

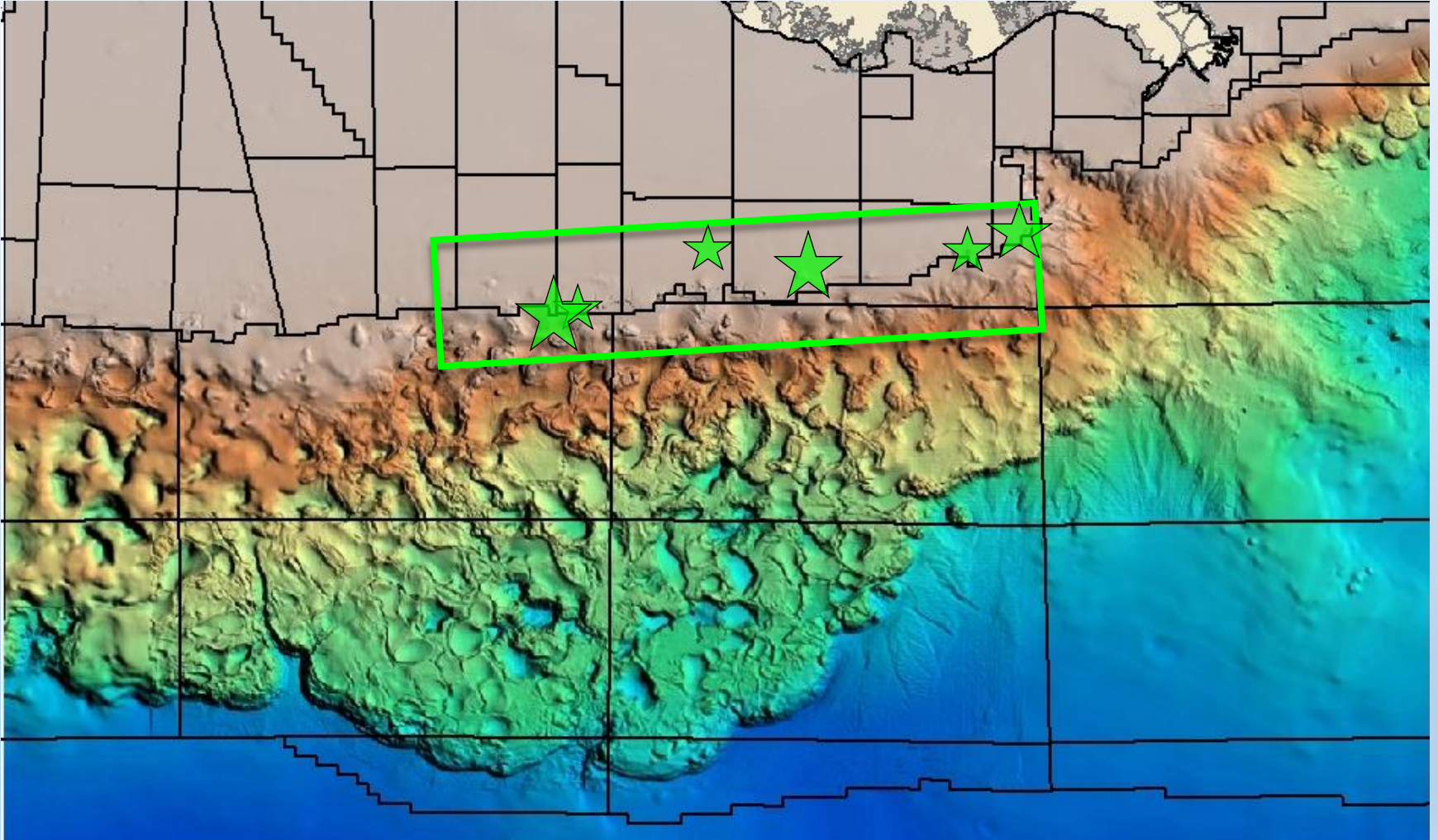
Advanced Exploration Technology & Concepts: Key to Future Gulf of Mexico Deep Shelf Oil & Gas

**Dwight “Clint” Moore & Michael Neese
with Rich Heaney, Bill Lefler, & Tom Uphoff**



**GCAGS 2014 – Lafayette, LA
October 6 2014**

Shelf Miocene Sub-Salt Play Area



Exploring a Proven Petroleum System

400+ MMboe were discovered in the 1990s in the Shelf Miocene Sub-Salt play

Conger 240+ MMBoe

Discovered	1 st Prod
1998	2000

Hickory >45 MMBoe

Discovered	1 st Prod
1998	2000

Mahogany >45 MMBoe

Discovered	1 st Prod
1993	1997

Enchilada >30 MMBoe

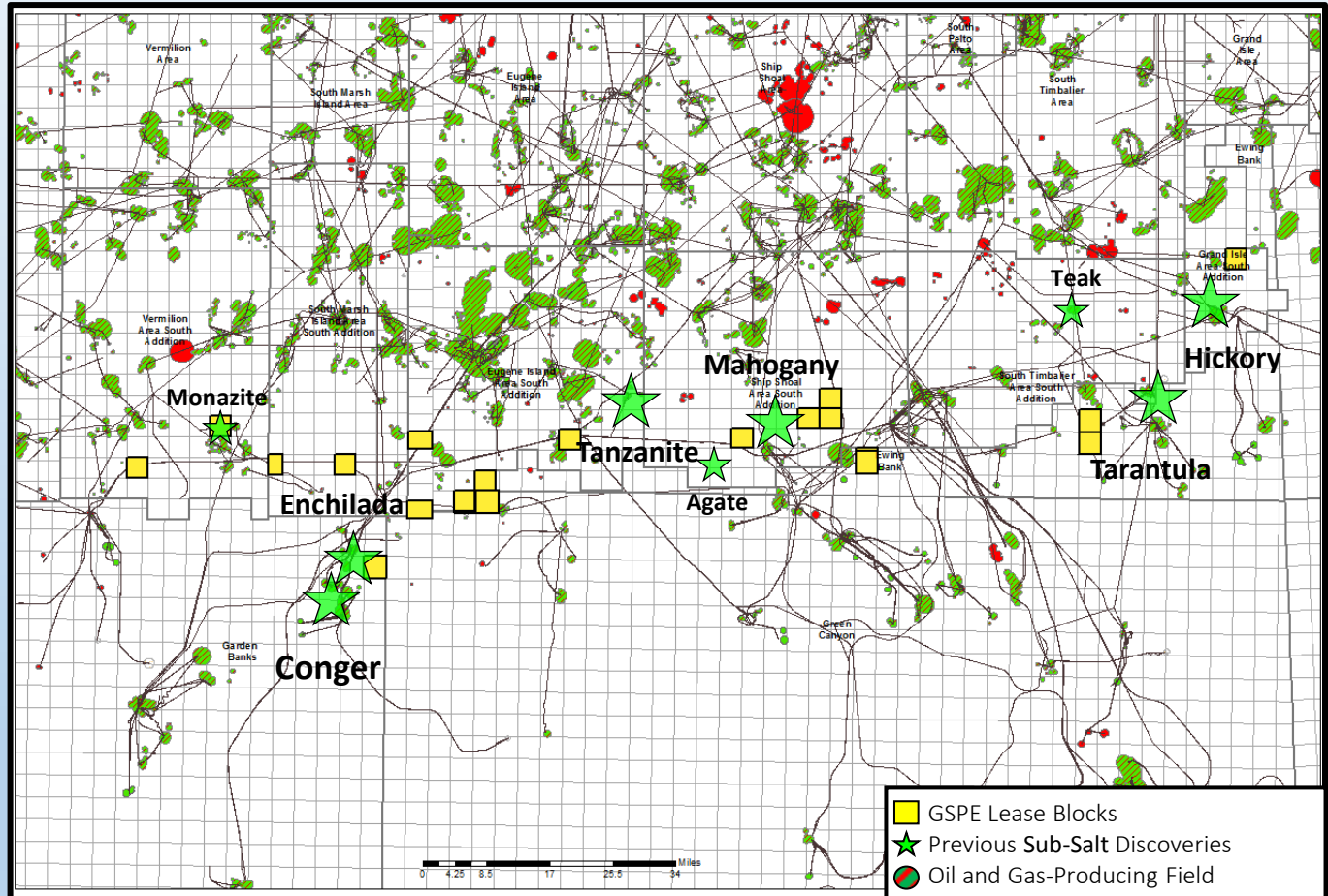
Discovered	1 st Prod
1995	1997

Tanzanite >20 MMBoe

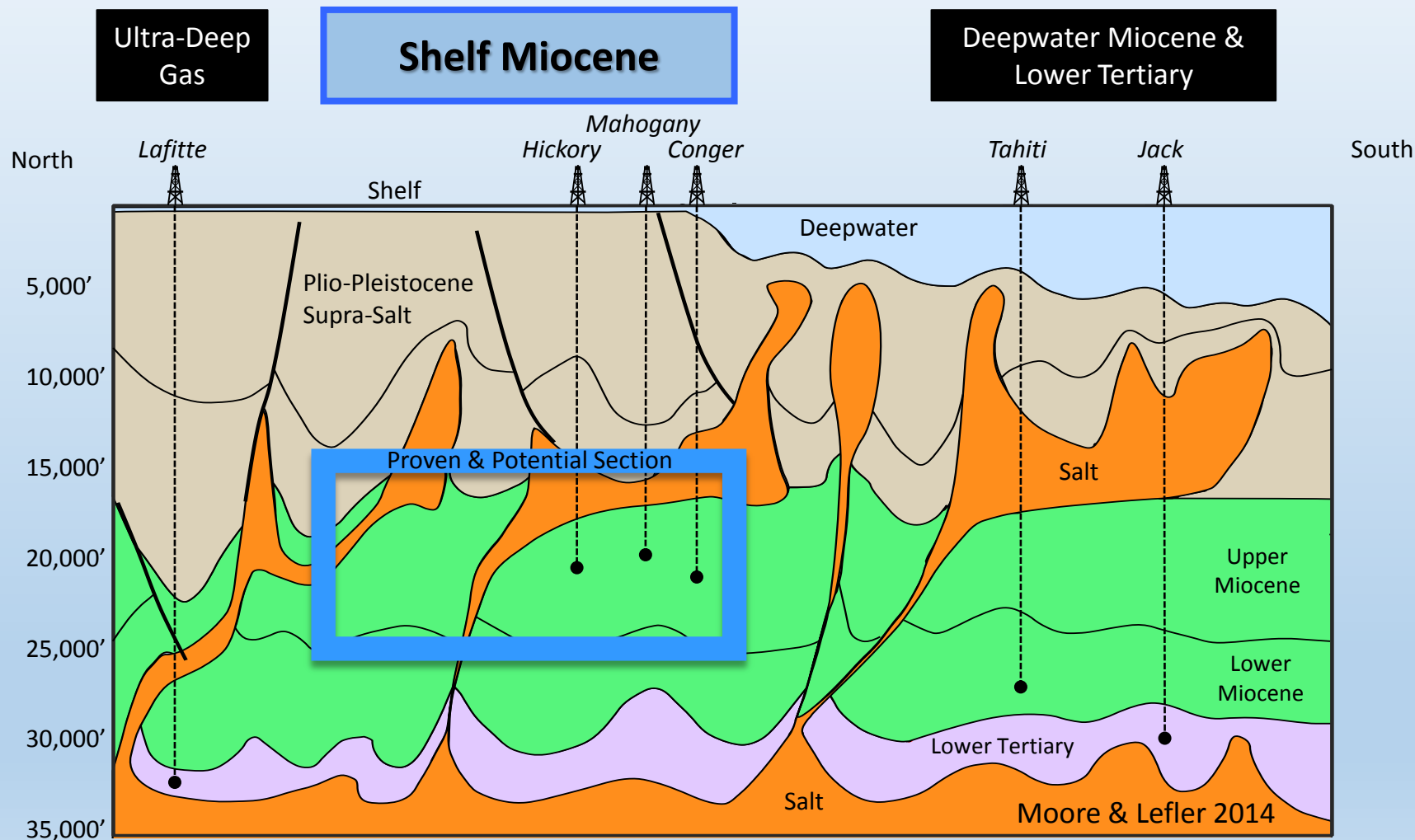
Discovered	1 st Prod
1998	1999

Tarantula >15 MMBoe

Discovered	1 st Prod
2001	2004

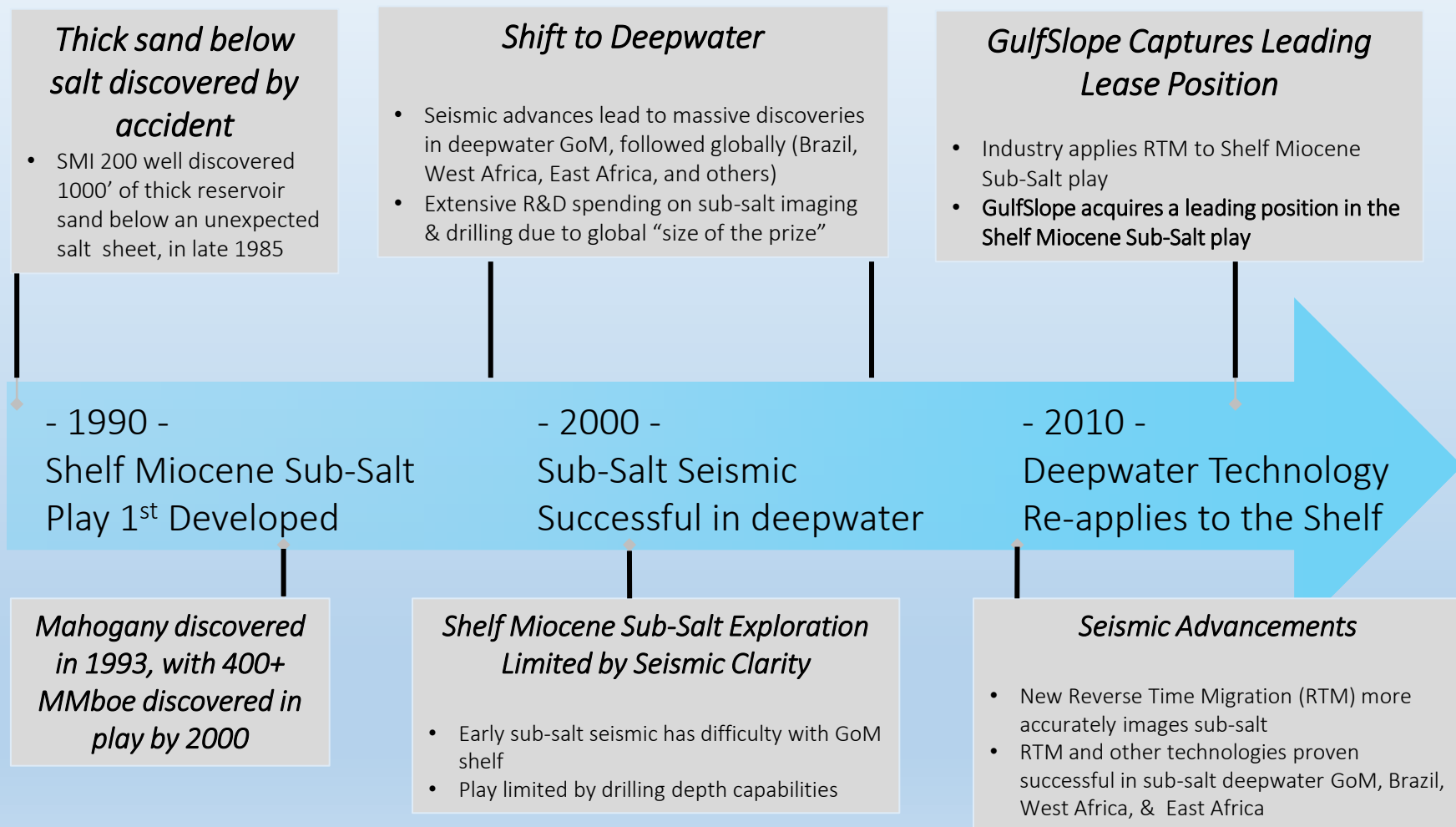


Shelf Miocene Sub-Salt Target Section



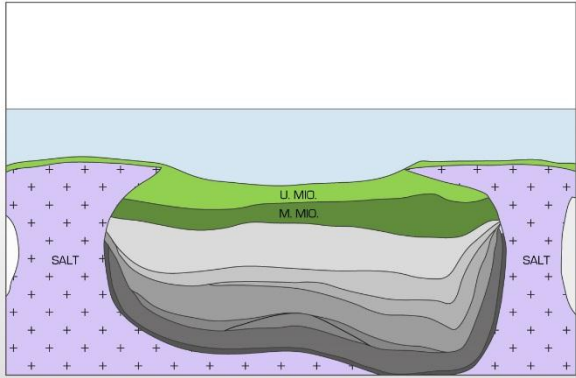
Evolution of the Shelf Miocene Sub-Salt Play

The play was 1st produced in the 1990's but older technology left potential giant fields behind

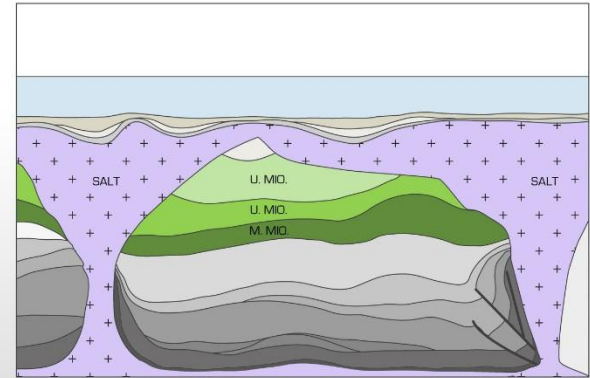


Dynamic Salt & Sediment Model

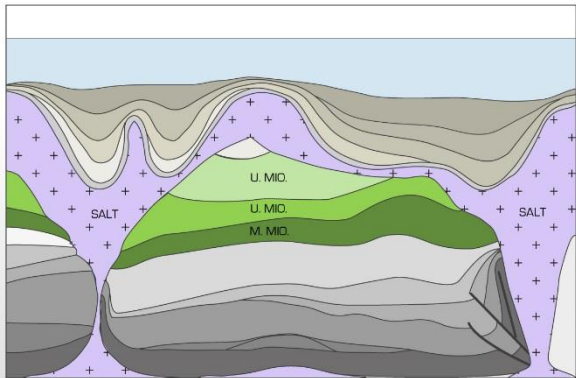
Salt Model - Upper Miocene Time



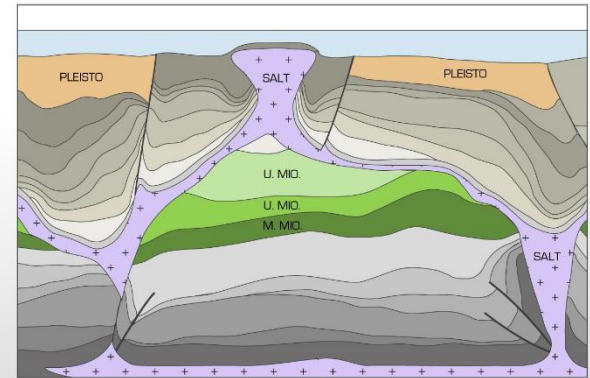
Salt Model - Thick Salt Case



Salt Model - Late Pliocene to Early Pleistocene Time

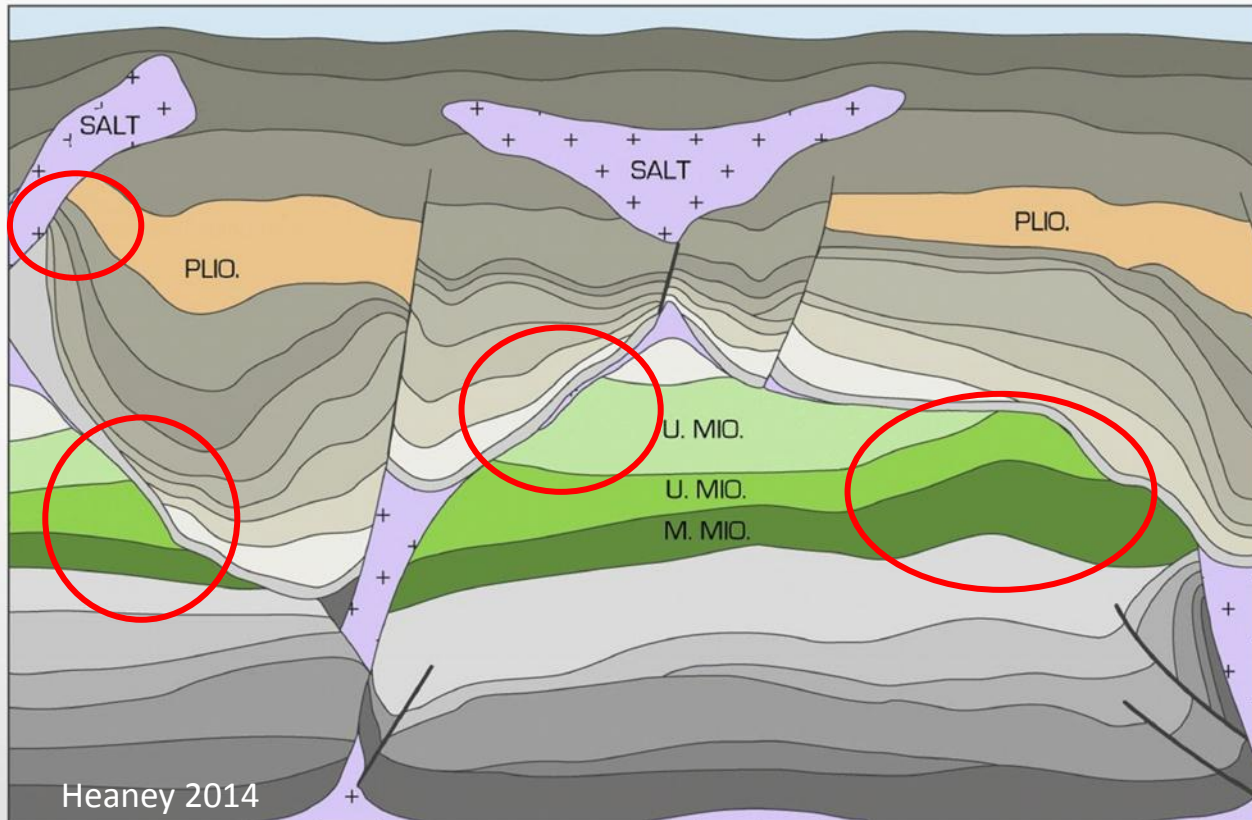


Salt Model - Pleistocene Time



Observed Trap Styles in Play Area Today

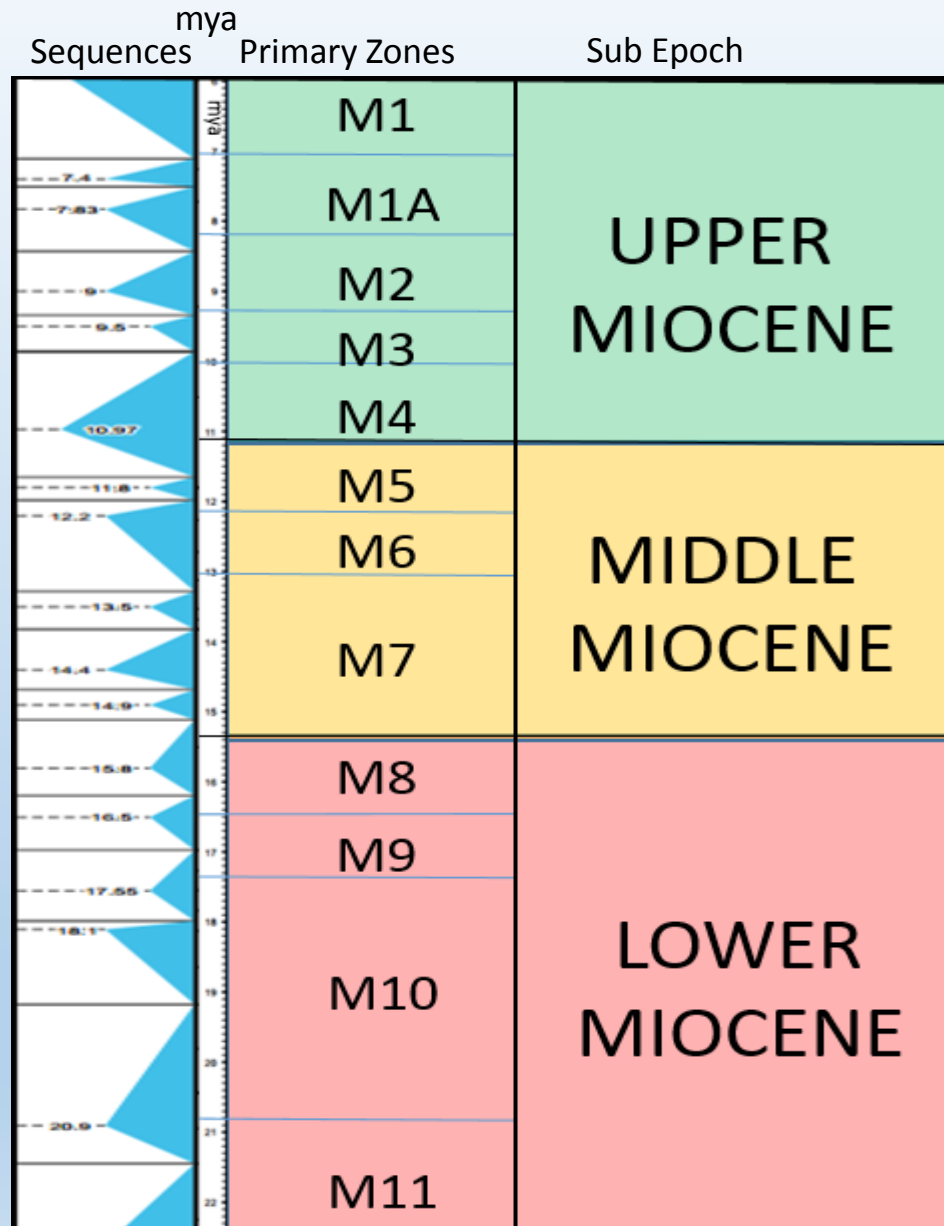
Salt Model - Recent Time



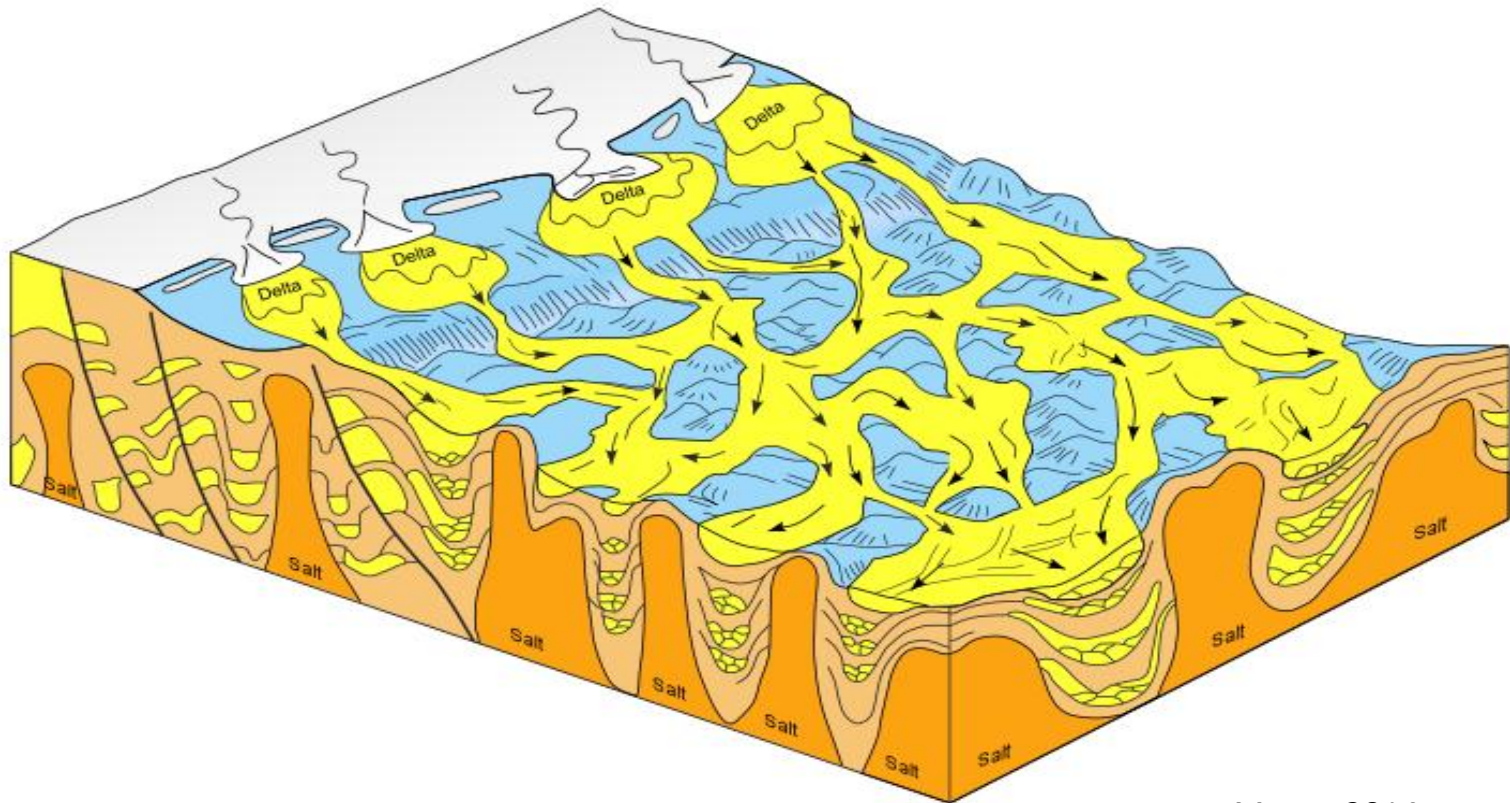
GulfSlope
Energy

GulfSlope
Energy

15+ Sequences - Lowstand Sand Potential

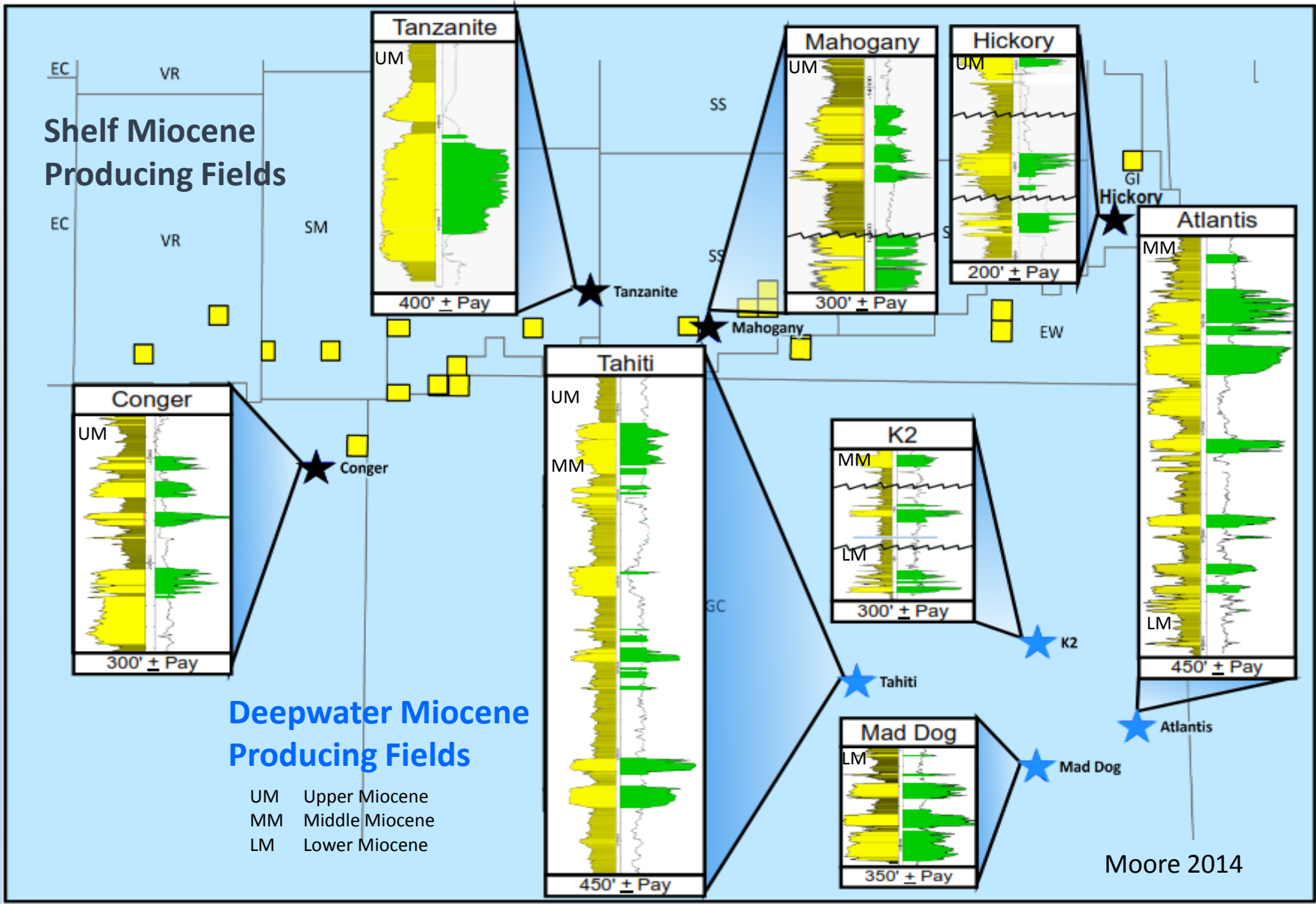


Miocene Deltas Feed Salt-Supported Extended-Slope Creating Confined Mini-Basins

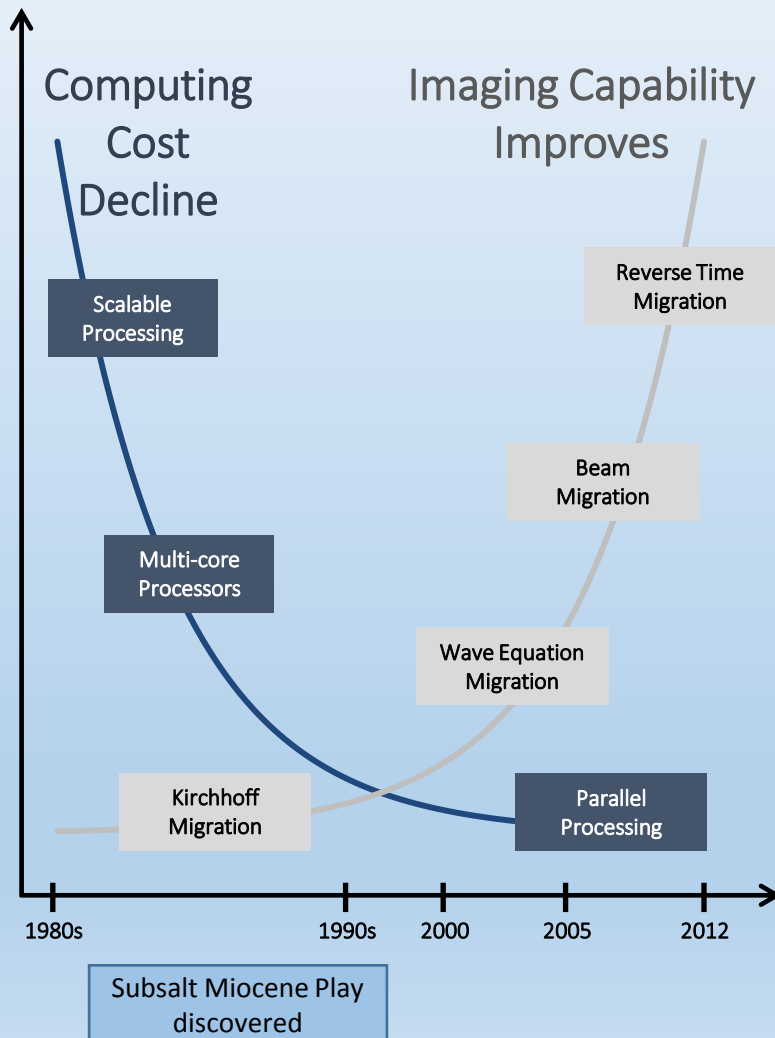


Moore 2014

Miocene Subsalt Pay Sands - Slope Fans + Basin Floor Fans



Advanced Seismic Technology Better Imaging at Lower Cost



- Technology Evolution

- Seismic Processing
 - Faster, better and cheaper processing techniques
 - Advanced processing yields the most accurate view of subsalt prospects
- Algorithm Evolution
 - 1990s: Kirchhoff
 - 2000s: WEM and Beam migration
 - Today: RTM

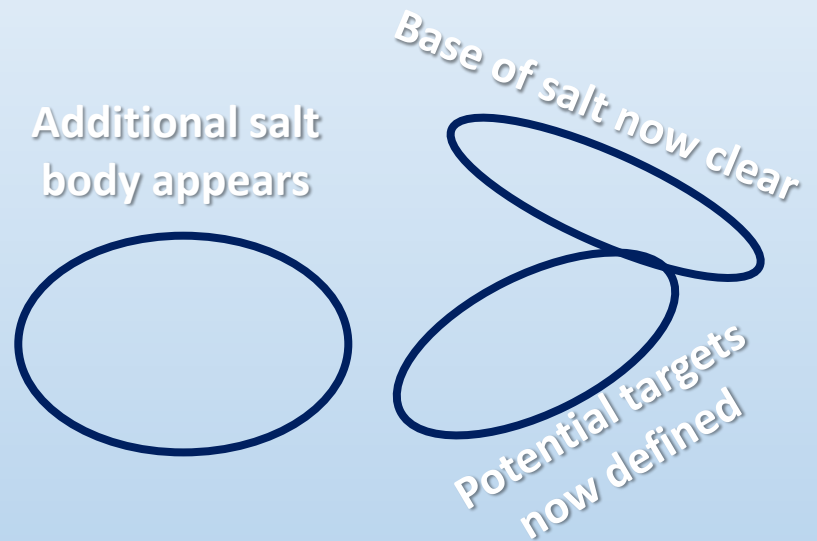
Seismic Processing Improvements

Why this Opportunity Still Exists Today...

Legacy: WEM Processing

Modern: RTM Reprocessed

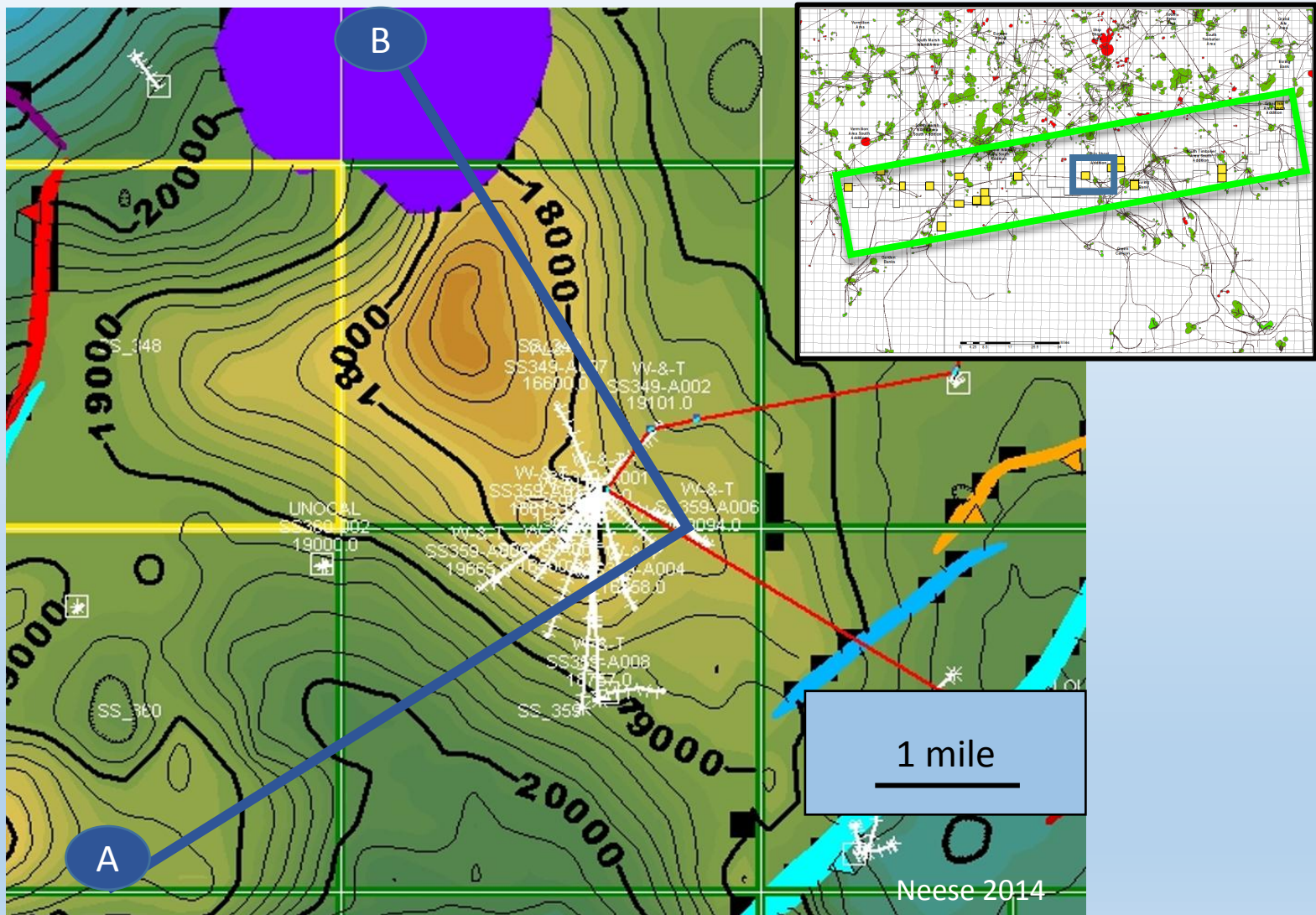
Unclear interpretation
of geology below salt



Previous generations of seismic sub-salt images were often unclear

Recent advances in seismic processing provide clearer images

Mahogany Simplified Structure Map



Geophysical Advantage of Play

**Advanced Seismic Technology
now allows us to find
Deepwater Size Prospects in Shallow Water**

Geologic Advantages of Play

- High Porosity-Permeability Miocene Sand Reservoirs
- Slope Fans & Amalgamated Channels - Confined Mini-Basin Geometries
- 5 Key Fields - Conger, Mahogany, Hickory, Tanzanite, Enchilada
- Proven Petroleum System - High Volumes Liquid Oil and/or Condensate
- New & Advanced Seismic Processing Clarifies Sub-Salt Imaging

Economic Advantages of Play

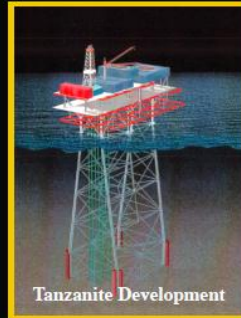
- Moderate Drill Depths - 15,000' - 25,000' - Good pressure drives
- Mostly Jack-up Rig Access - \$ 125-175K/day - \$ 40-60 MM per wildcat
- Mostly Conventional Platforms - \$40-75 MM per platform
- Existing Platform-Pipeline Infrastructure across area

Emerging Shelf Play = Shelf Miocene Sub-Salt Play

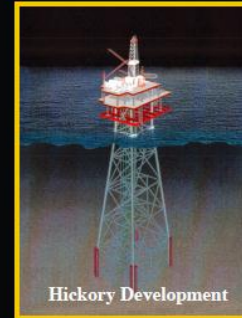
PIONEERING SUBSALT SHELF DISCOVERIES



Tarantula Development



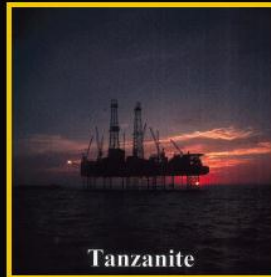
Tanzanite Development



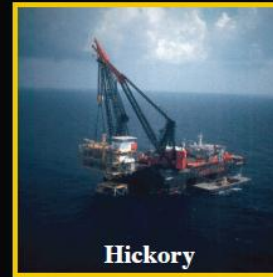
Hickory Development



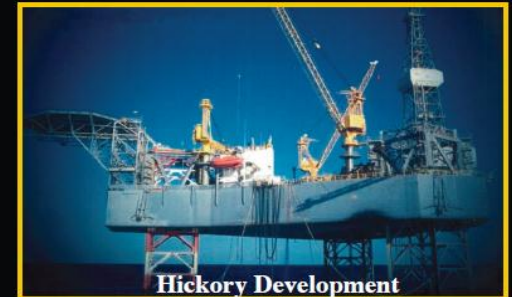
Tanzanite Development



Tanzanite



Hickory



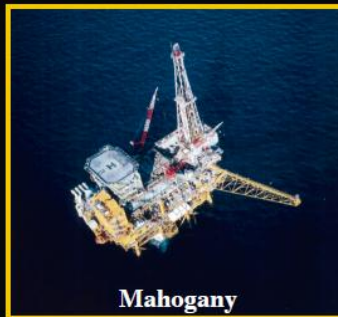
Hickory Development



Gorilla Jack-Up



Mahogany Development



Mahogany



Mahogany Semi - Sub

Acknowledgements

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