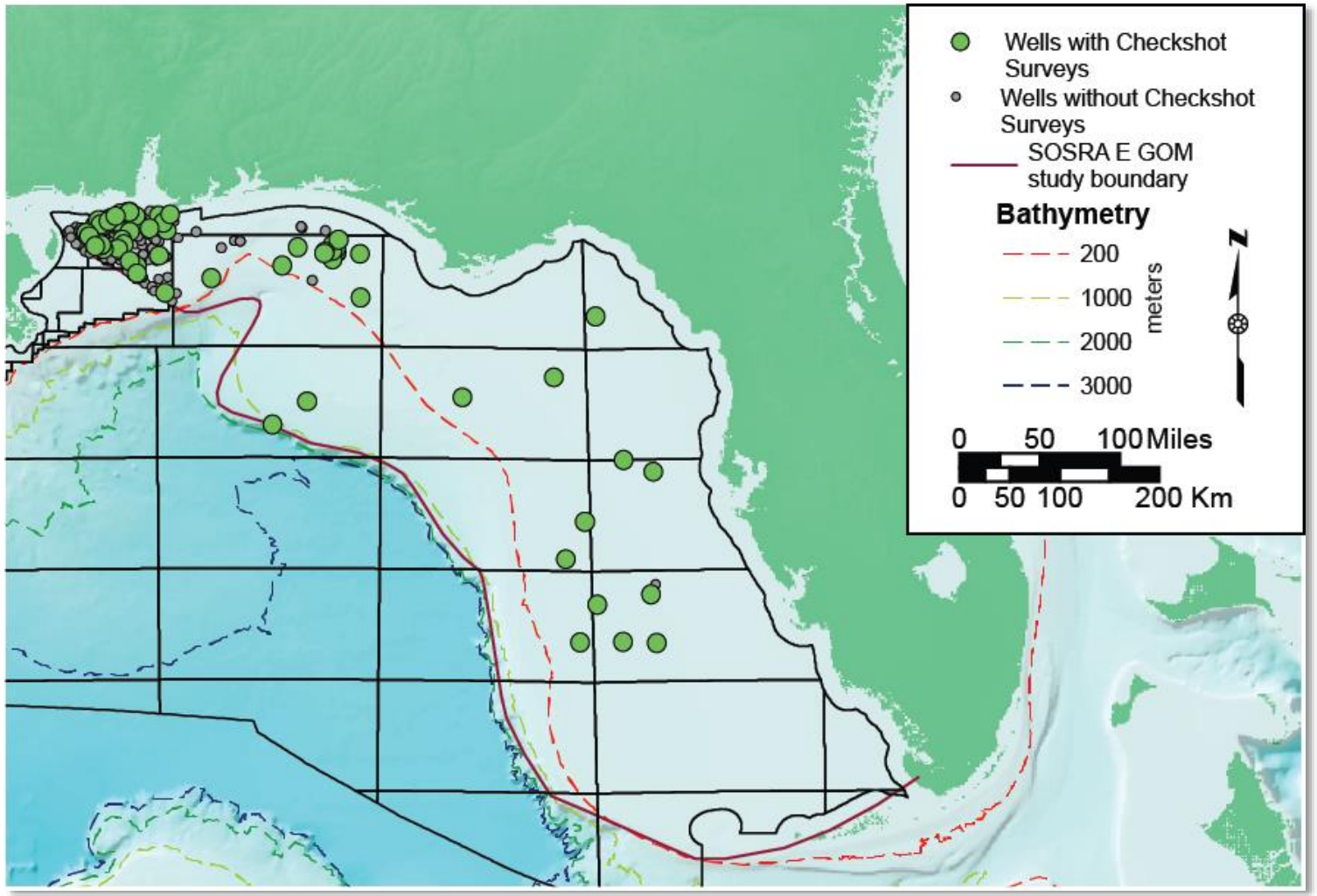
Temperature-depth profile

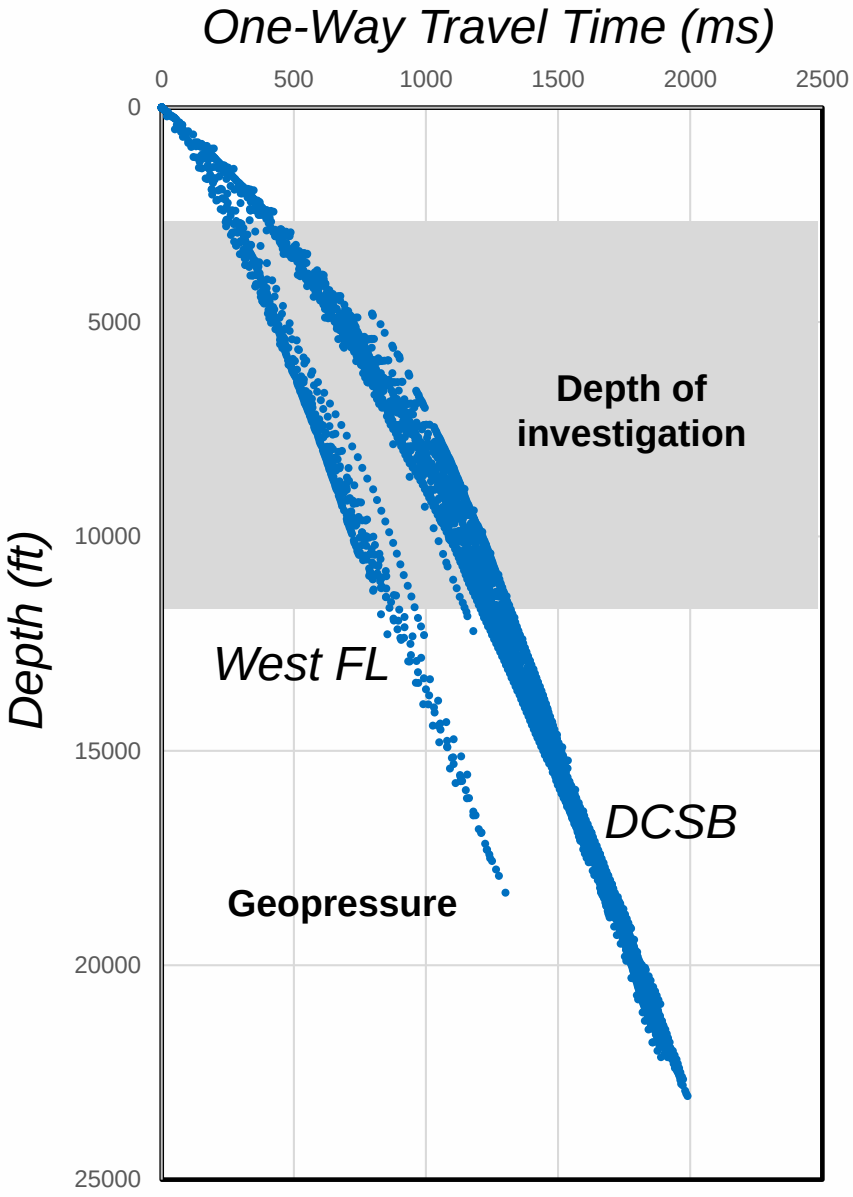


Burial history curve

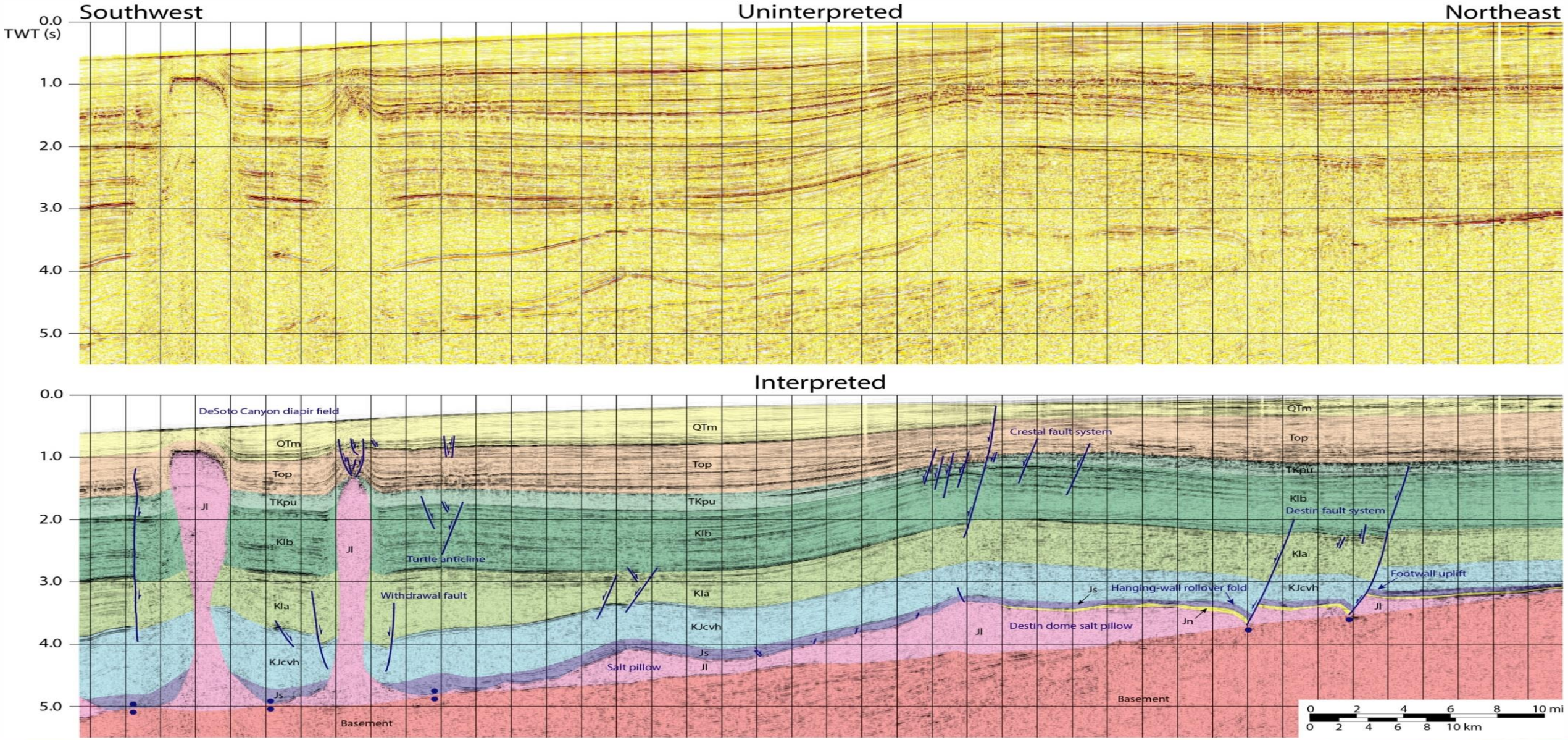


Seismic Velocity Surveys

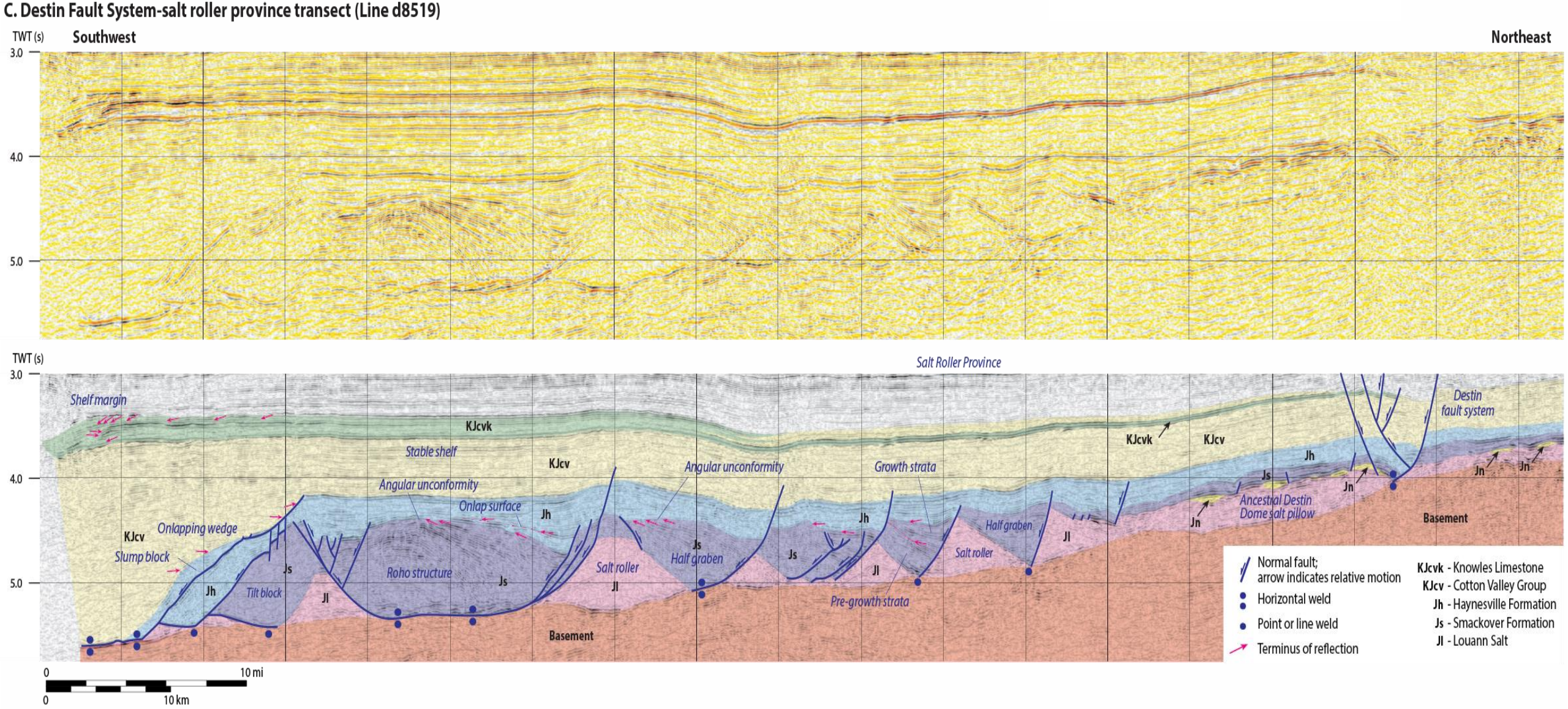




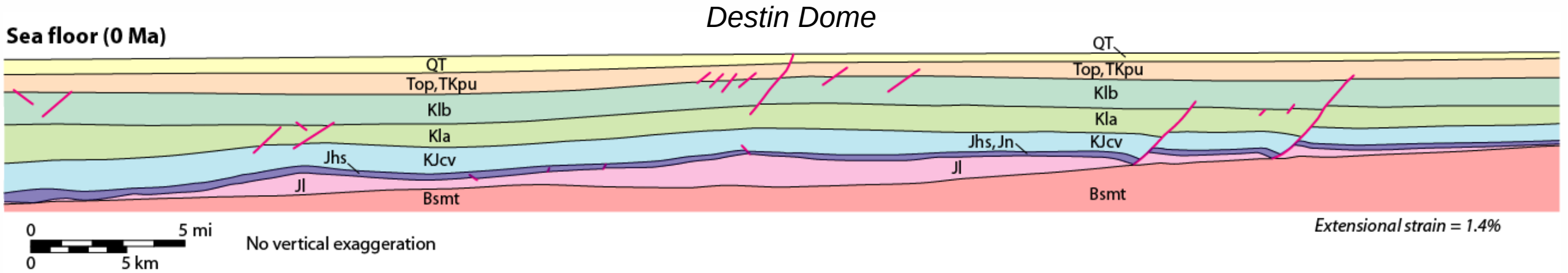
DCSB Destin Dome

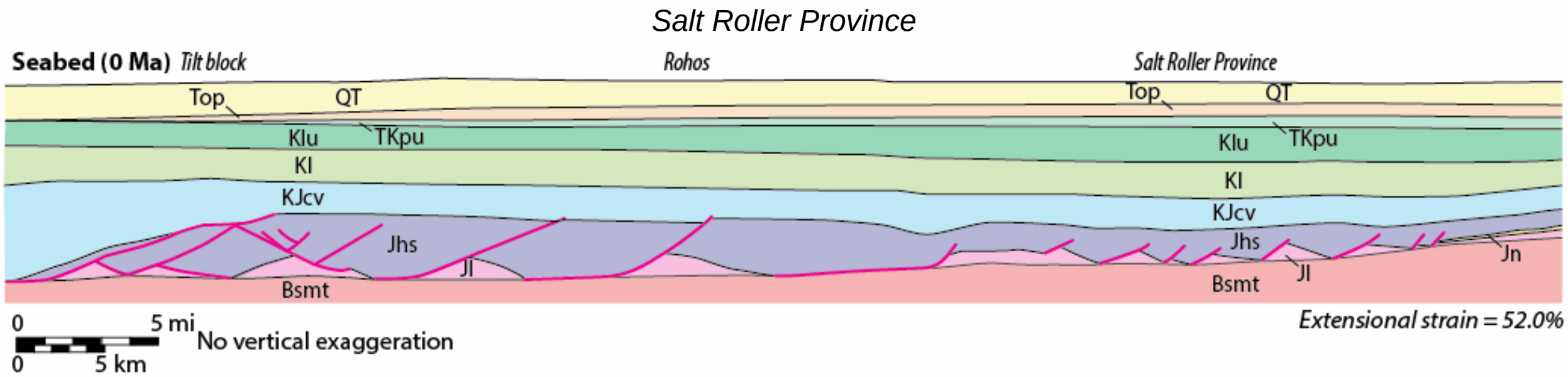


DCSB Salt Roller Province

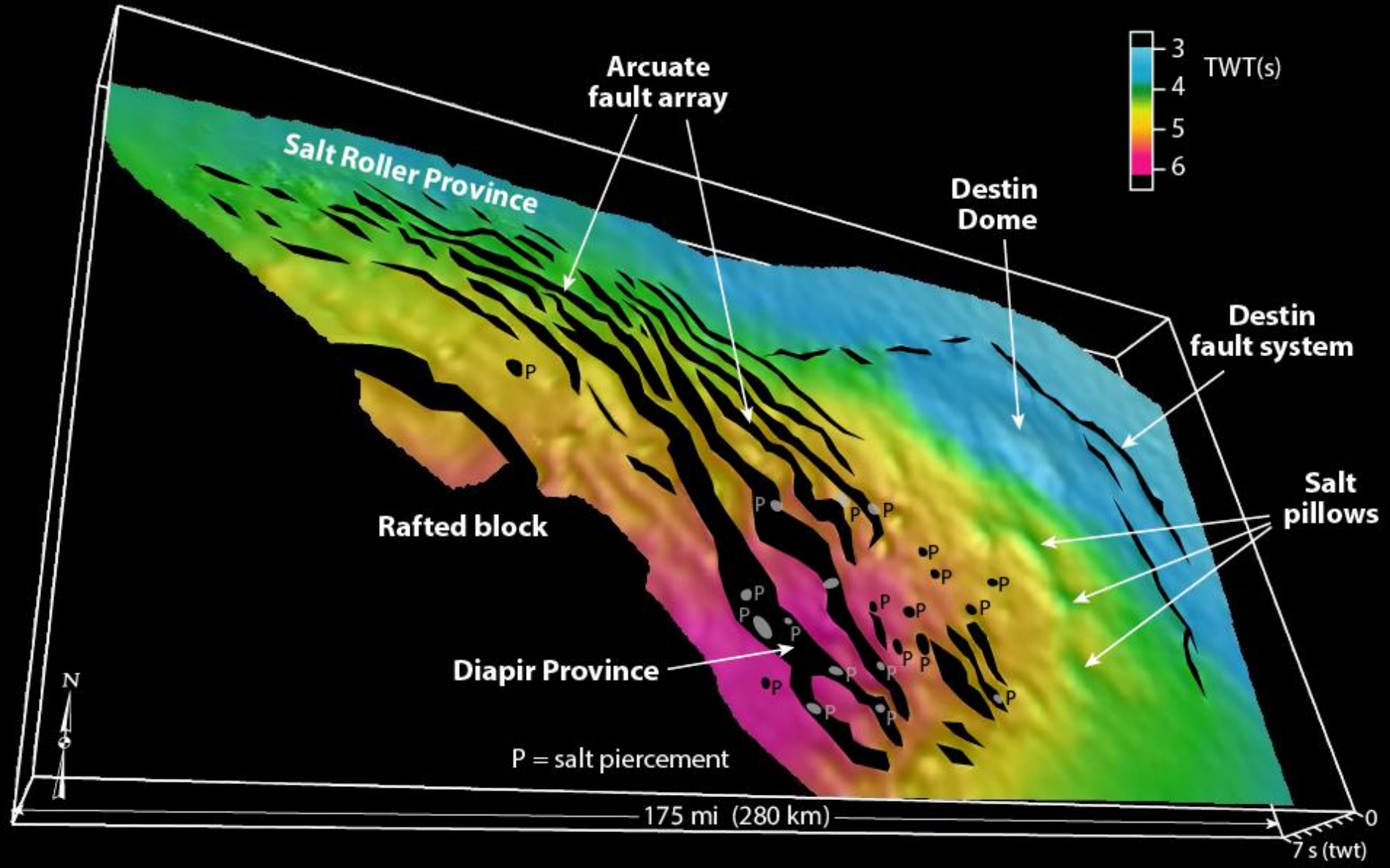


Depth Converted Structural Cross Sections, DeSoto Canyon Salt Basin

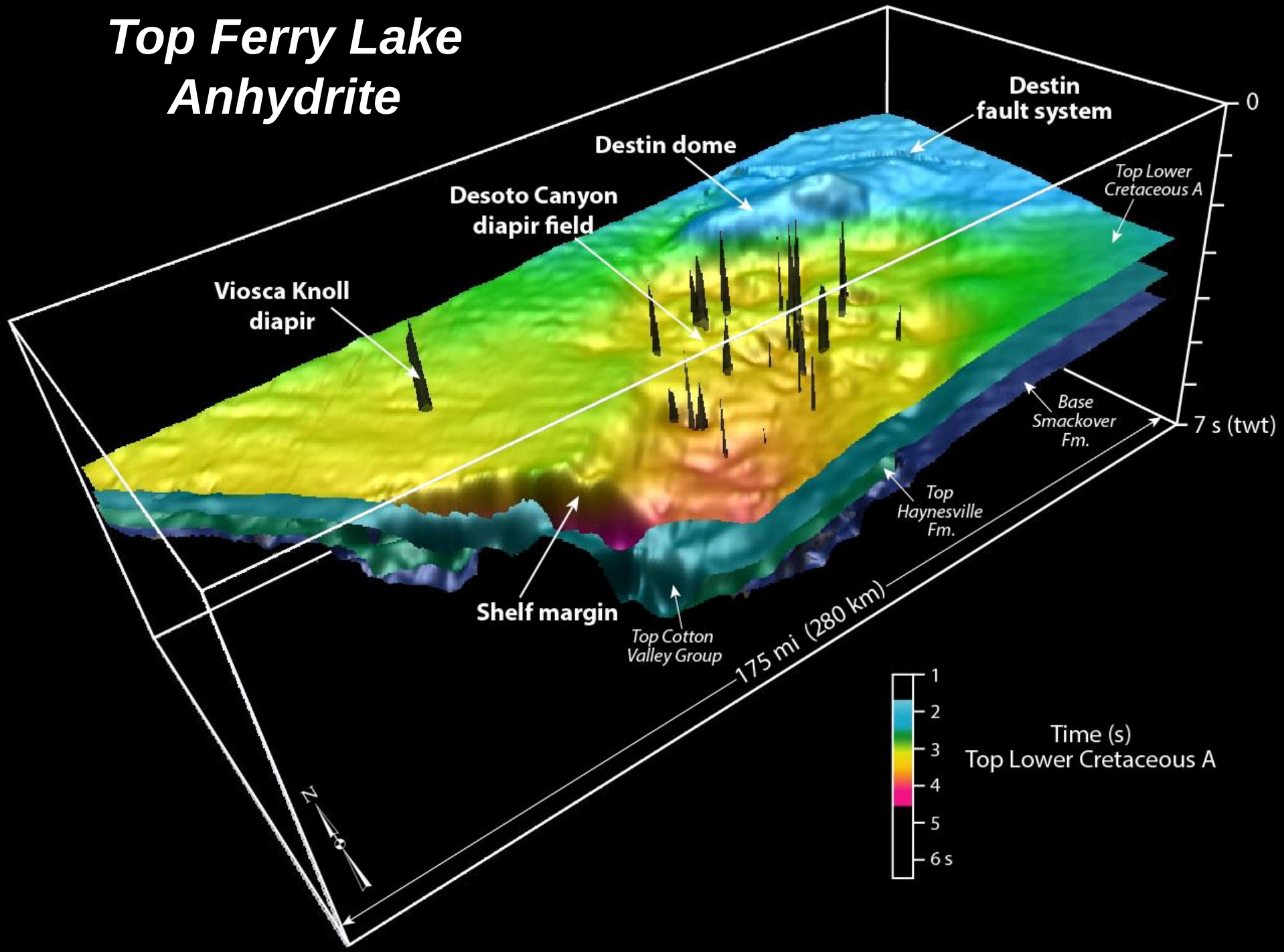




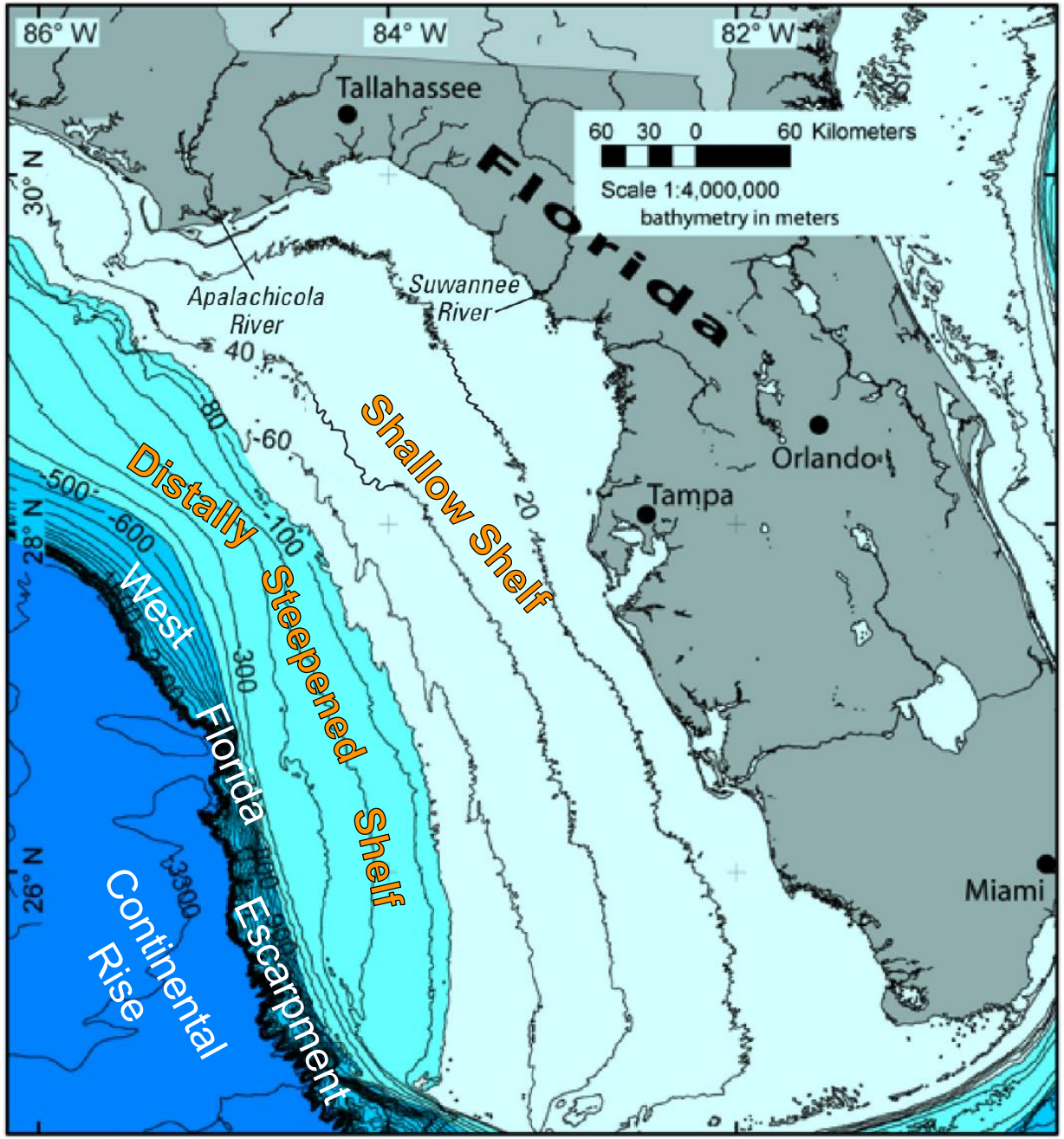
Top Smackover Limestone



Top Ferry Lake Anhydrite

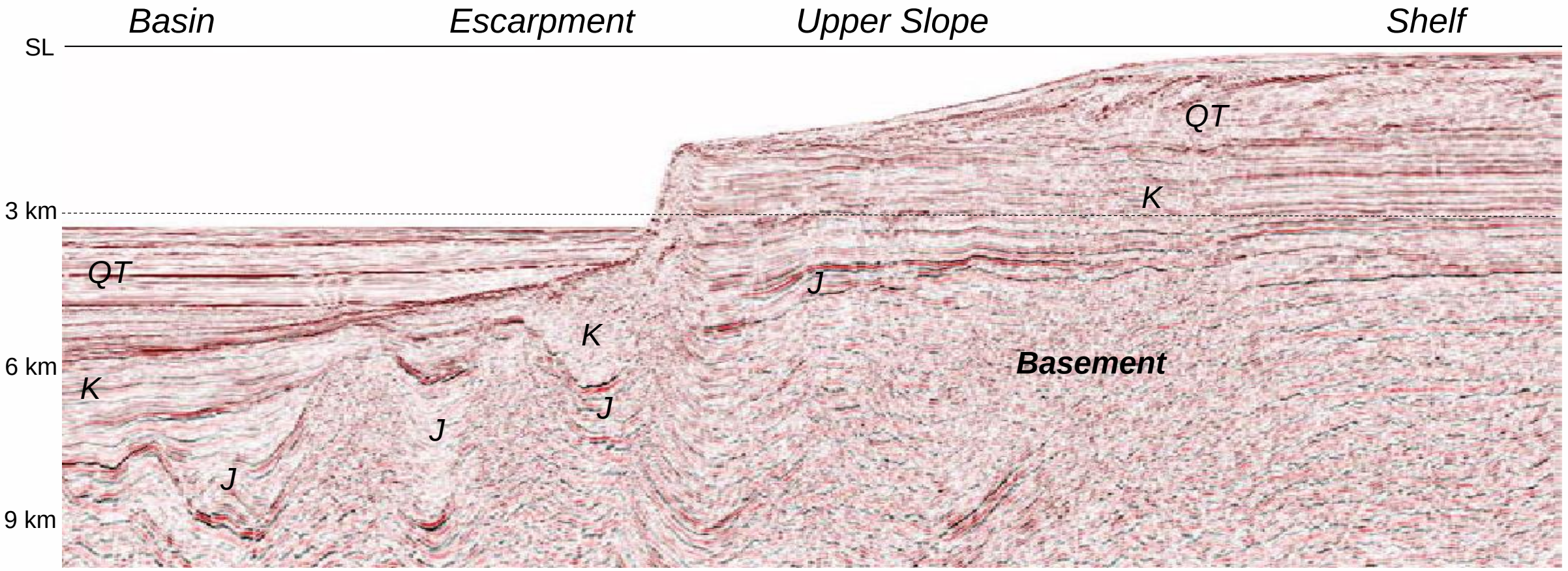


West Florida Shelf Bathymetry



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

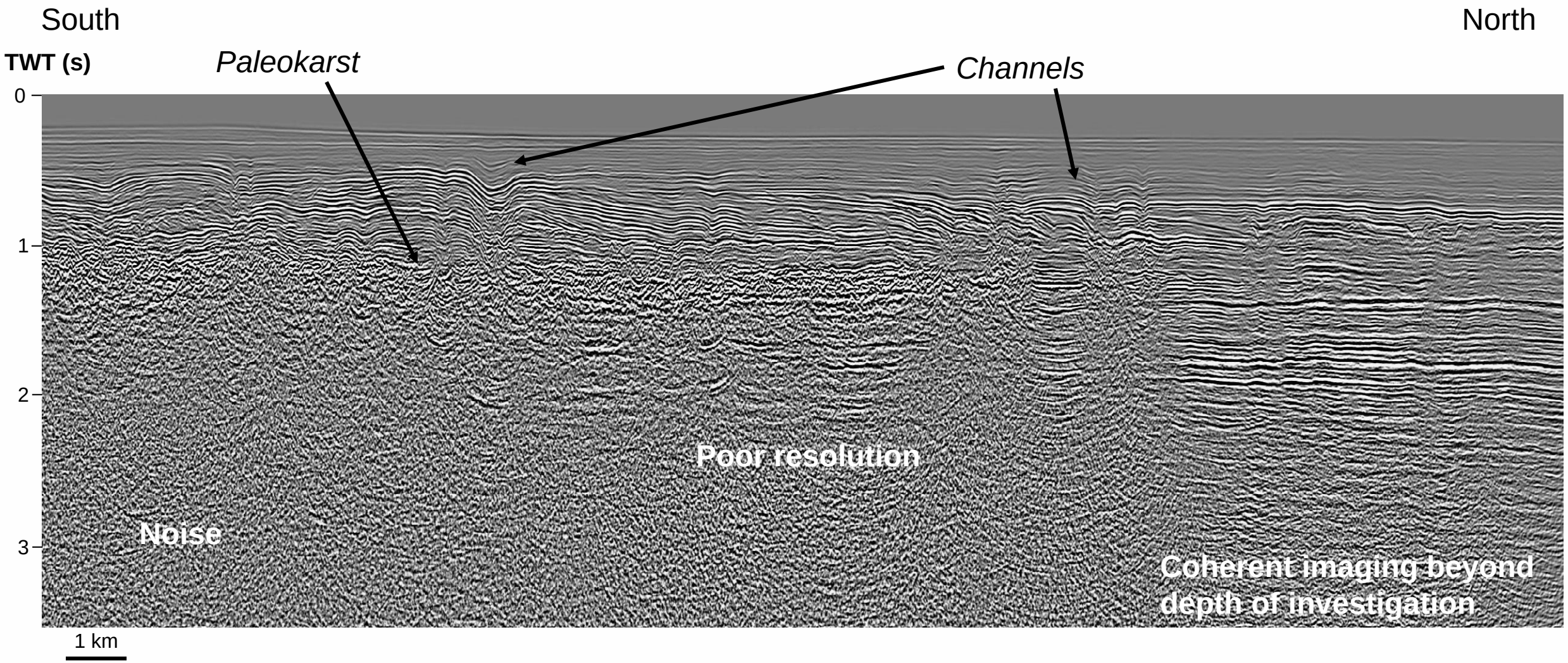
West Florida Shelf-Escarpment



VE ~4x

Roberts and Erickson (2009)

Data Quality – West Florida



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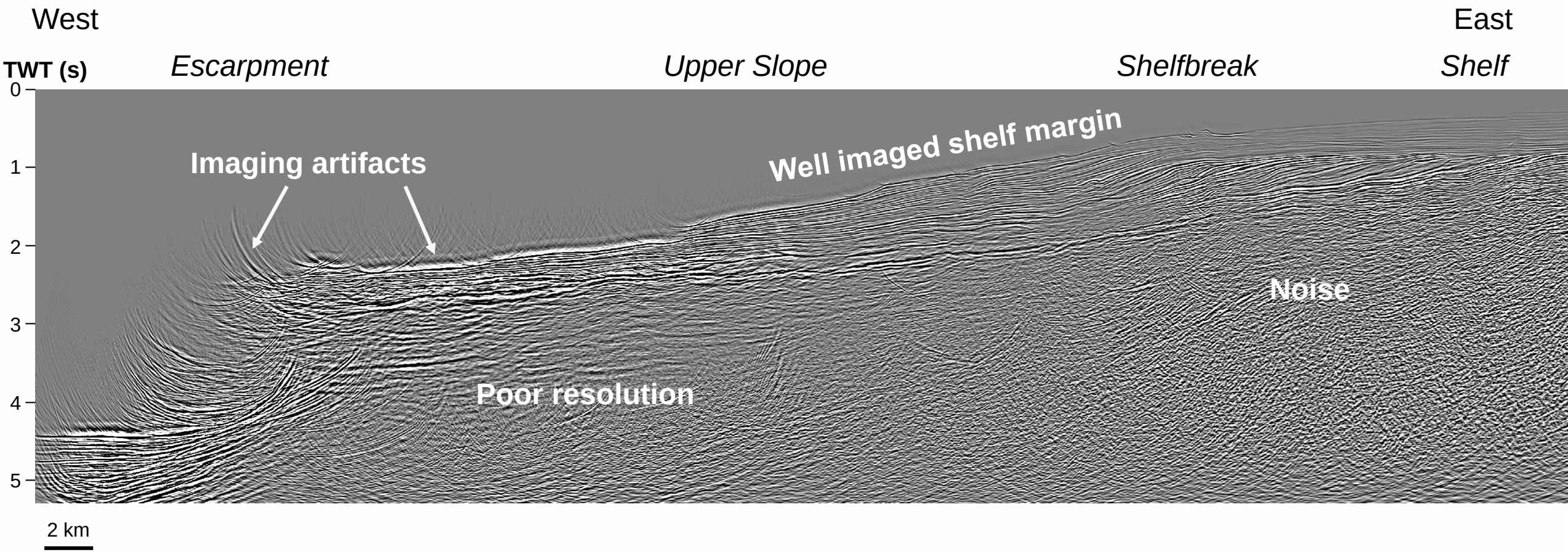
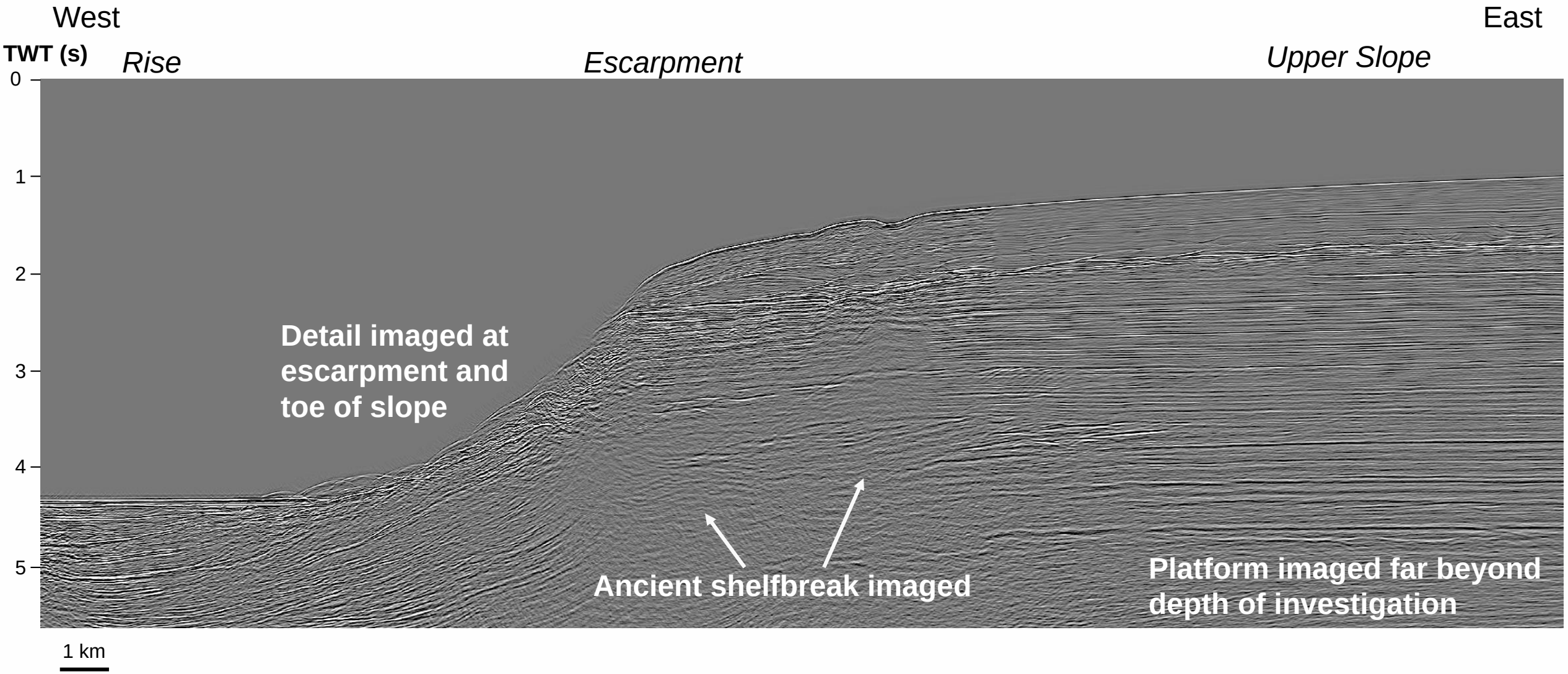
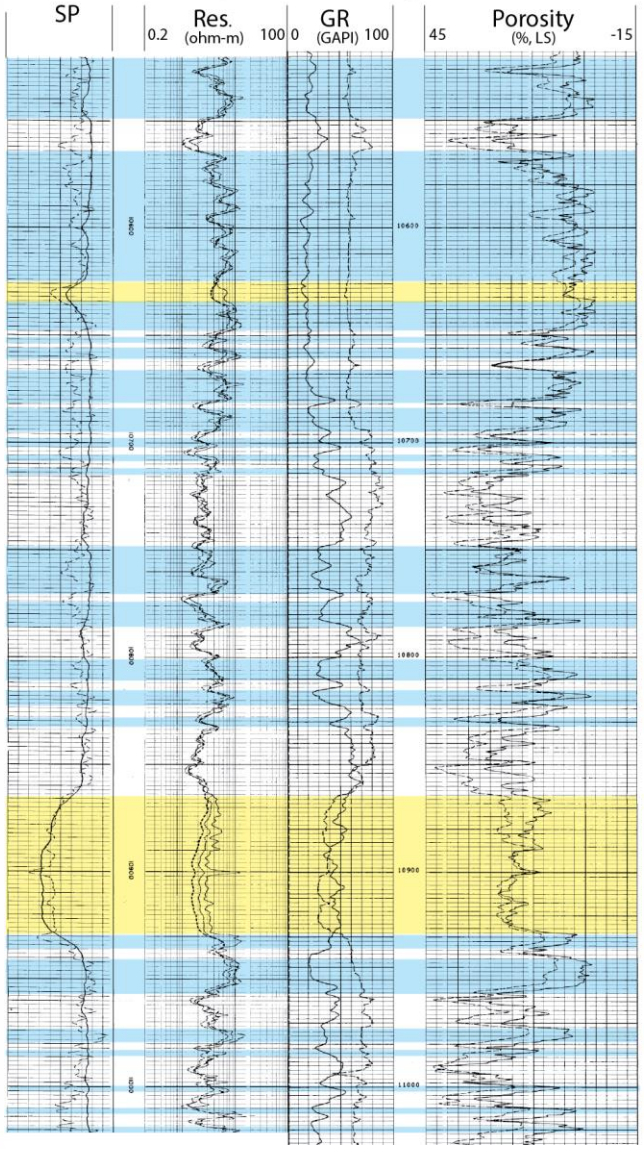


Data Quality – West Florida



Prospective EGOM Sinks

Well G02468, Desoto Canyon Salt Basin



Paluxy Formation

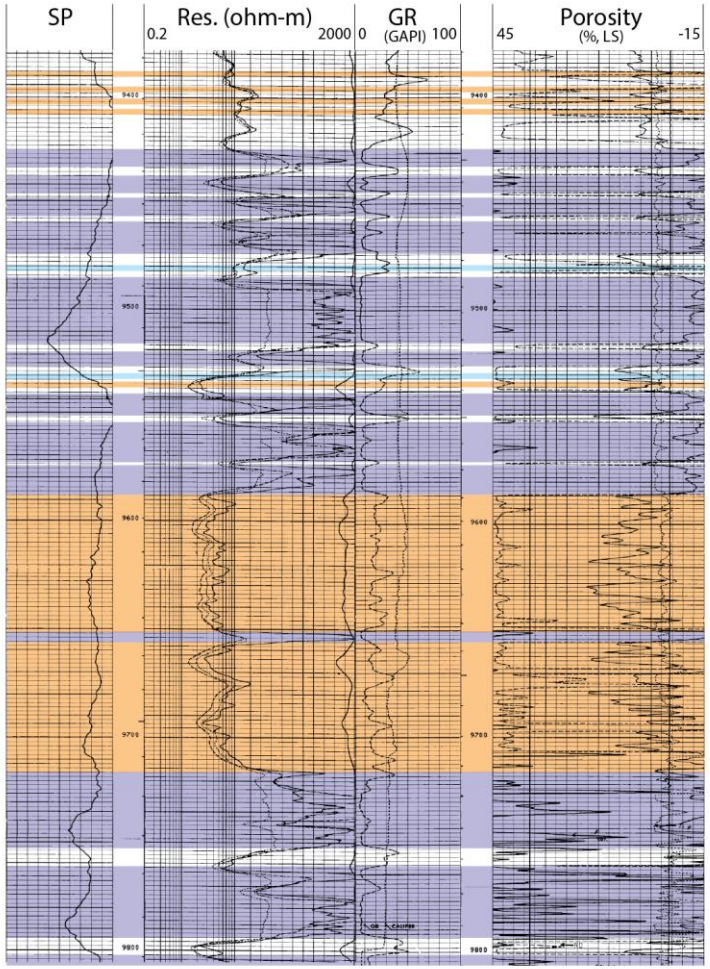
Major prospects in sandstone of Tuscaloosa Group and Paluxy Fm.

Topseal

Reservoir

Porosity locally >20%

Well G3912, West Florida Shelf



Punta Gorda Anhydrite

Topseal

Reservoir

Porosity locally >15%

Reservoir

Major prospects in porous dolomite associated with anhydrite intervals

Shale | Sandstone | Limestone | Dolomite | Anhydrite

A Tale of Two Platforms

Ultradeep gas platform

Shallow gas well

Observations and Issues

- Large portfolio of potential sinks and seals in eastern Gulf of Mexico region.
- Seismic and well data being interpeted.
- Geopressure >12,000 ft; main storage prospects in Cretaceous-Miocene section.
- Multiple sandstone formations prospective in DeSoto Canyon Salt Basin; abundant mudrock and carbonate seals, including chalk.
- Relatively simple Cretaceous carbonate platform and distally steepened Cenozoic shelf in West Florida.
- Variable seismic quality in West Florida.
- Porous dolomite below anhydrite seals.