CHANDELEUR ISLAND SURVEY AREA OFFSHORE LOUISIANA

Investigations of carbon storage potential

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INSTITUTE FOR GEOPHYSICS

Partnership for carbon capture & offshore geologic storage
GoMCarb

GCCC Gulf Coast Carbon Center

Bureau of Economic Geology

NATIONAL ENERGY TECHNOLOGY LABORATORY

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About the GBDS

- "Gulf of Mexico Basin Depositional Synthesis"
- Part of The University of Texas Institute for Geophysics (UTIG)
- Ongoing, industry-supported project
- Research the depositional history & framework of the GoM & provide a comprehensive synthesis of the Mesozoic & Cenozoic fill of the GoM with the intent to better understand reservoirs
- Results updated & distributed regularly as a digital database

- https://ig.utexas.edu/energy/gbds/

Objectives of the GBDS for GoMCarb

- To contribute resources from the GBDS database for the success of GoMCarb project objectives

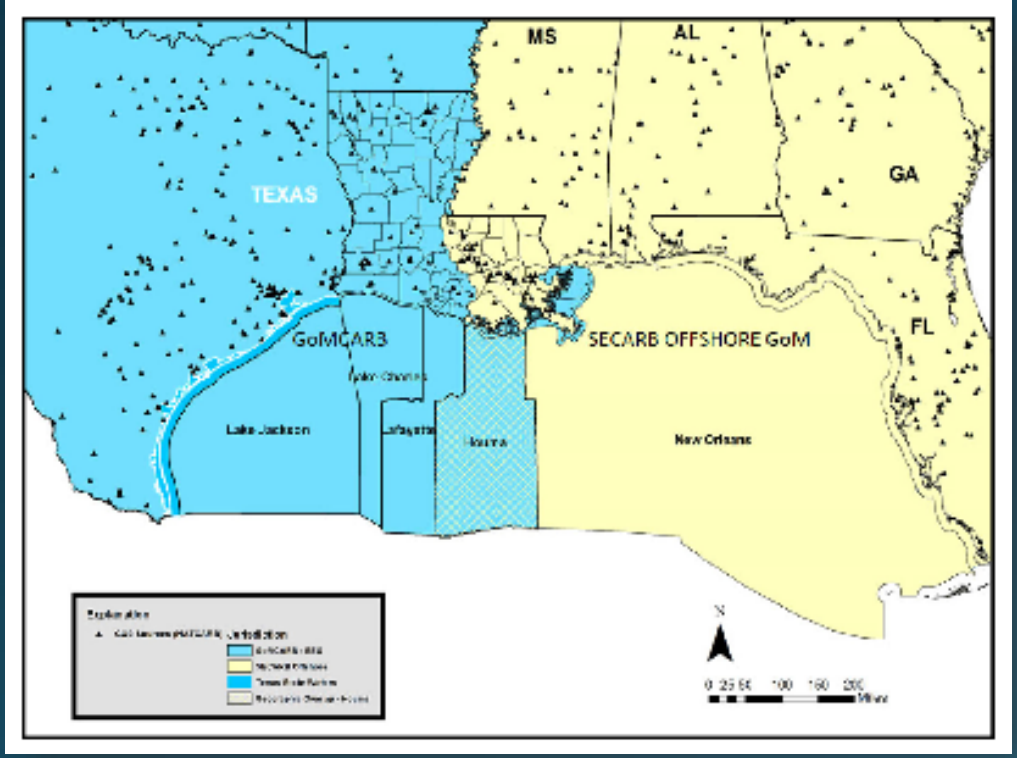
- Assemble, integrate and assess publicly available geologic data (e.g. biostratigraphy, well logs and regional & local seismic) with the GBDS regional database to characterize offshore storage resource potential in the Chandeleur Island 3D seismic survey area.

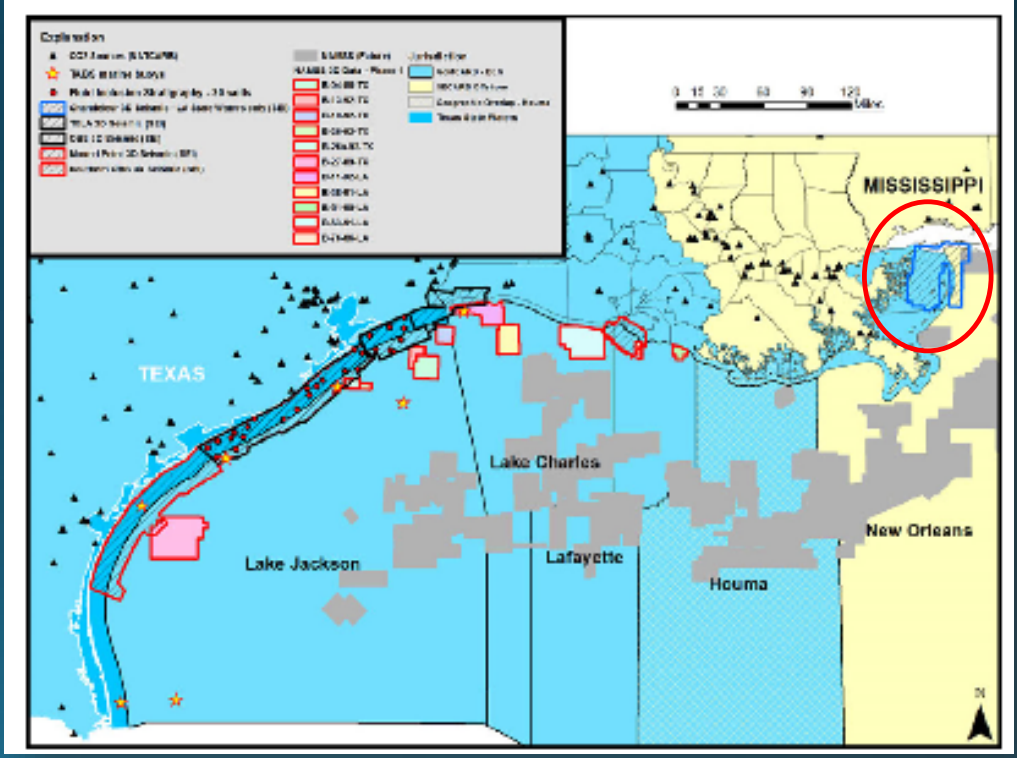
Objectives of the GBDS for GoMCarb

- Interpret stratigraphic boundaries & faults through the Cenozoic
- Identify potential traps/seals
- Estimate porosity (data permitting)
- Interval of interest is the Miocene

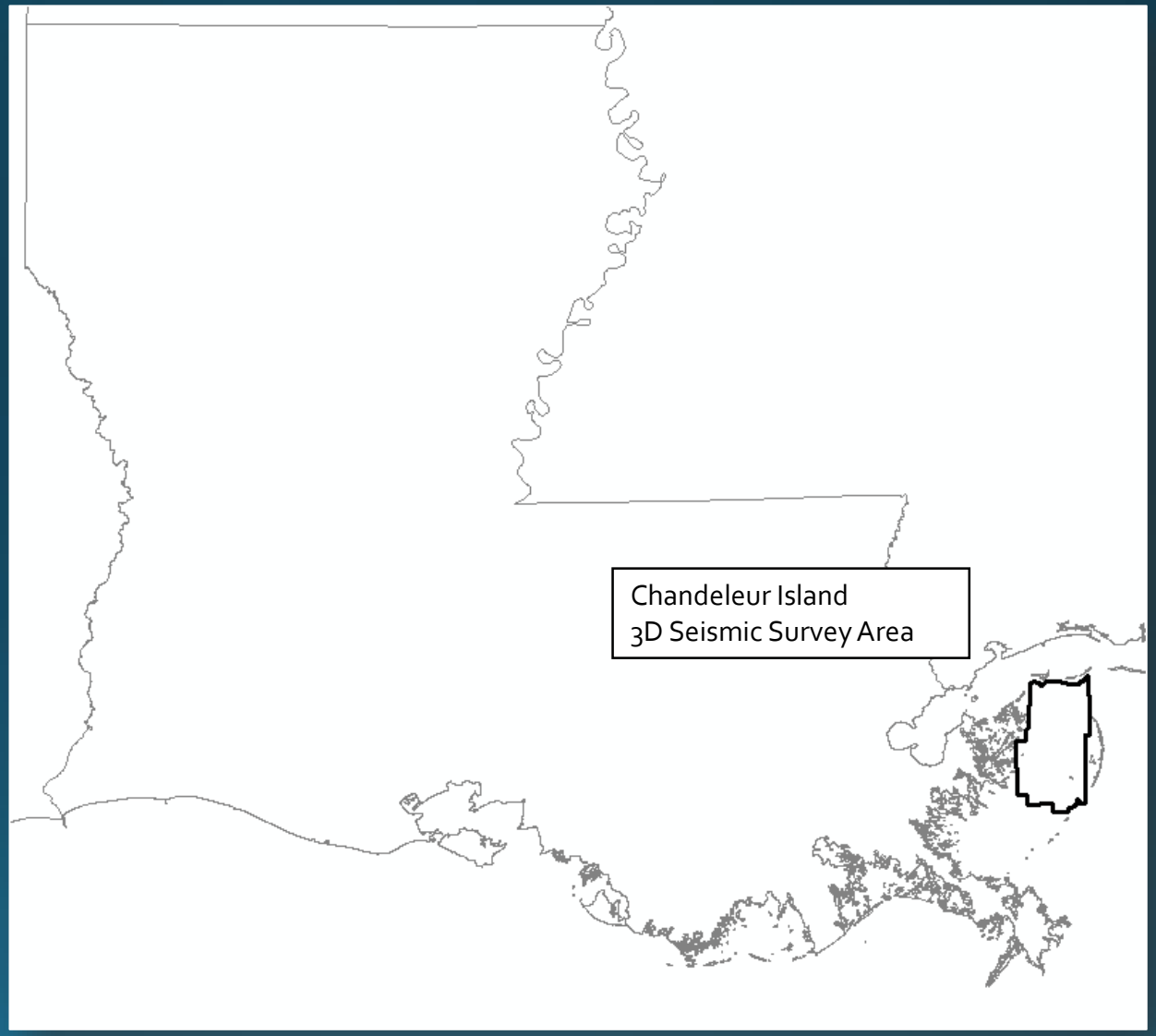
GoMCarb & Chandeleur Island study areas (SA)

GoMCarb in Blue; SECarb in yellow; Chandeleur circled in red



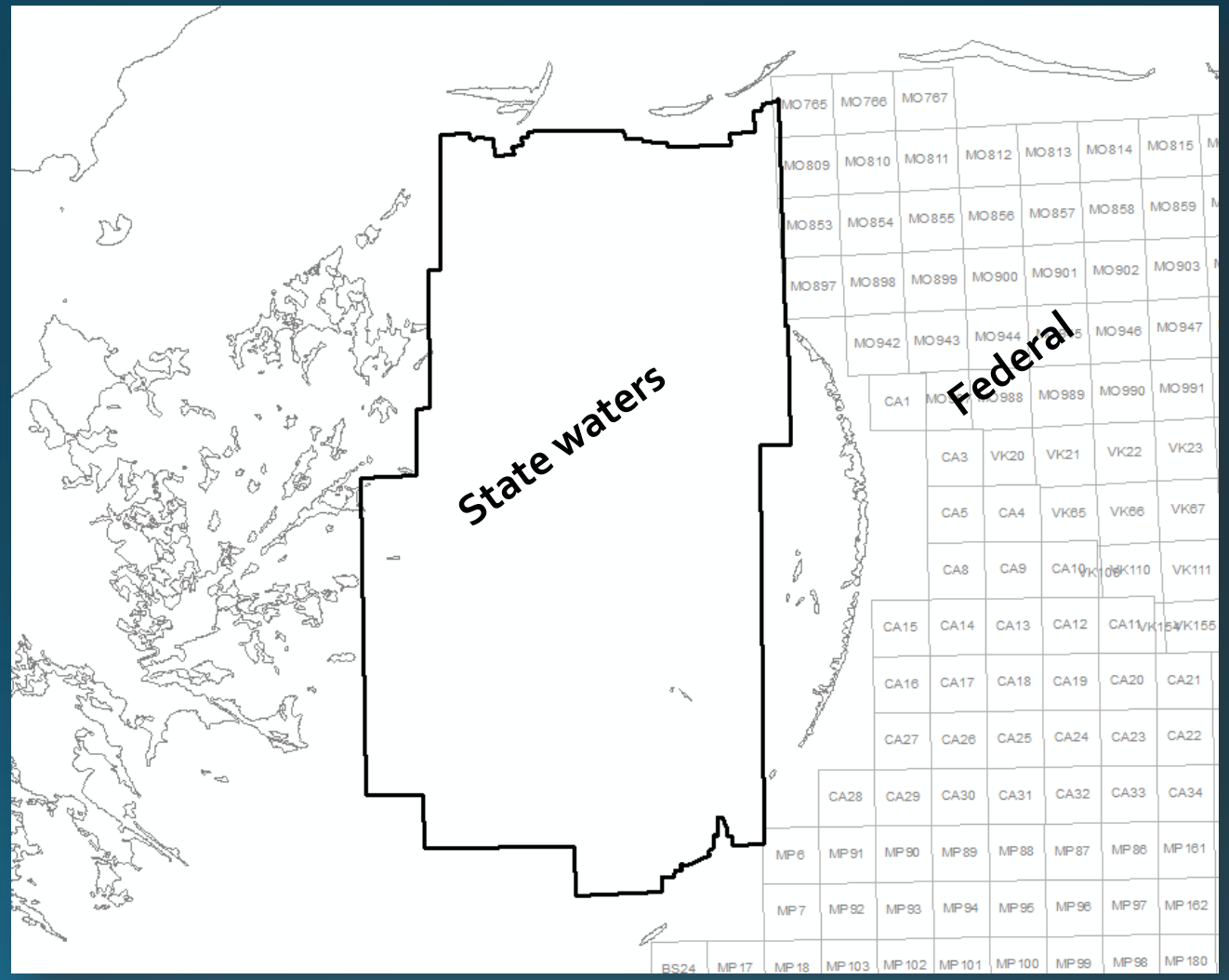


Chandeleur Island 3D Seismic SA



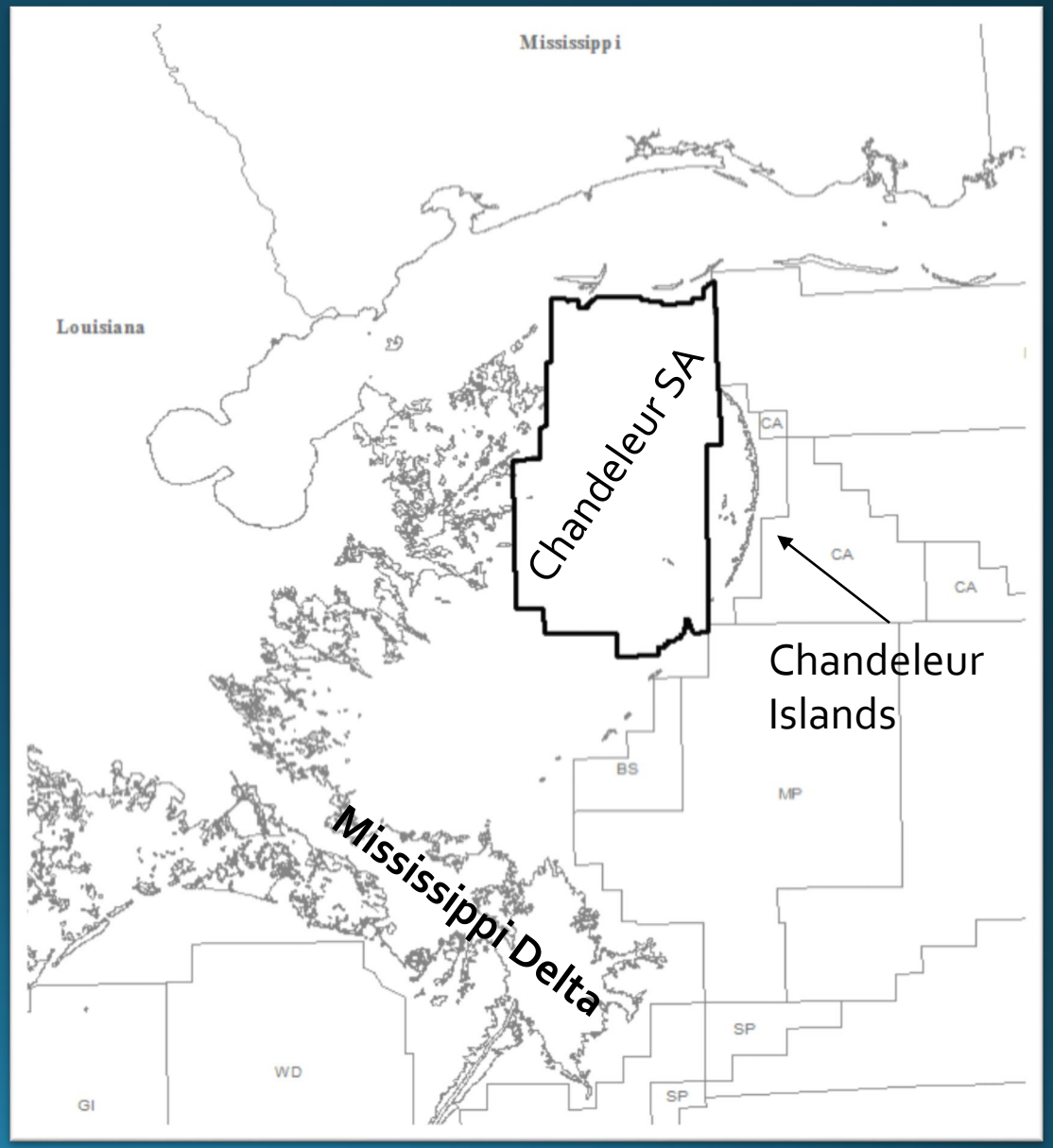
Political Location

State Waters

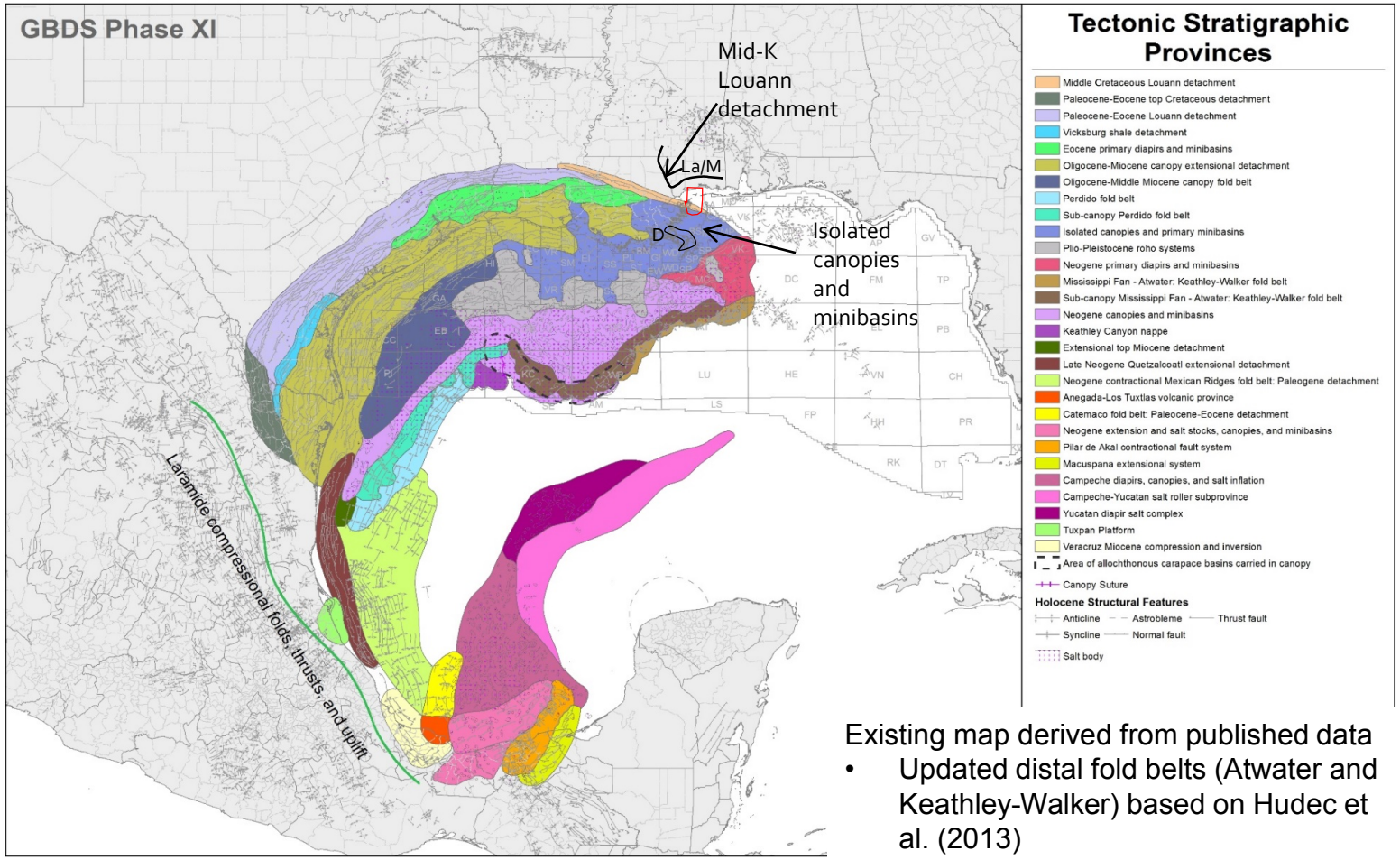


Geologic Setting

- Bound by MS and LA coasts (N & W), Chandeleur Islands (E) and the Mississippi Delta (S)
- SA bisected by NW/SE trending Albian Shelf margin (extensive faulting)
- Northern half on continental shelf – low-relief stratigraphy w/little-no faulting
- Southern half dives into a region of isolated salt canopies and mini basins



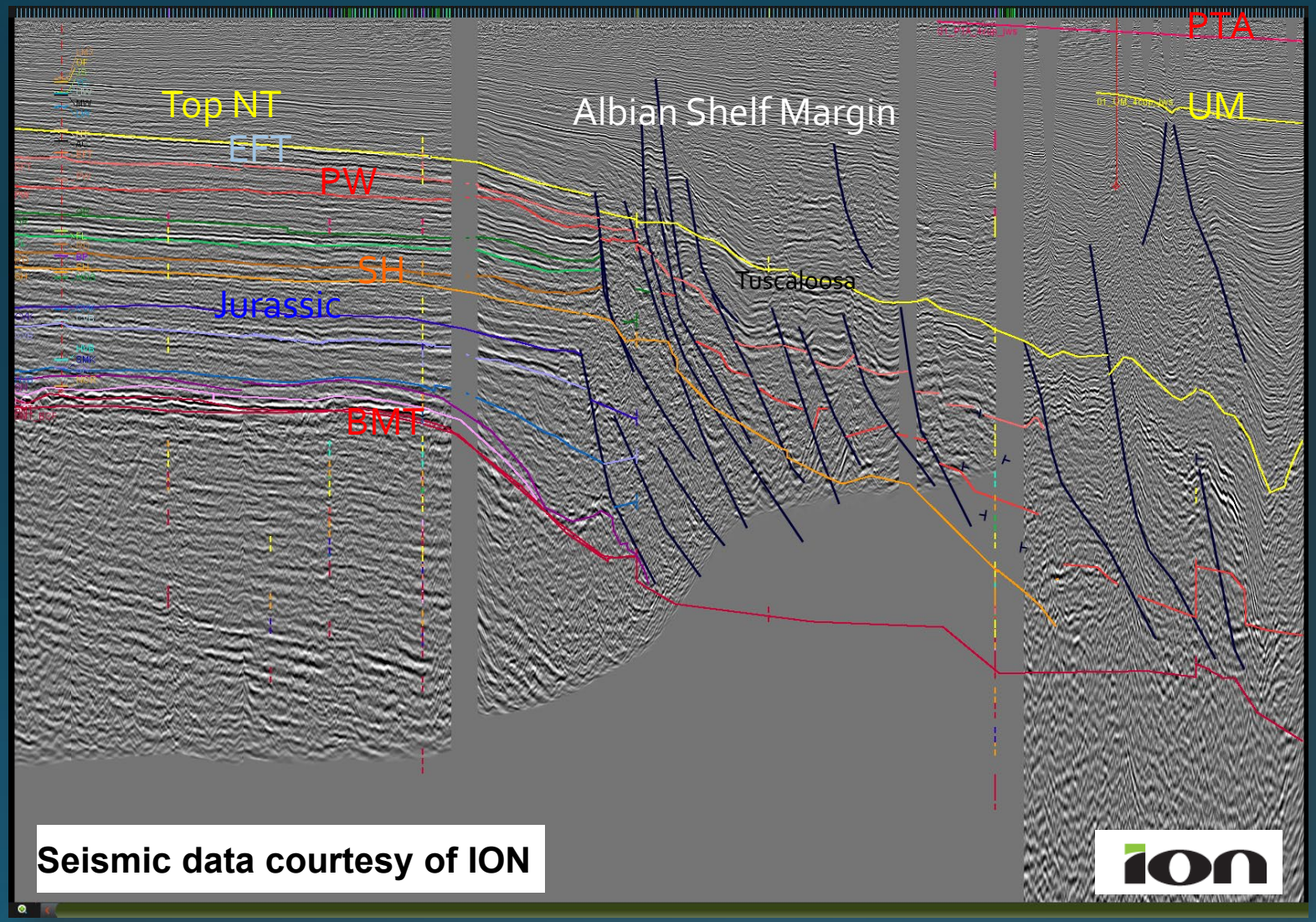
Tectonic Provinces Map



Existing map derived from published data

- Updated distal fold belts (Atwater and Keathley-Walker) based on Hudec et al. (2013)

Local Geologic Cross-Section



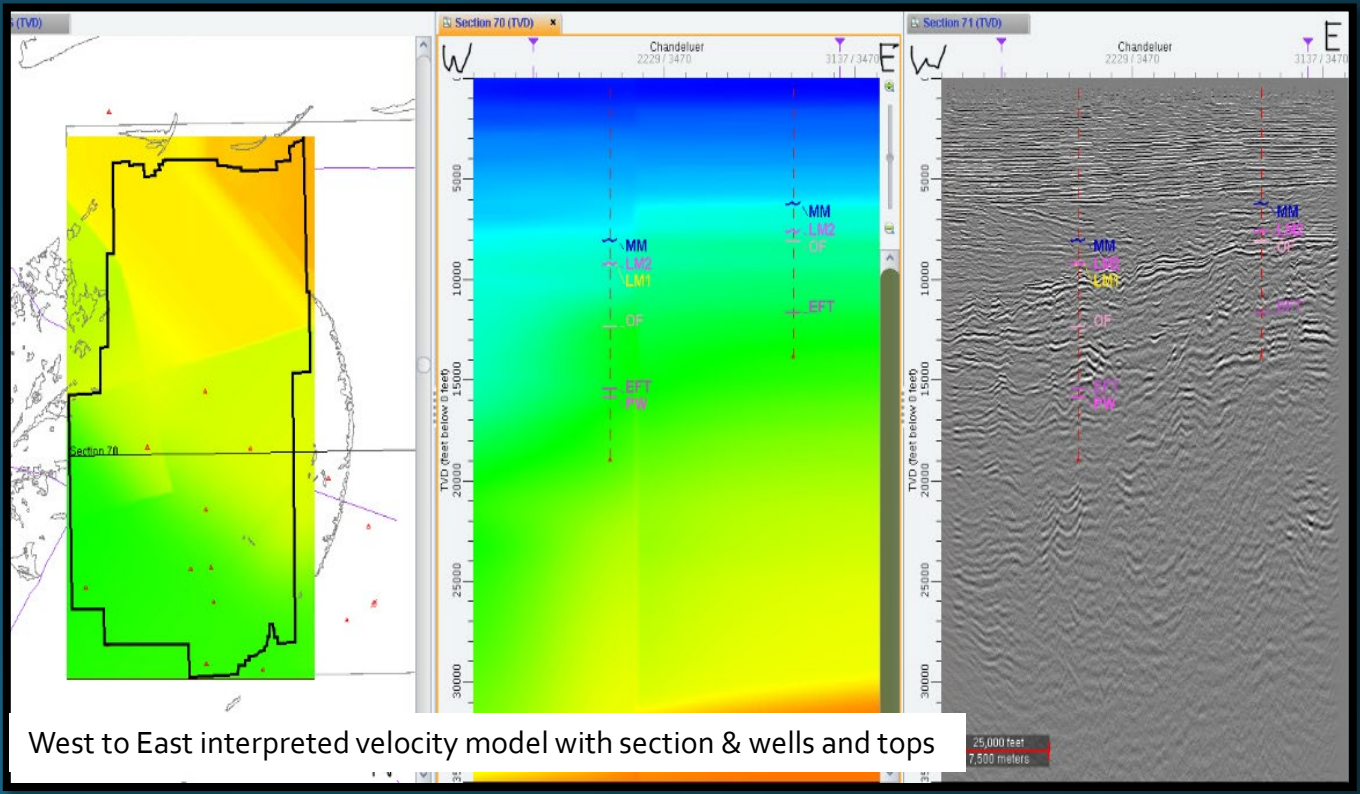
Difficulty with Data

- State vs. Federal data archiving standards
  - Submission requirements
  - Organization
- Vintage Data 1970's – 1990's
  - Lower resolution
  - Down hole logs originally raster data
- 3D seismic data delivered in time, not depth
  - GBDS data in depth

Velocity Model

(Created by Penelope Parr)

- Insufficient log data available to create a velocity model
- Created by utilizing interval velocity data from 3 ION GulfSPAN lines intersecting survey area
- Low-resolution data means the model isn't perfectly aligned, but overall, the conversion is a proximate fit to existing biostrat tops

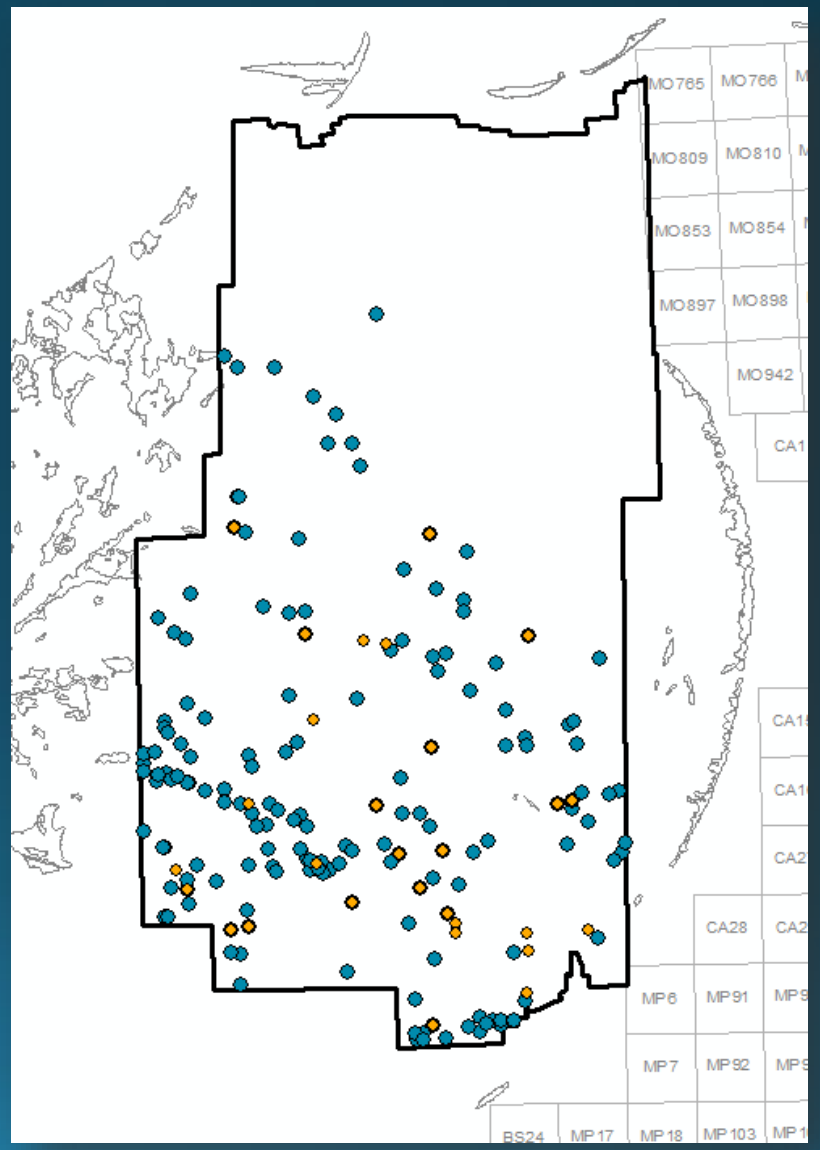


West to East interpreted velocity model with section & wells and tops

Biostratigraphic Data for well correlation

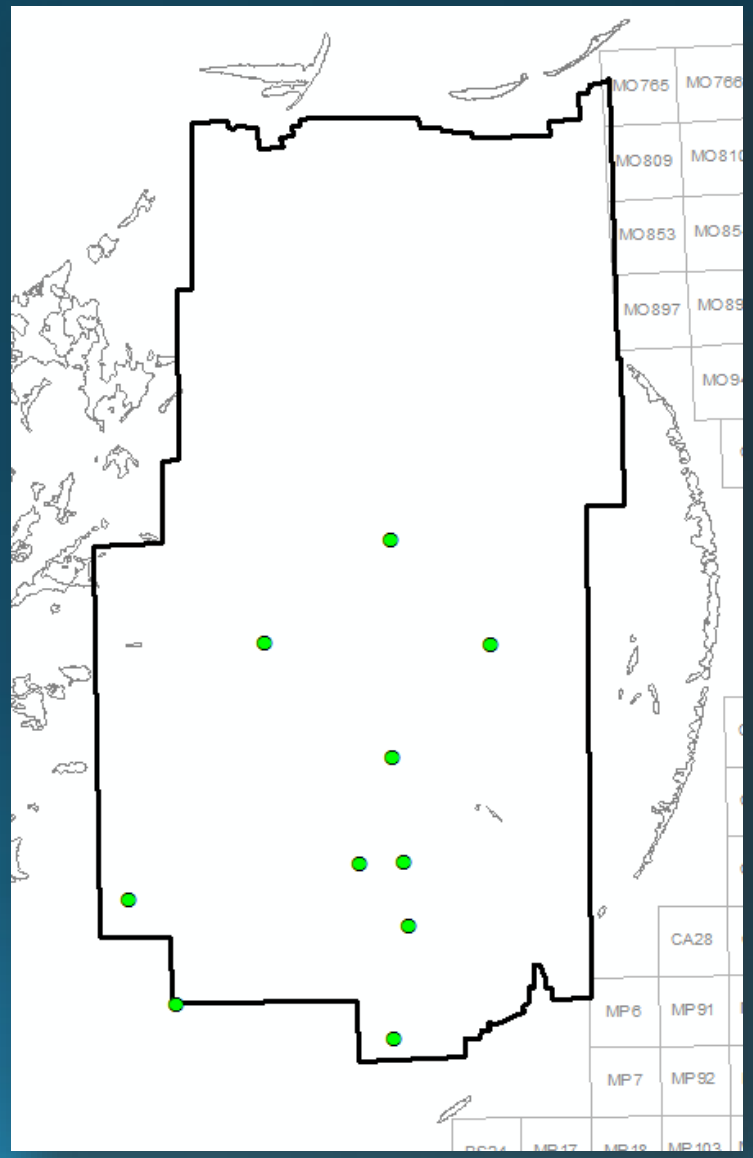
- Blue – Drilled wells
- Yellow – Wells with biostrat reports (PDI)

- **Area is largely devoid of significant oil & gas accumulations despite number of wells – failed top seals?*



Biostratigraphic Data for well correlation

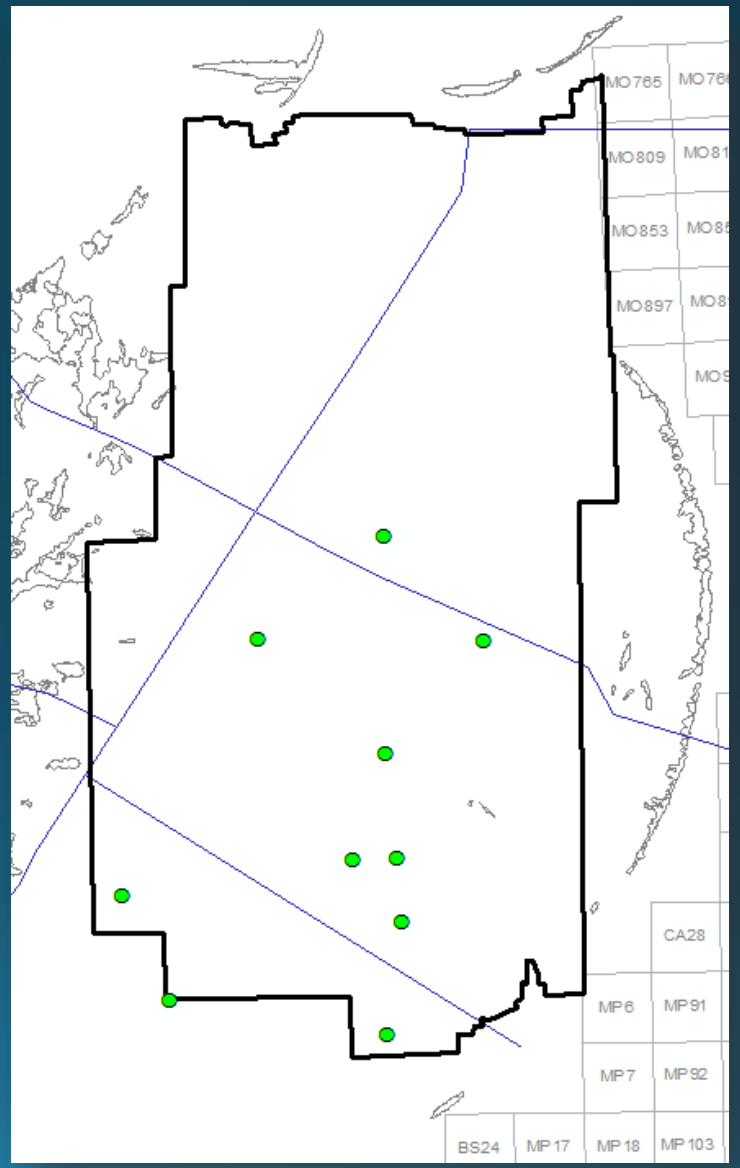
- Blue – Drilled wells
- Yellow – Wells with biostrat reports (PDI)
- Green – Wells with applicable data (through Miocene)



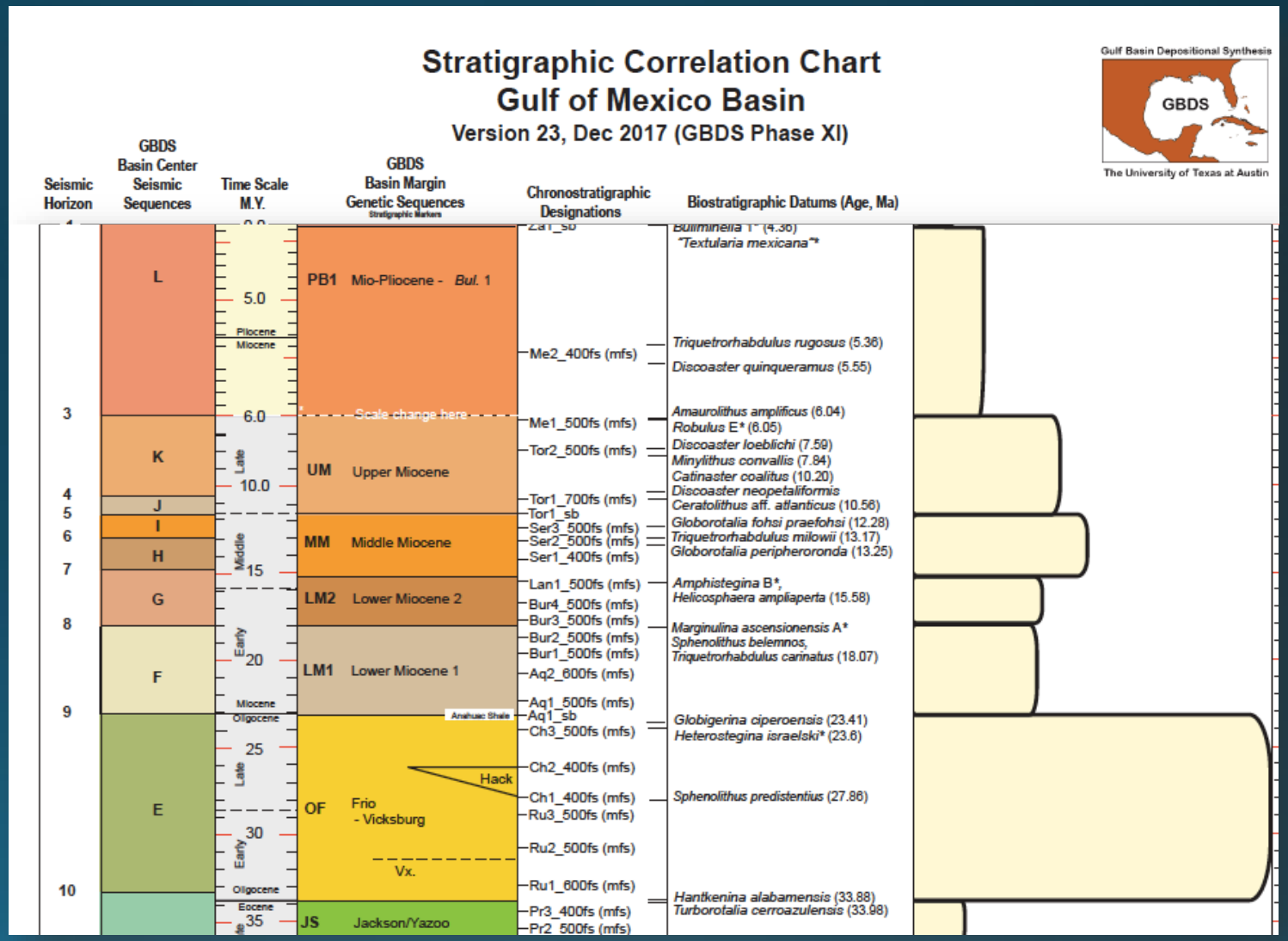
Biostratigraphic Data for well correlation

- Green – Wells with applicable data (through Miocene)

- Caveats:
  - Distant from ION lines
  - Biostrat from “green wells” predominantly based on benthic forams
    - Modern biostrat predominantly based on planktonic forams and calc. nannos

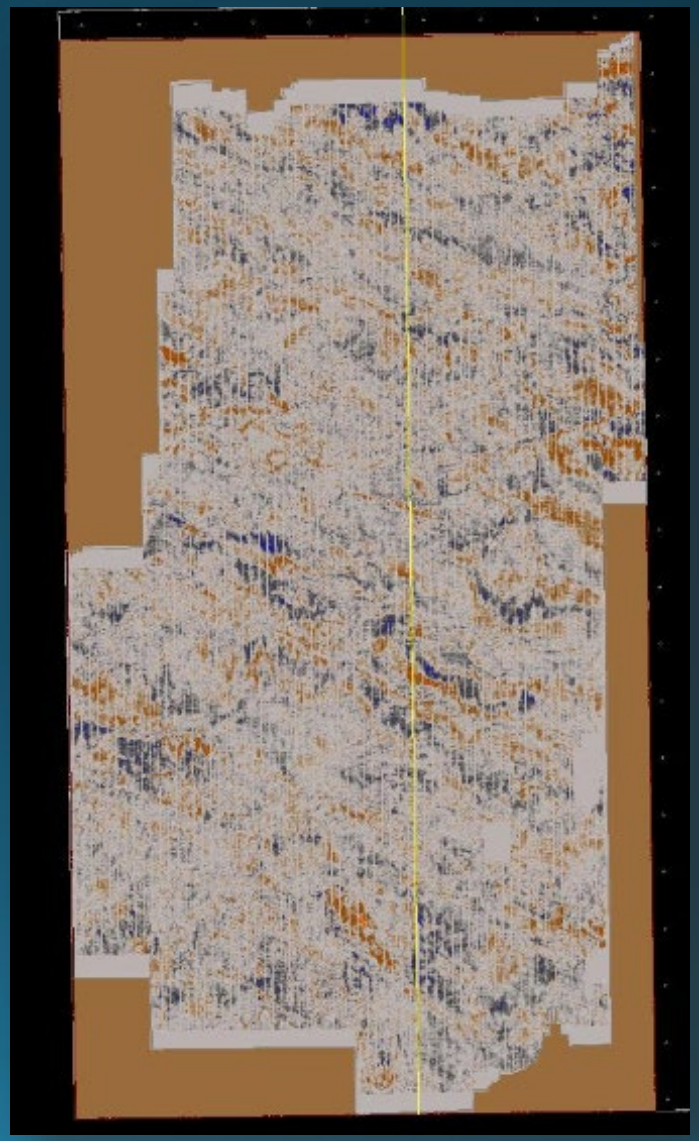


GBDS Stratigraphic Correlation Chart

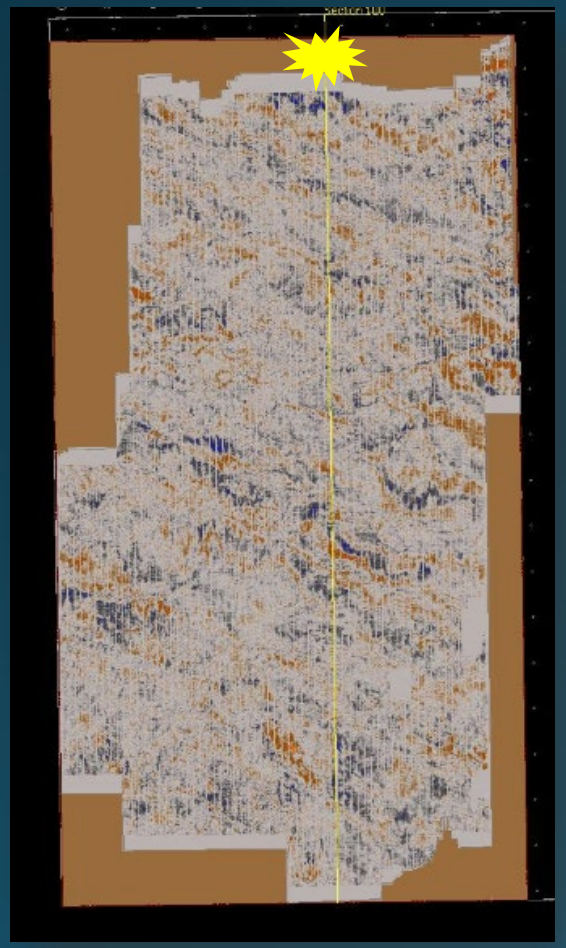


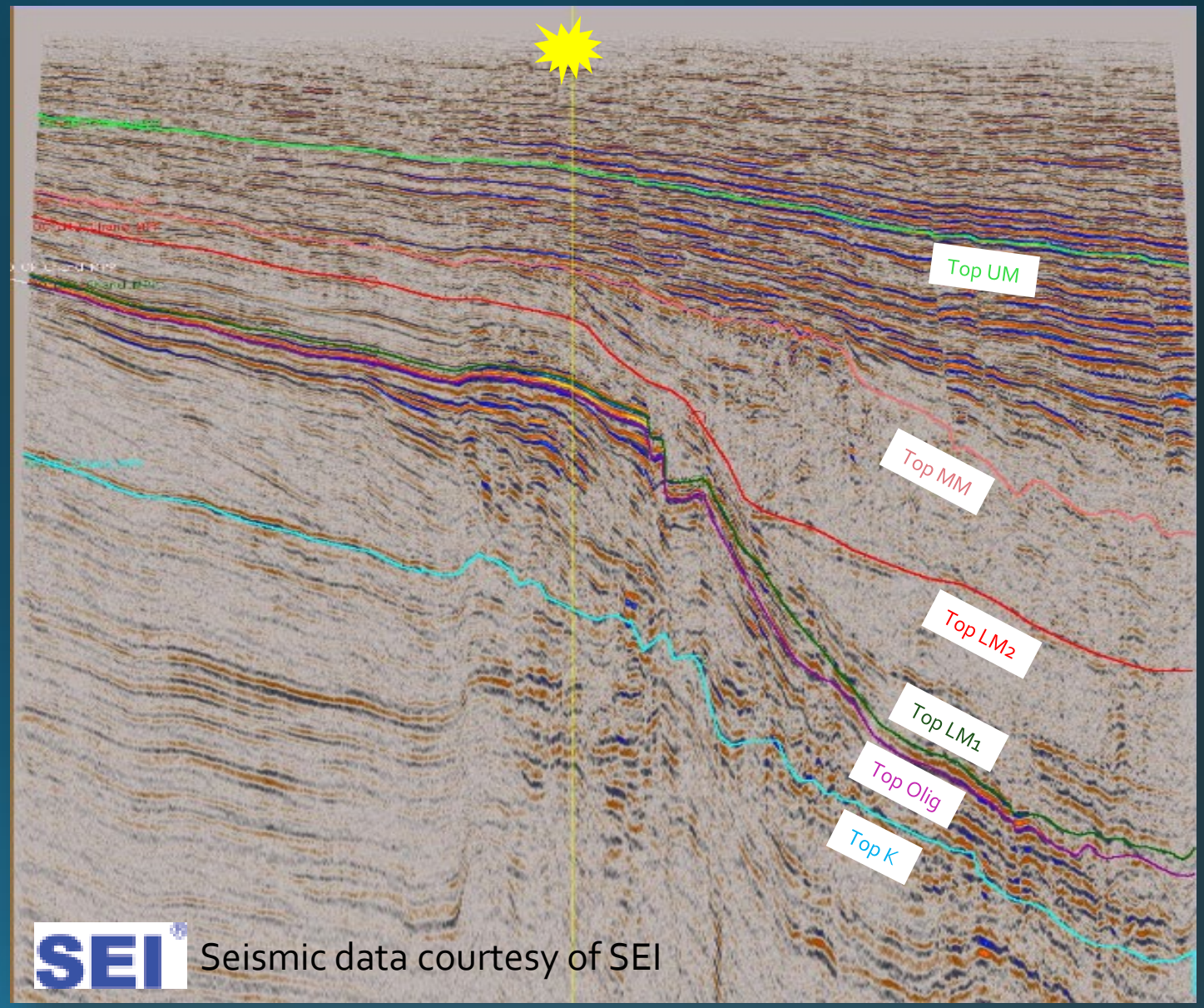
Interpretation to-date

- 6 stratigraphic horizons
  - Cretaceous through top of data
  - Correlated to nearby wells, previously interpreted by GBDS
- Grids created for each horizon
- GIS contour grids created for each horizon
- Fault interpretation in progress



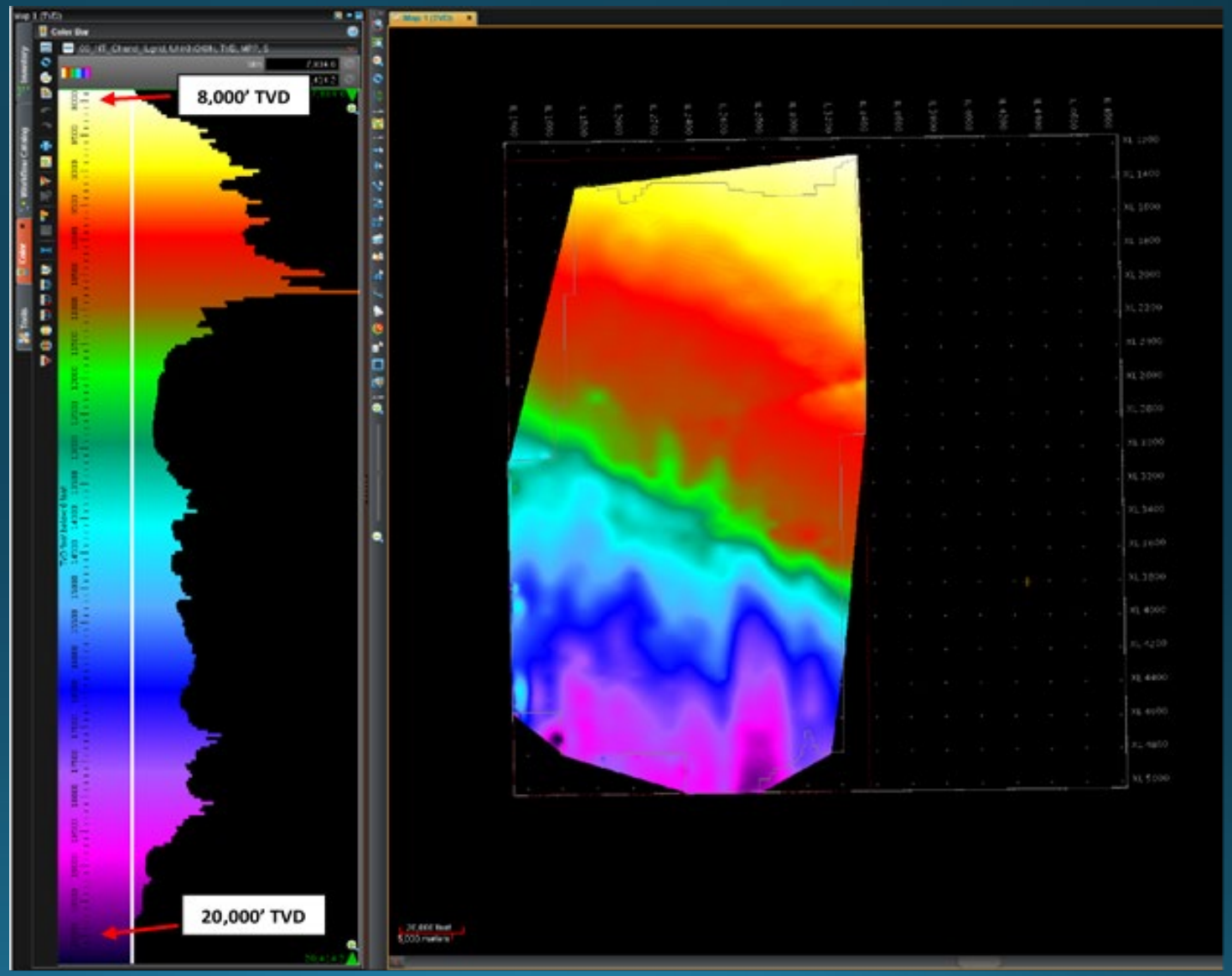
Stratigraphic Interpretation





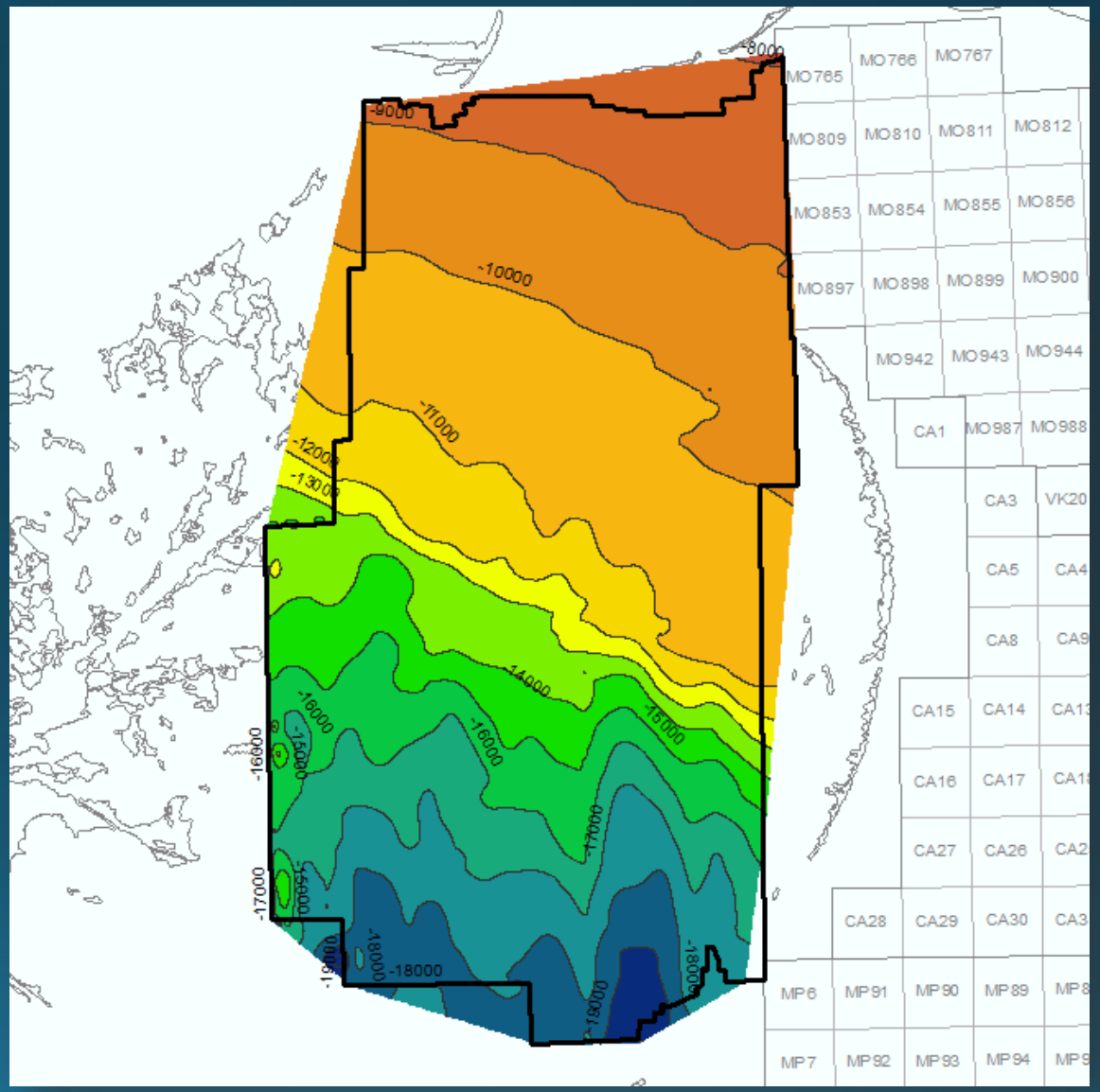
Grids

- Top Cretaceous



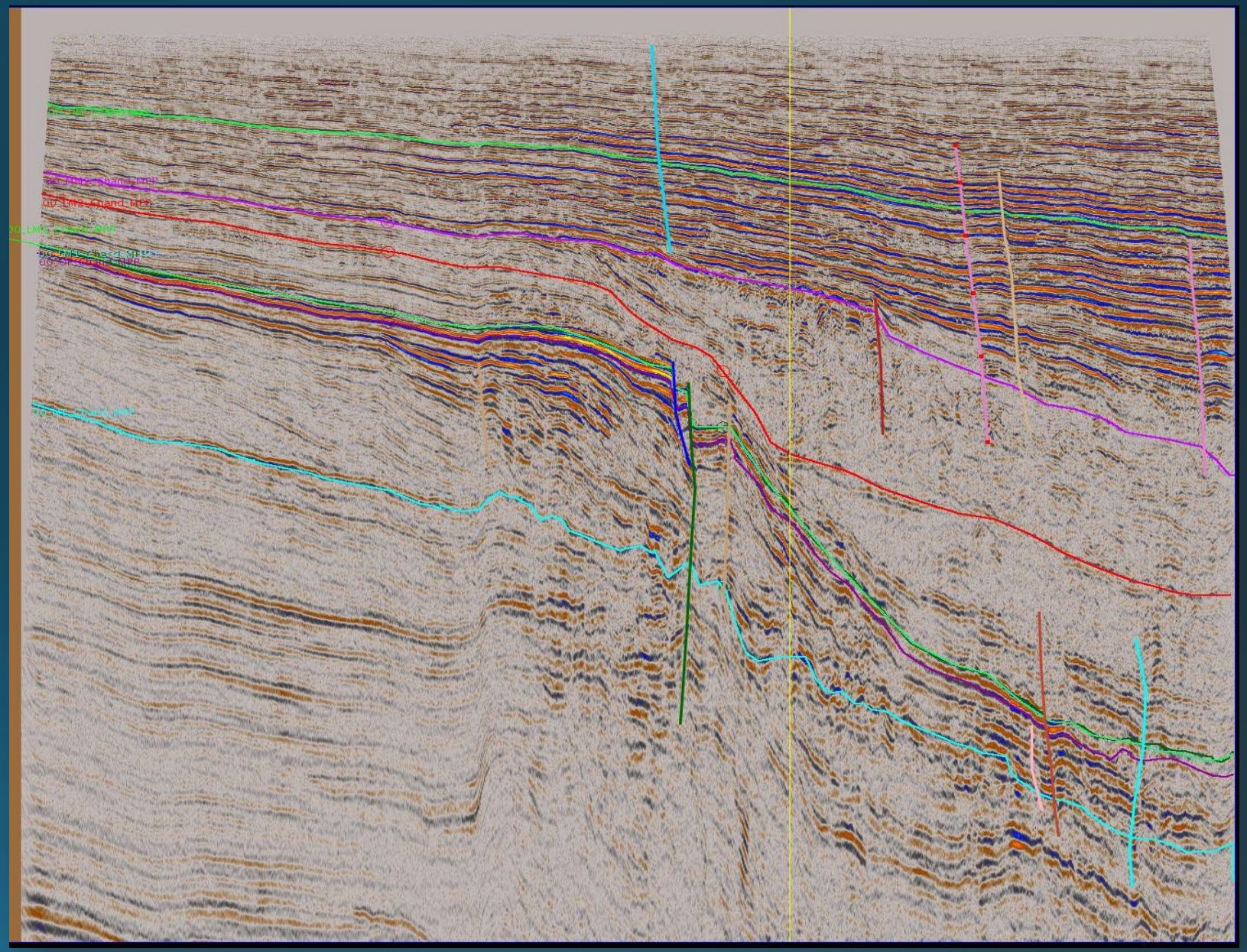
GIS

- Grids exported from Decision Space to create GIS contour maps



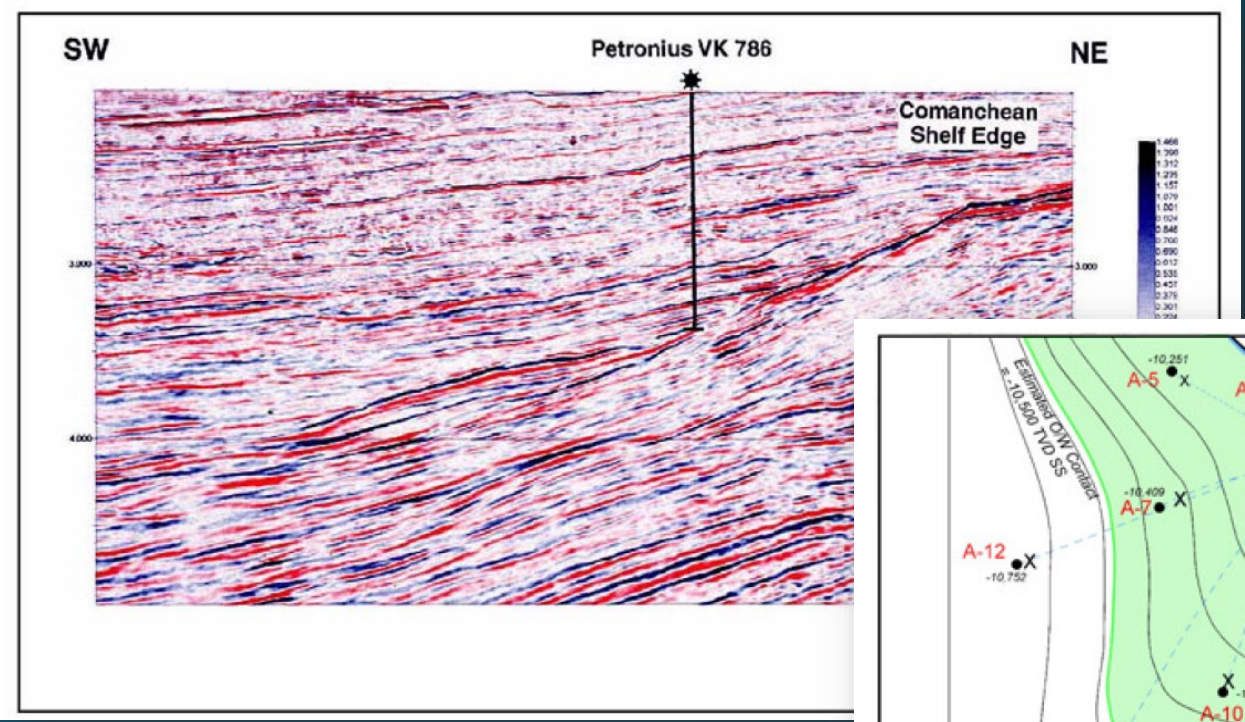
Faults

- Interpretation in progress
- SA moderately faulted
- Notable faulting through the Miocene



Future Work

- Identify traps/tops seals (emphasis on the Miocene)
  - Ideally like Petronius VK 786 (Chevron)
- Estimate porosity (data permitting)



- Middle Miocene SS reservoirs
- Trap is a pinchout of Miocene SS onlapping onto Cretaceous shelf margin
- Little or no faulting

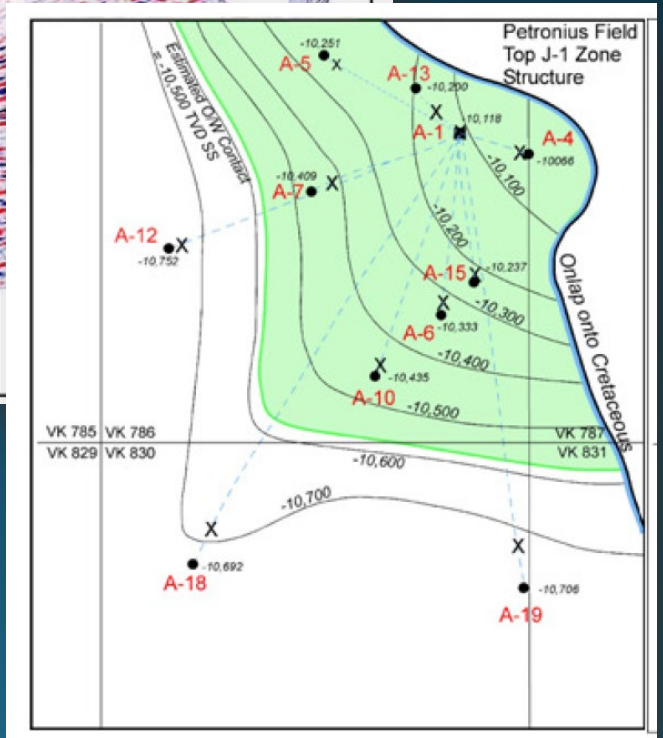


Figure 2 – Petronius J1 sand top structure map
From Li, et al. 2013, OTC 24111

Thank You.