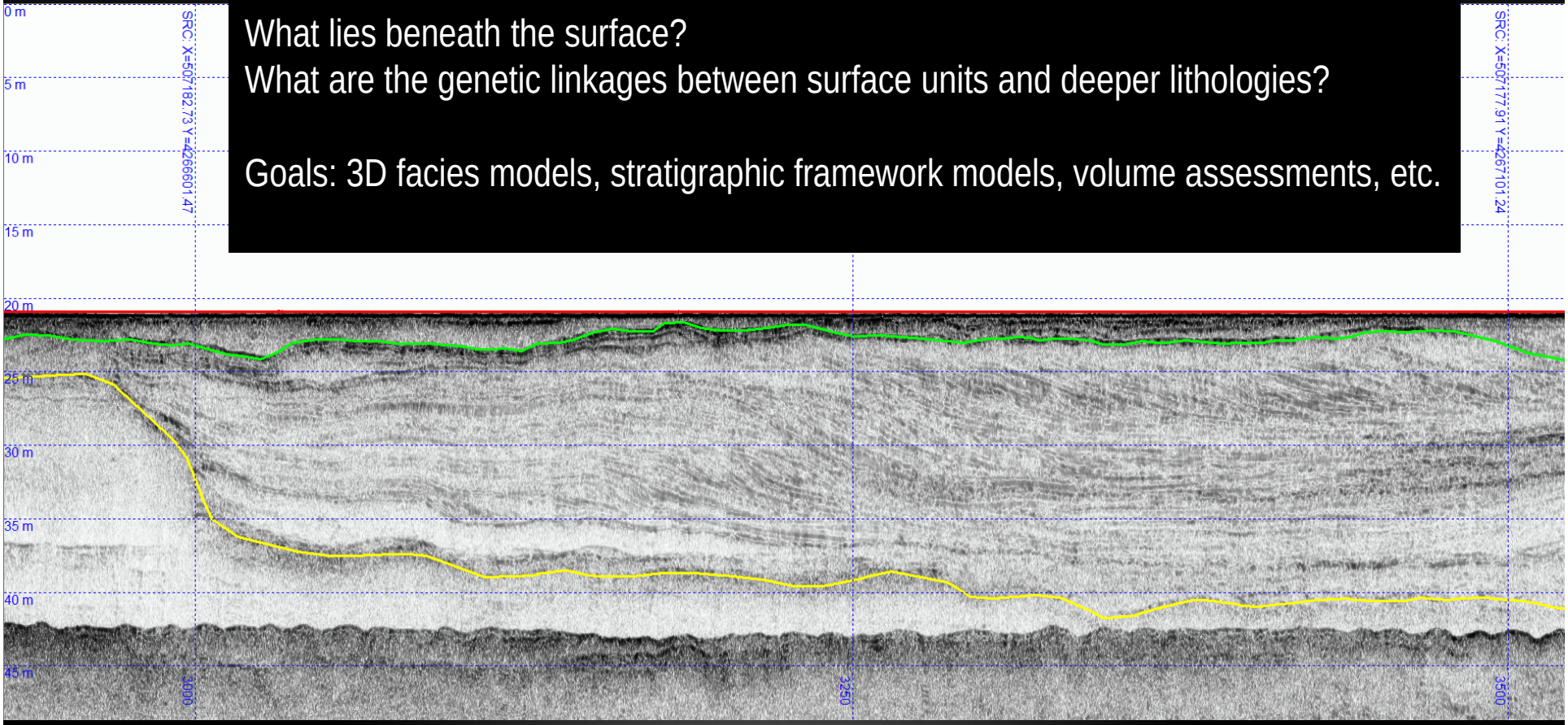
MAPPING DELAWARE'S OFFSHORE SHALLOW STRATIGRAPHIC FRAMEWORK

What lies beneath the surface?
What are the genetic linkages between surface units and deeper lithologies?

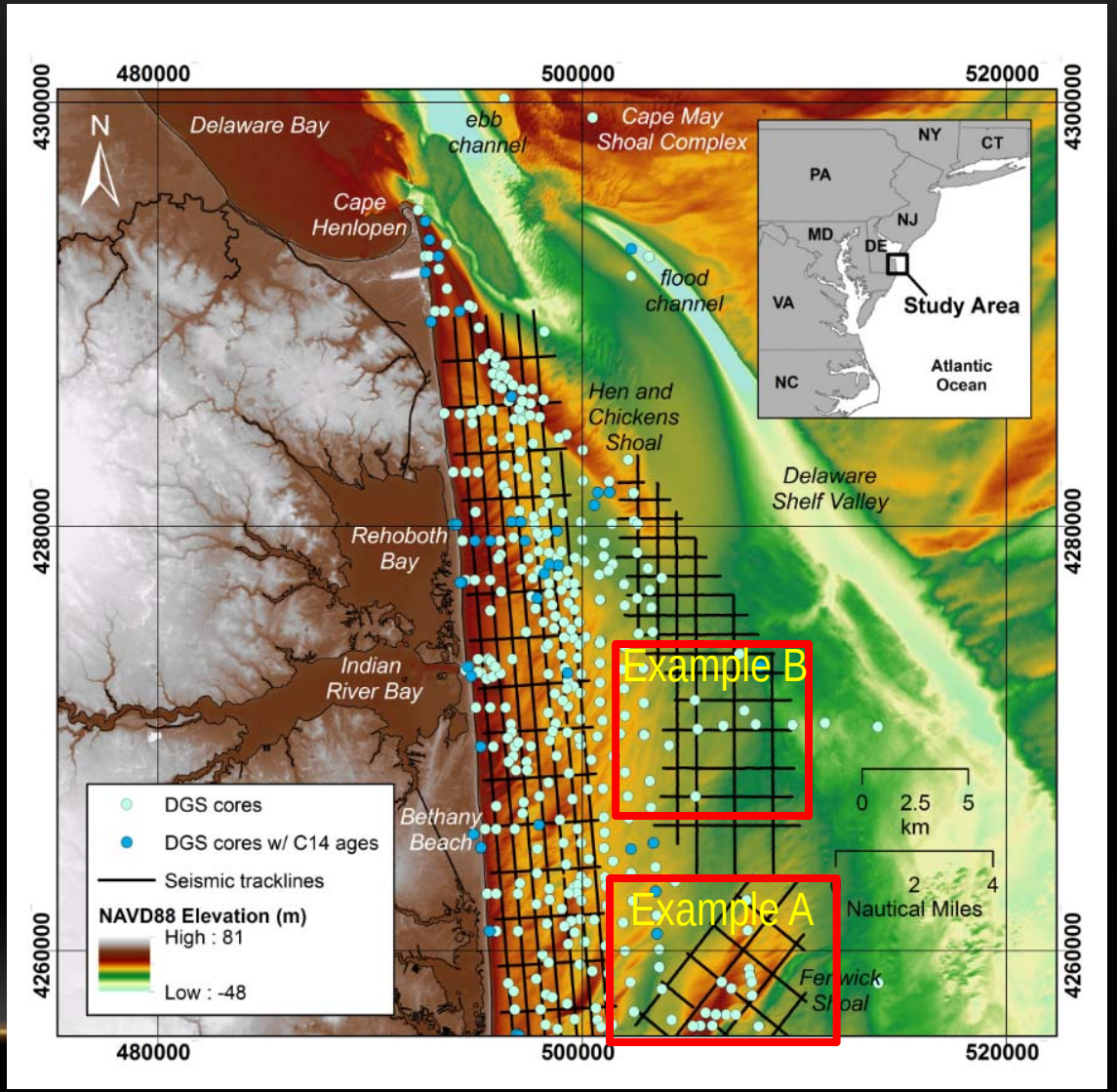
Goals: 3D facies models, stratigraphic framework models, volume assessments, etc.



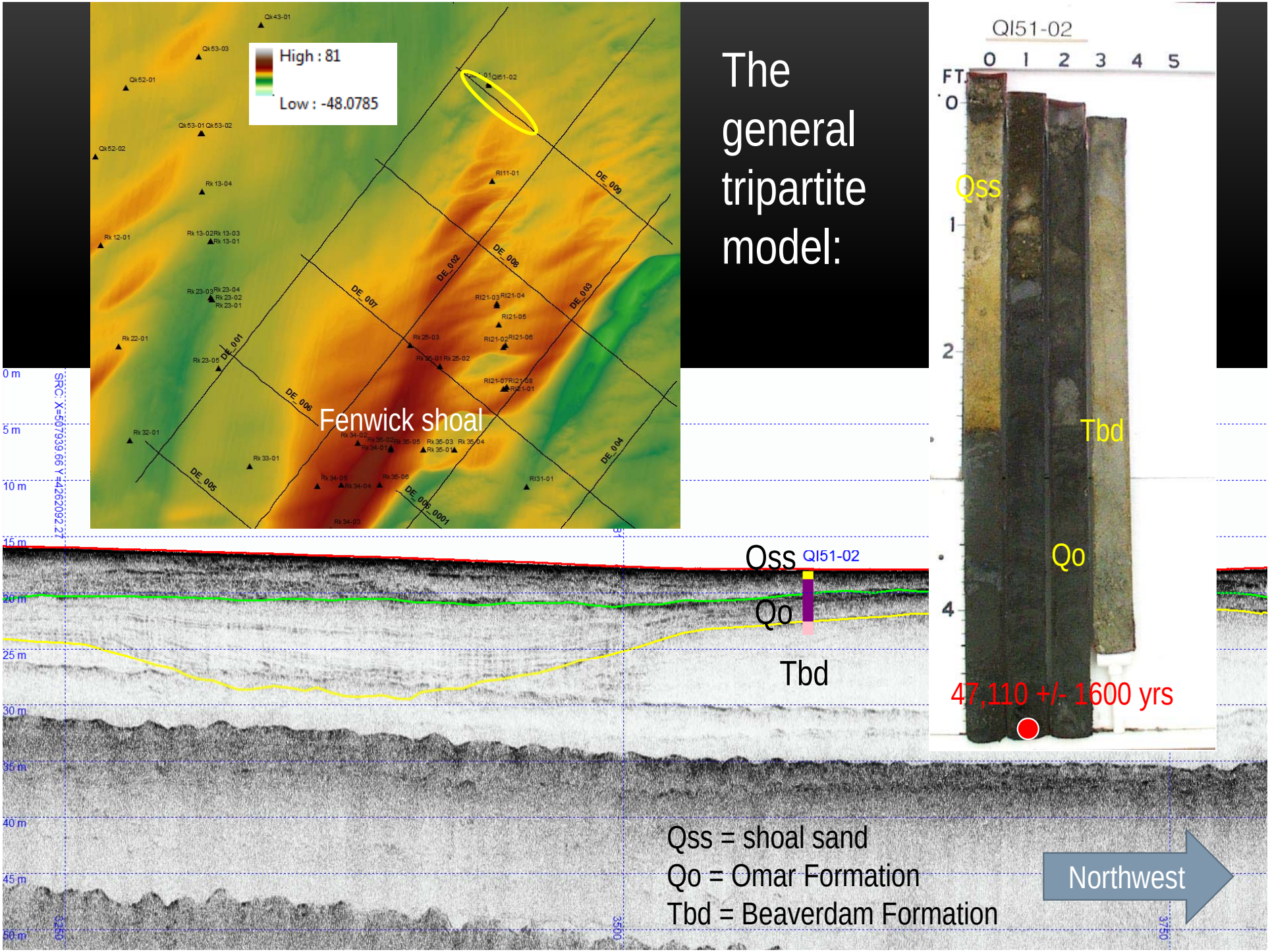
Robin Mattheus, Delaware Geological Survey

DATASET

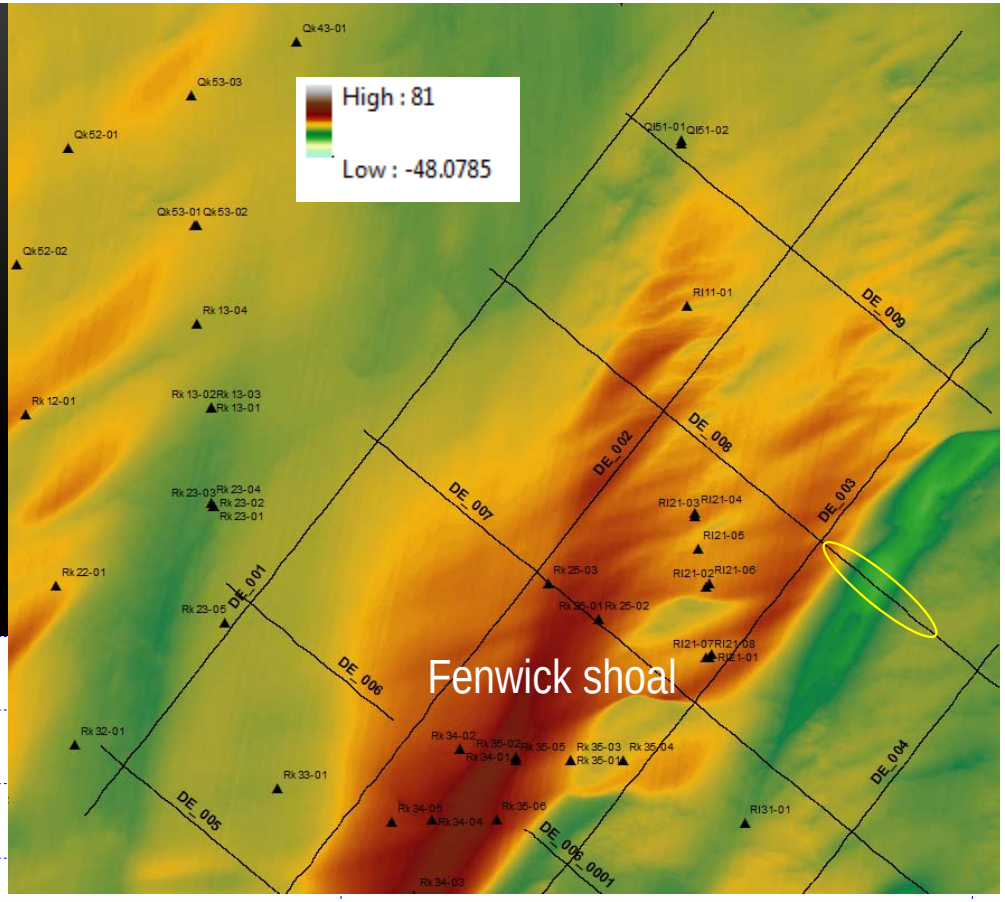
- High-resolution ‘chirper’ datasets
  - 2013 DNREC
    - State waters
    - 2-10 kHz
    - ~300 km
  - 2015 BOEM
    - Federal waters
    - 0.7-12kHz
    - ~203 km
- Lithologic information
  - 419 Cores
  - Onshore and offshore geologic maps and cross-sections

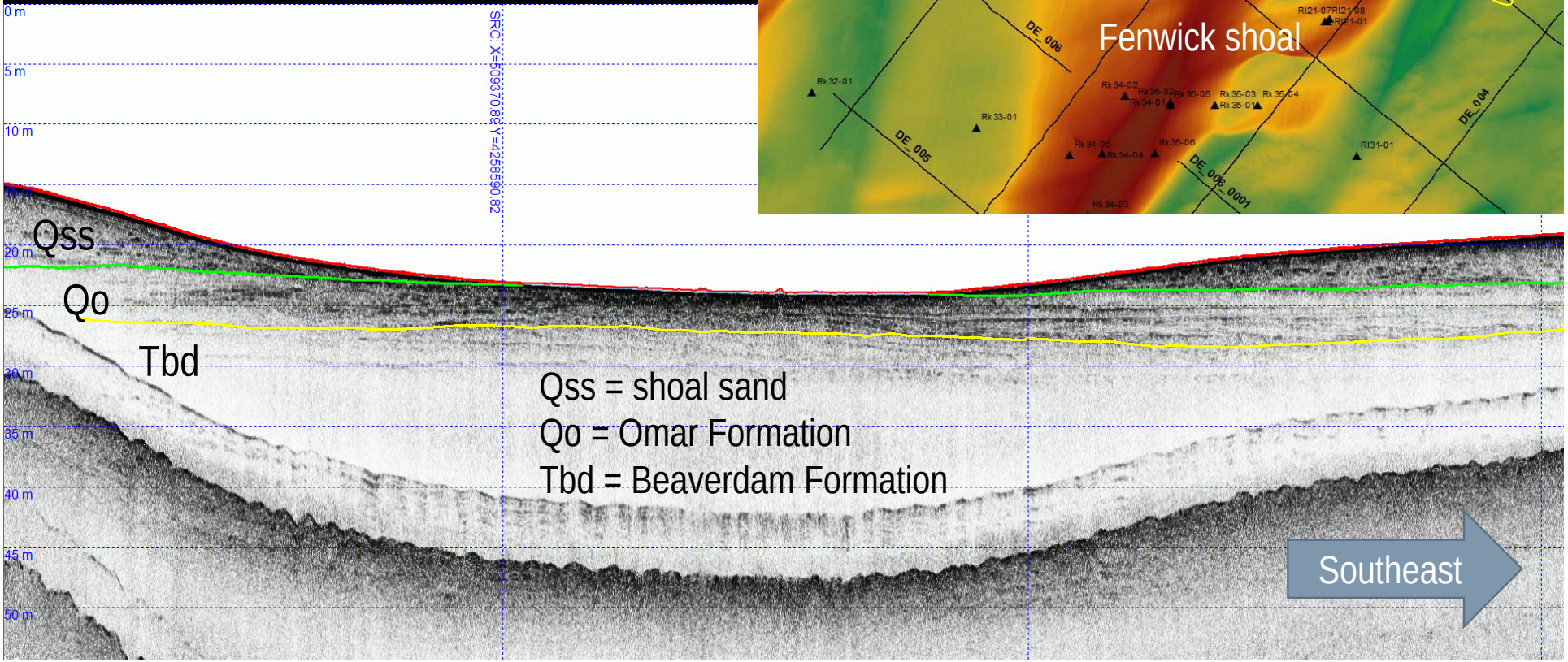


The general tripartite model:

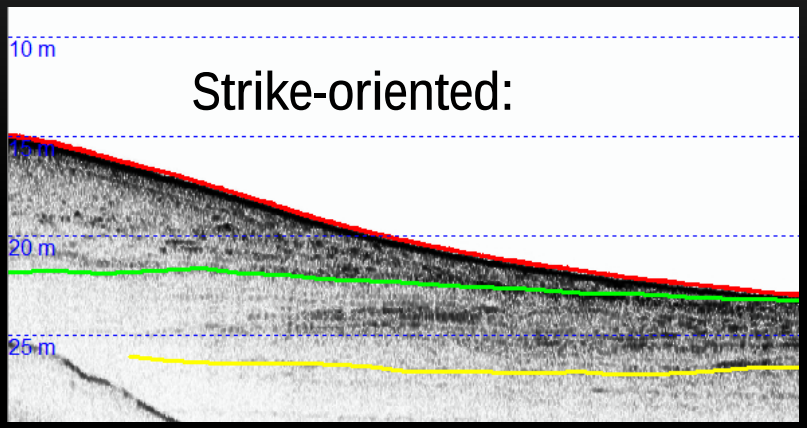


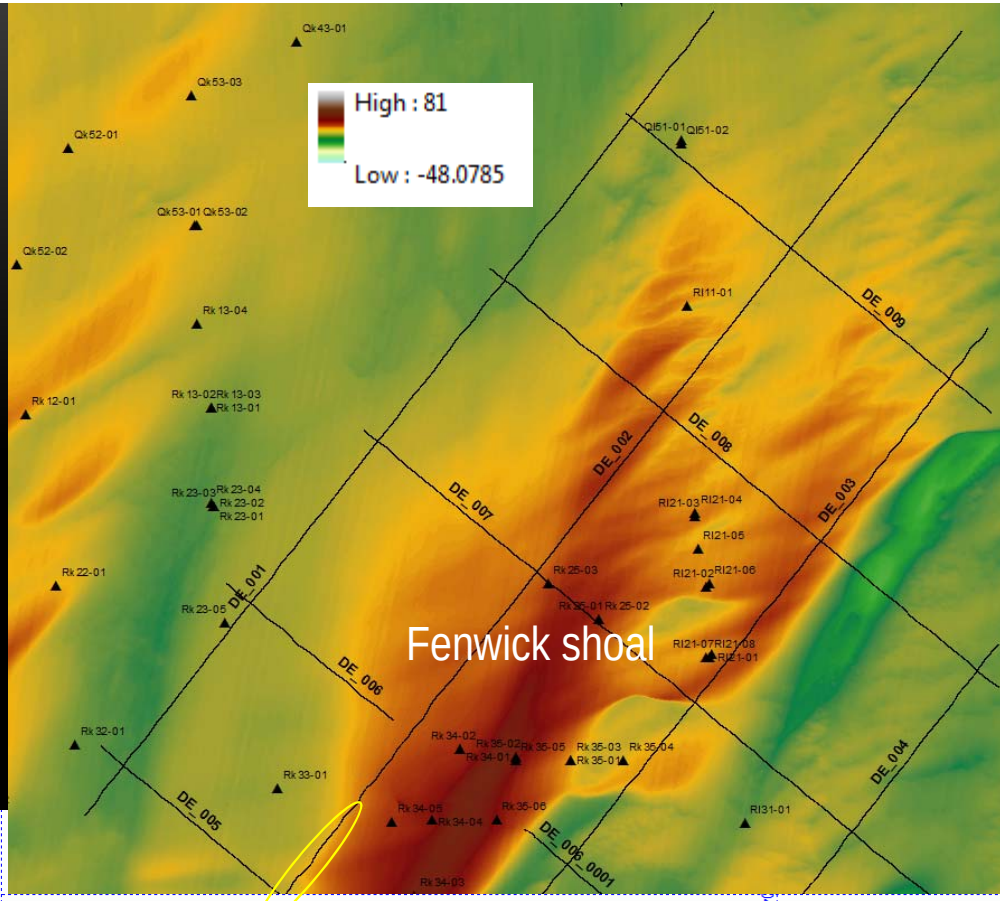
Pleistocene and/or older outcrops common between shoal bodies:

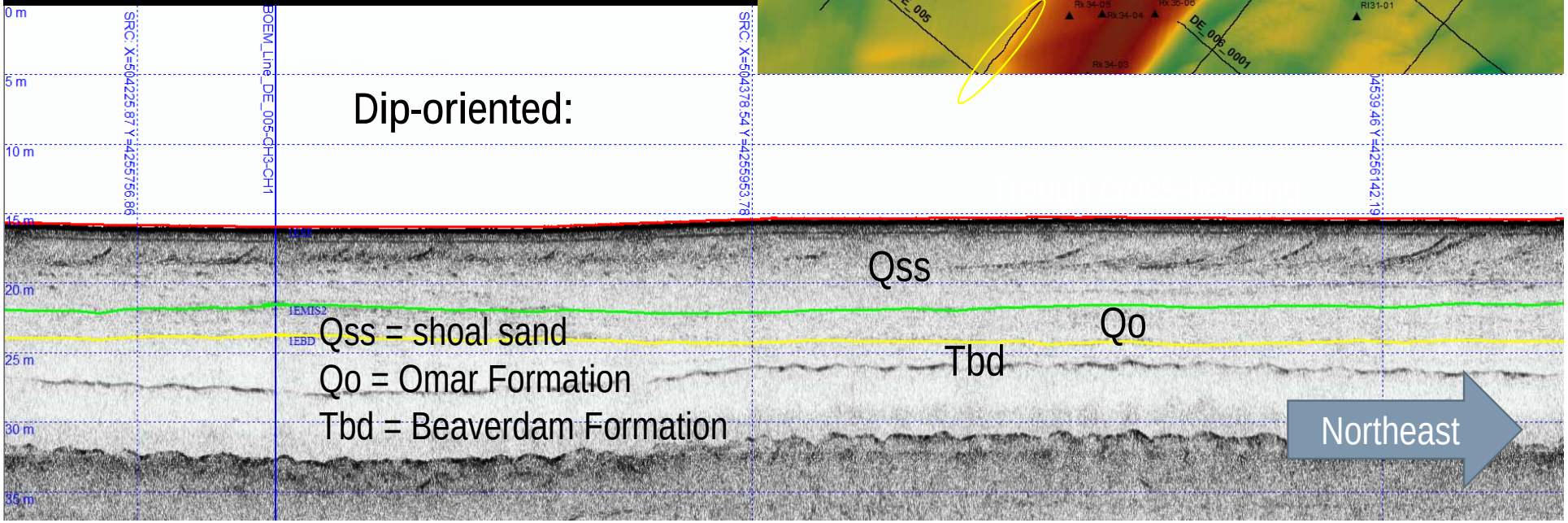


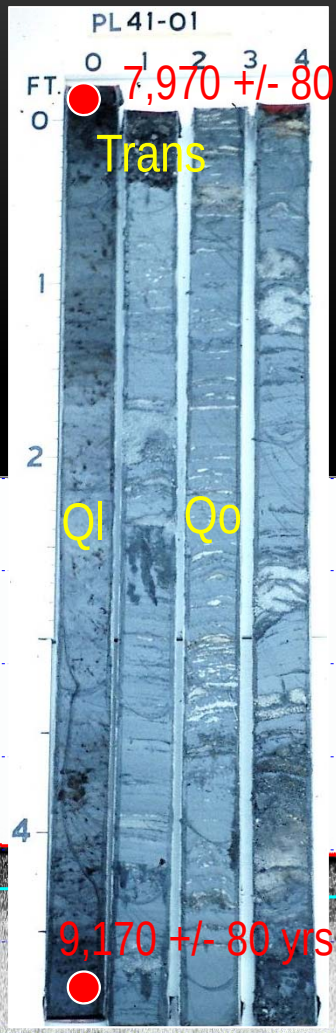


Internal reflection configurations vary depending on orientation:



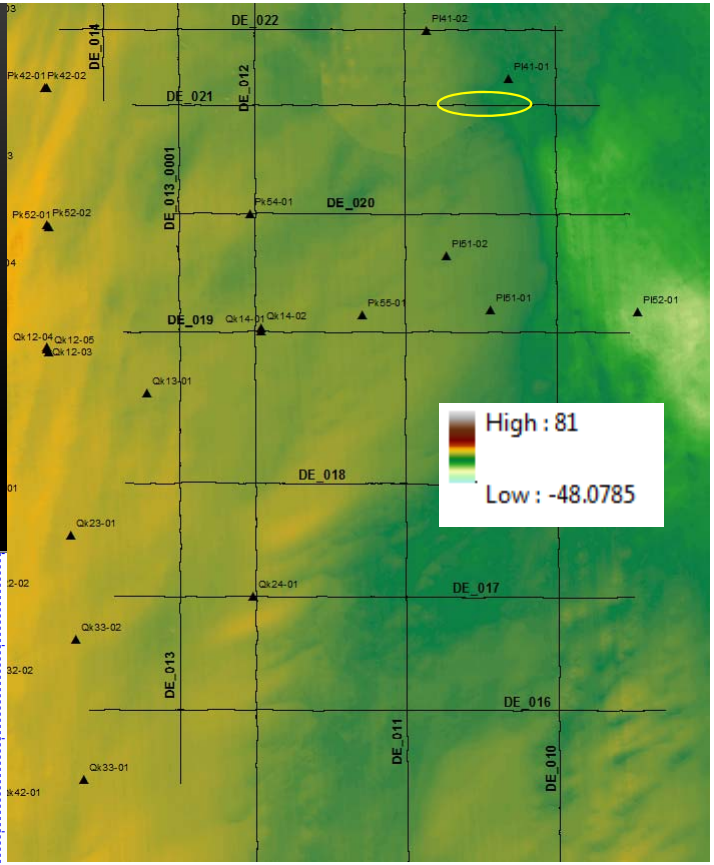


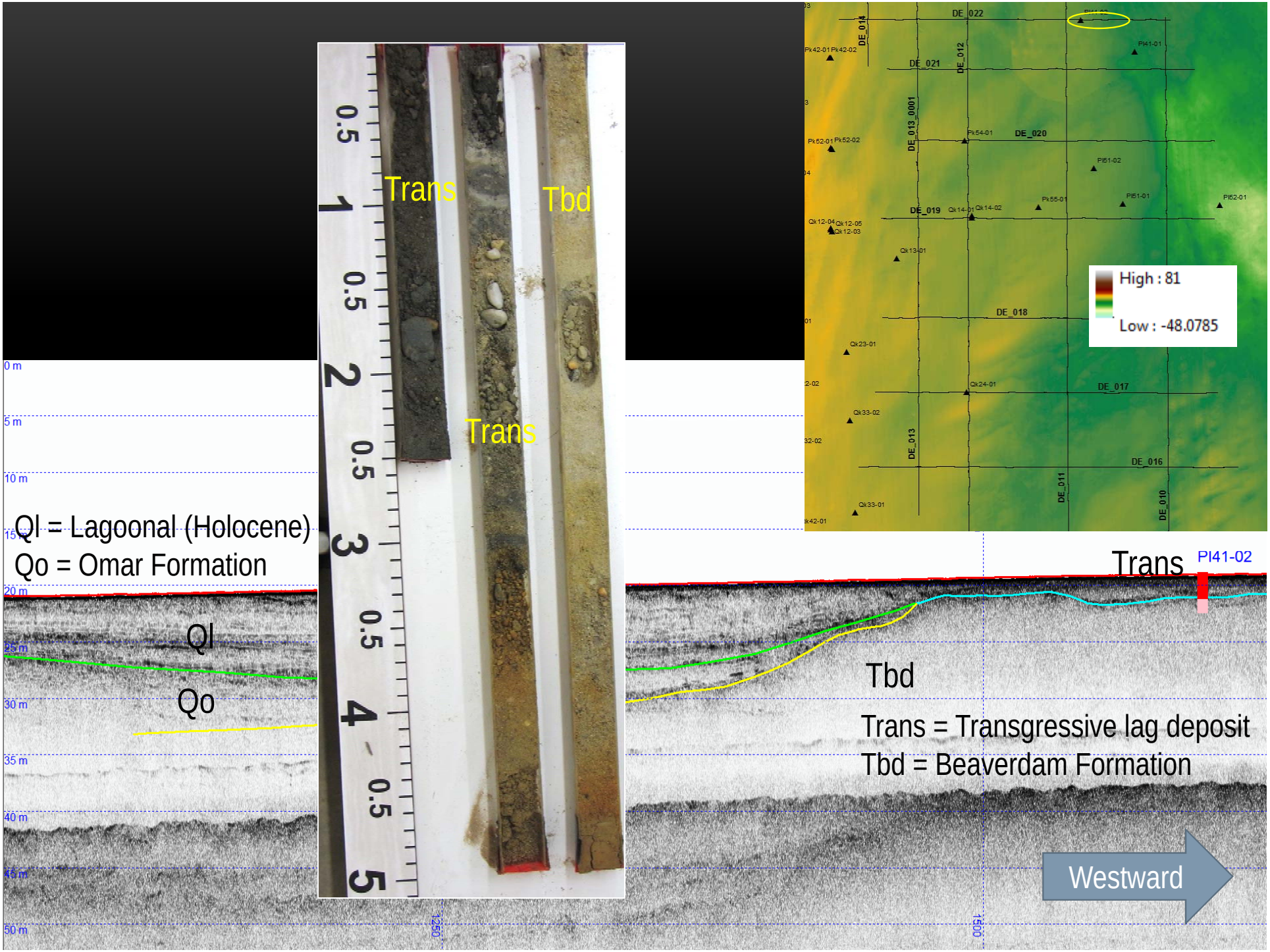




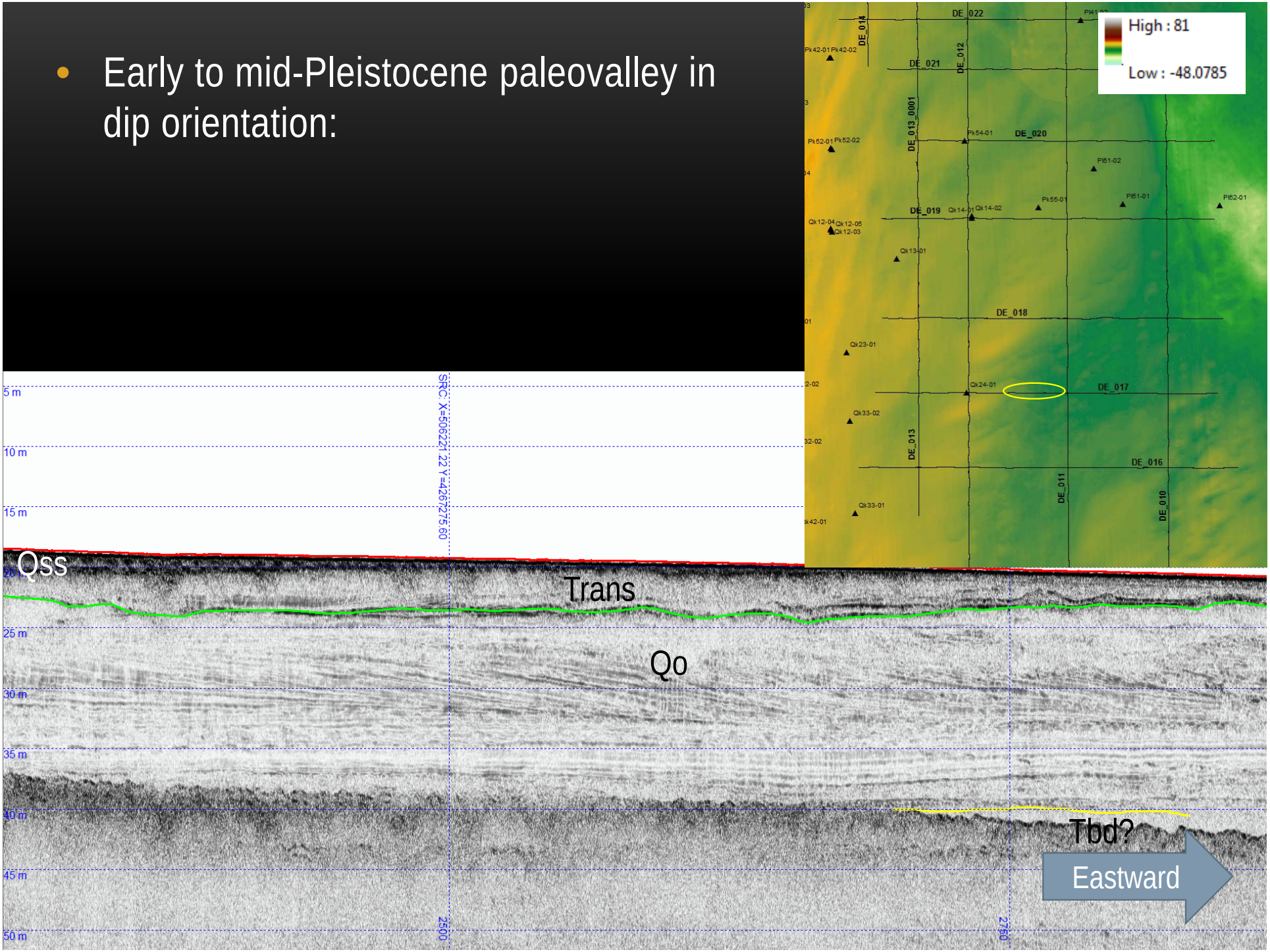
- Valley fill:

Ql = Lagoonal (Holocene)
Trans = Transgressive lag deposit
Qo = Omar Formation
Tbd = Beaverdam Formation



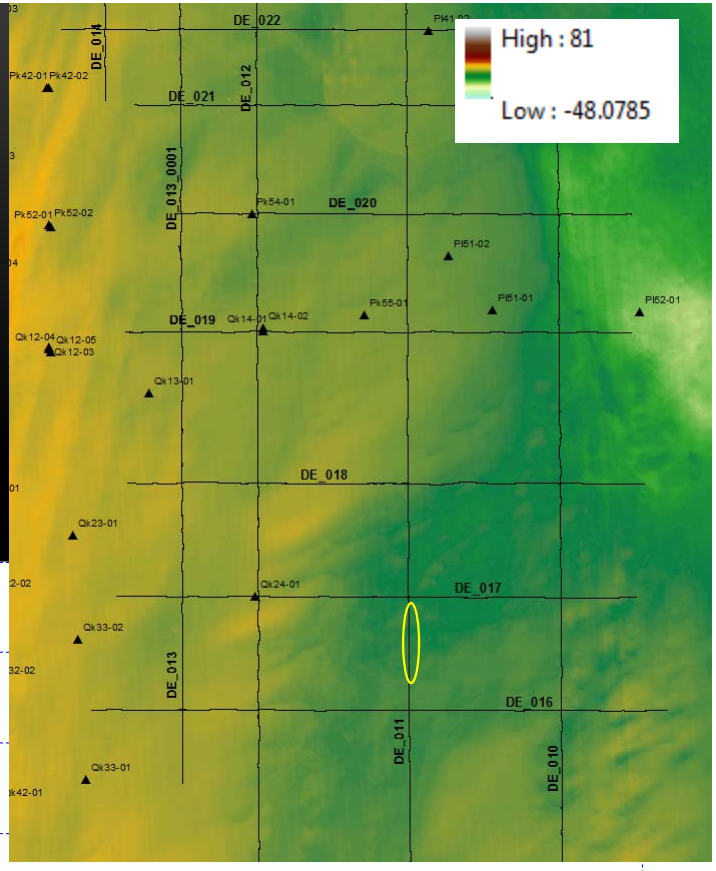

Trans
Tbd
Trans
High : 81
Low : -48.0785
Ql = Lagoonal (Holocene)
Qo = Omar Formation
Ql
Qo
Trans
PI41-02
Tbd
Trans = Transgressive lag deposit
Tbd = Beaverdam Formation
Westward

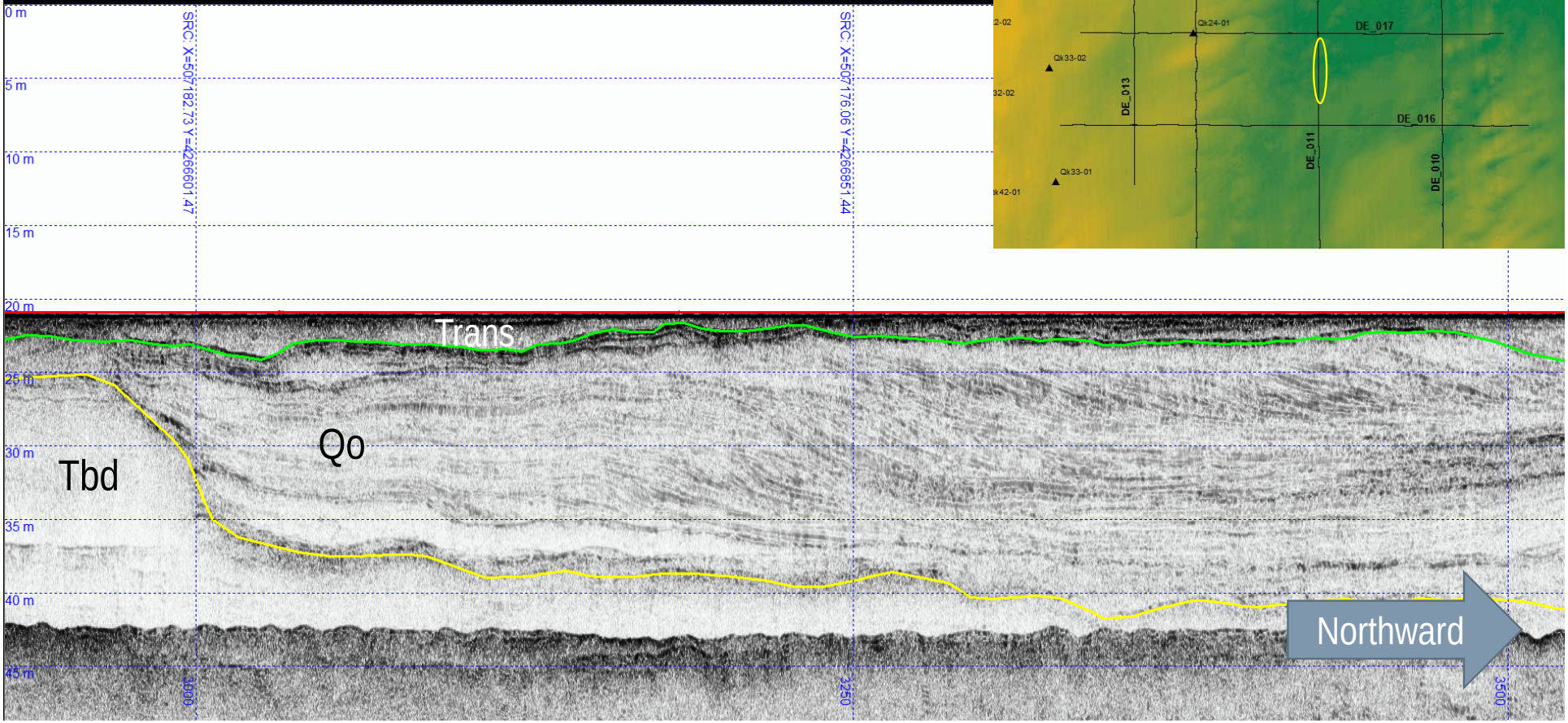
- Early to mid-Pleistocene paleovalley in dip orientation:



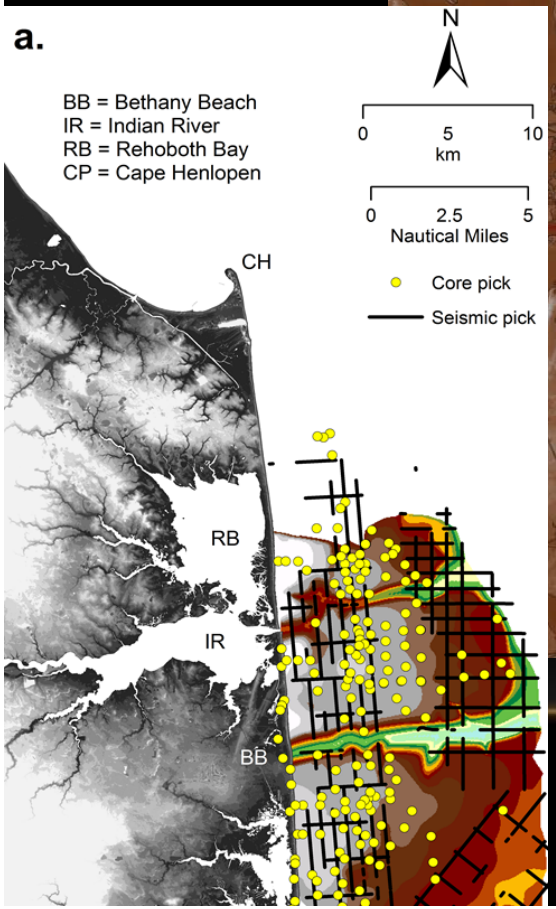
- Early to mid-Pleistocene paleovalley in strike orientation:

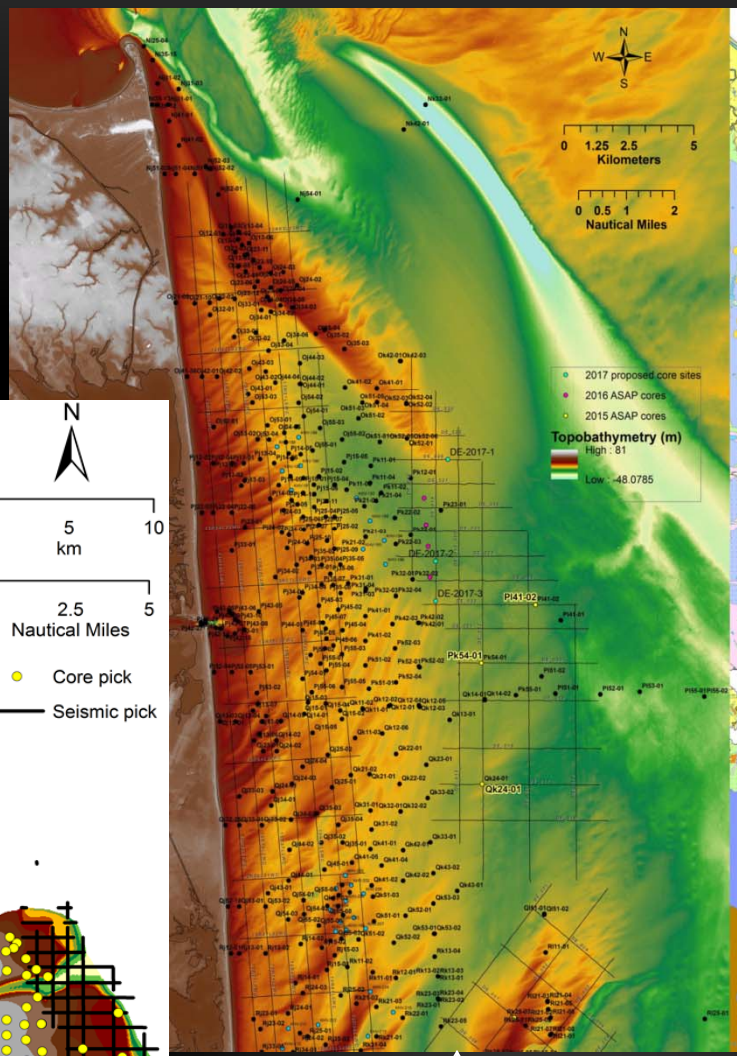
Trans = Transgressive lag deposit
Qo = Omar Formation
Tbd = Beaverdam Formation

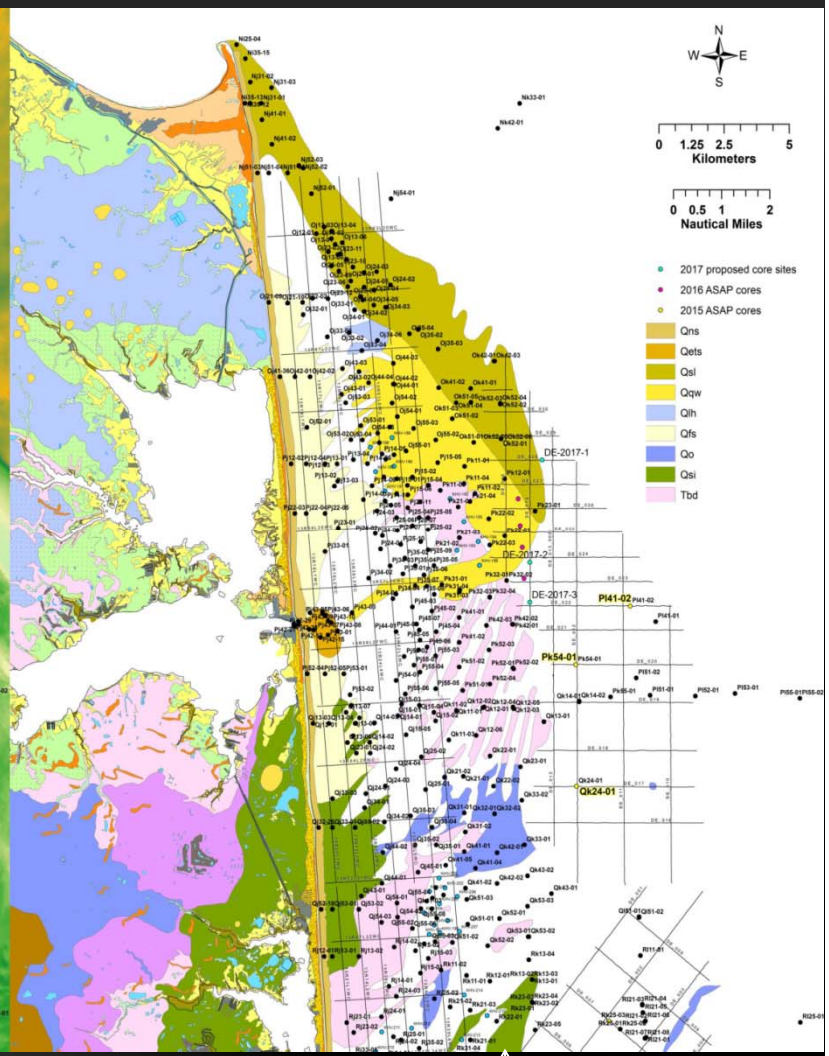




A work in progress: Surface geology map (outcropping Beaverdam, Omar, Sinepuxent, etc.) and paleogeographic maps (Tertiary-Quaternary contact, etc.)







Seafloor topography/geomorphology

Pre-Holocene surface outcrop sedimentology

← Paleogeography (T-Q contact)

SUMMARY

- Stratigraphic framework studies provide insight into surficial and subsurface sediment facies distributions.
- Seismic facies patterns can infer subsurface lithology in absence of core data.
- Shoal sands are sourced by the reworking of older shelf units.
- Continued mapping efforts are useful to target not only surficial sand resources, but potential subsurface ones as well.

…continued work:

31 new cores (Army Corps and BOEM)!