

Cenozoic History Written in a Passive Continental Margin: *It's there for the reading*

Gregory Mountain

Rutgers University + Lamont-Doherty Earth Obs.

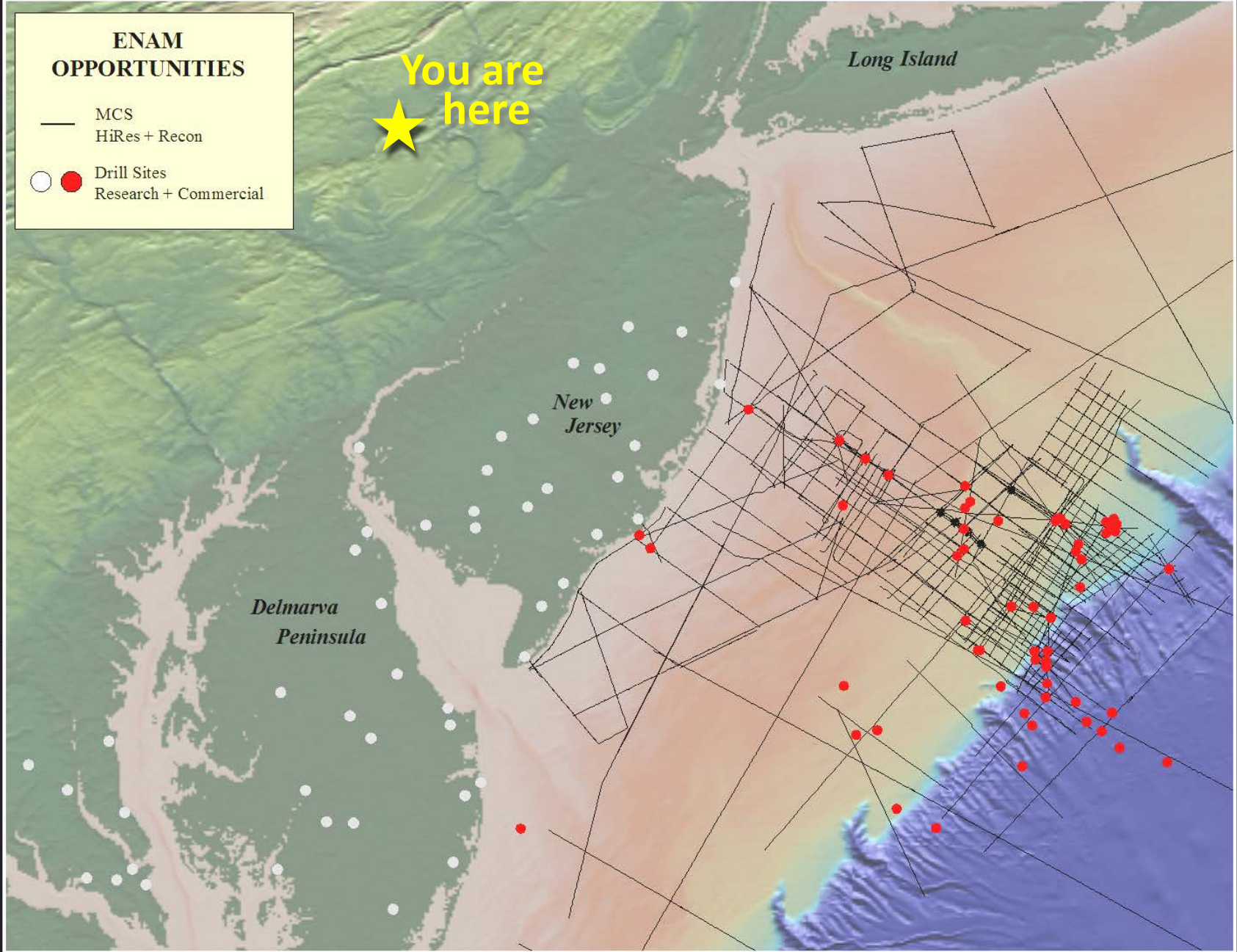



-77° -76° -75° -74° -73° -72°

**ENAM
OPPORTUNITIES**

- MCS
 HiRes + Recon
- Drill Sites
 ● Research + Commercial

**You are
here**

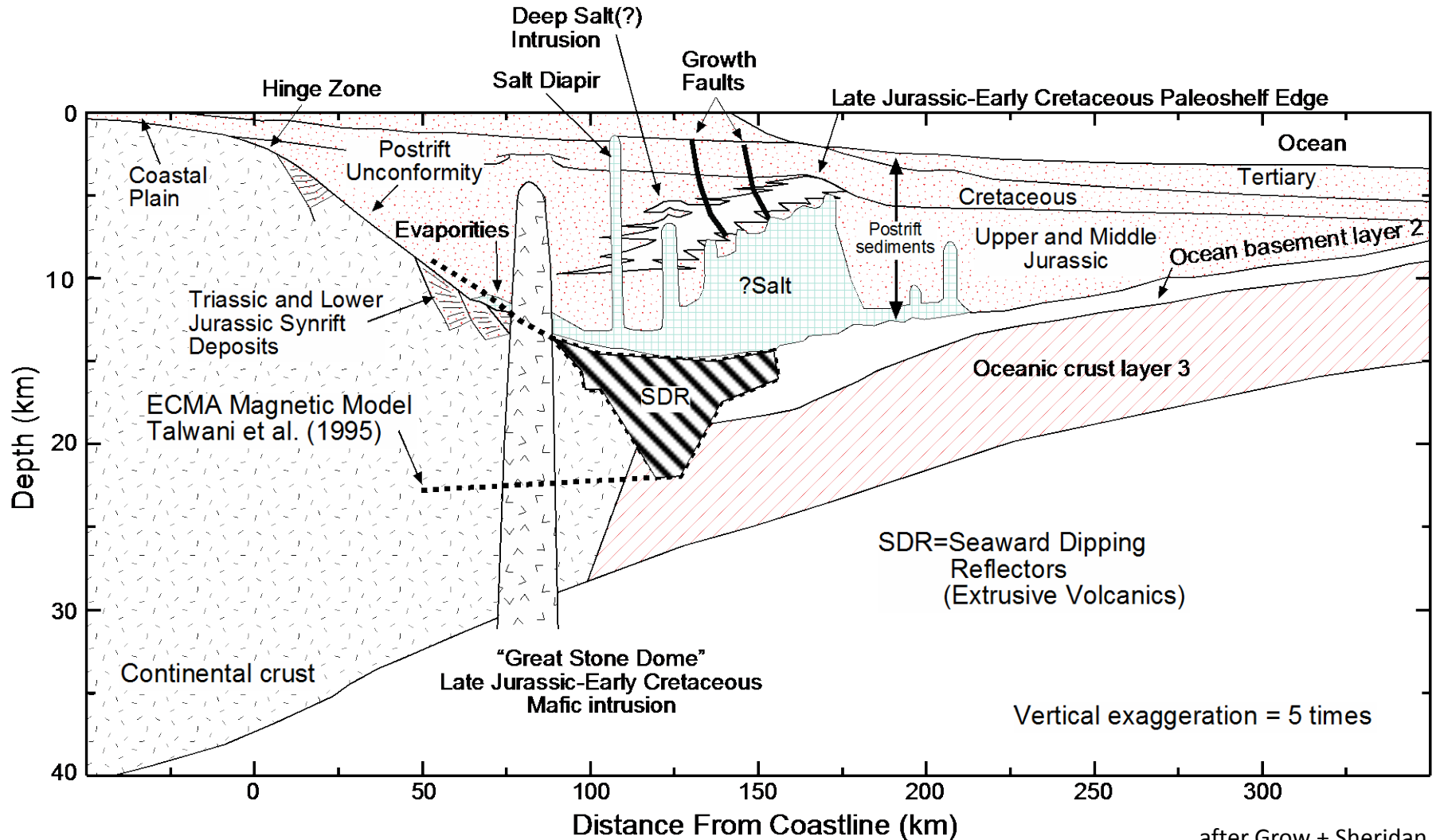


40°

39°

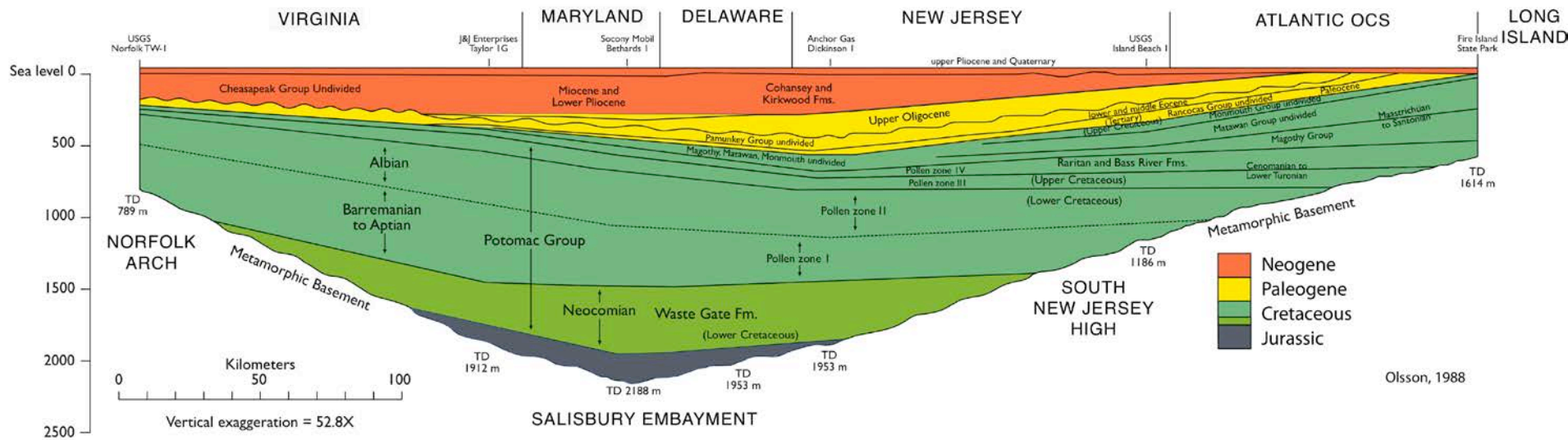
Baltimore Canyon Trough

As much as 16 km of post-rift sediment
Much of it deposited in < 100 m water depths
Long record of margin evolution

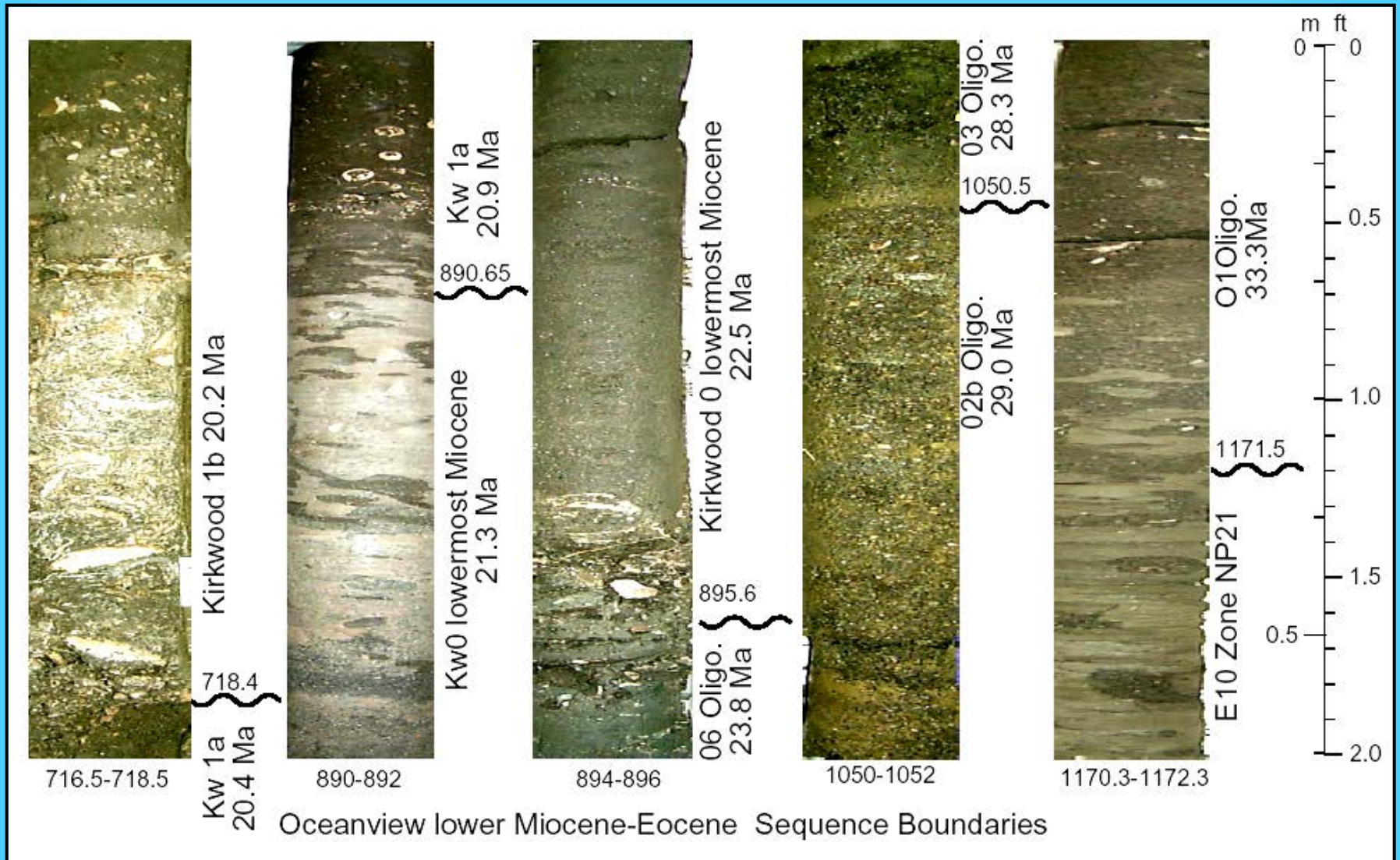


Shoreline Strike Line, Baltimore Canyon Trough

- Thick Jurassic offshore where subsidence provided ample accommodation
- Thick deltaic Cretaceous onlapped landward, prograded seaward
- Thin, discontinuous Paleogene leading seaward to carbonate ramp-like shelf
- Late Oligocene return to deltaic + shoreface progradation
- Undeniable along-strike Neogene variations – *the causes deserve our attention!*

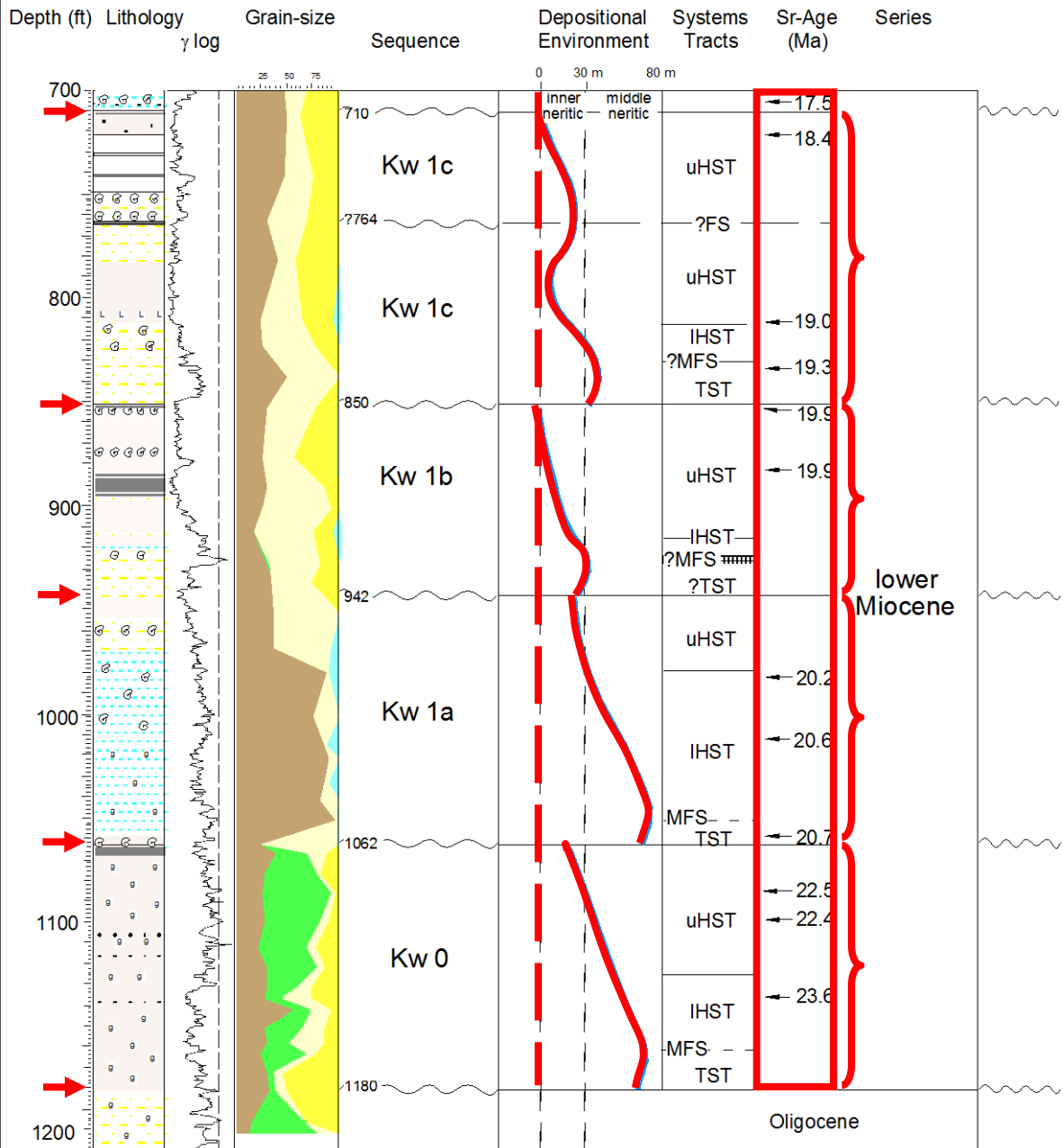


Sequence Boundaries Divide the Record



9+ Miocene, 6-8 Oligocene, 10 Eocene, 3 Paleocene, 14 Late Cretaceous

Cape May borehole, lower Miocene



Coastal Plain Drilling

Lower Miocene sequences

- erosional boundaries
- shoaling upwards
- each ends near shoreline
- Sr isotopic dating ± 0.5 Ma
- ~1.5 Ma duration

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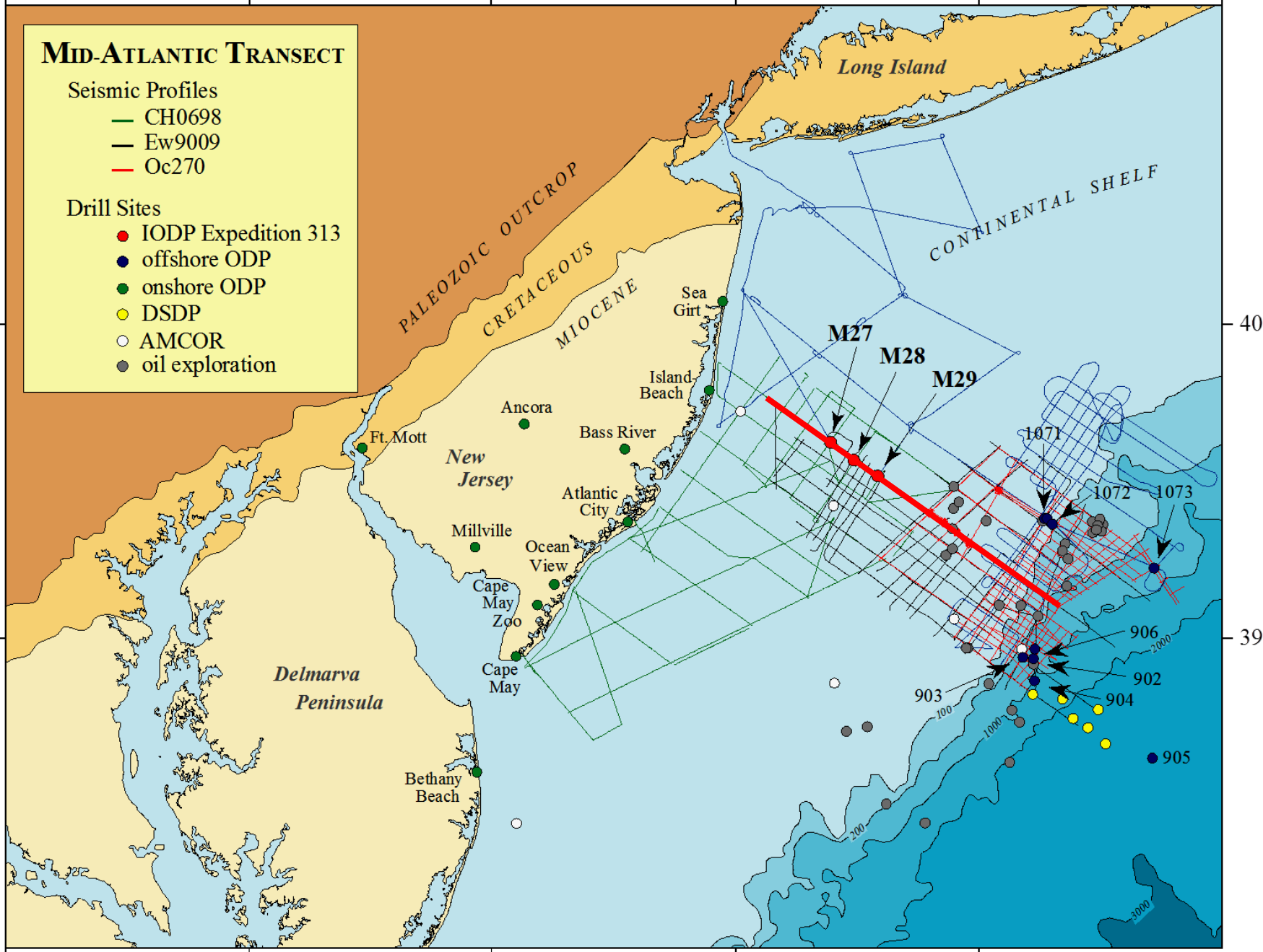
MID-ATLANTIC TRANSECT

Seismic Profiles

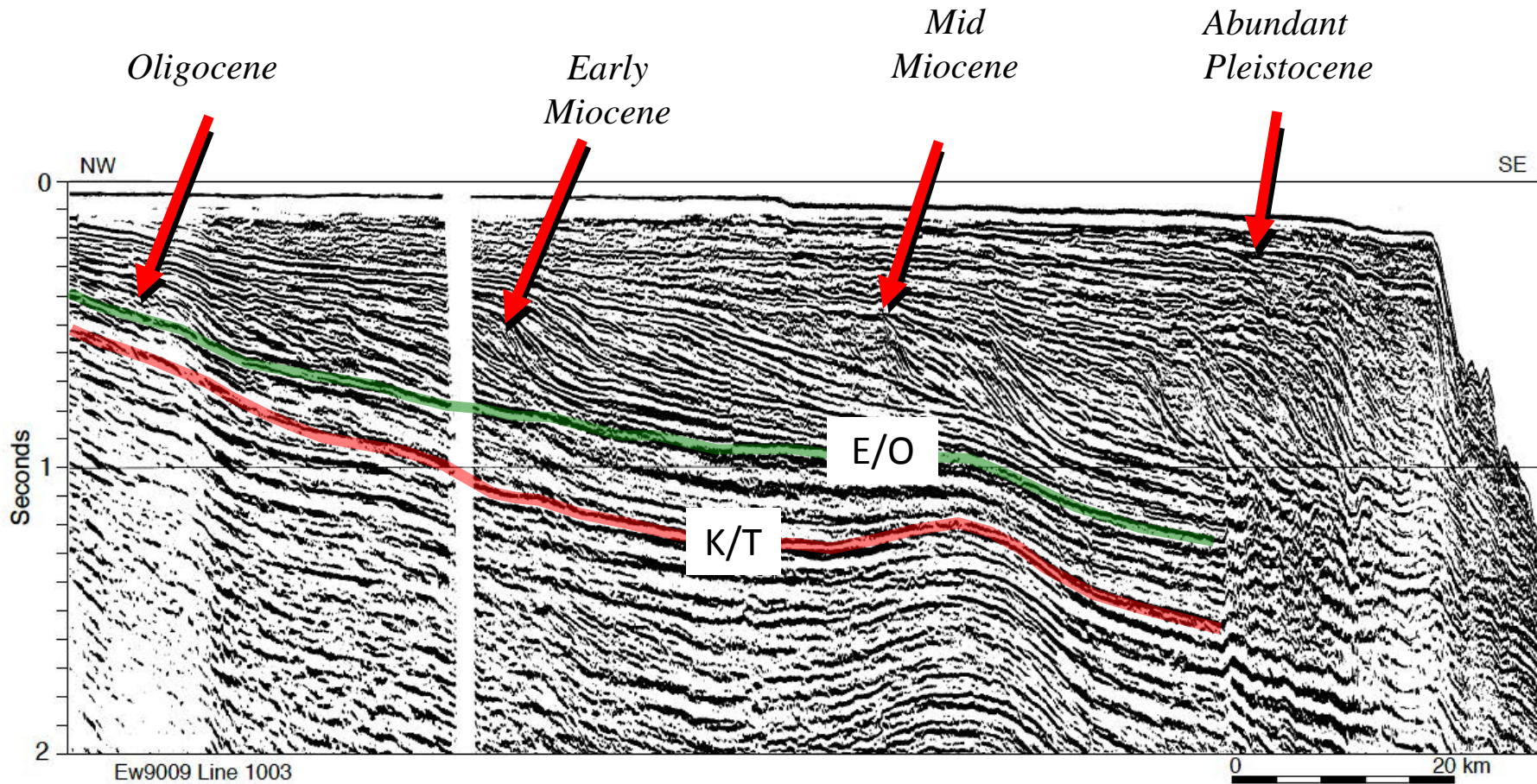
- CH0698
- Ew9009
- Oc270

Drill Sites

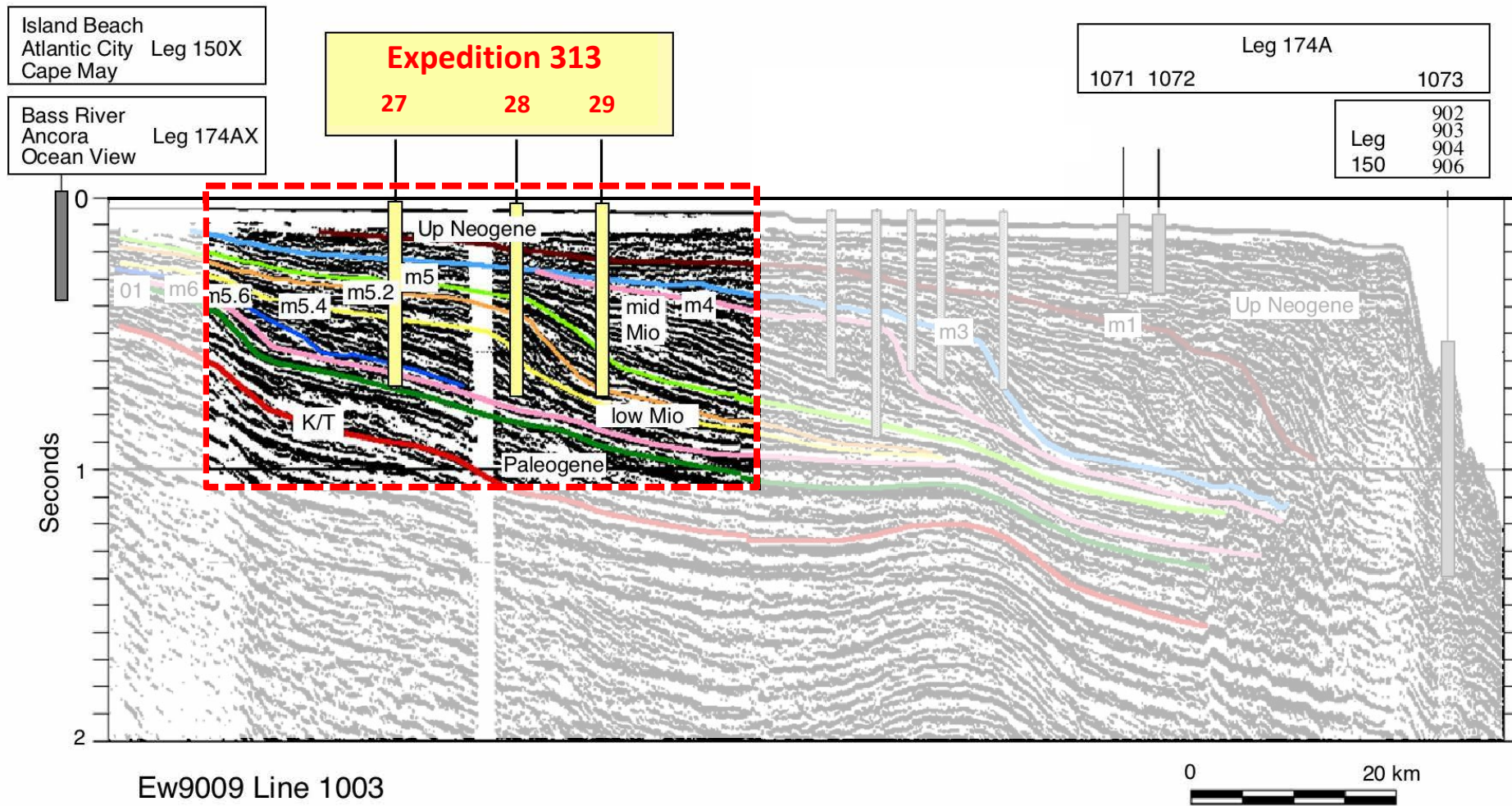
- IODP Expedition 313
- offshore ODP
- onshore ODP
- DSDP
- AMCOR
- oil exploration



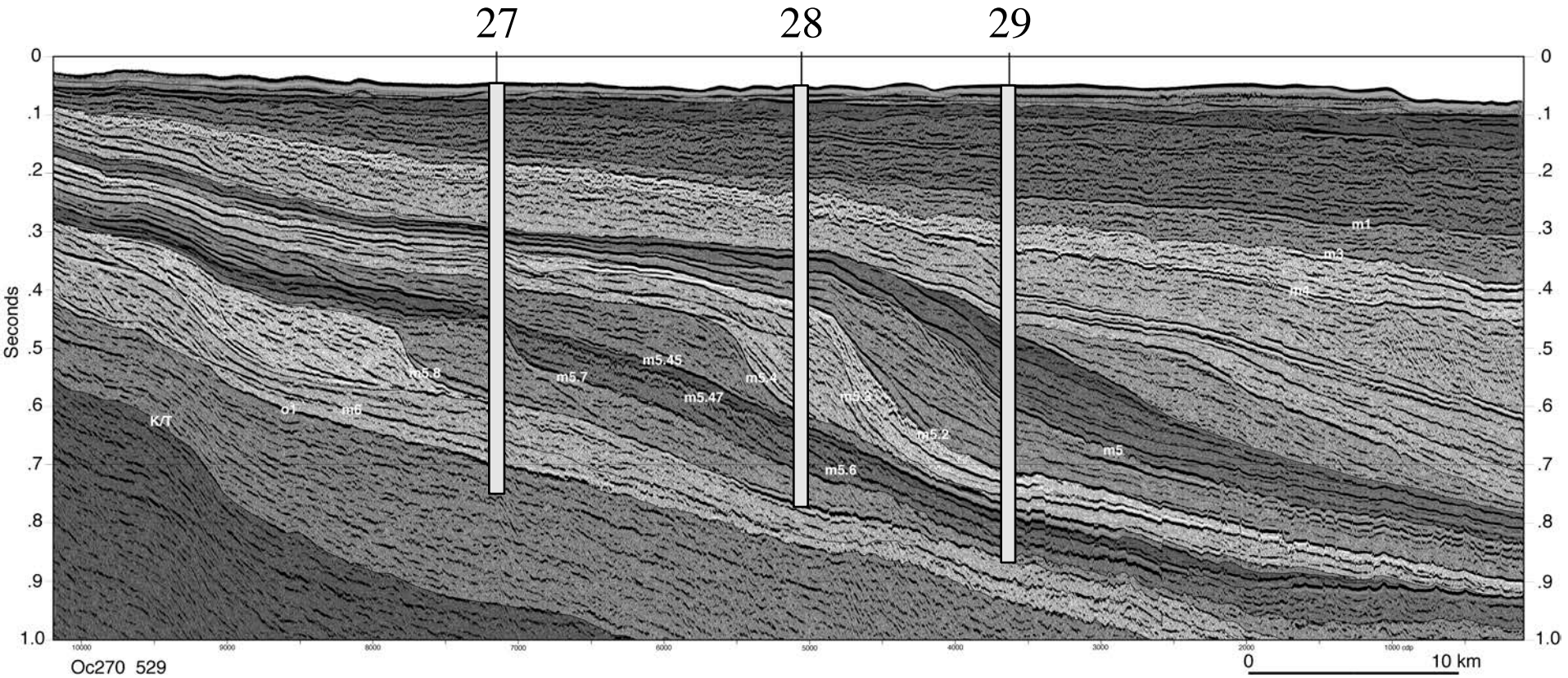
New Jersey Continental Shelf



Exp313 Located to Test Oligocene-Miocene SL Imprint



IODP Expedition 313 – New Jersey Shallow Shelf

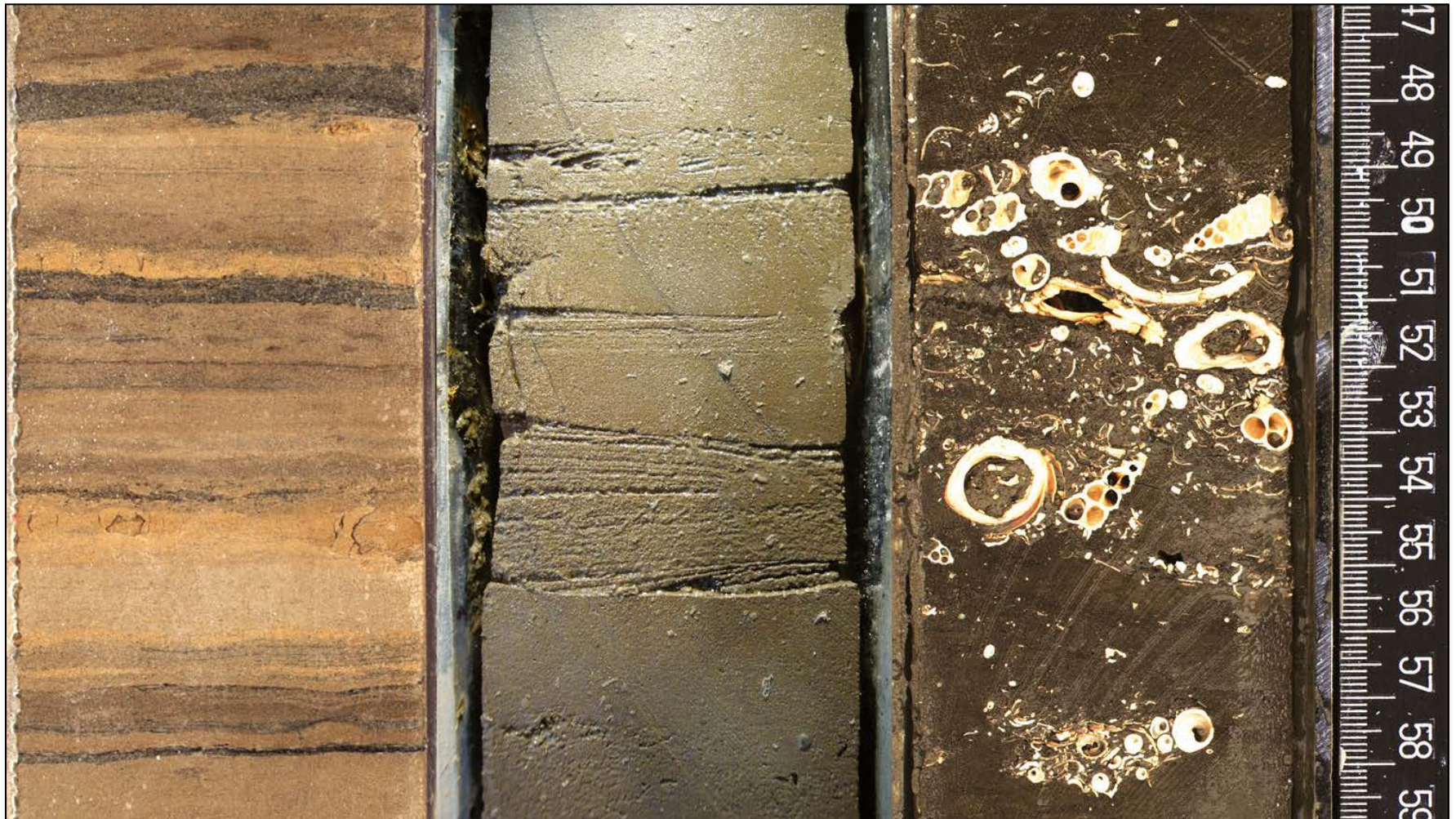


Excellent Core Quality / 80% Recovery

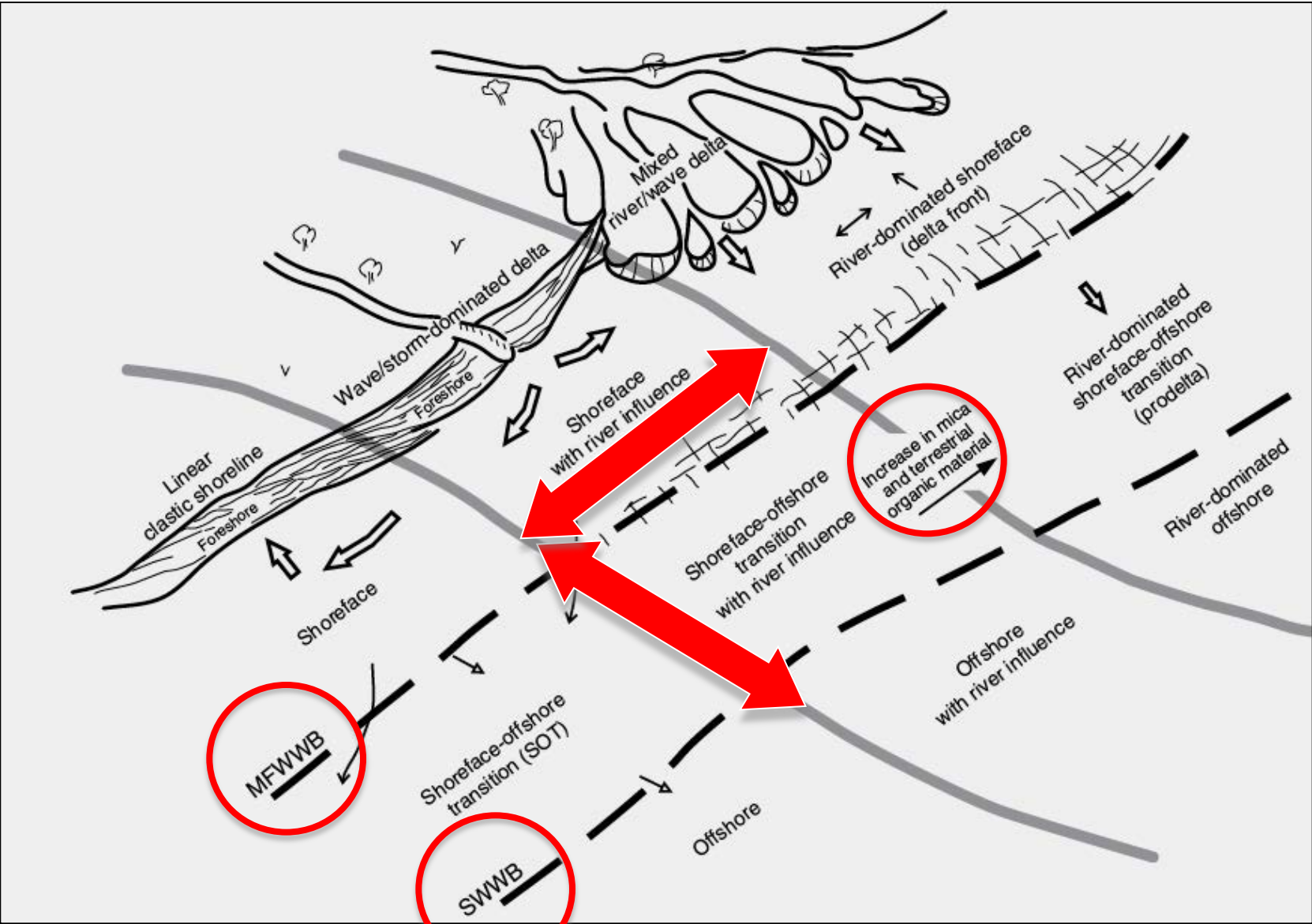
clay/silt bands

storm beds

shell beds



Lithofacies revealed changes in paleo-water depths as well as alternating storm + river dominated shorelines



Key Stratigraphic Surfaces

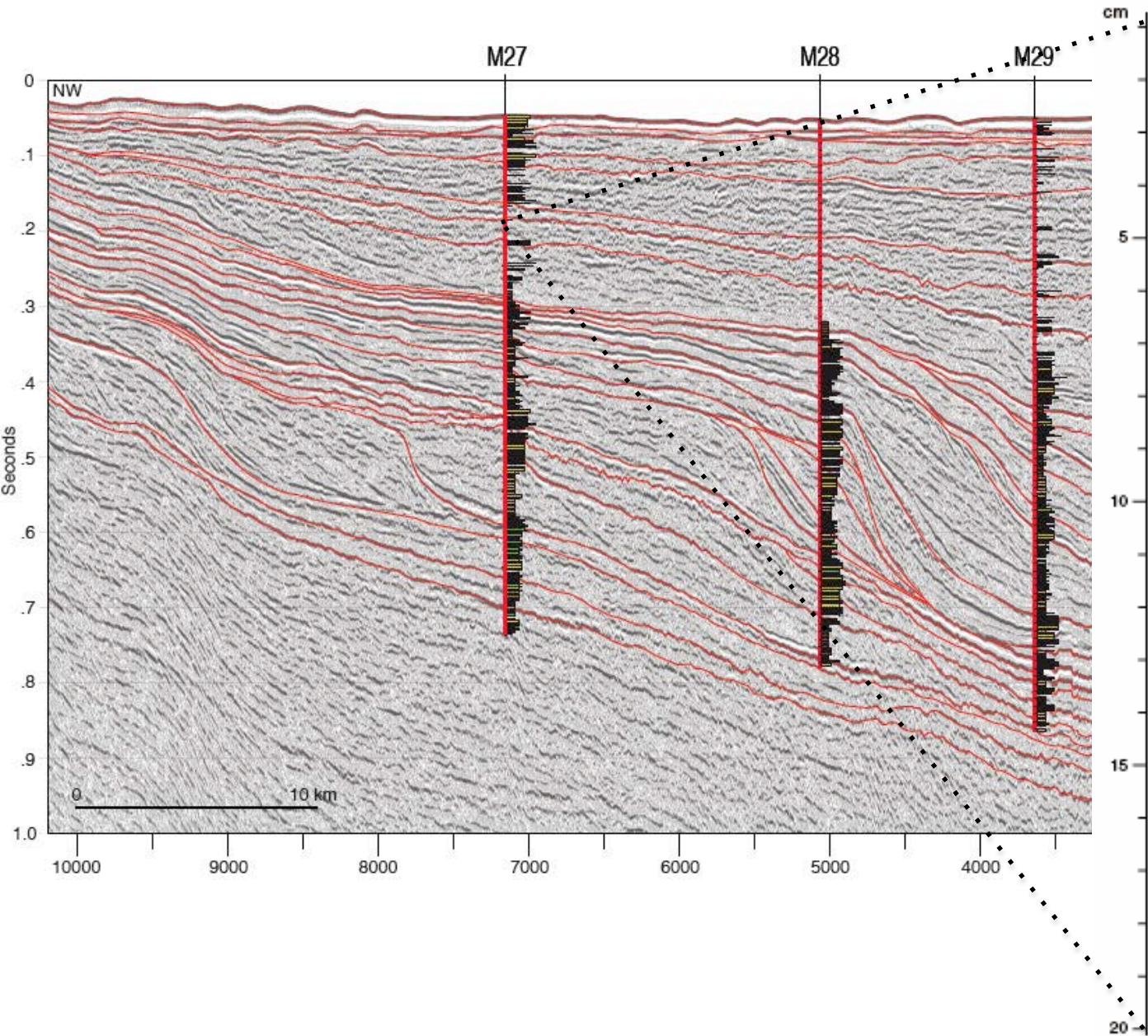
transgressive
surface

foreshore

sequence
boundary



Lithostratigraphy

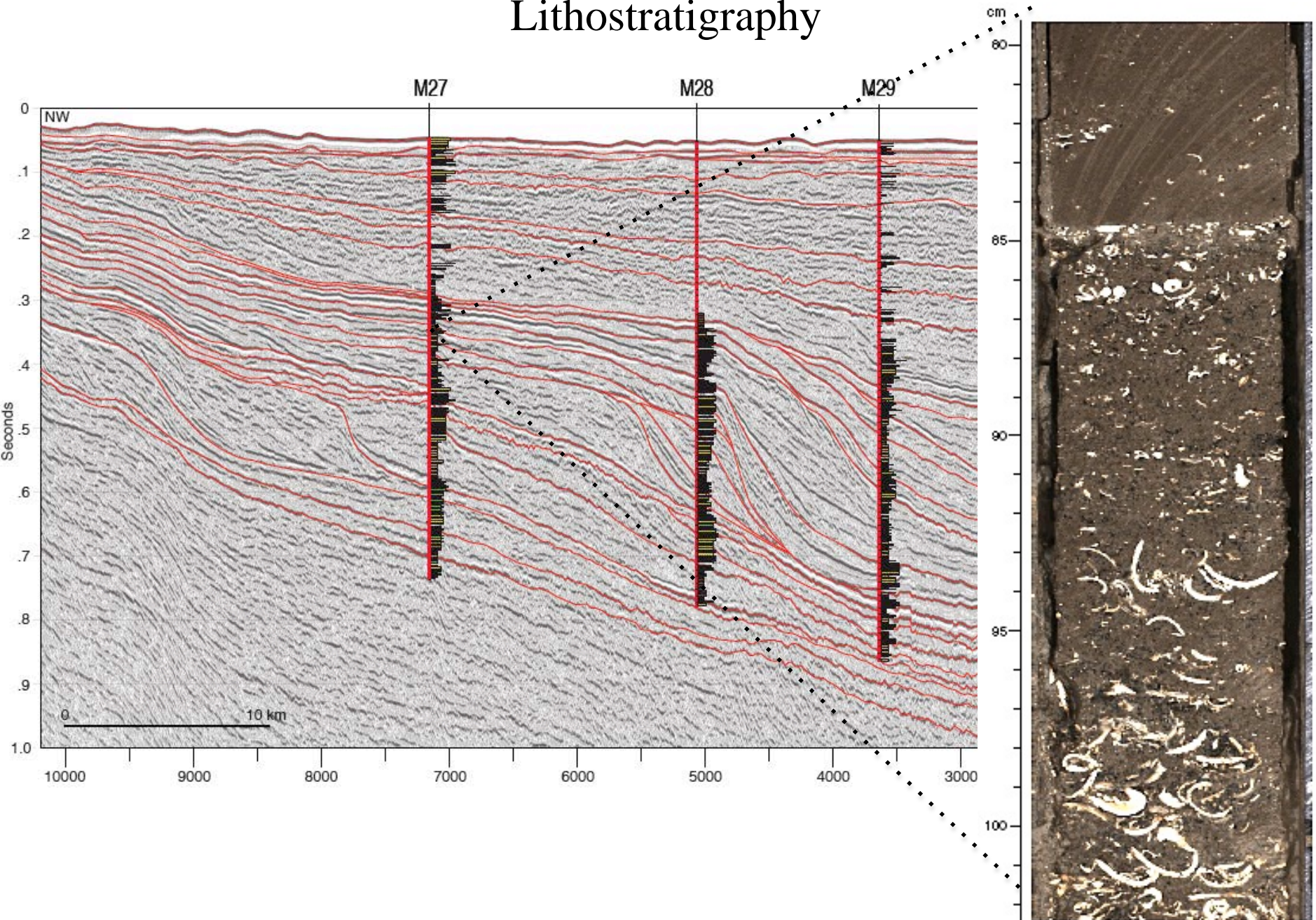


paleosol



Lithostratigraphy

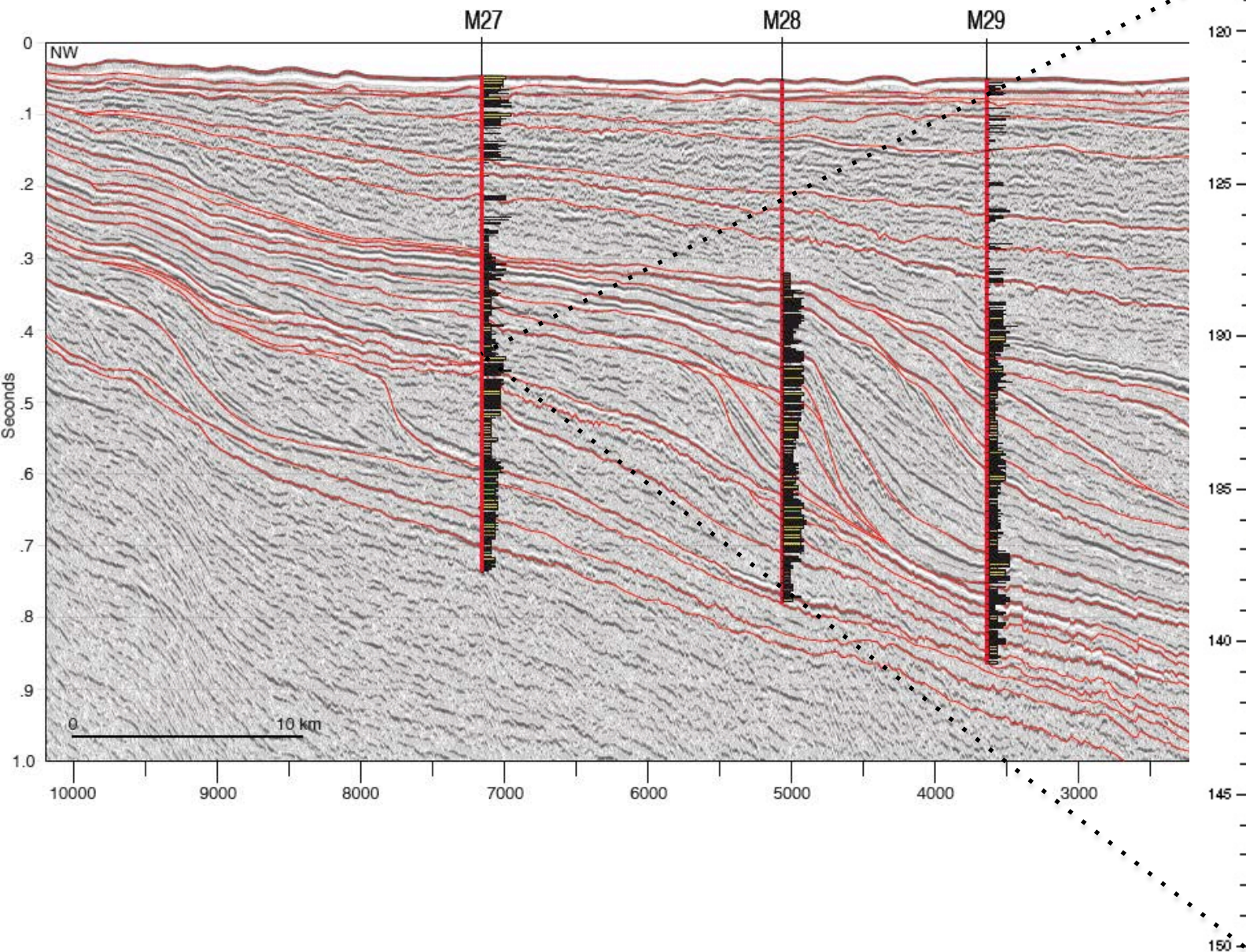
Flooding surface



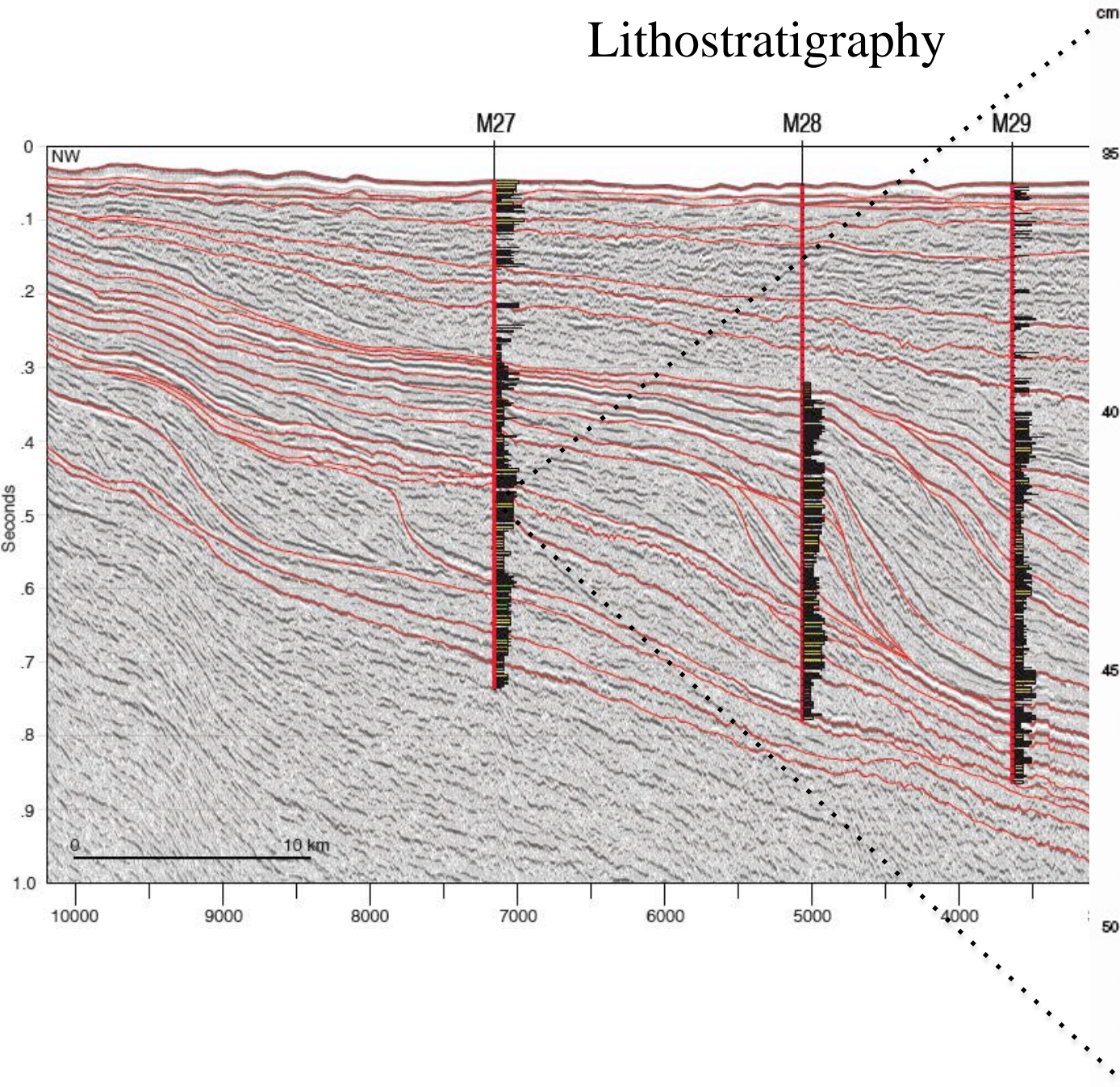
Lithostratigraphy

Sequence boundary

m5.45



Lithostratigraphy

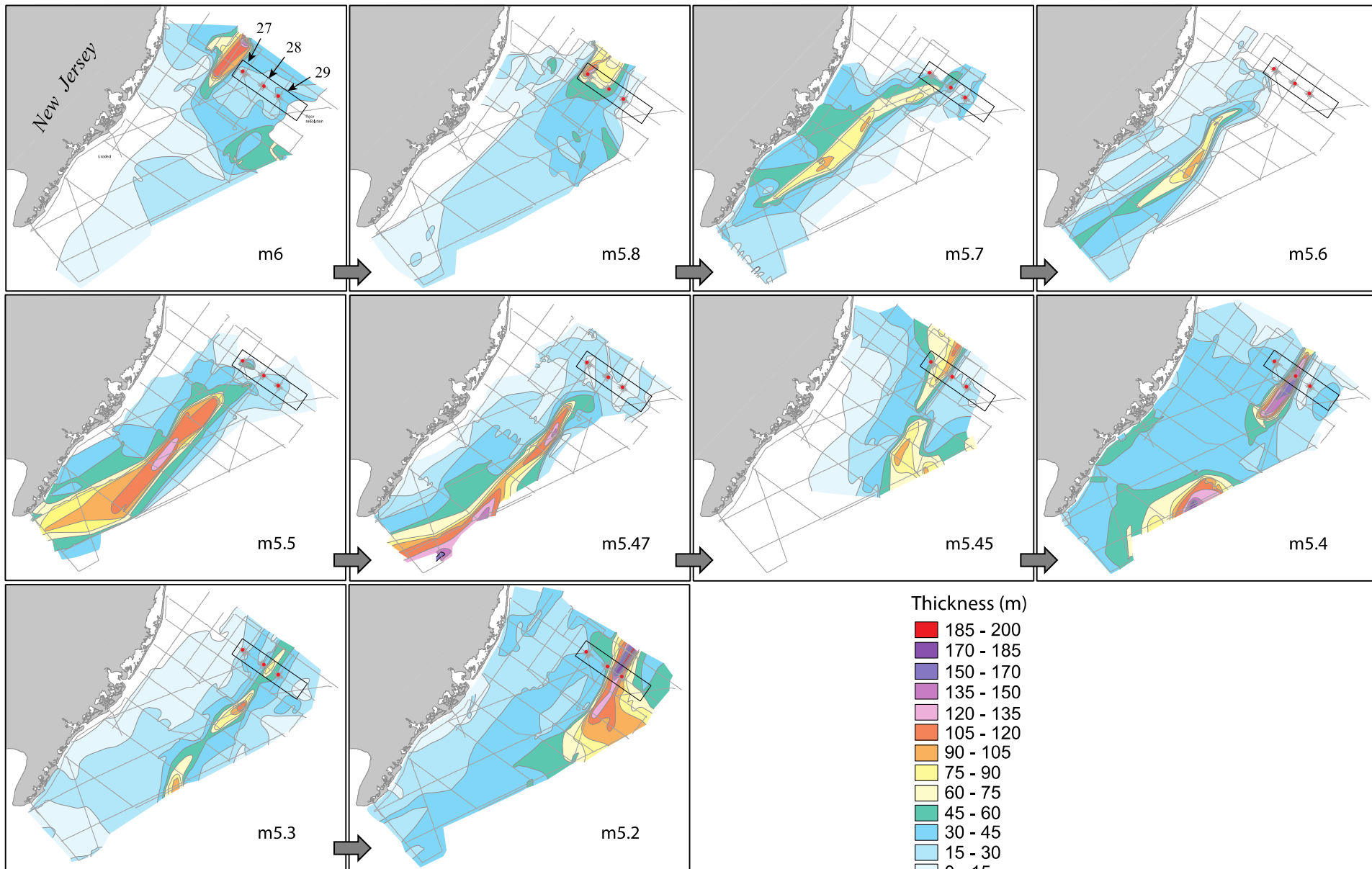


shoreface

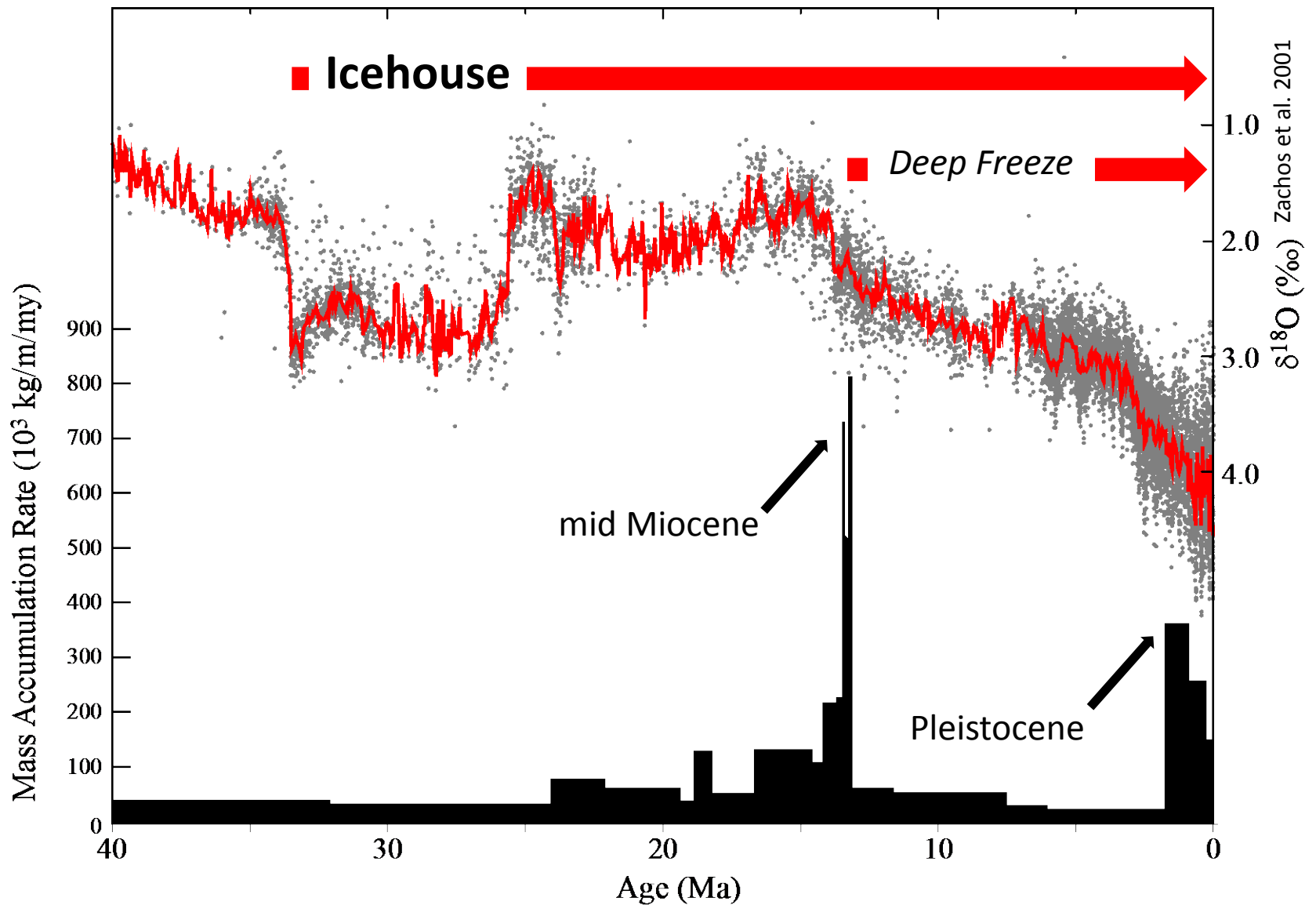


Miocene Isopachs – 24 to 15 Ma

Dueling sediment sources? See-saw accommodation? Long-shore reworking?

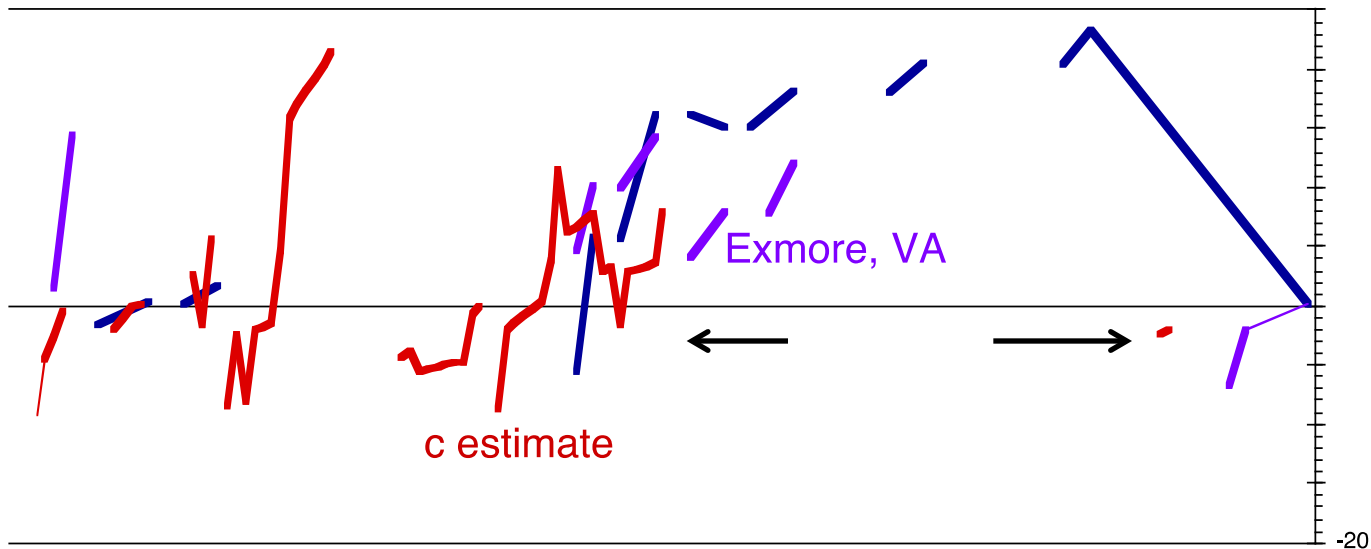


Sediment Accumulation Has NOT Been Smooth + Steady

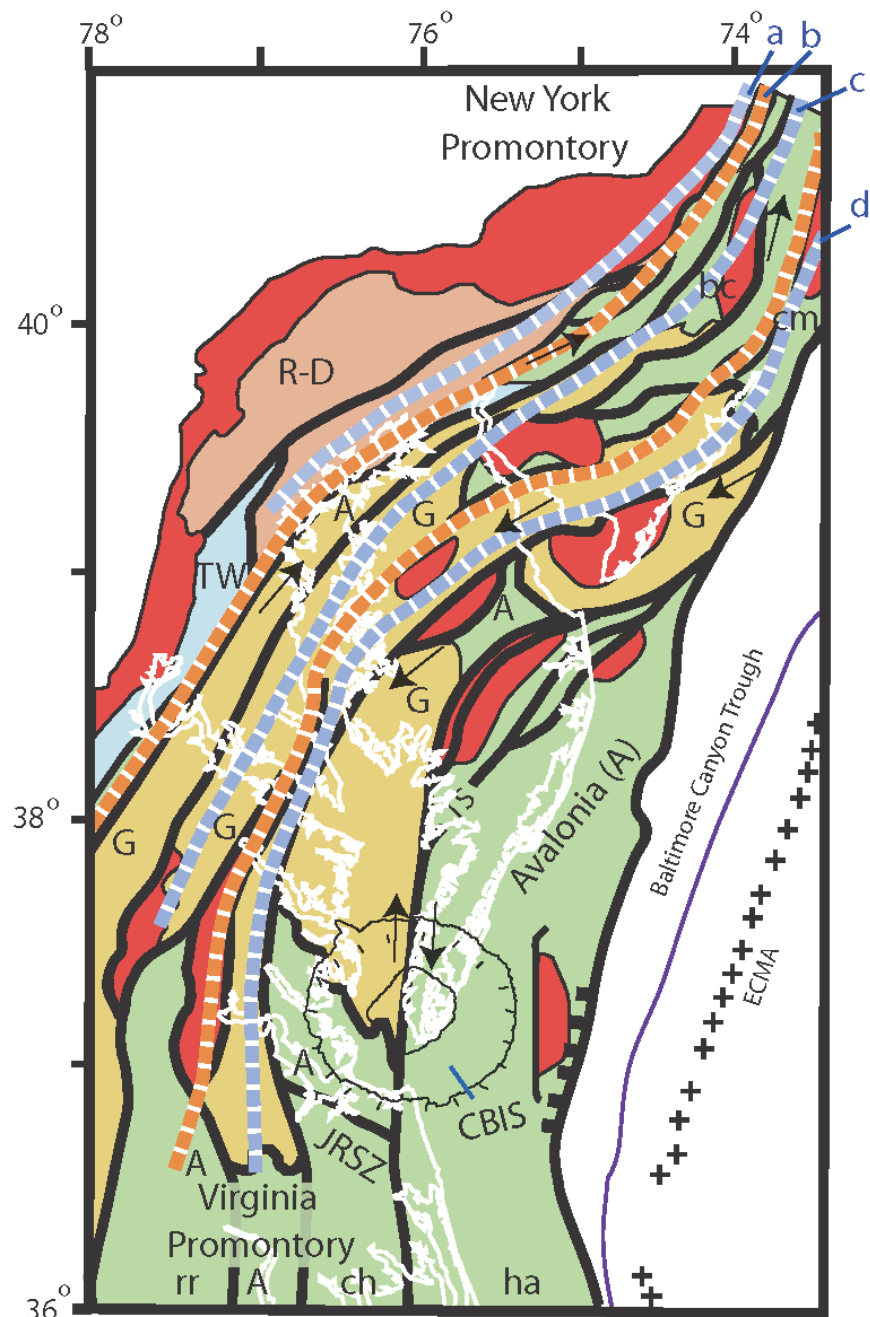


Passive-Aggressive Tectonics ?

NJ – VA Problem (late Miocene-Pliocene)

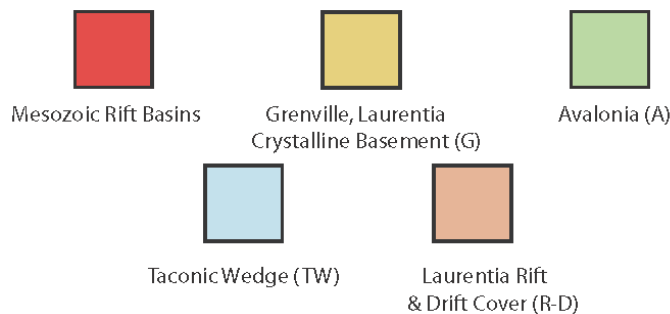


Following thick lower + mid Miocene, NJ = hiatus in upper Miocene thru Pliocene
VA backstripping yields 20 m sea level rise
Cause? – NJ inversion or VA subsidence



Why the difference in regional stratigraphy?

- Fault bounded grabens + wrenching
- Fault bounded terranes
- “Rolling basins”
- Dynamic topography
- Variations in intraplate stress



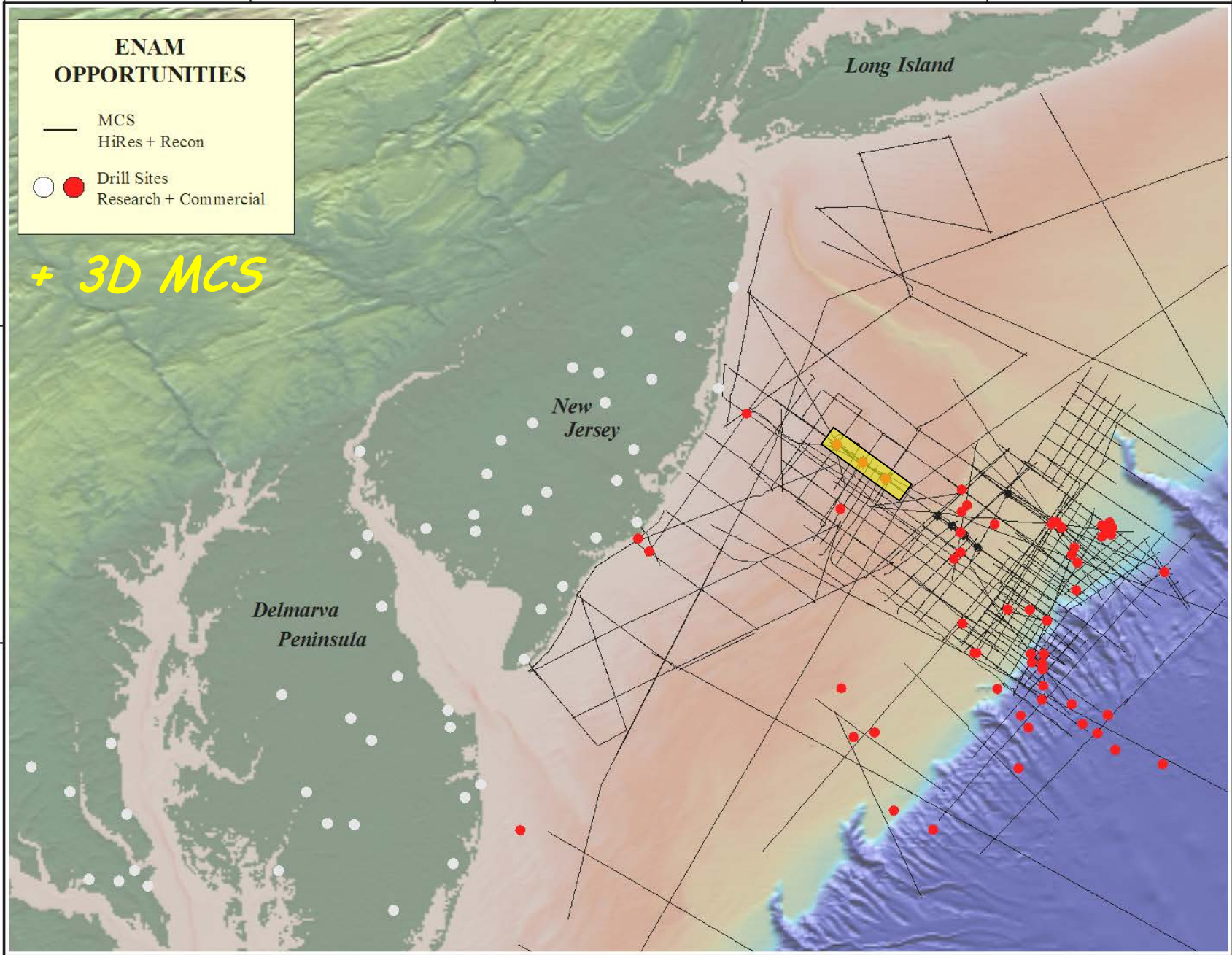
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+ 3D MCS



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