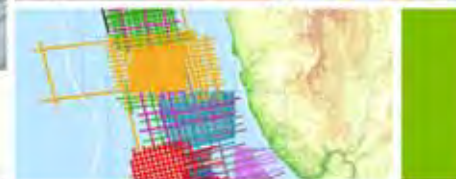
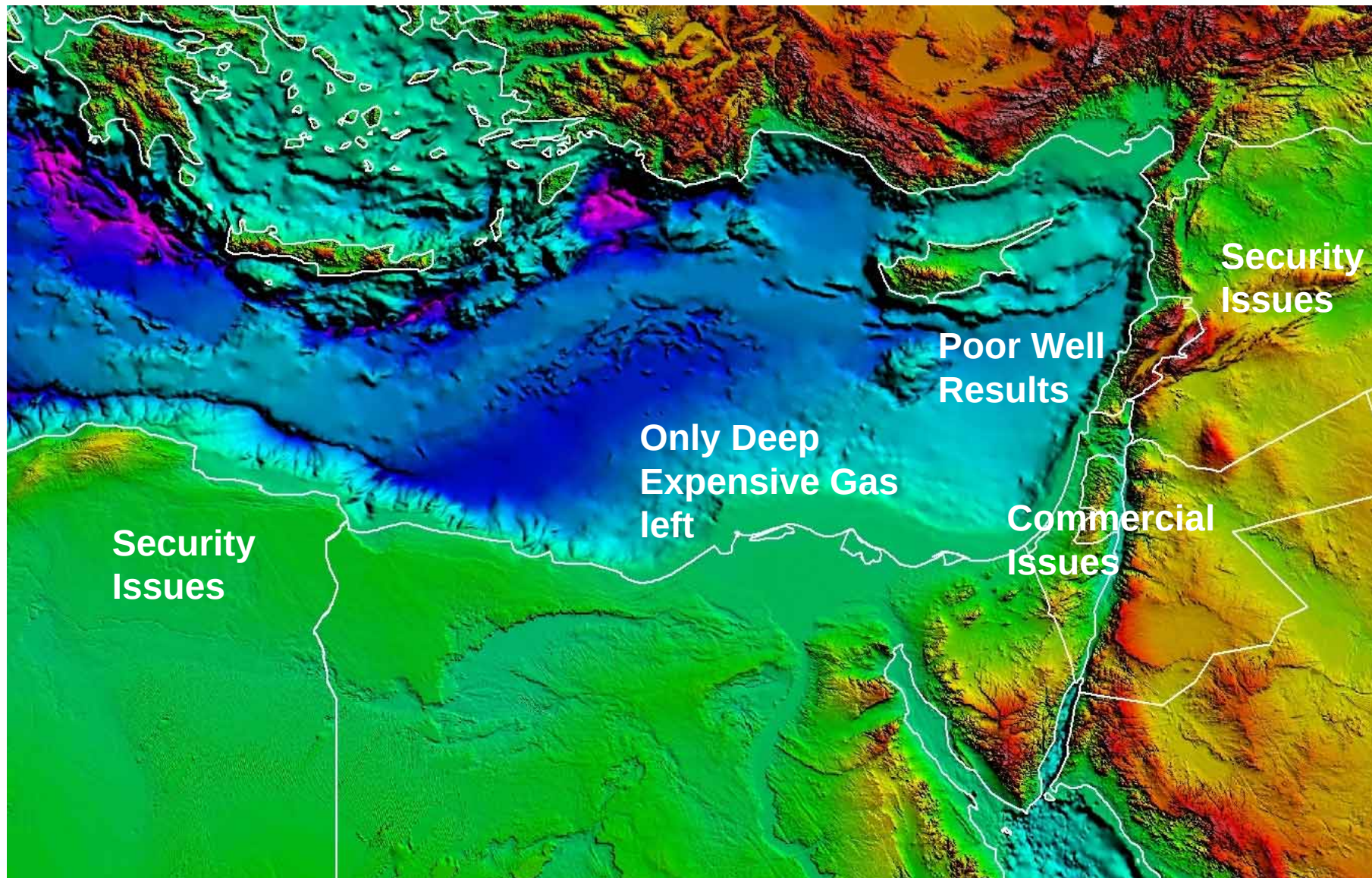


Petroleum Systems of the Levant

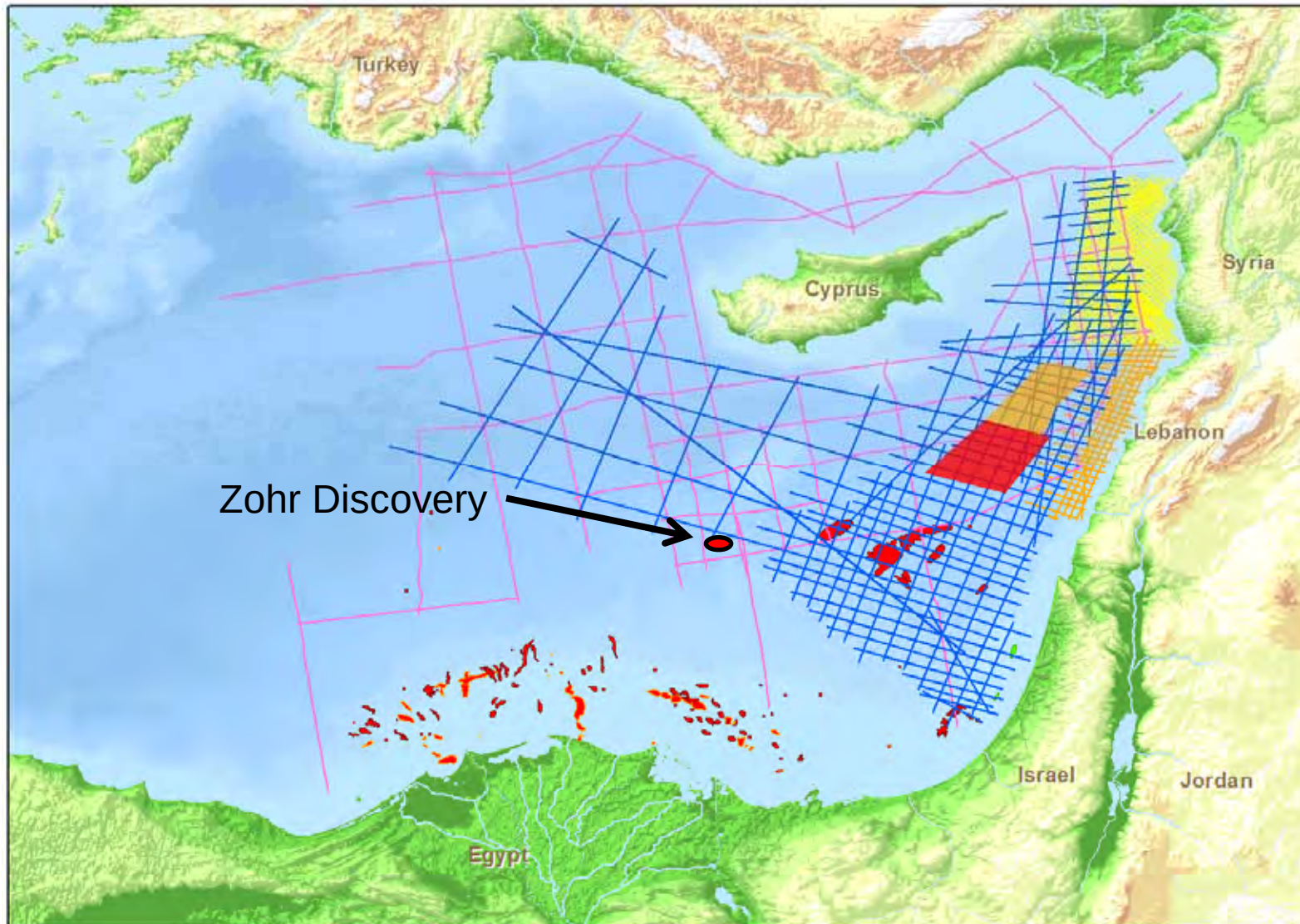
Neil Hodgson



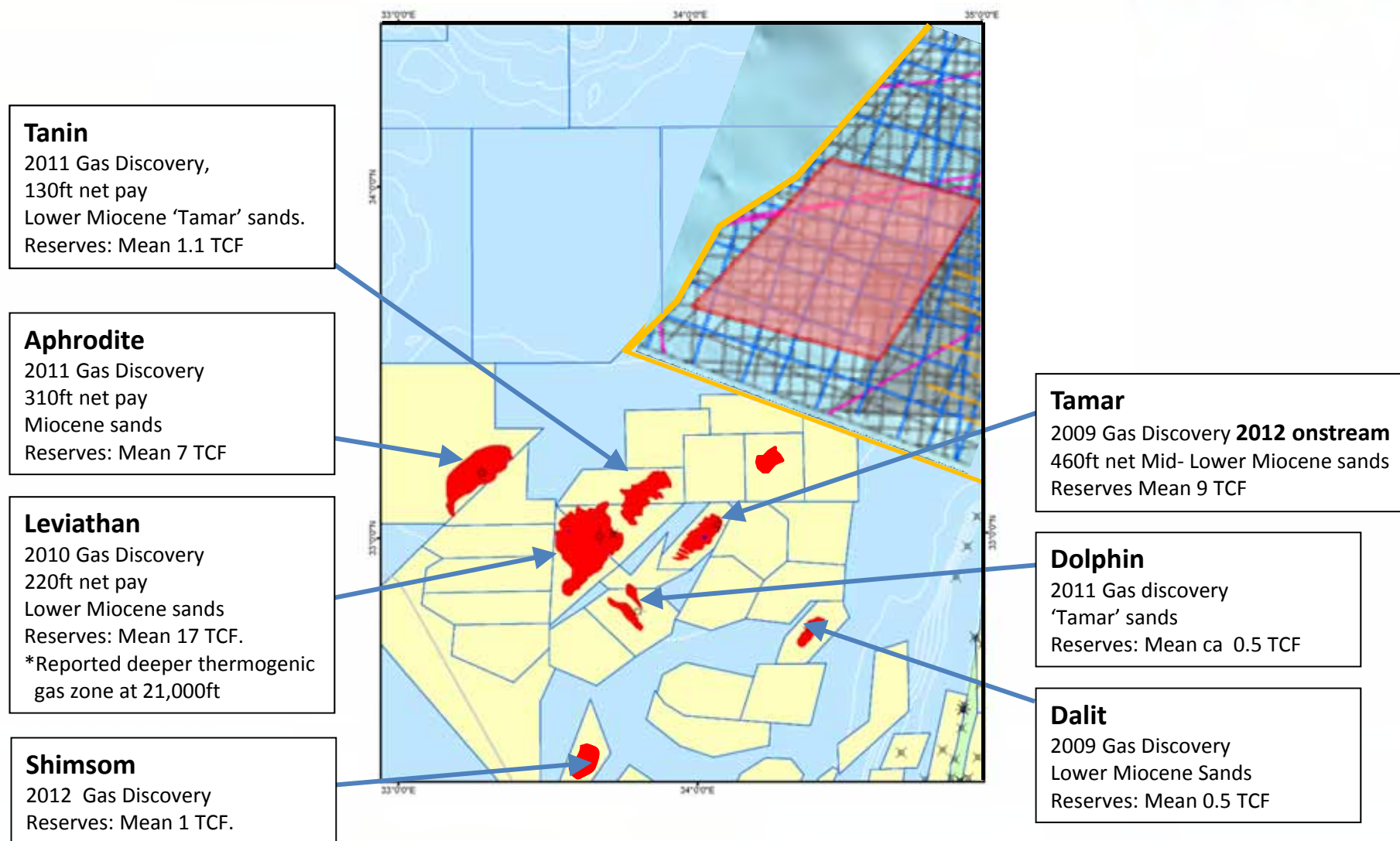
Eastern Mediterranean: What's with the Perception?



Game Changer in the Levant



South Levantine Basin: Gas Basin?



So what do we **know** about the Levant Basin?

1. Biogenic Gas Play in deepwater
2. Locally derived reservoir of poor quality
3. Complex, strike-slip structures.

All suggesting difficult reservoirs, gas, hard to develop and long lead time to production.

I don't think any of the above is true

Early Miocene Reservoir thickening to the north



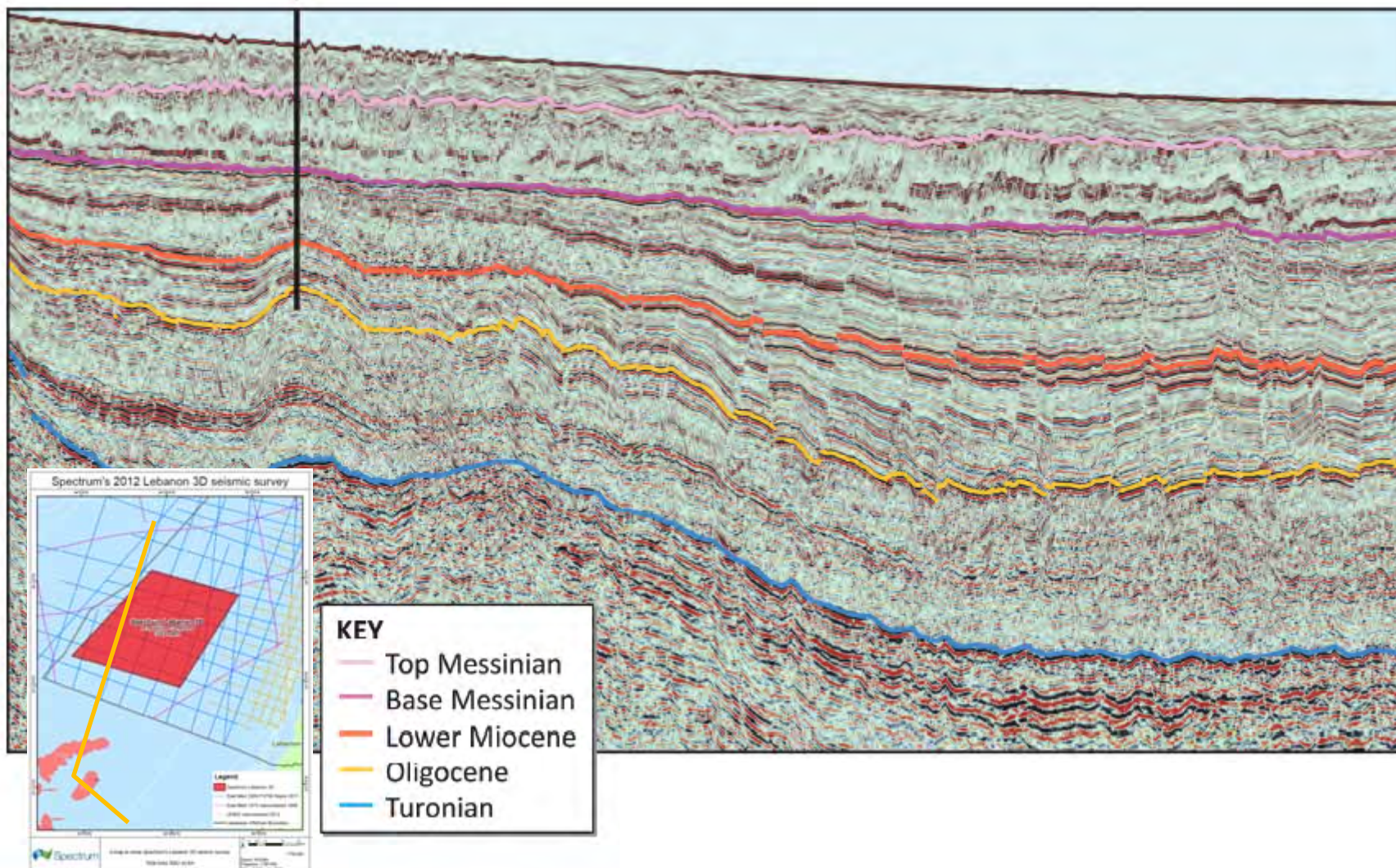
S

Tamar

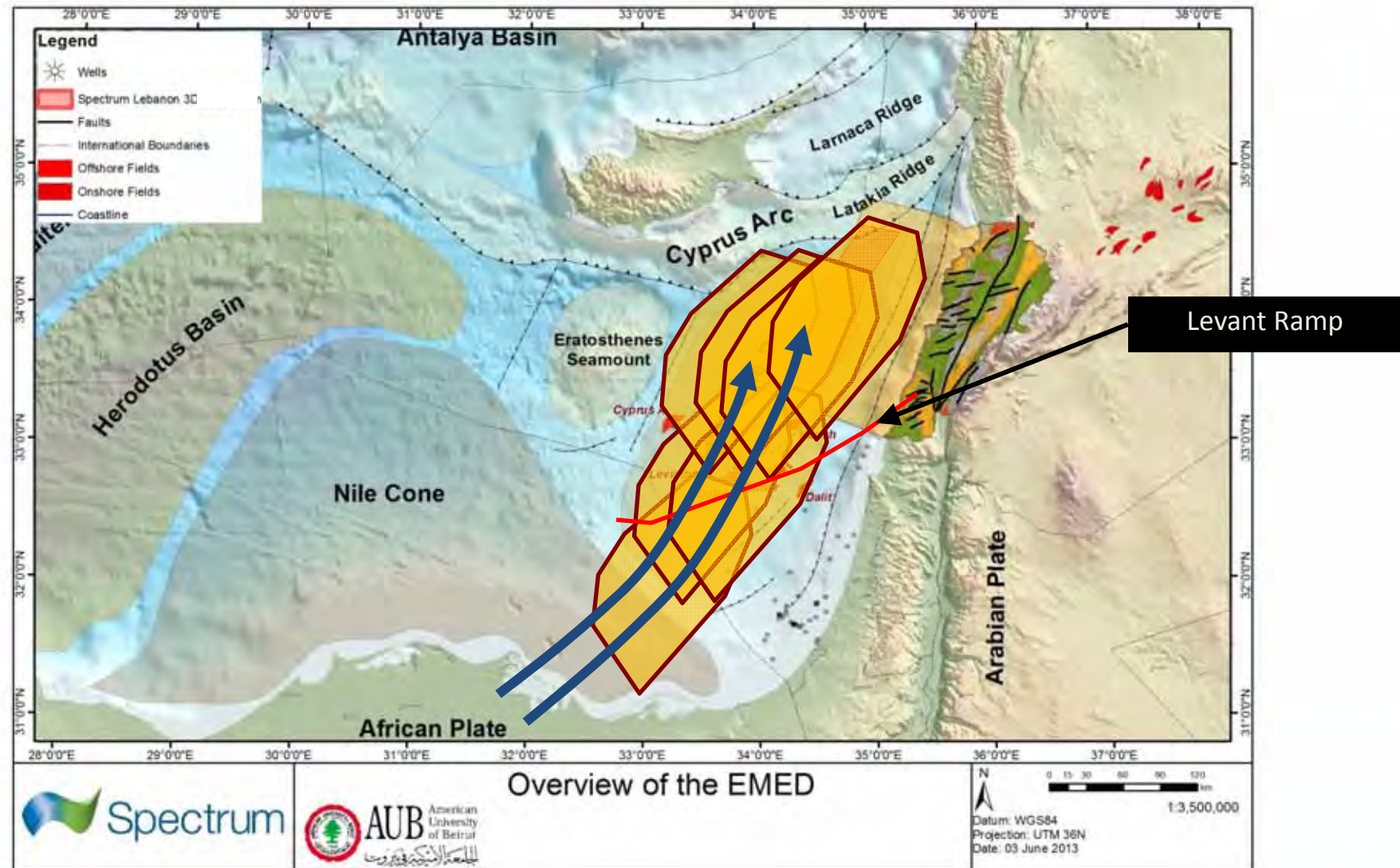


Line length 220 km

N



1. RESERVOIR:



 Spectrum

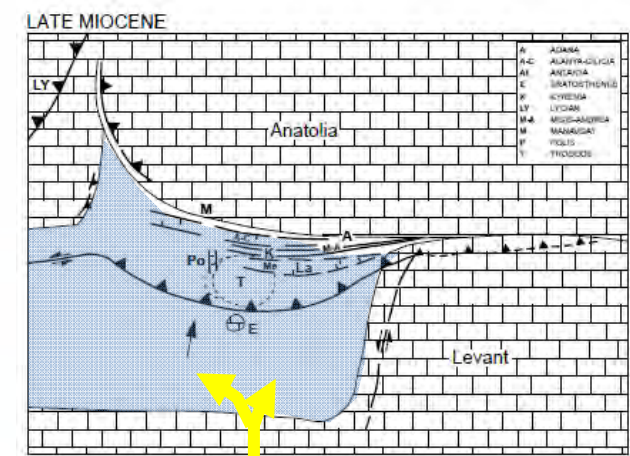
Nile River Drains into “Niger” Delta



Nile Delta Establishing

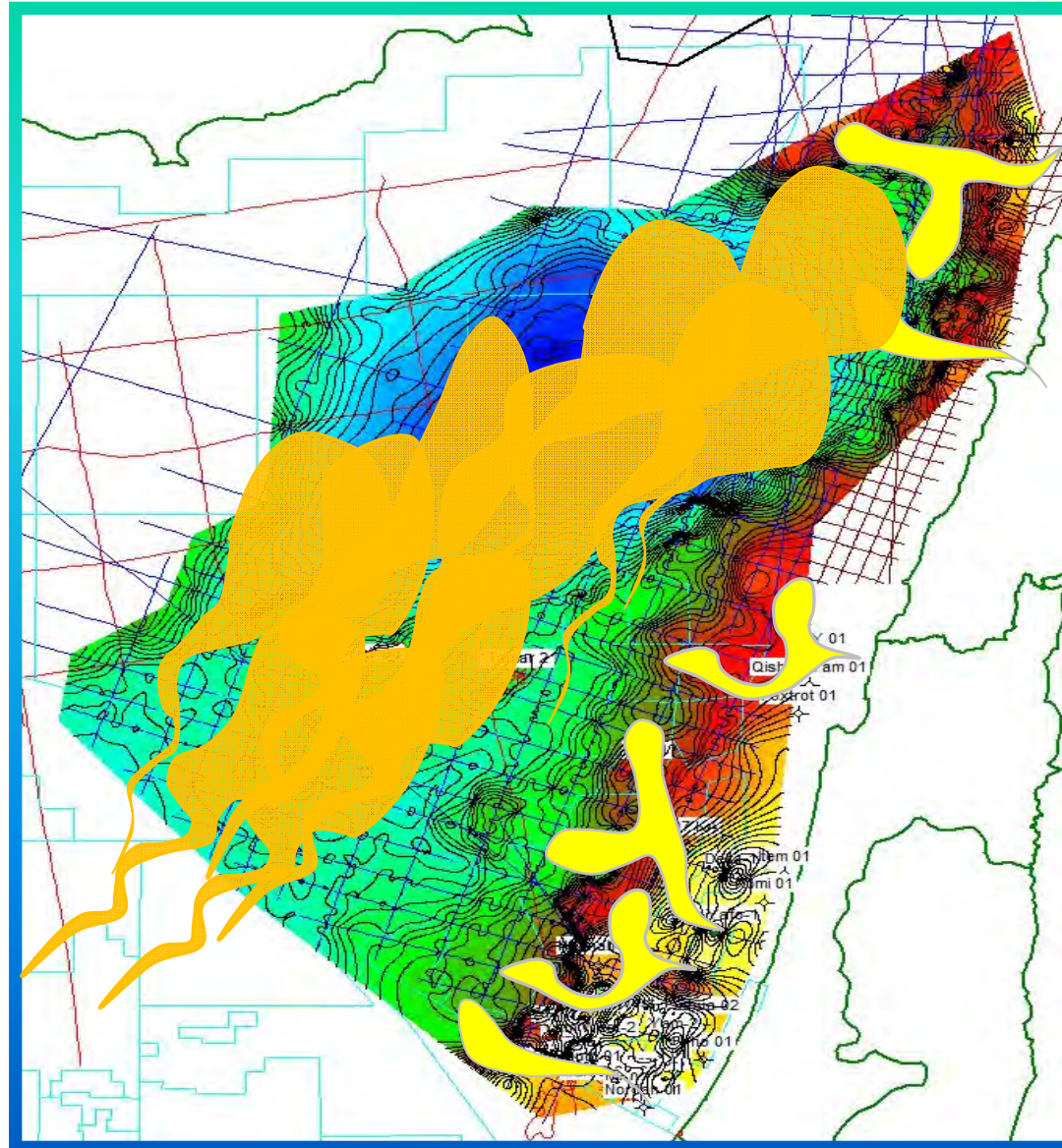


Open Sea way



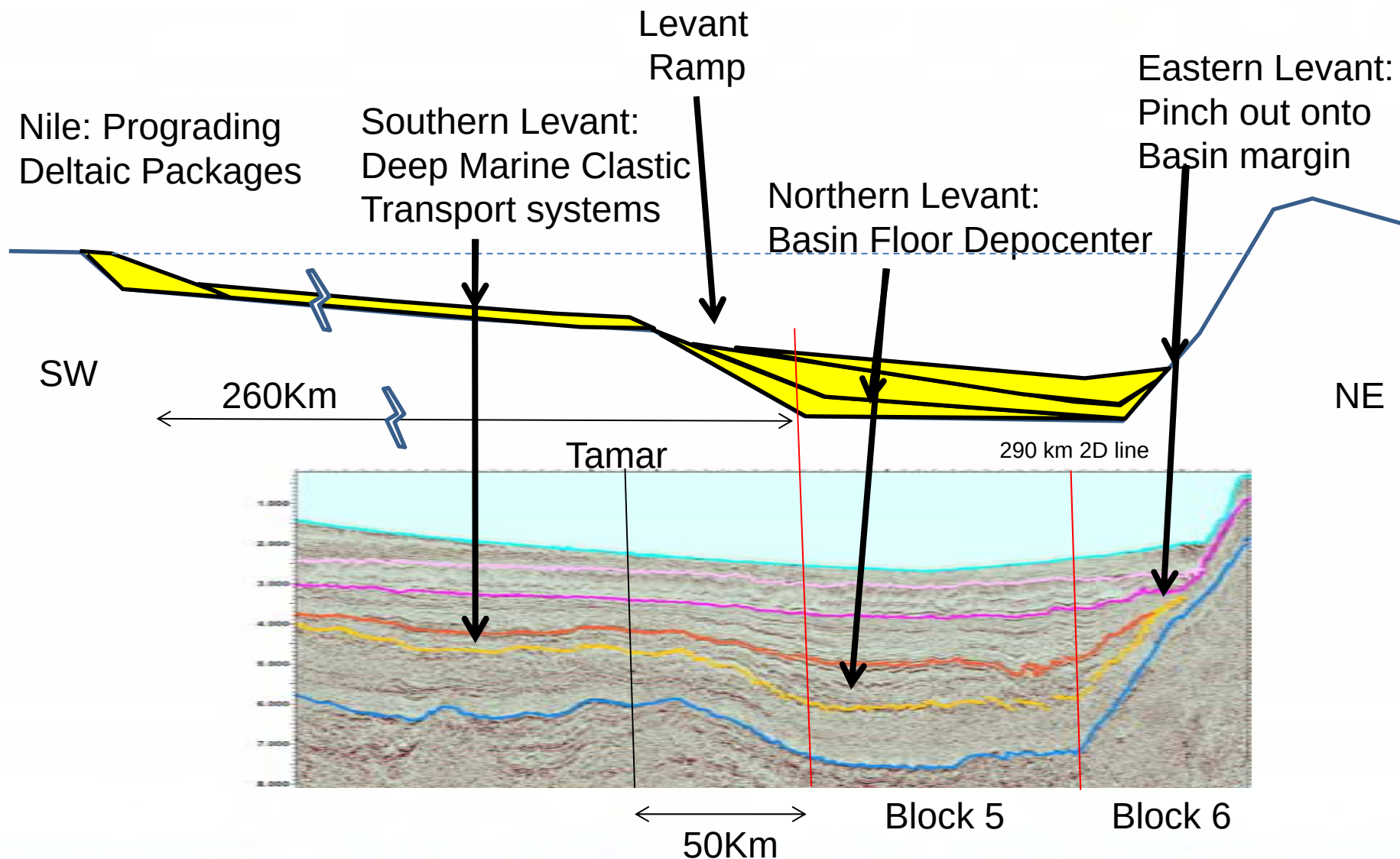
Late Miocene
Closed

Sand Provenance



After Peace,
Petex Nov
2012

Geometry of Basin System E. Miocene



Early Miocene sand input from Arabian Plate?

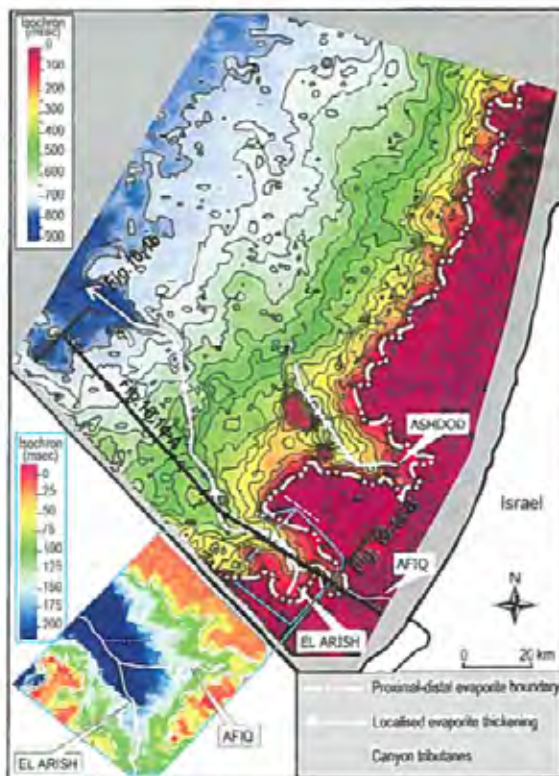
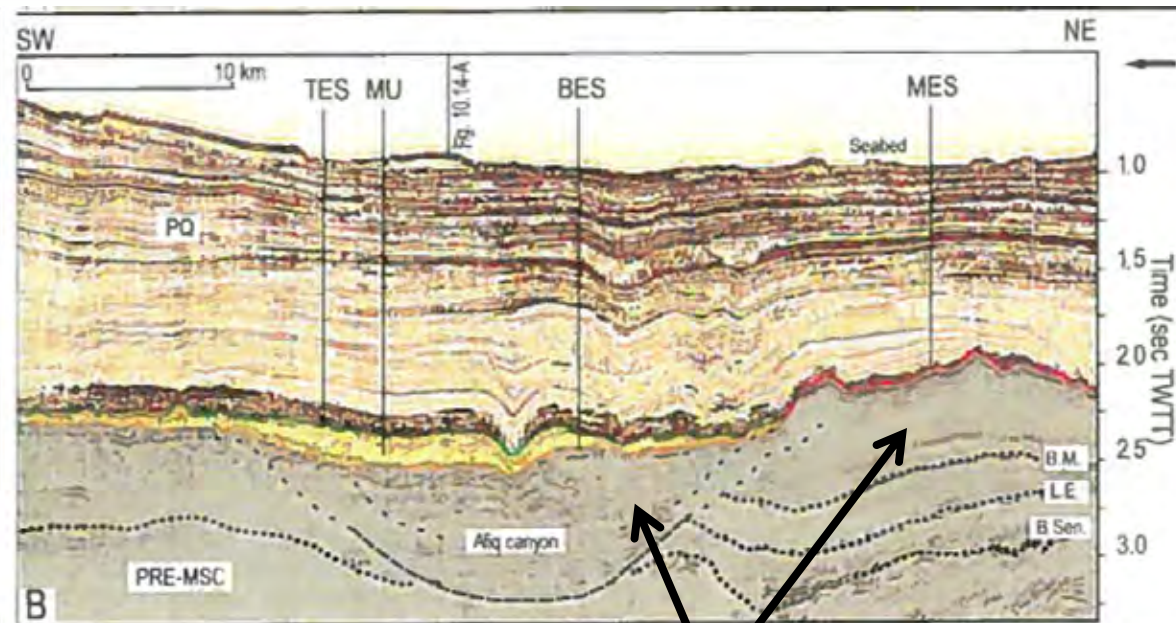


Figure 10.15. TWTT thickness (msec) of the Messinian evaporitic Mobile Unit MU [after Bertoni and Cartwright 2006]

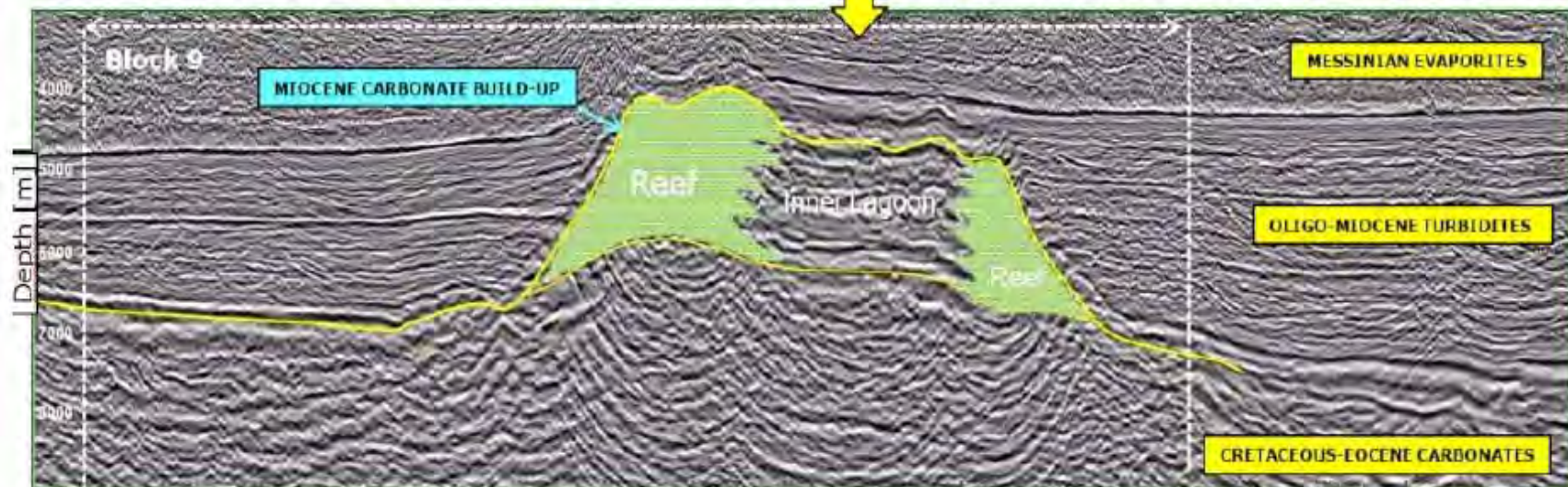
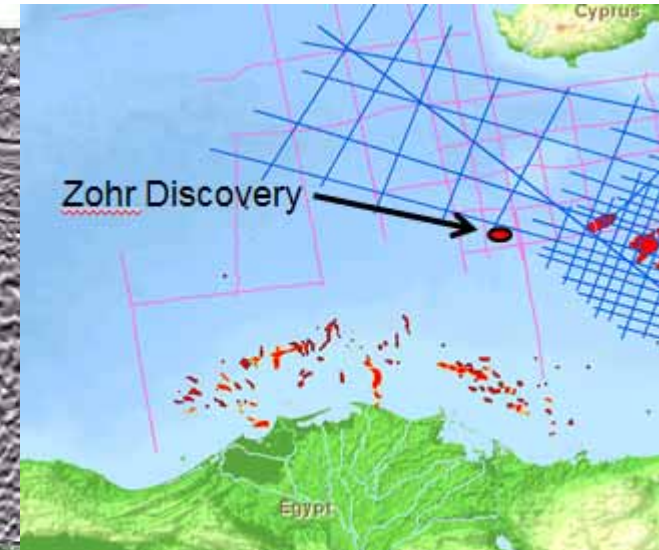
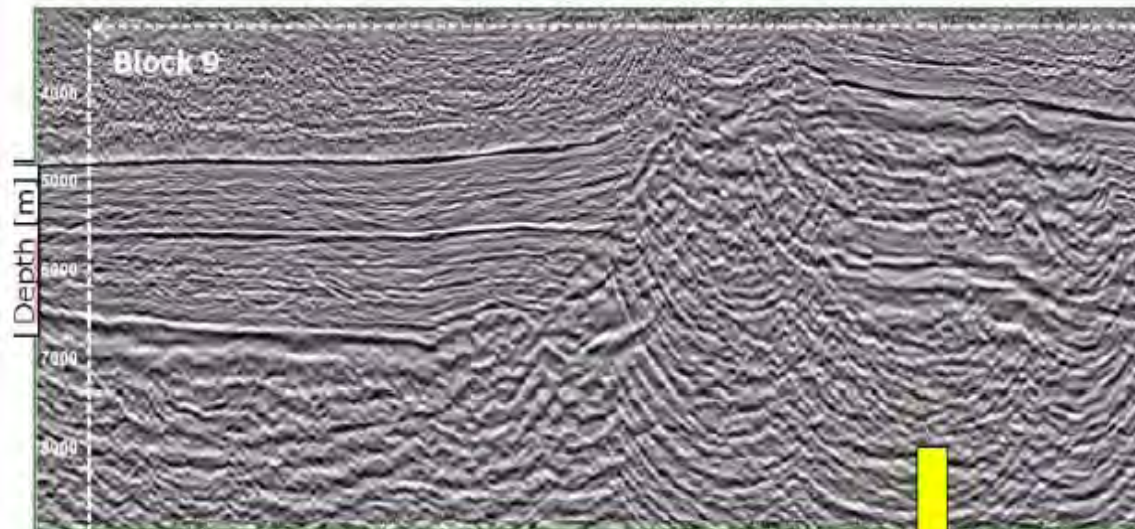


Afiq canyon insising into Early Miocene
le post-dating Early Miocene sand influx
Therefore not the source for Early Miocene sands
That fill the northern Levant basin

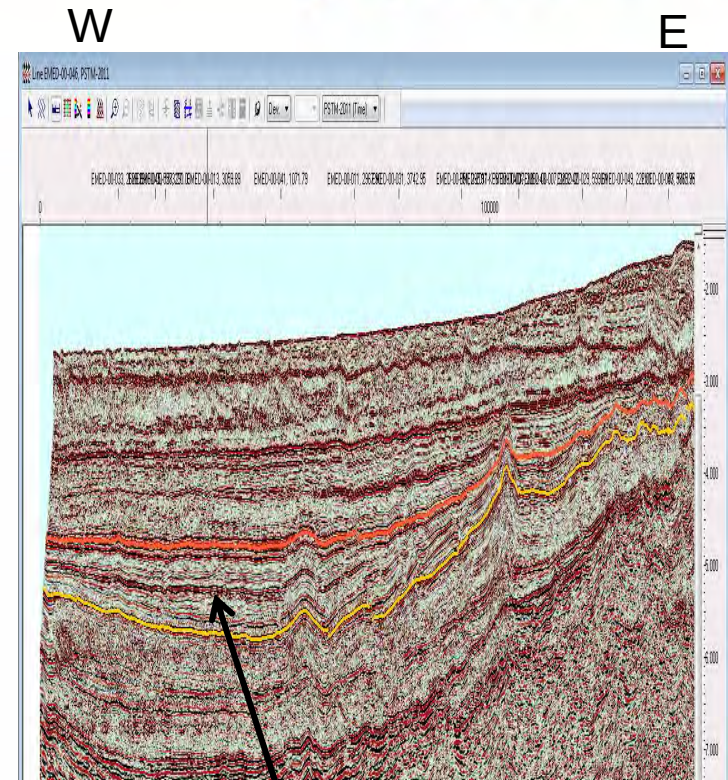
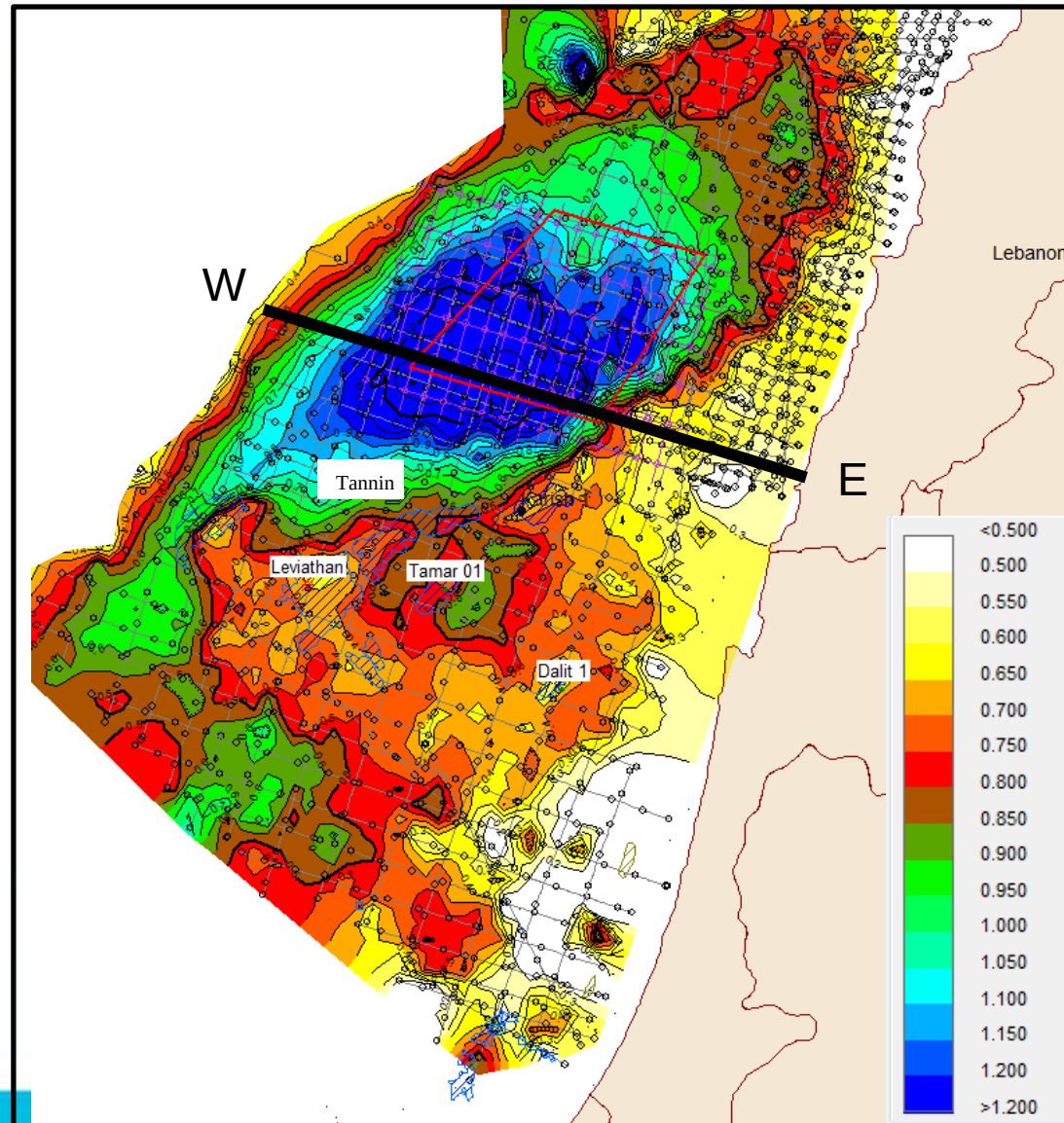
Zohr Seismic / Geoseismic



E MIOC NILE ISN'T FLOWING NORTH...



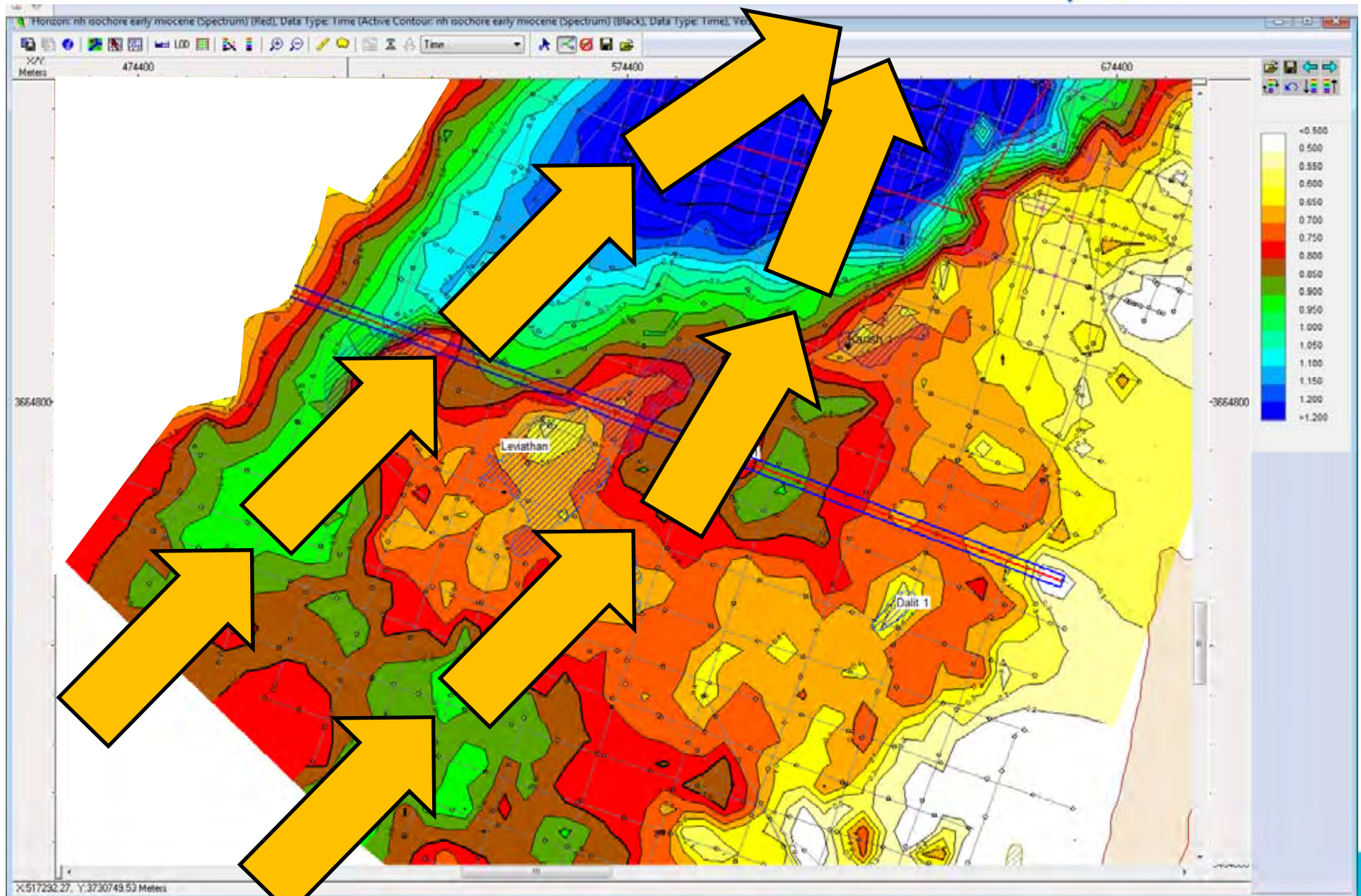
Isochore (TWT interval) Map of the Early Miocene



Top Early Miocene Sands

Orange= top Early Miocene
Yellow = base Early Miocene

Sand falls into the N Levant Basin...



Does Any Sand NOT fall into the N Levant Basin...

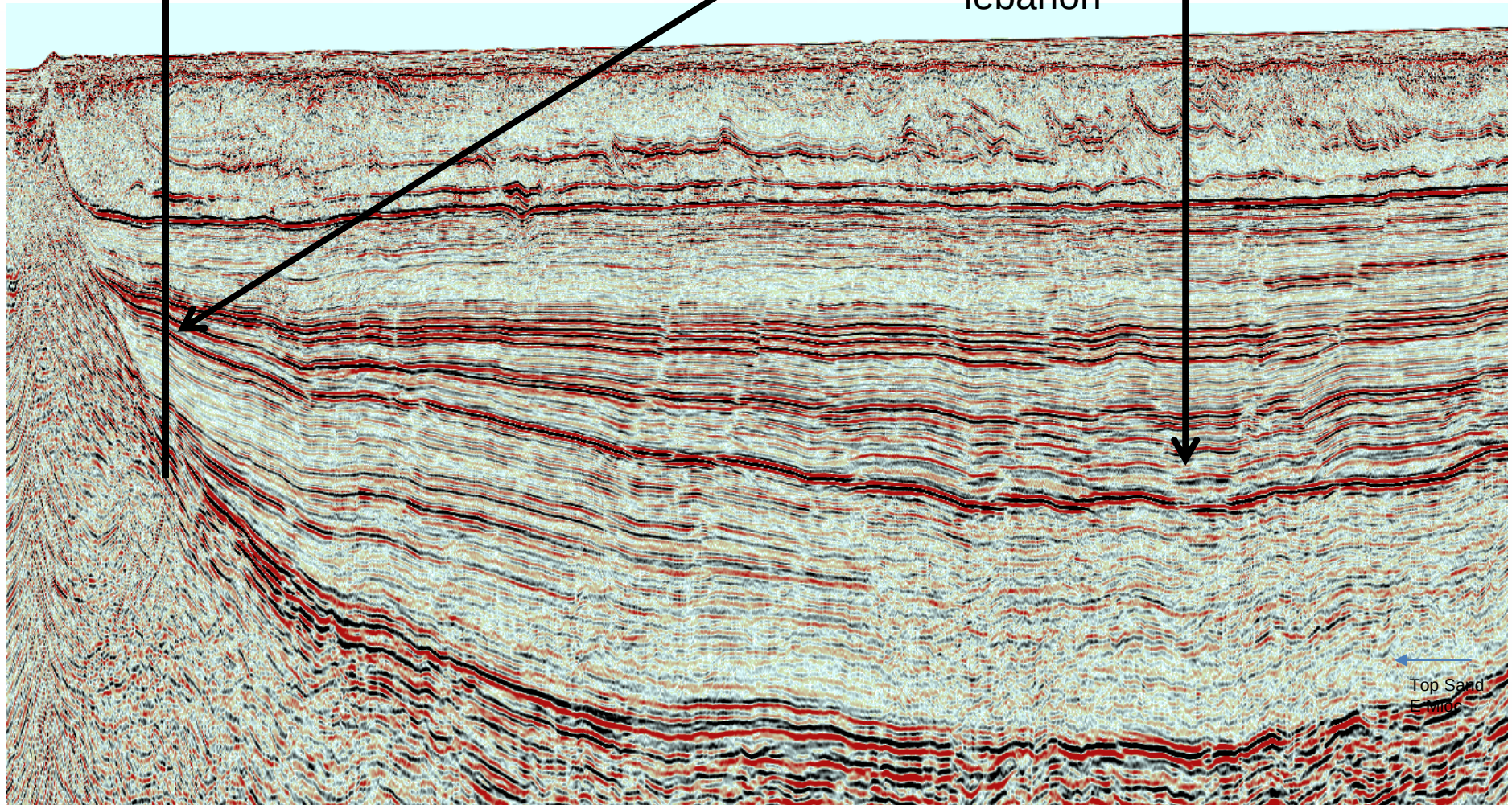


Amathusa-1

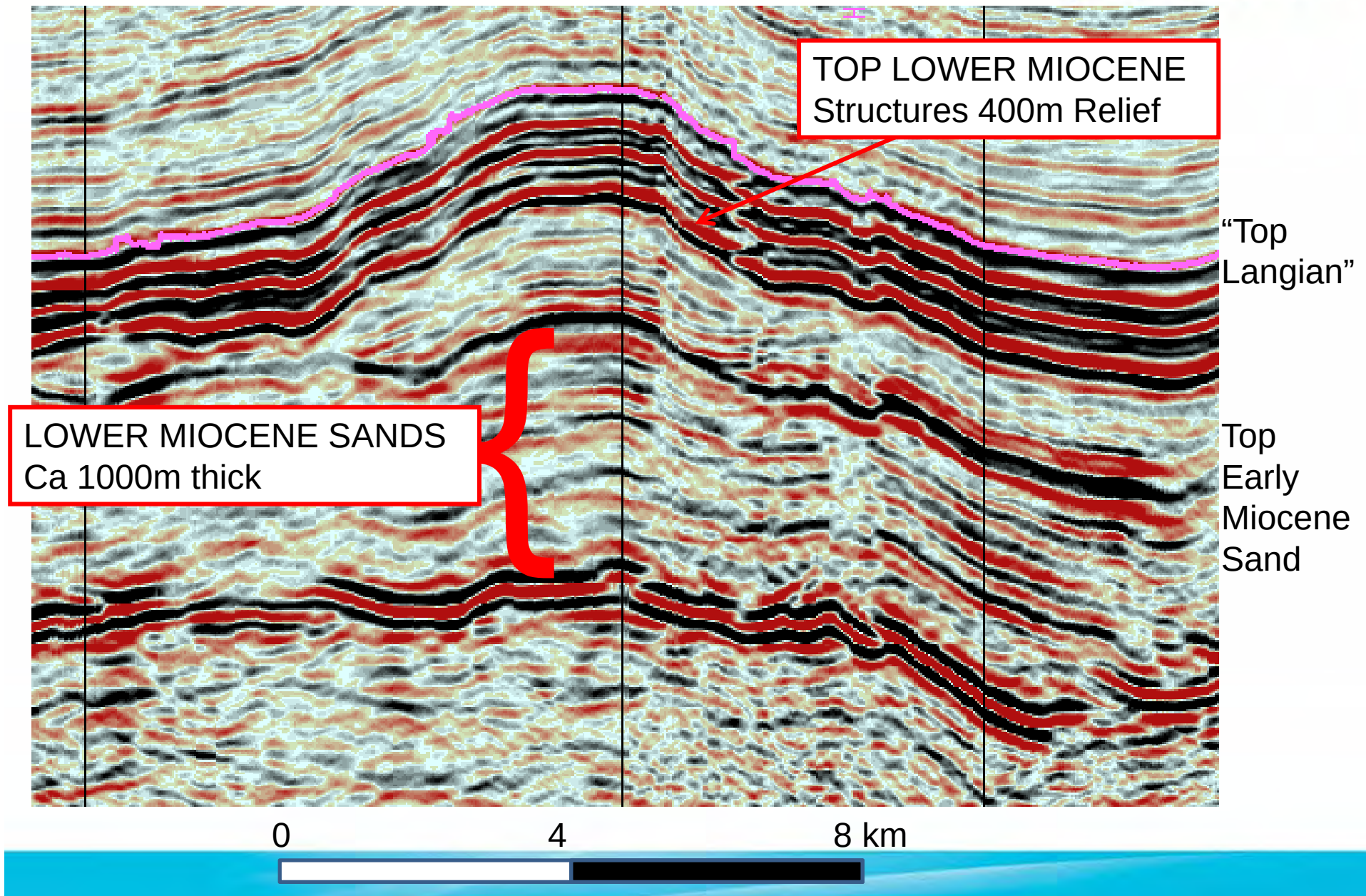
Very thin interval block 9:



Thick sand in Block 5
lebanon



ENE – WSW line along strike N LEVANT Basin



Charge

Deepening Basin into Lebanon: More chance of Oil



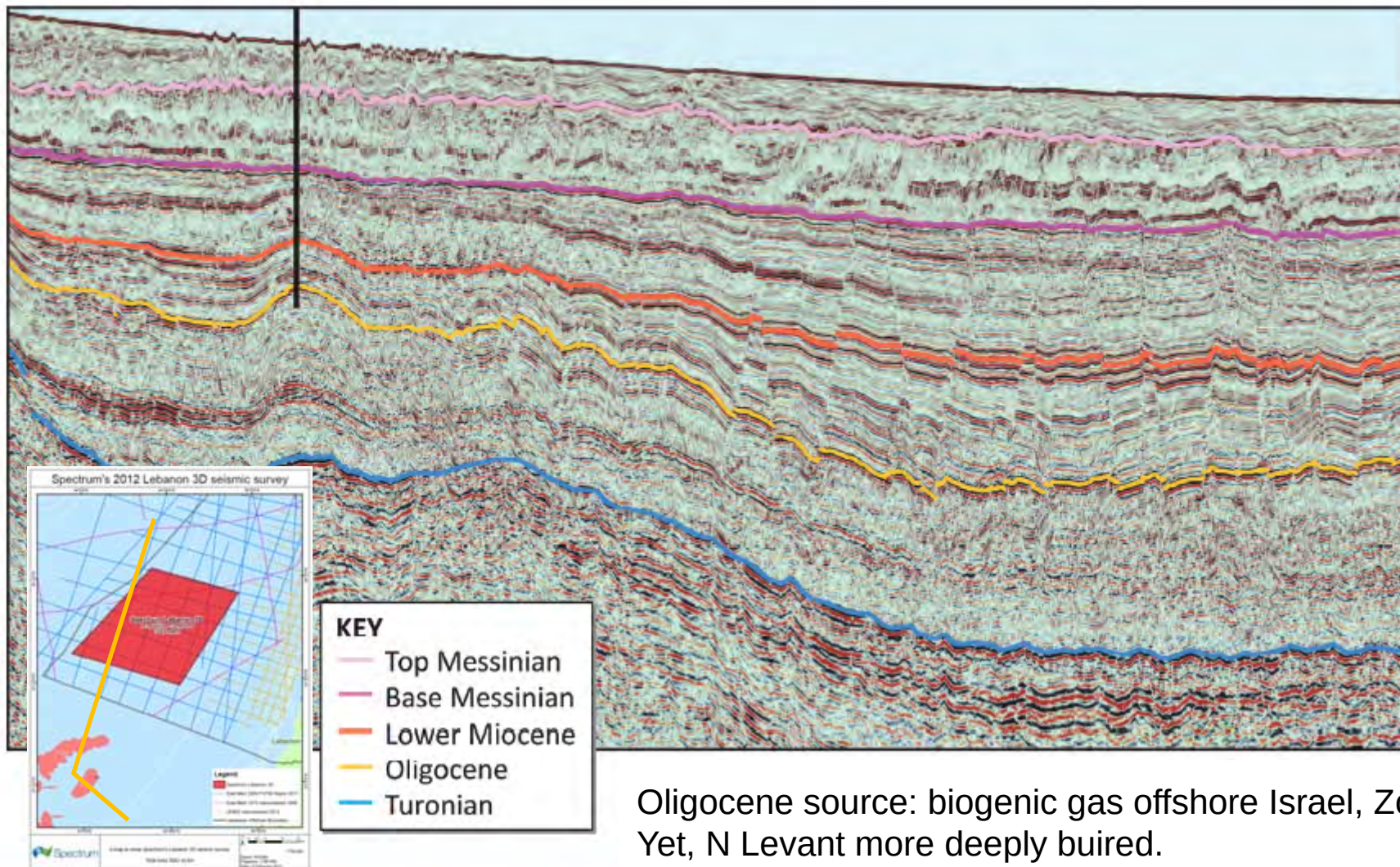
S

Tamar



Line length 220 km

N



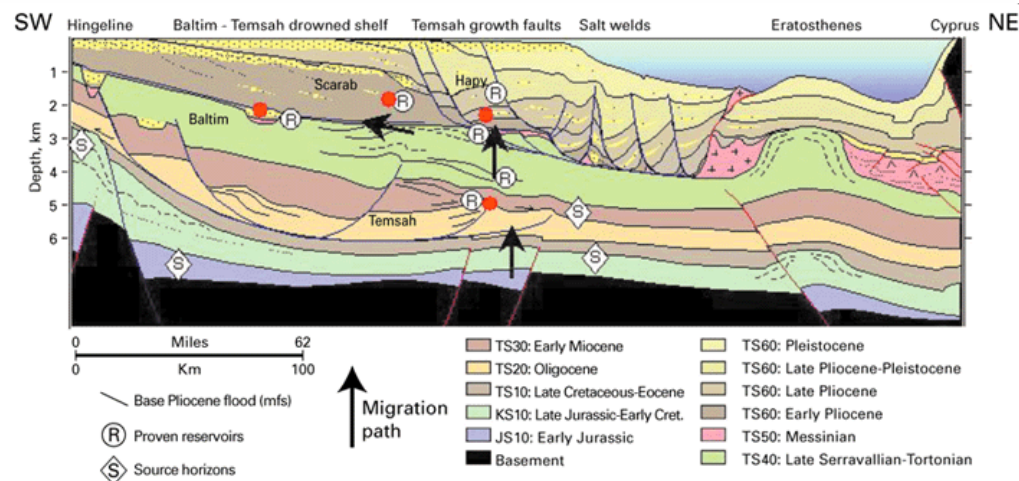
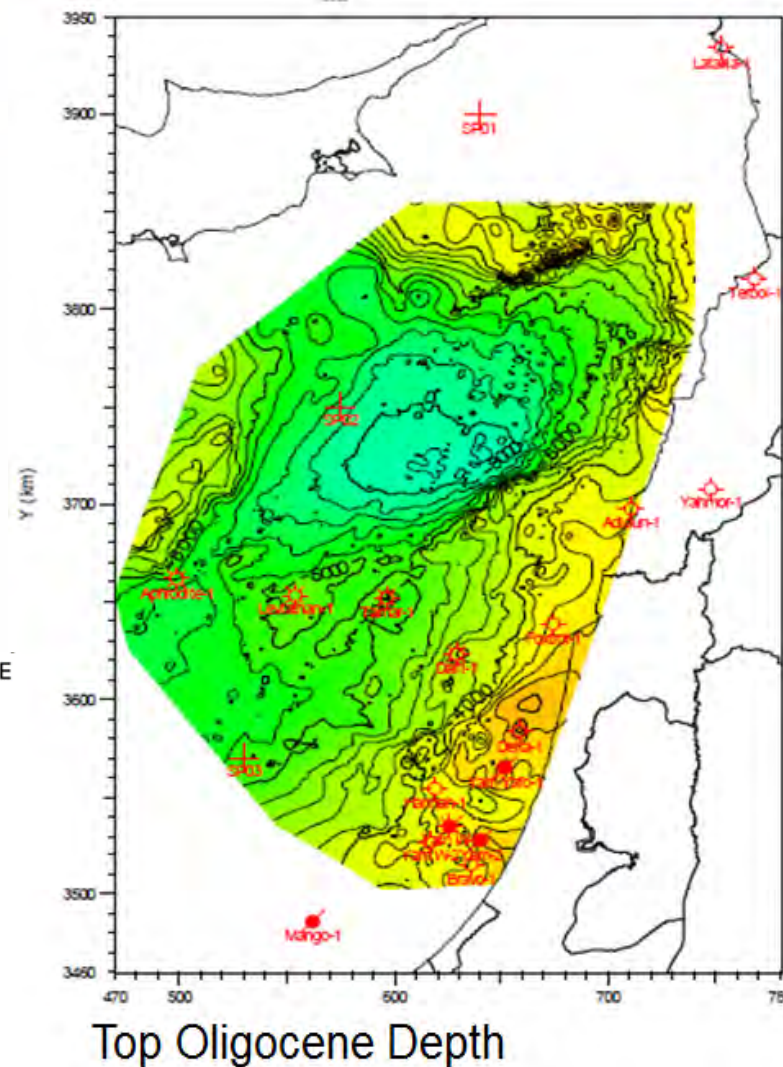
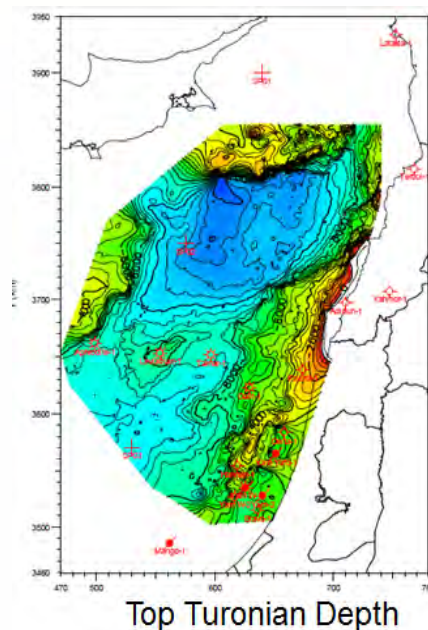
2: Charge

3D Basin Modelling: South to North Levant



Source Rocks

1. Miocene
2. Oligocene
3. Eocene
4. Campanian
5. Cenomanian
6. Early Cretaceous
7. Jurassic
8. Triassic



Source: From Dolson et al., 2001.

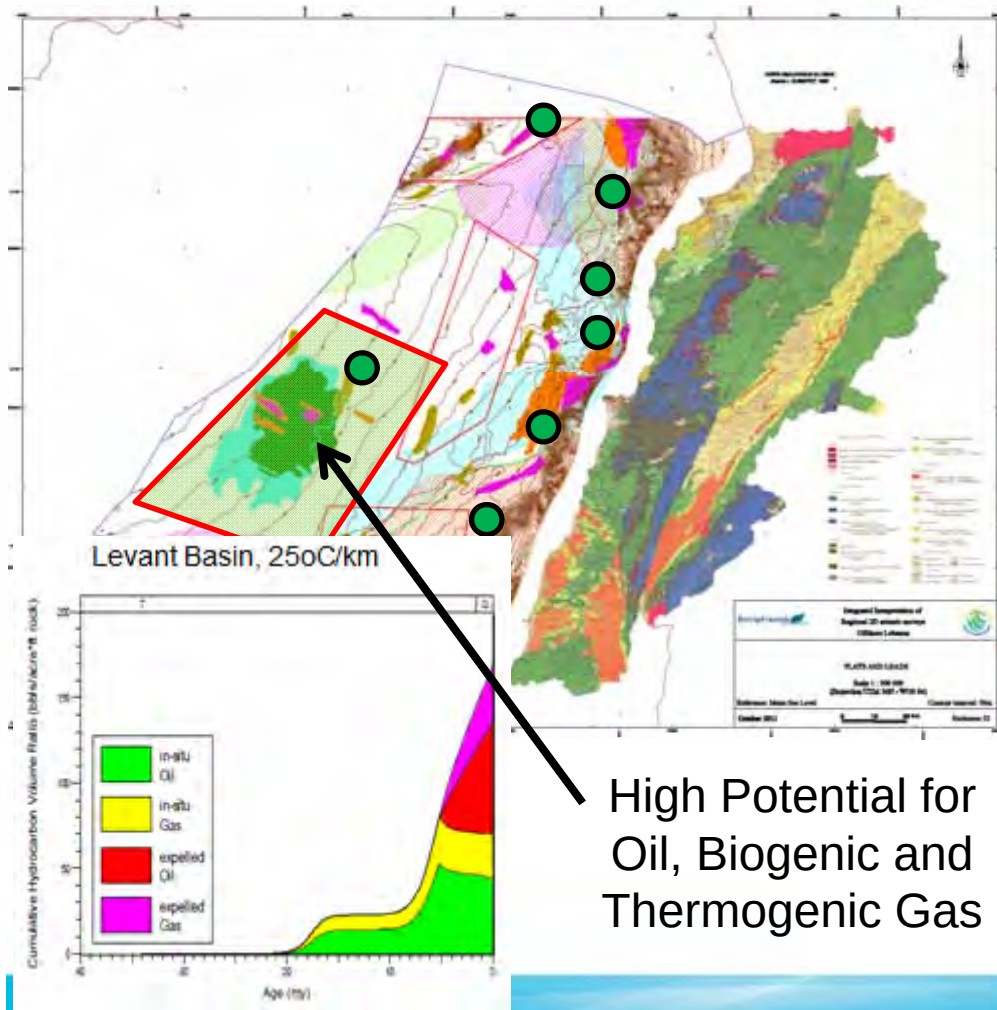
Independent basin modelling & seeps



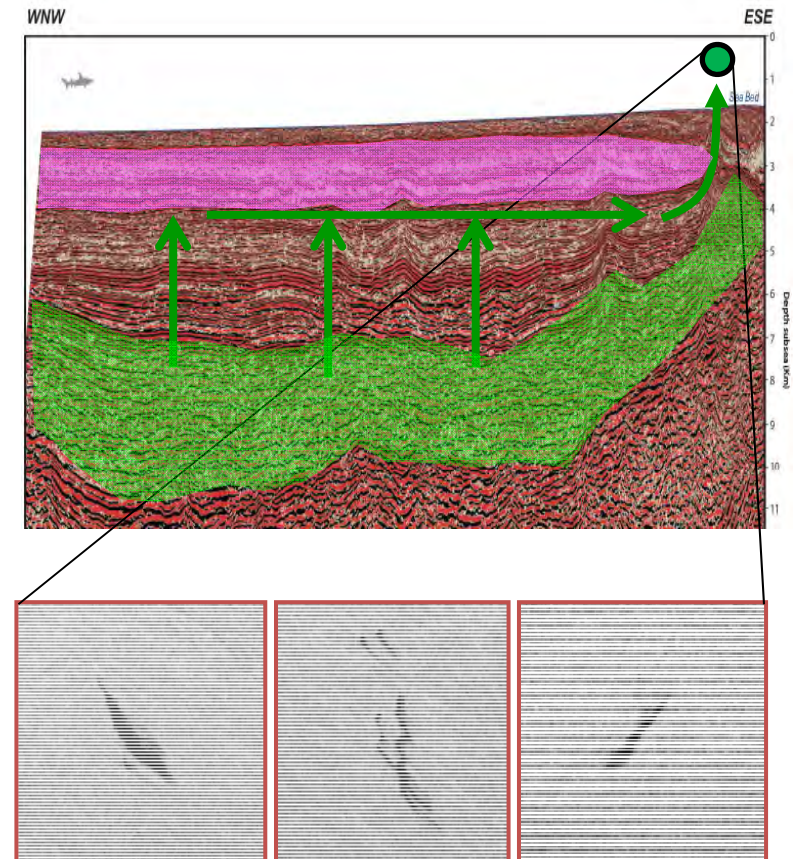
Levant Basin, 250C/km



CONCLUSIONS on PETROLEUM SYSTEMS U. Cretaceous **Thermogenic** System

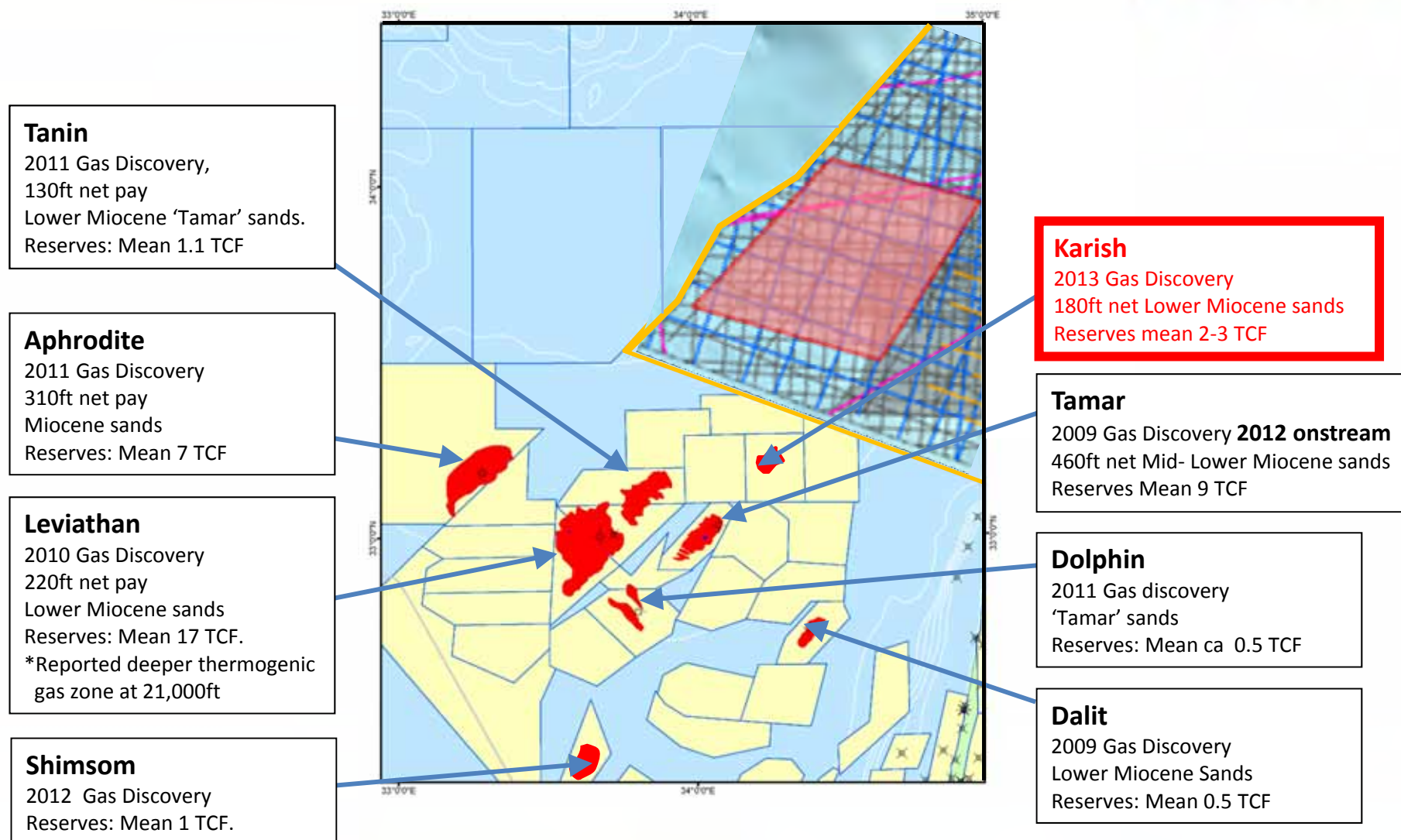


High Potential for
Oil, Biogenic and
Thermogenic Gas

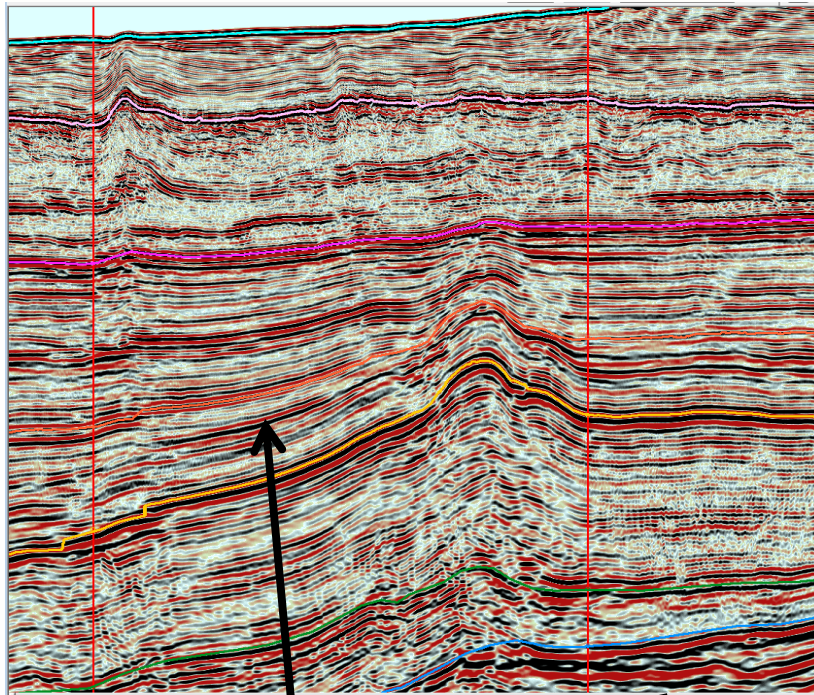


? Southern Levant Basin, 15C/km

South Levantine Basin: All biogenic Gas?



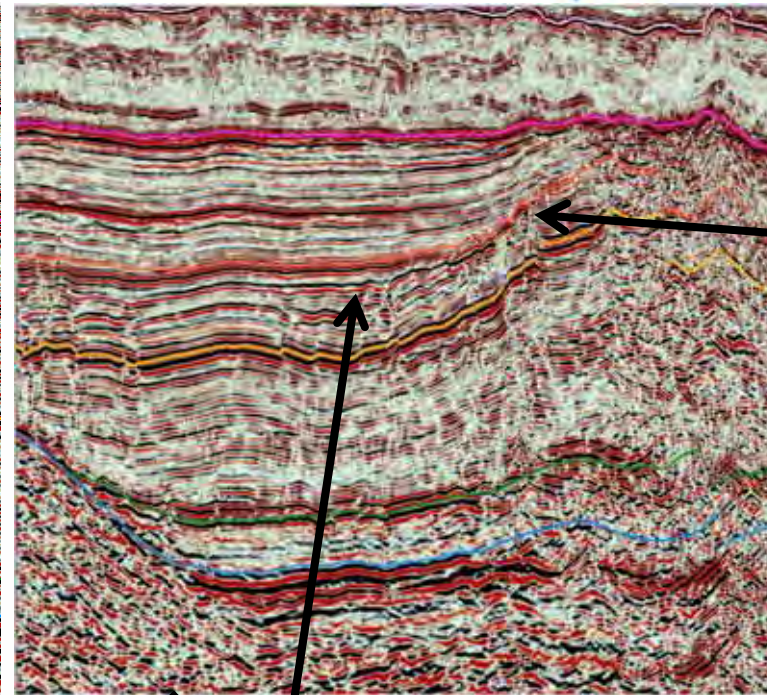
Karish Well



EM 0046
West-east

Karish

Early Miocene
strongly pinching
out onto in Margin

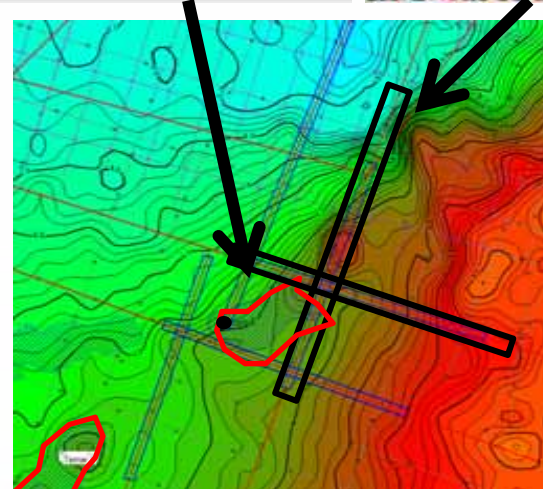


No
E Mio
Sands

EM 007
South-North

Karish

Early Miocene pinch out: this
is a stratigraphic play!



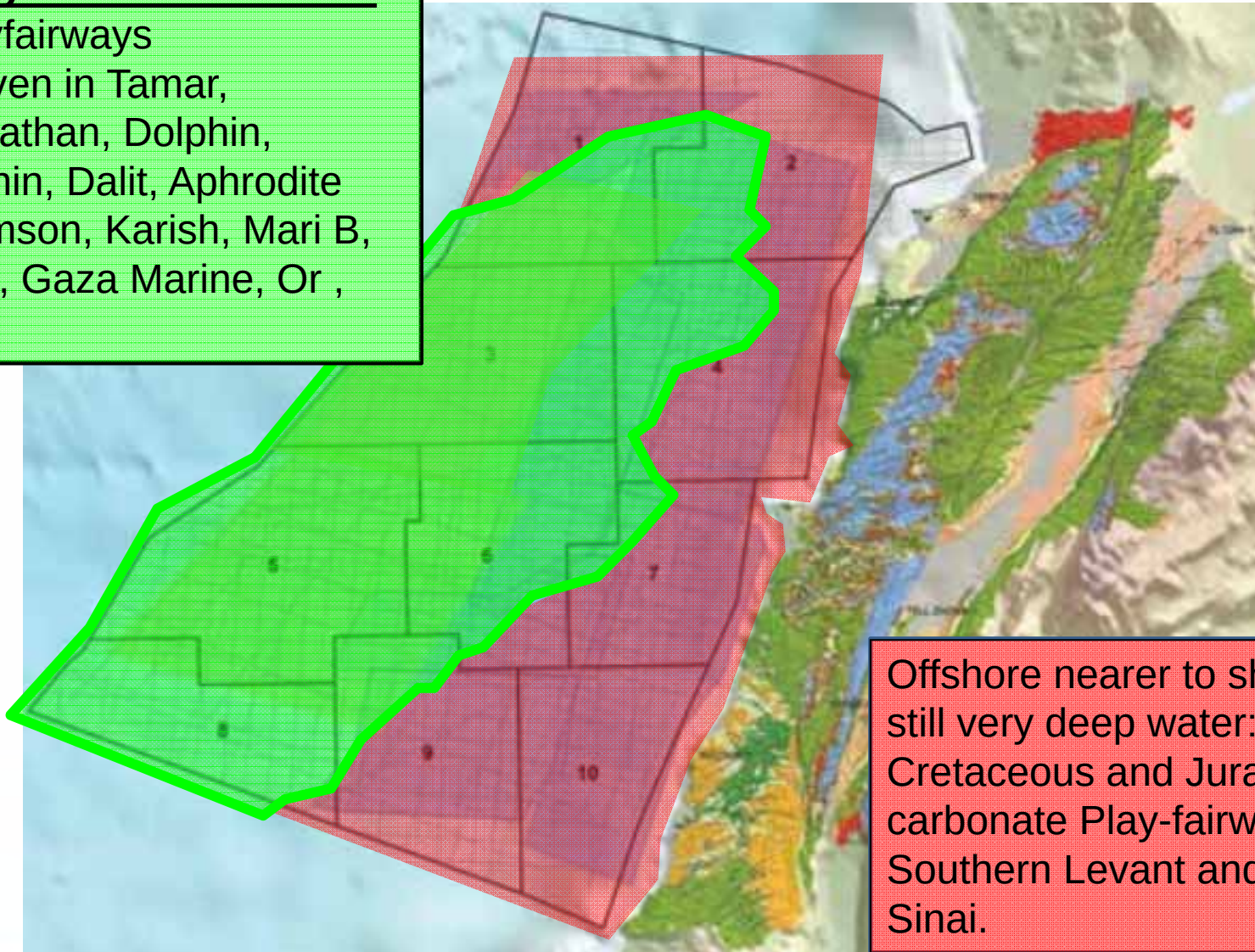
Playfairway comparison



Early and Late Miocene

Playfairways

Proven in Tamar,
Leviathan, Dolphin,
Tannin, Dalit, Aphrodite
Shimson, Karish, Mari B,
Noa, Gaza Marine, Or ,
Nir.

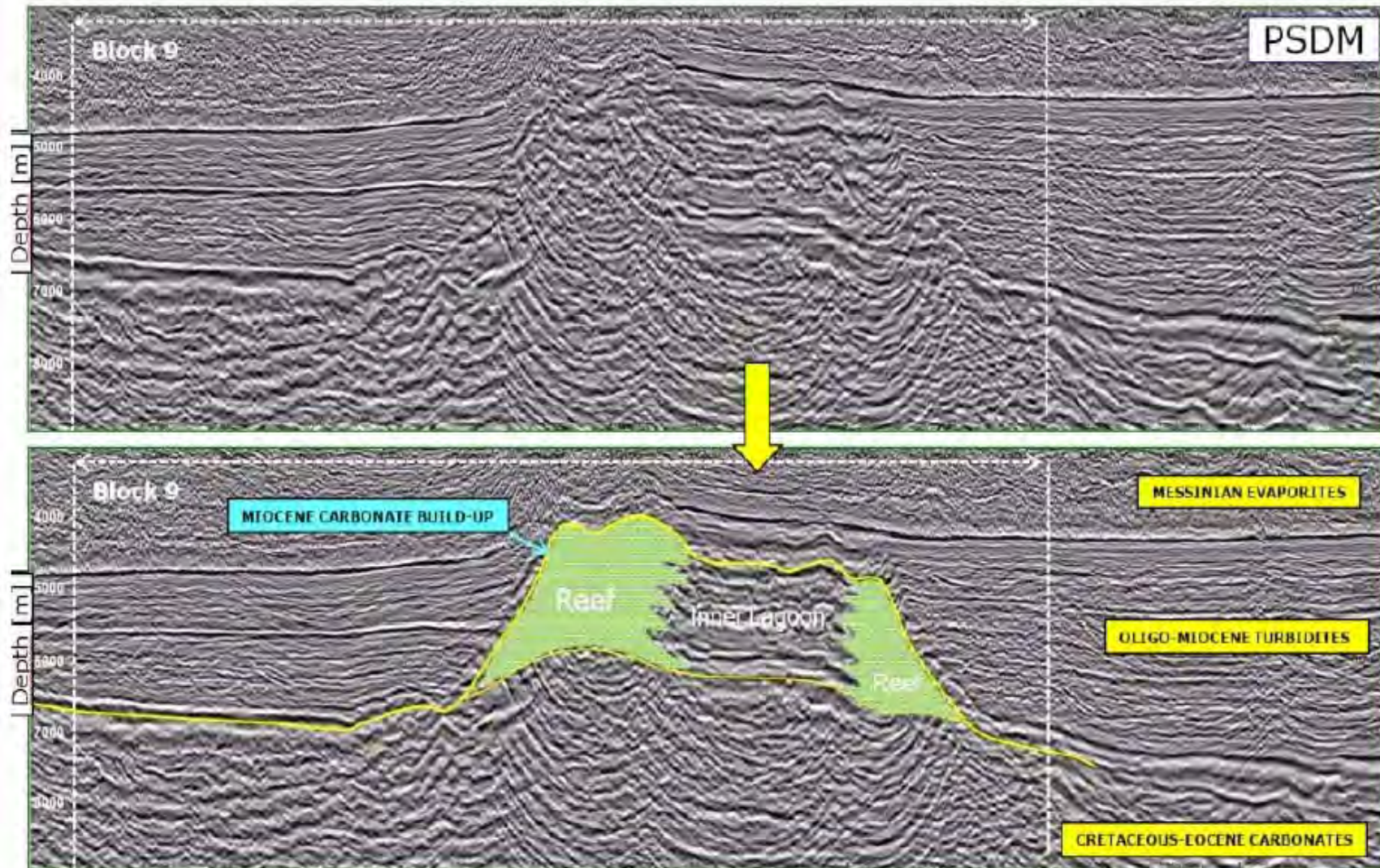


Offshore nearer to shore but
still very deep water:
Cretaceous and Jurassic
carbonate Play-fairways
Southern Levant and North
Sinai.

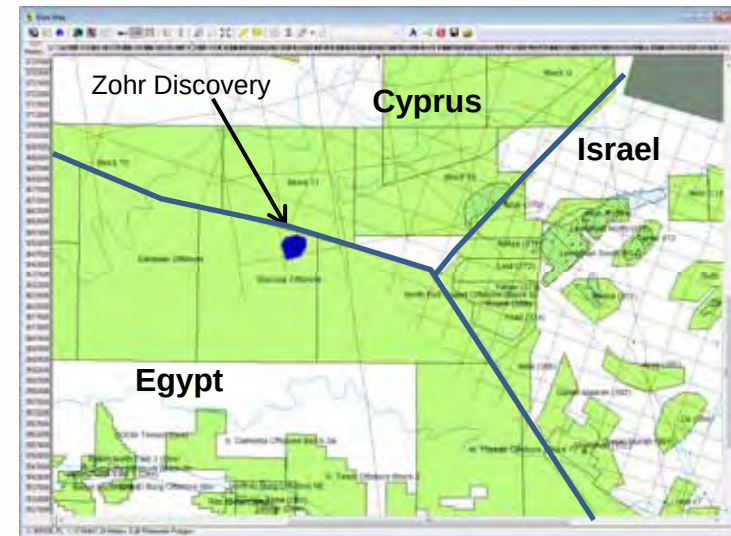
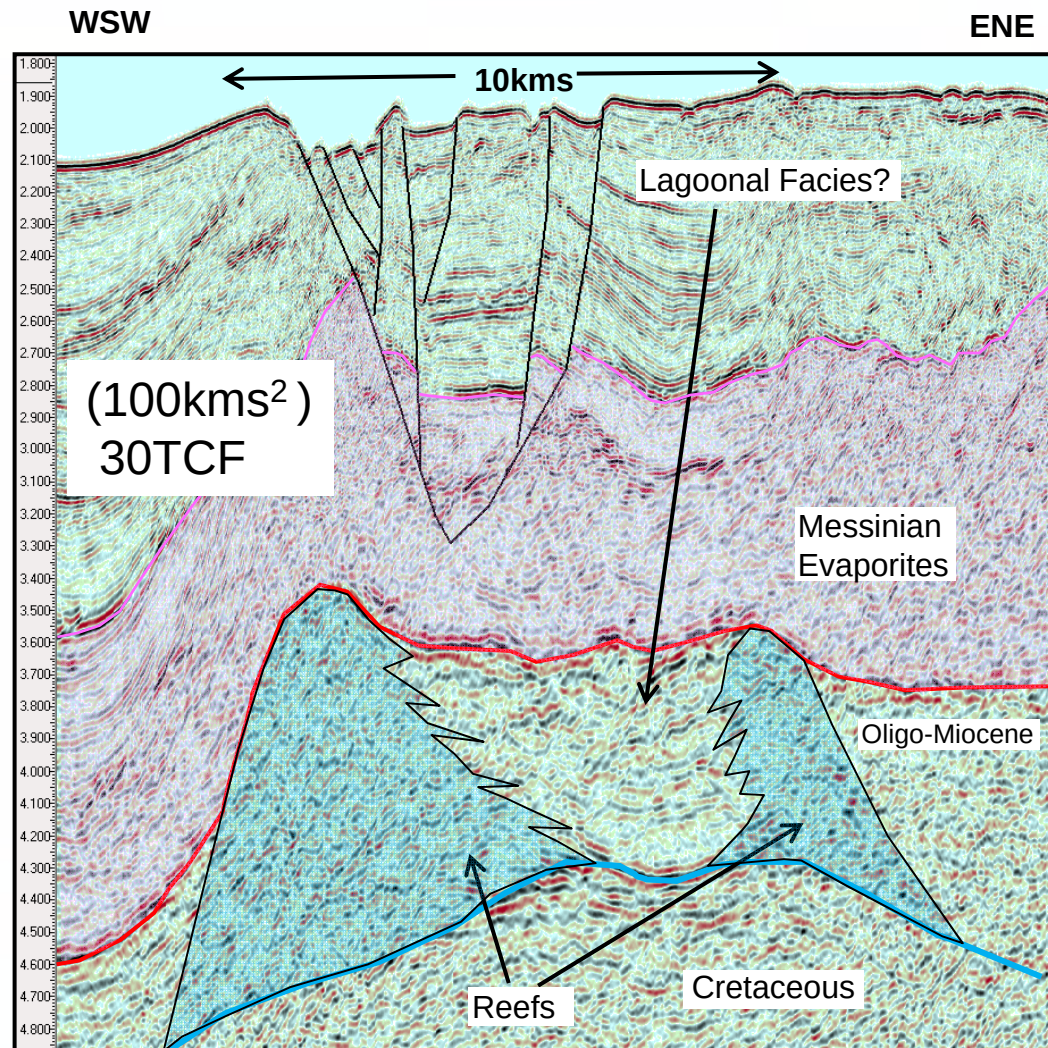
Zohr ?Biogenic Gas



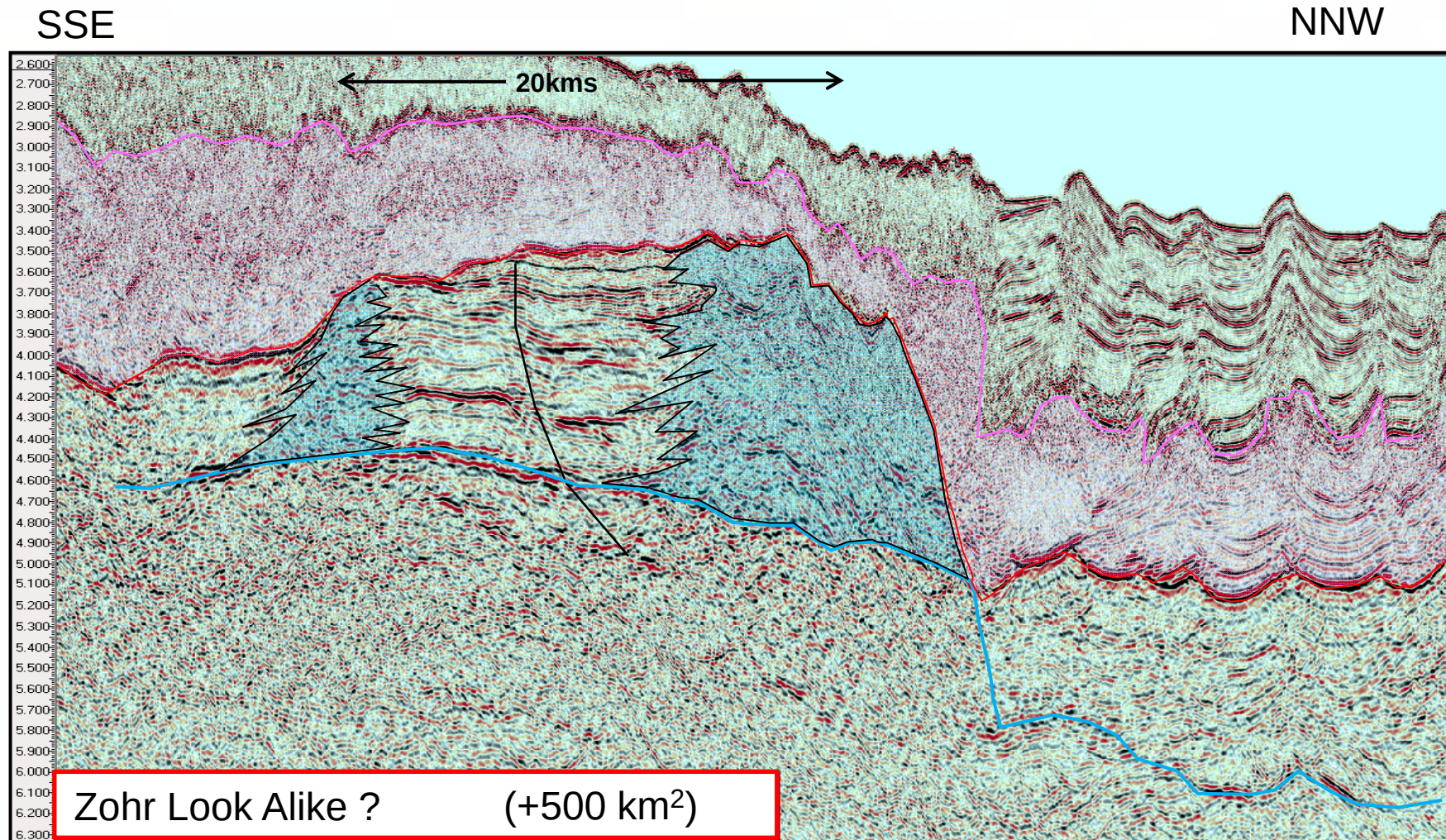
IEOC's line published a few years ago over zohr



Line on edge of Zohr discovery



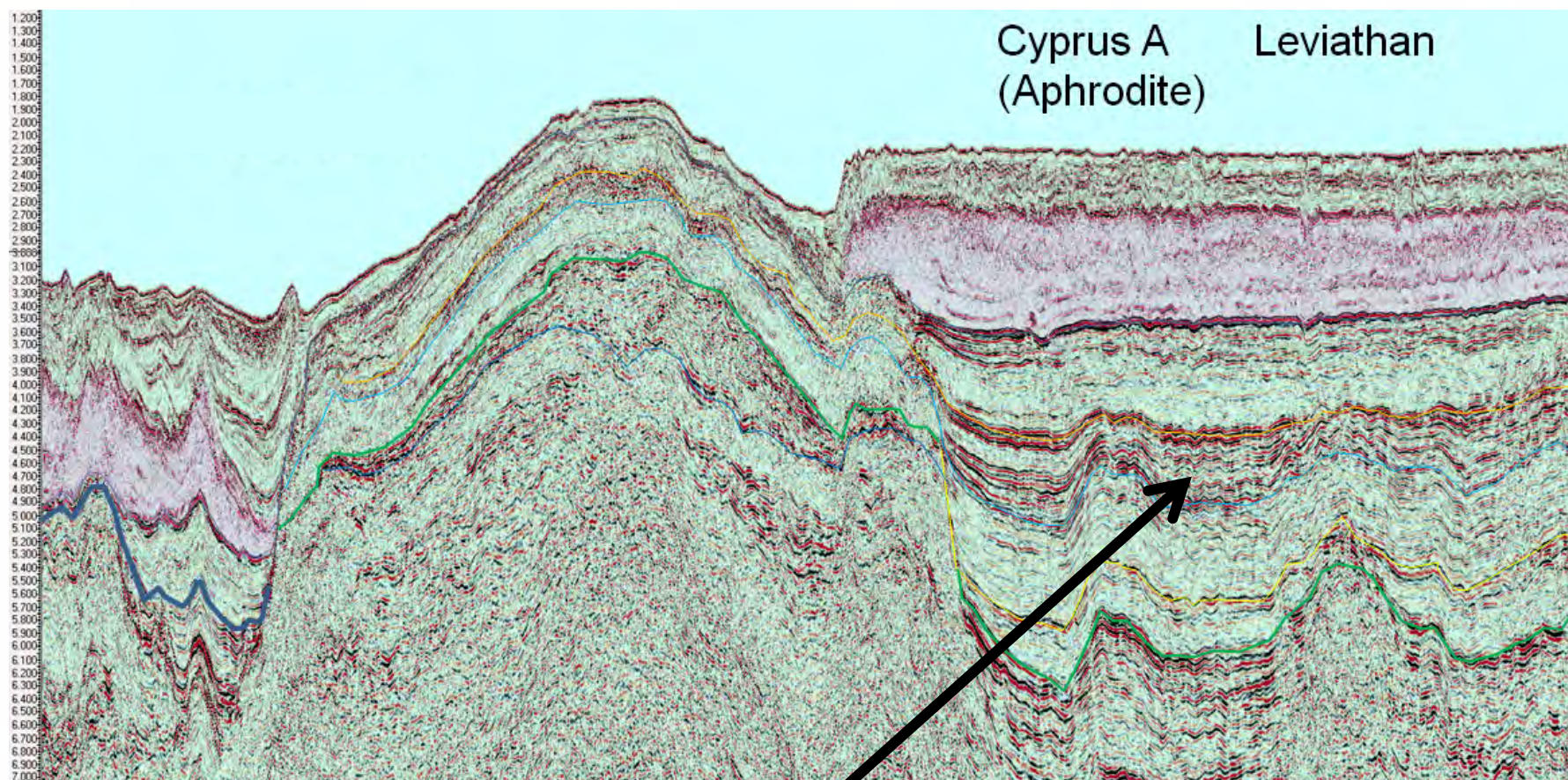
North of Zohr



Eratosthenes Sea Mount

W

E

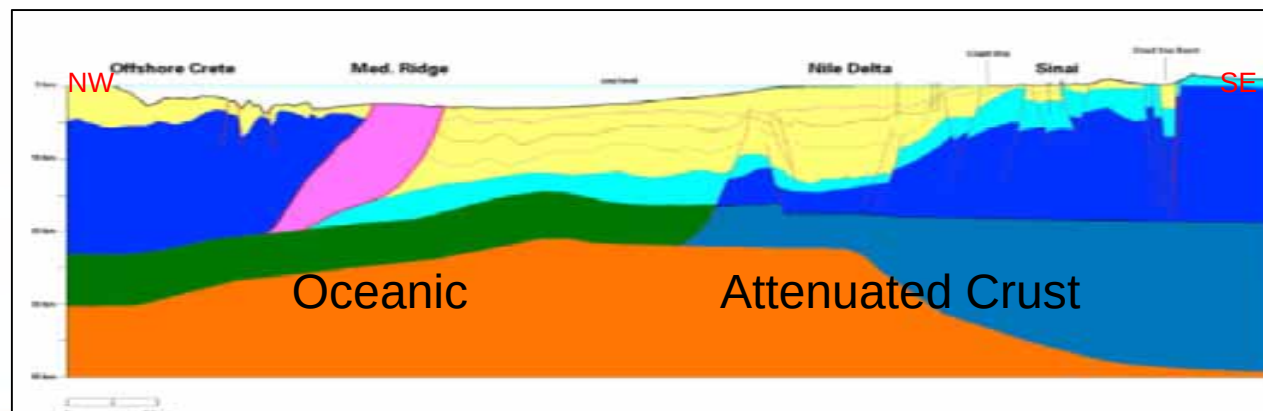
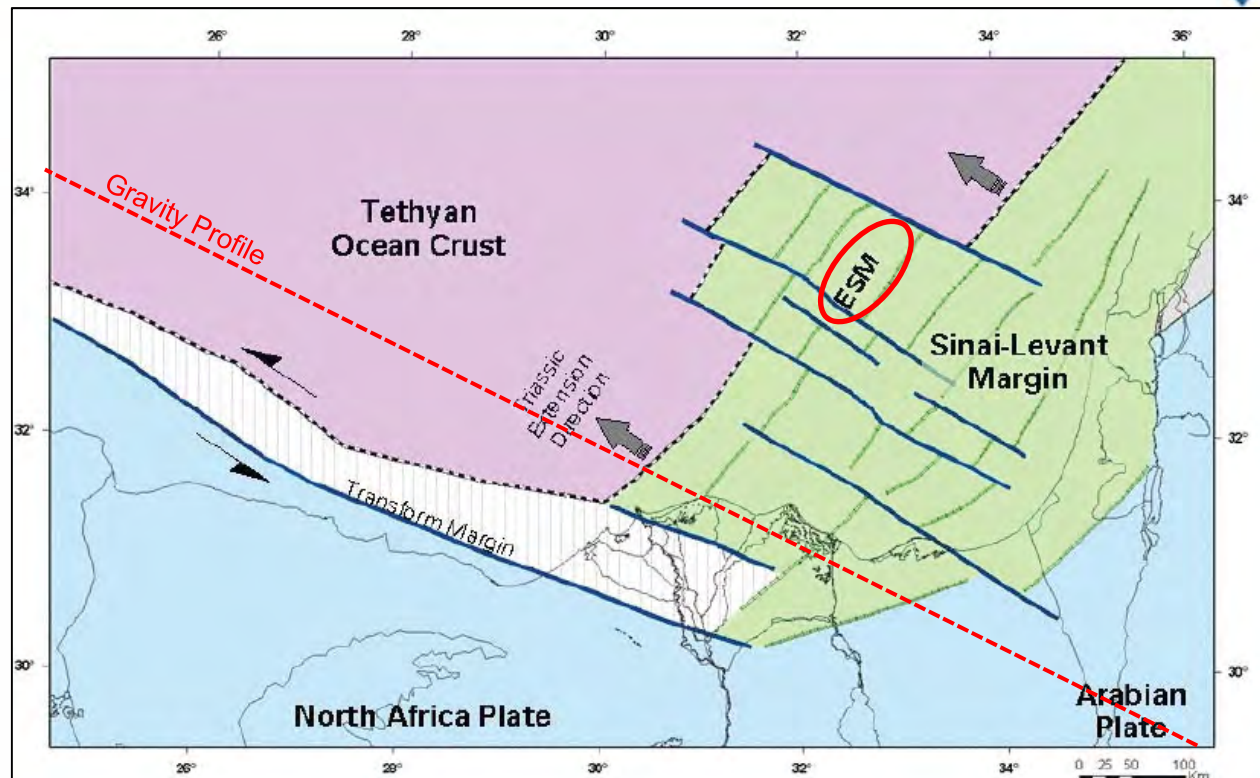


Herodotus Basin

Early Miocene

Northern Levant Basin

Crustal Model



Zohr Look-alikes Ringing the Seamount

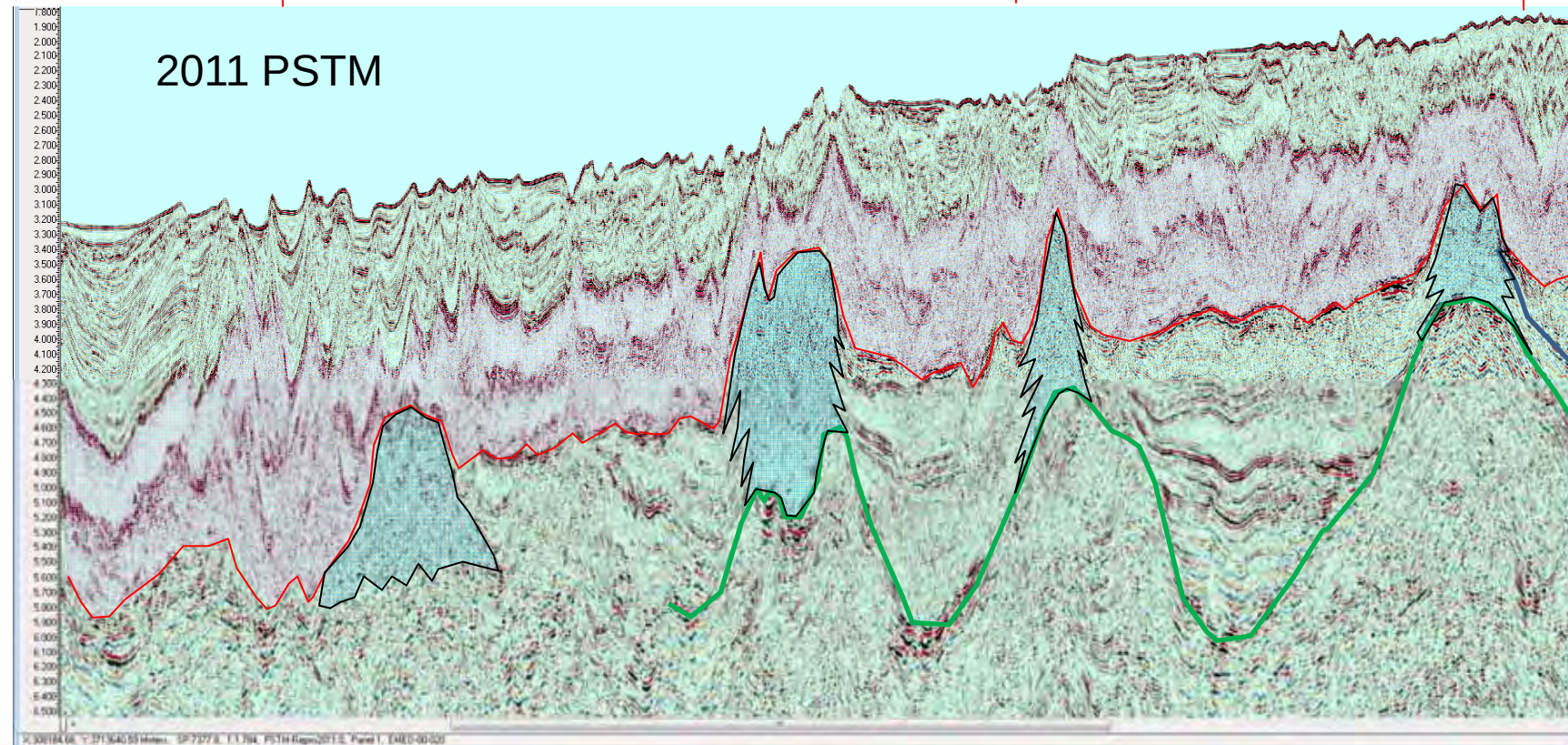
WSW

ESE

Total block 10

Total block 11

NE of
Zohr



3: Structure

Structures In South Lebanon



2D regional Line

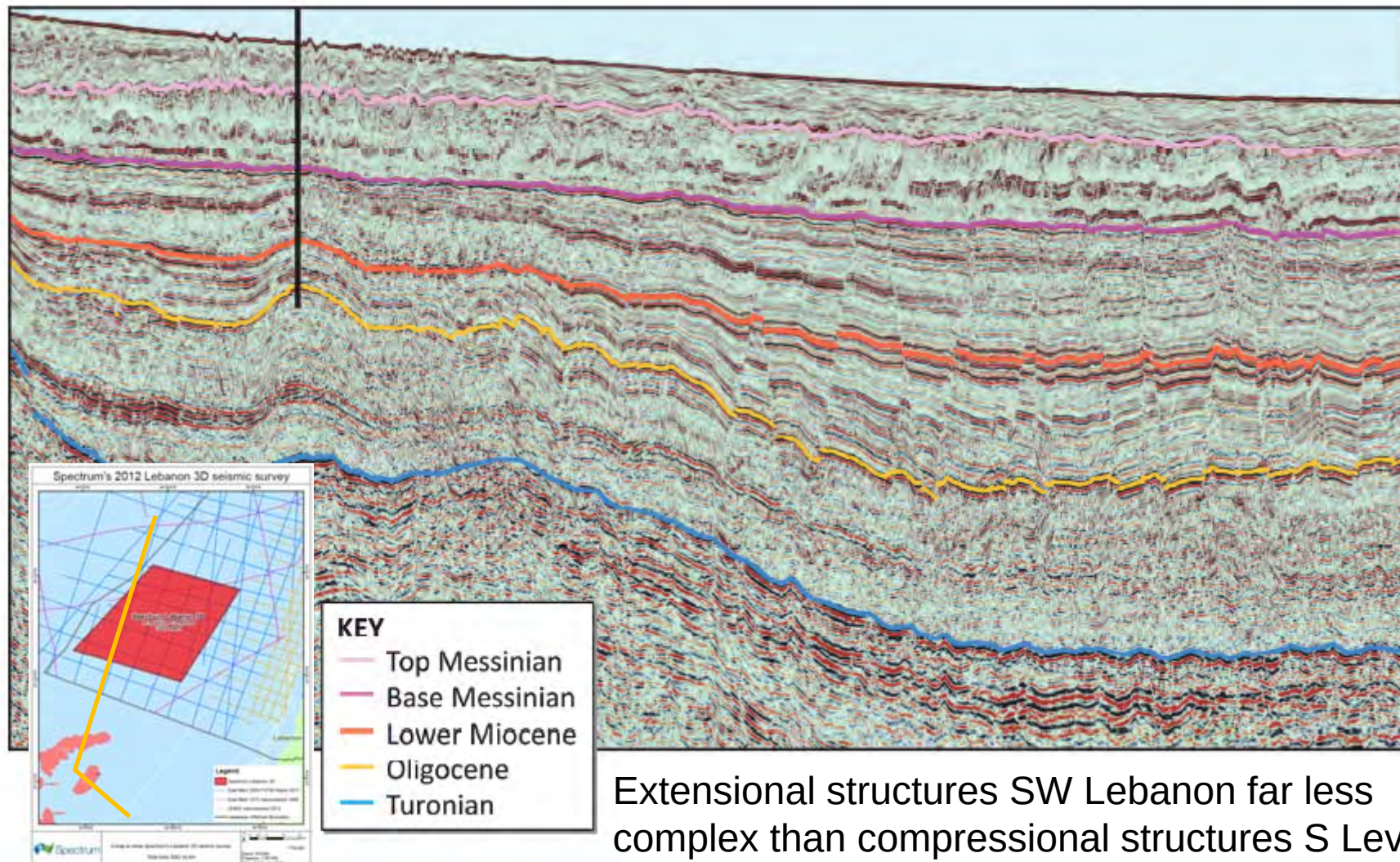
Line length 220 km

S

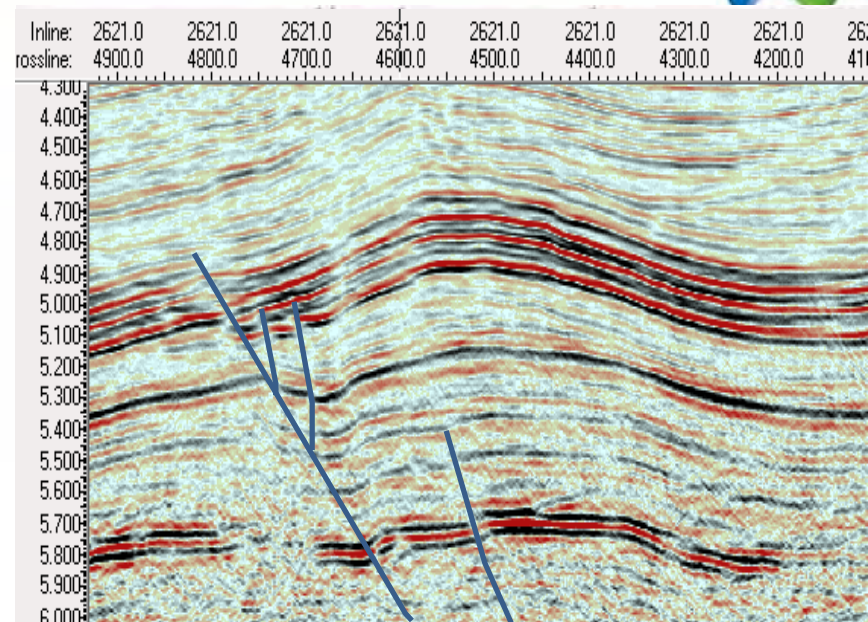
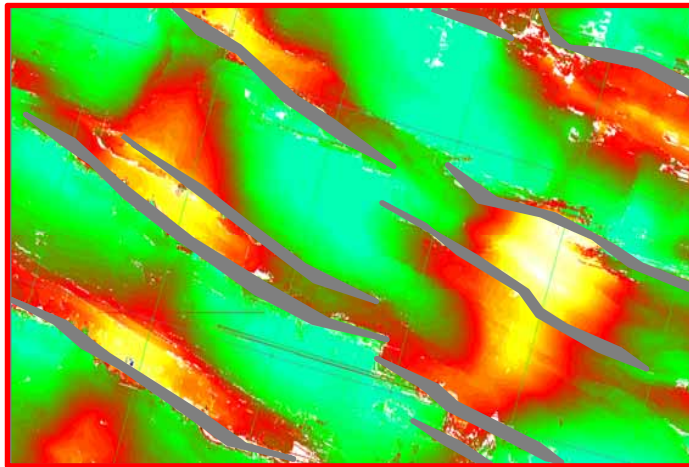
Tamar



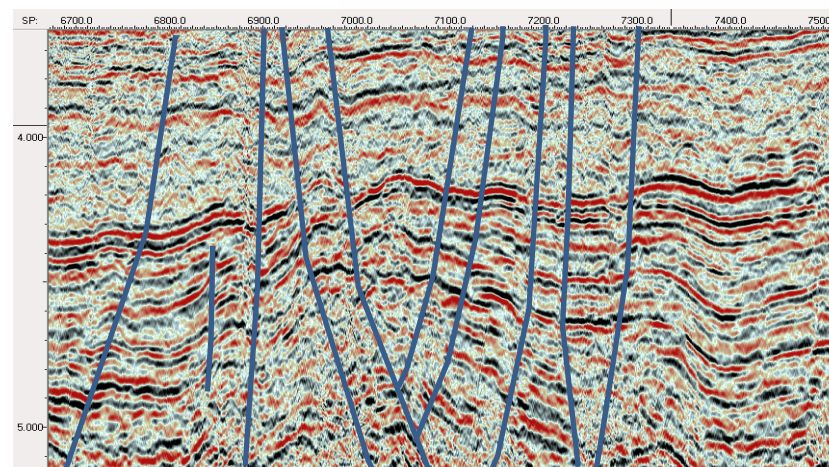
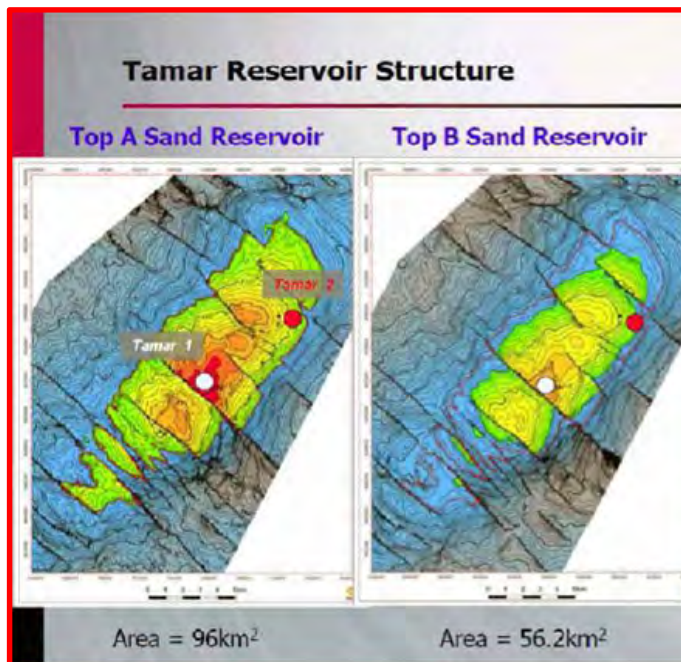
N



Structures North and South Levant Basin



Phoebe



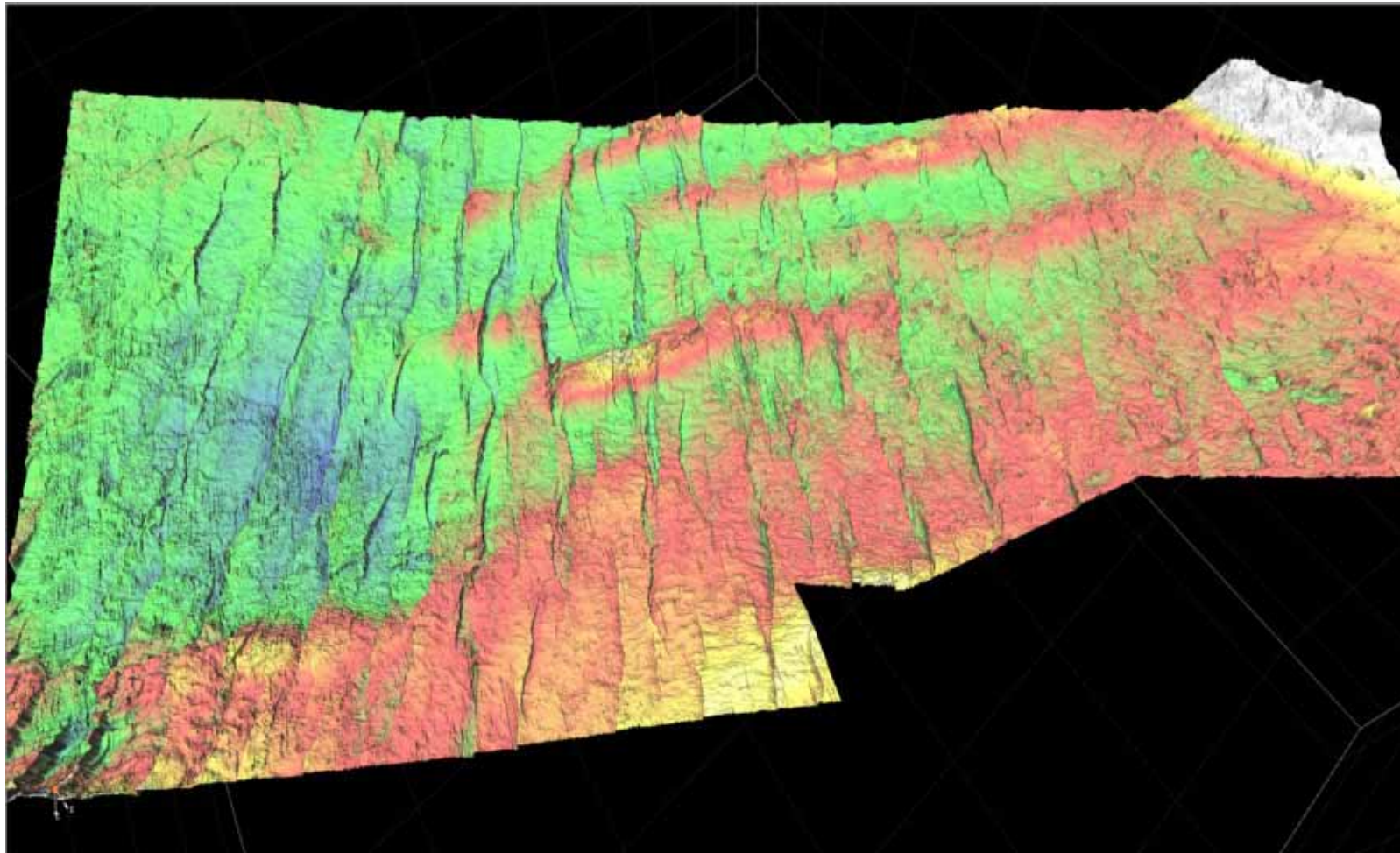
Leviathan

10km

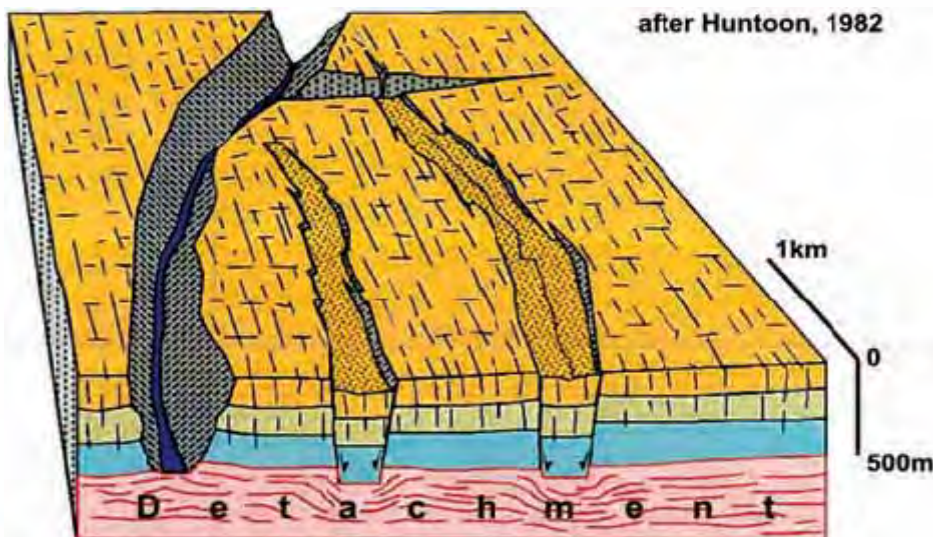
Ref: Noble Website

15km

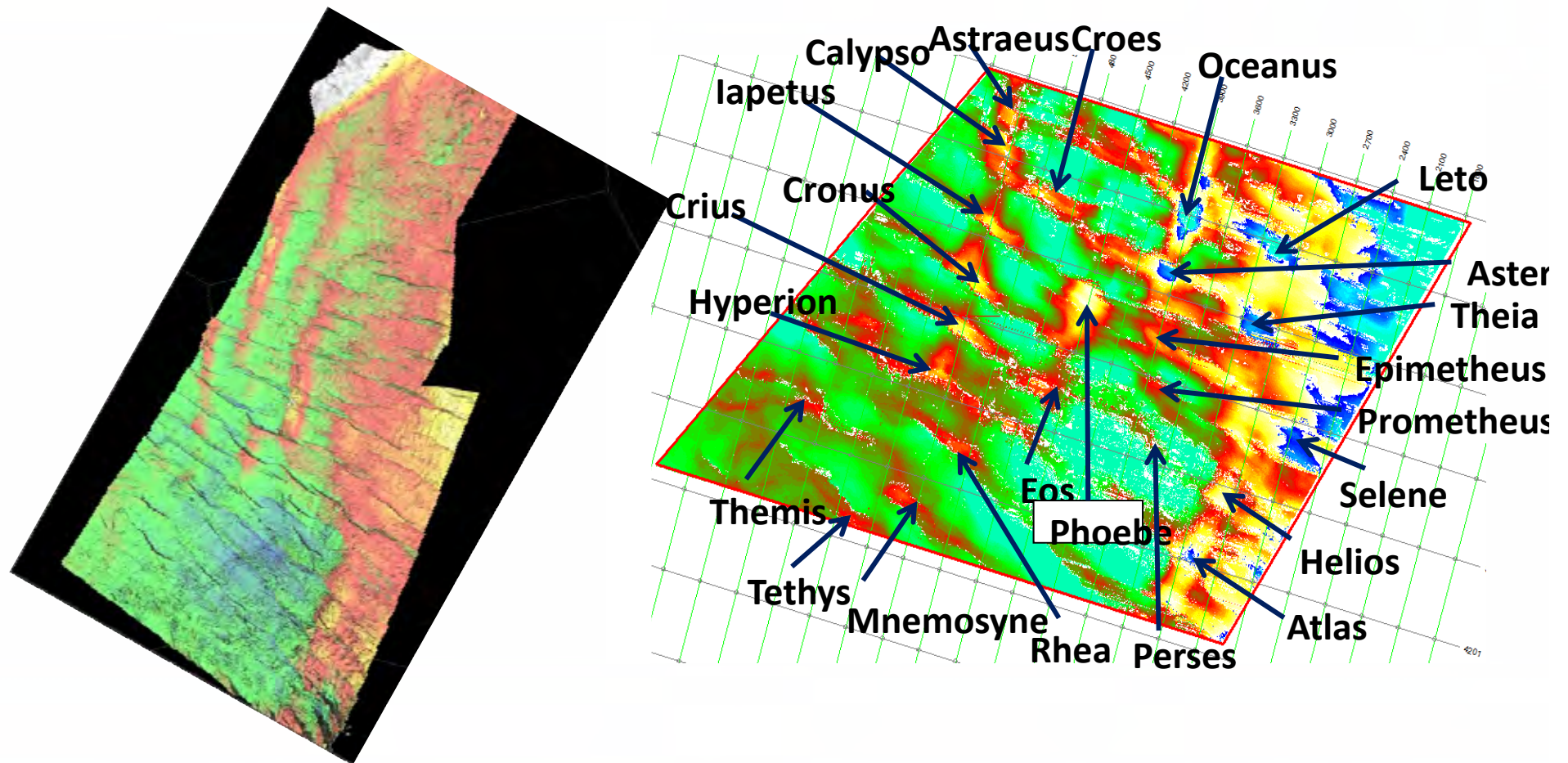
Structures North Levant Basin



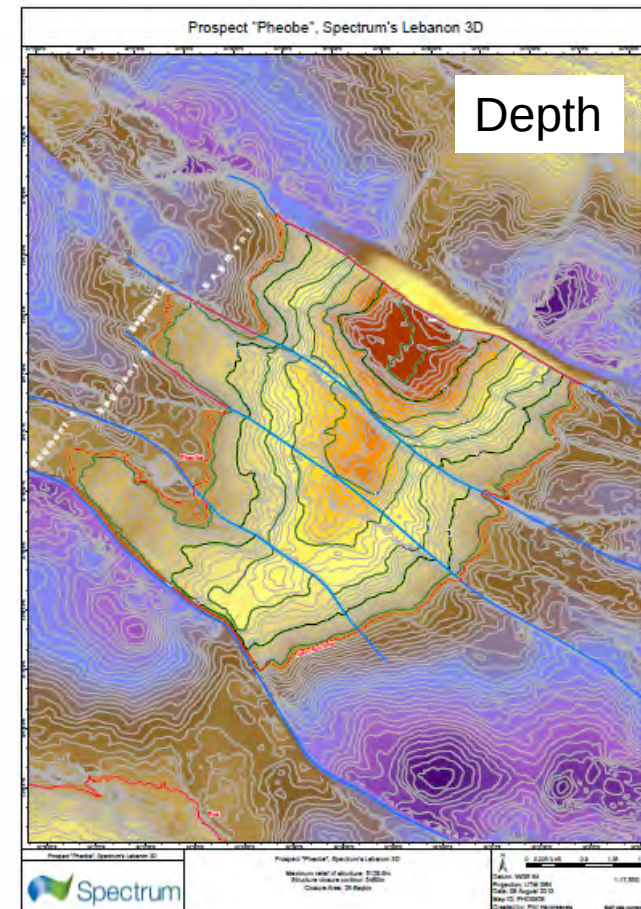
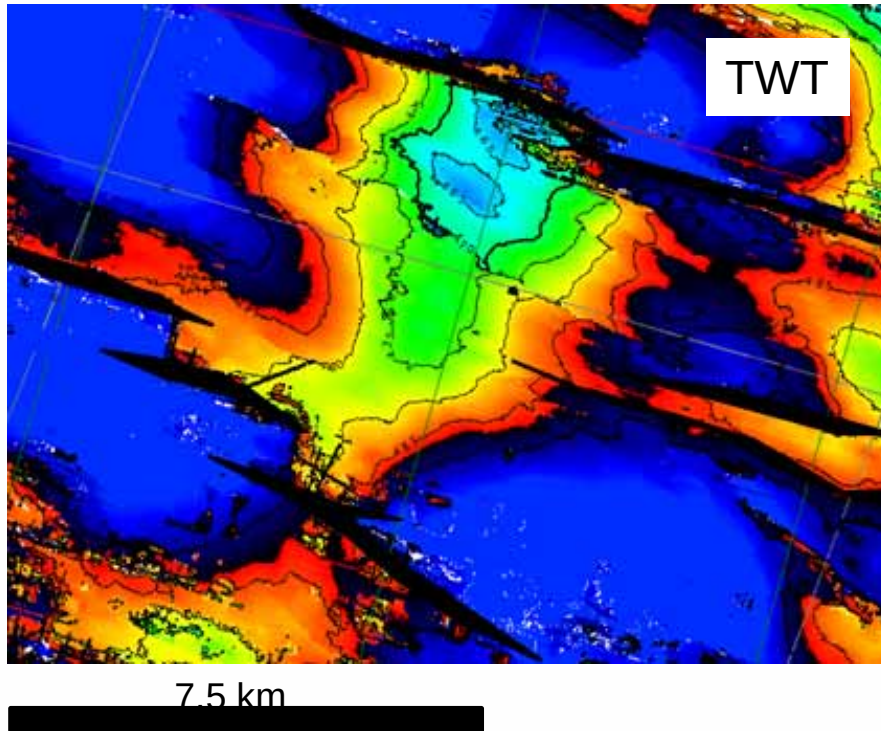
After Kosi, Tari, Nader, Skiple, Trudgill and Lazar, 2012



Southern half- block 5



PHOEBE; Resource Estimate



Phoebe Structure, Mapped at Top Langian

Crest 5180m, Spill 5460m, 280m relief, 40 sqkm Area

2 to 7 TCF potential

N Levant Concluding Q & A

Q. More than a biogenic gas play to chase in N. Levant Basin?

A. Yes! North Levant is an Oil and Gas Basin.

Q. Levant's thickest Reservoirs offshore Israel?

A. No! E. Miocene N. Levant 3-5 times thicker.

Q. Are the best structures in South Lebanon?

A. Yes! N Levant has bigger and less complex structure than Offshore Israel

Eastern Mediterranean: Keeps on Giving

