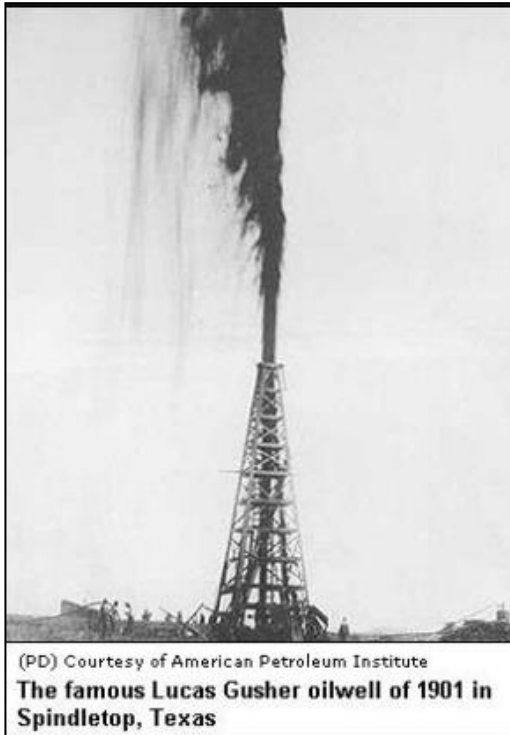


Post-well Review to Exploration Revival



Hi-Tech Seismic
in a Frontier Basin

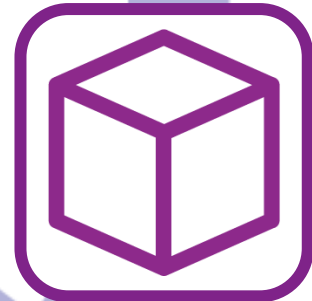
Seismically-Driven New Plays
in a Mature Basin



The Exploration Value Chain



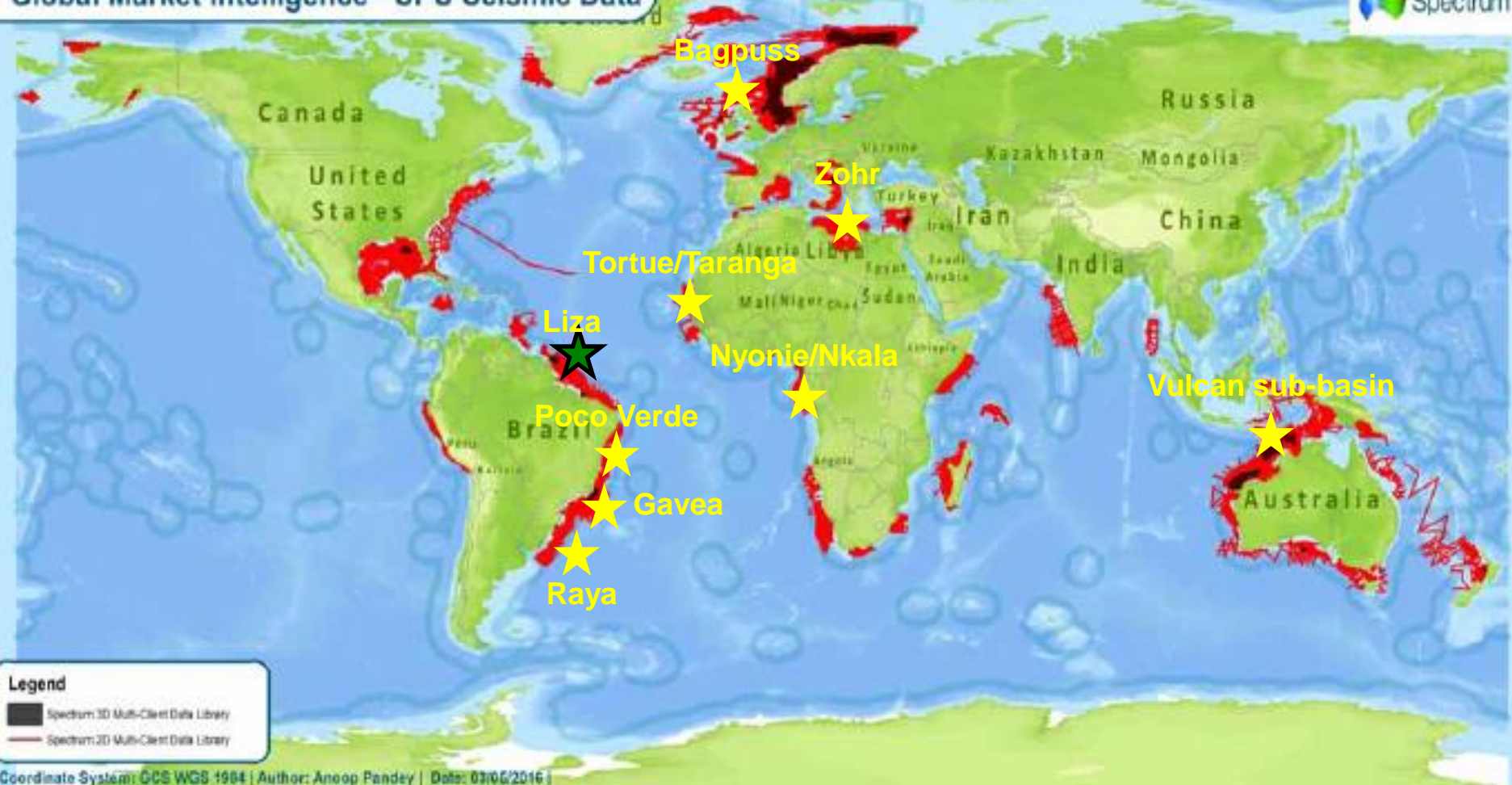
New Play Systems
across the Final New Frontier



3D Seismic Risk Reduction
for a Licence Round

Key Post-Well Result Evaluation

Global Market Intelligence - SPU Seismic Data



Coordinate System: GCS WGS 1984 | Author: Anoop Pandey | Date: 03/06/2016

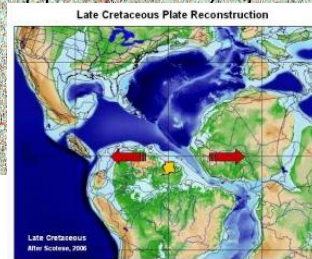
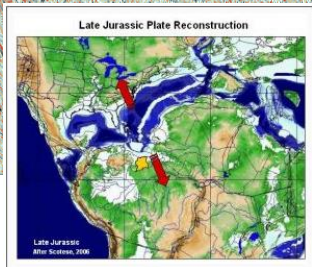
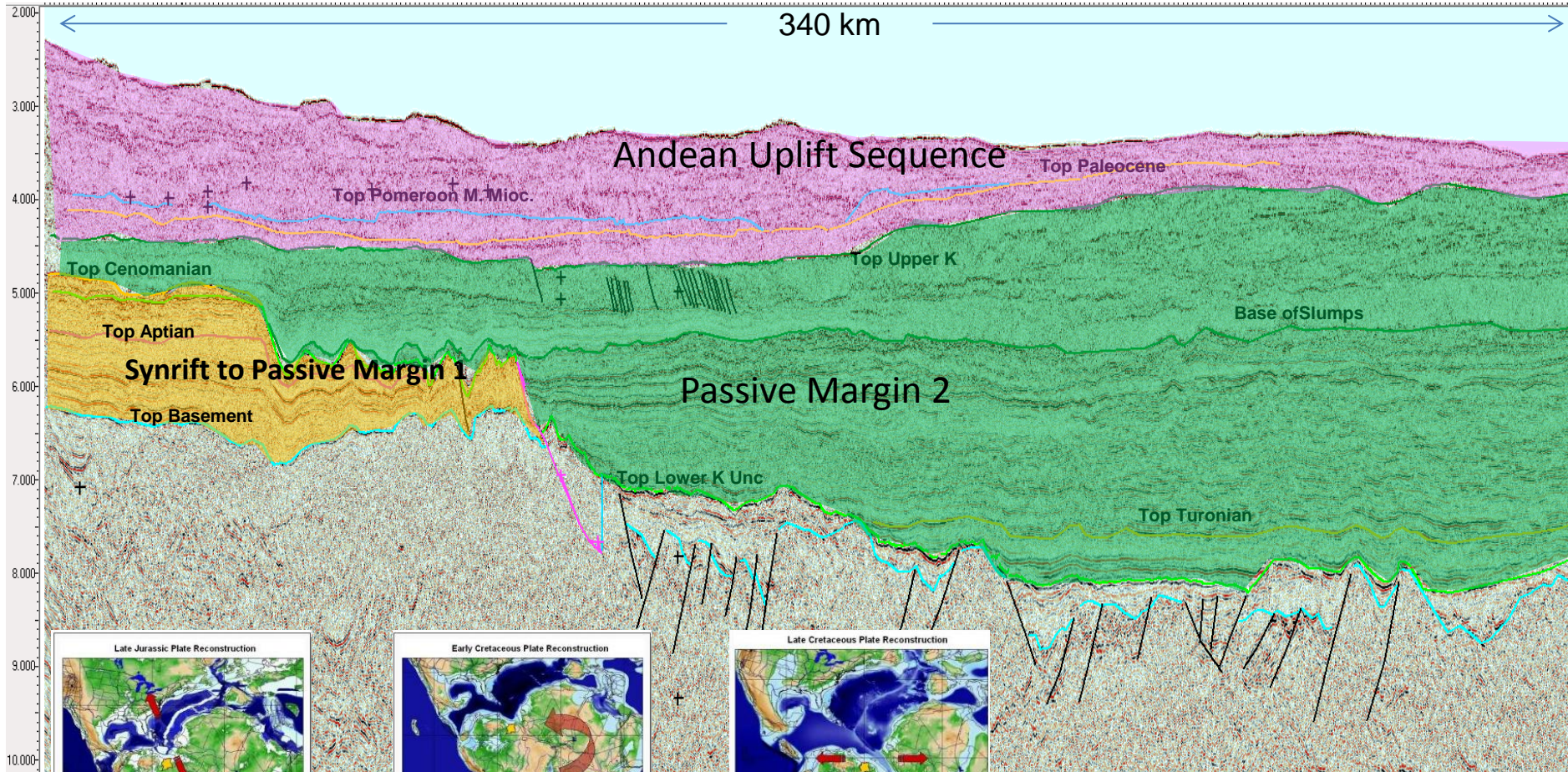
Tectonic Evolution Offshore Guyana



NW

SE

340 km

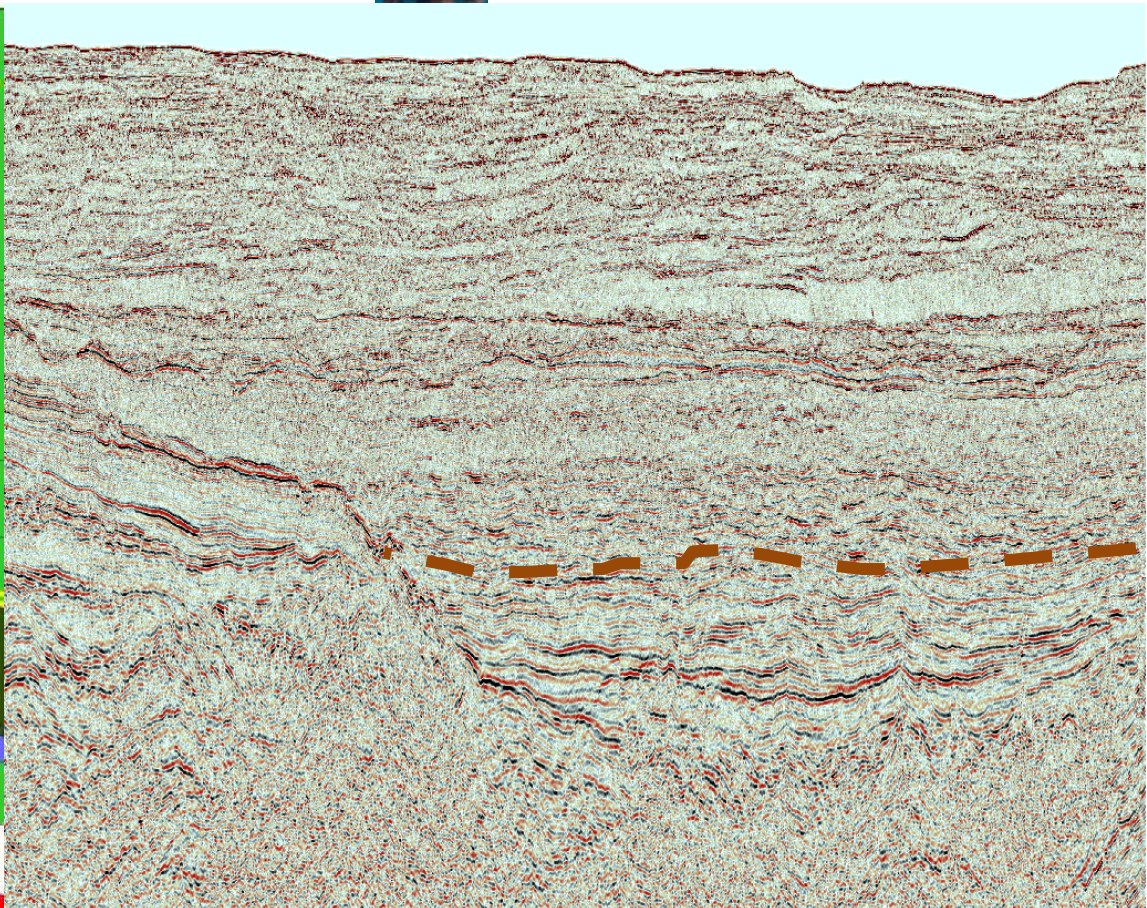
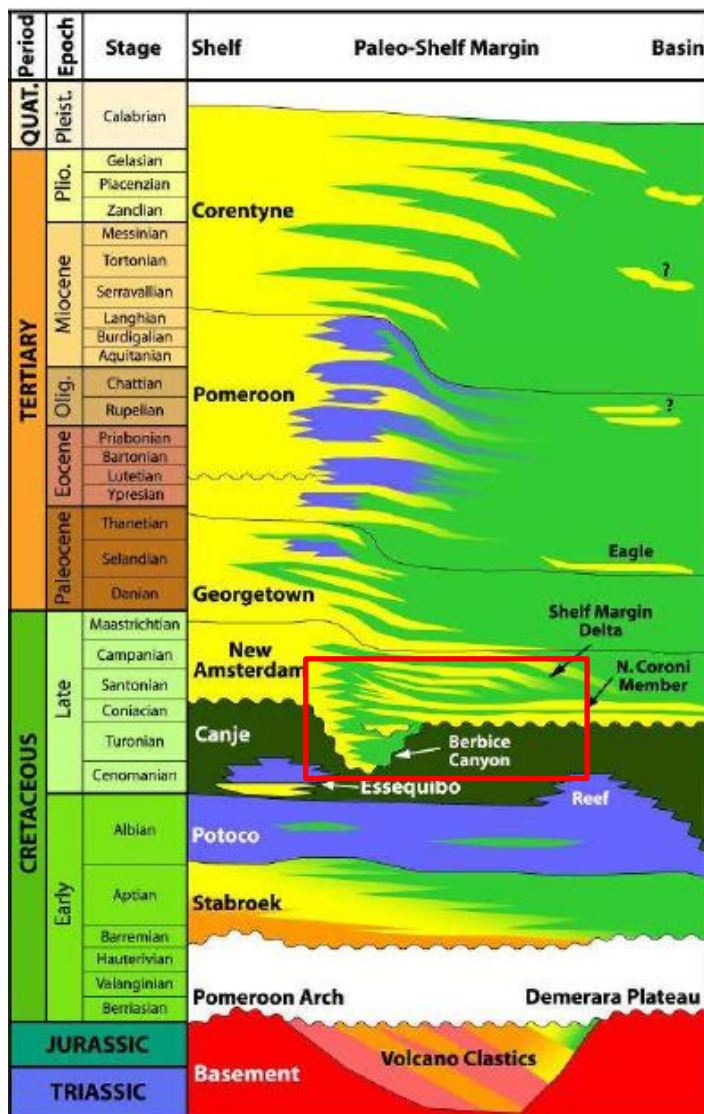


Central

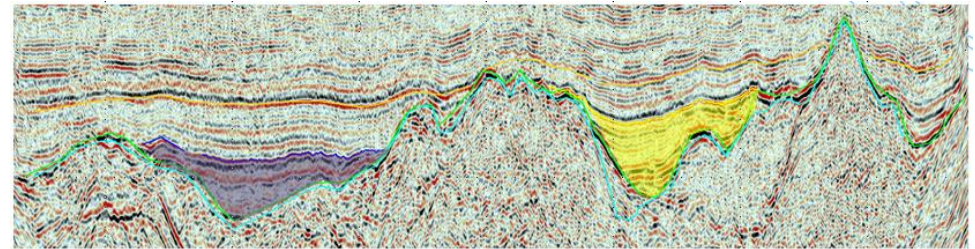
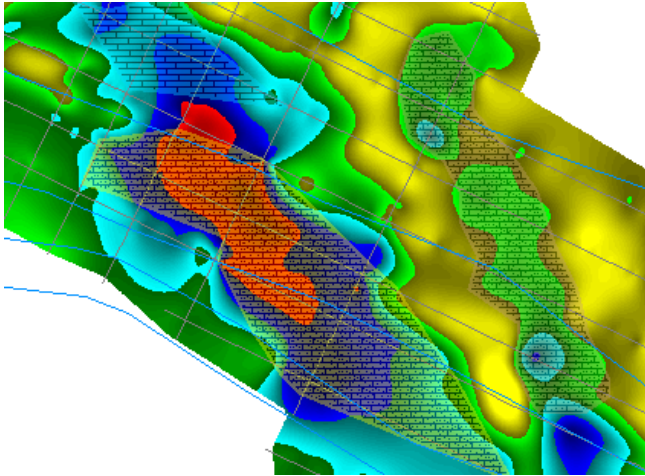
South

Equatorial

Exxon Liza Discovery



Post-Liza Cretaceous Prospectivity



EARLY CRETACEOUS

1. Compartmentalized anticlines formed during compression
2. Onlap Fill NW
3. Onlap Fill SE
4. Updip pinchout
5. Mounds (Carbonate buildups)

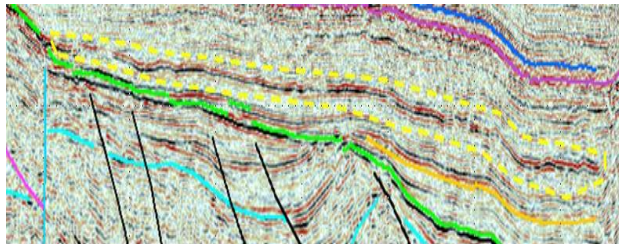
CENOMANIAN TURONIAN

1. High amplitude Zone in Submarine Canyon
2. Top of high amplitude zone laterally varying into less well defined high amplitudes and more chaotic character
- 3 - 5 Pondered Turbidites

Upper Cretaceous Prospectivity

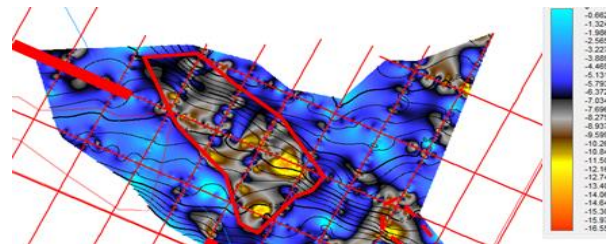


Upper K Sequence 1



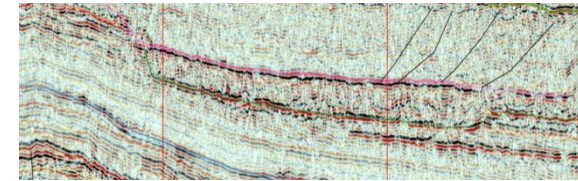
- Basin Floor Fans mainly in the early section of the sequence and mainly with updip pinchout against the Lower K Unconformity surface

Upper K Sequence 2



- Structural Stratigraphic traps with high amplitudes with apparent downdip concordance

Upper K Sequence 3



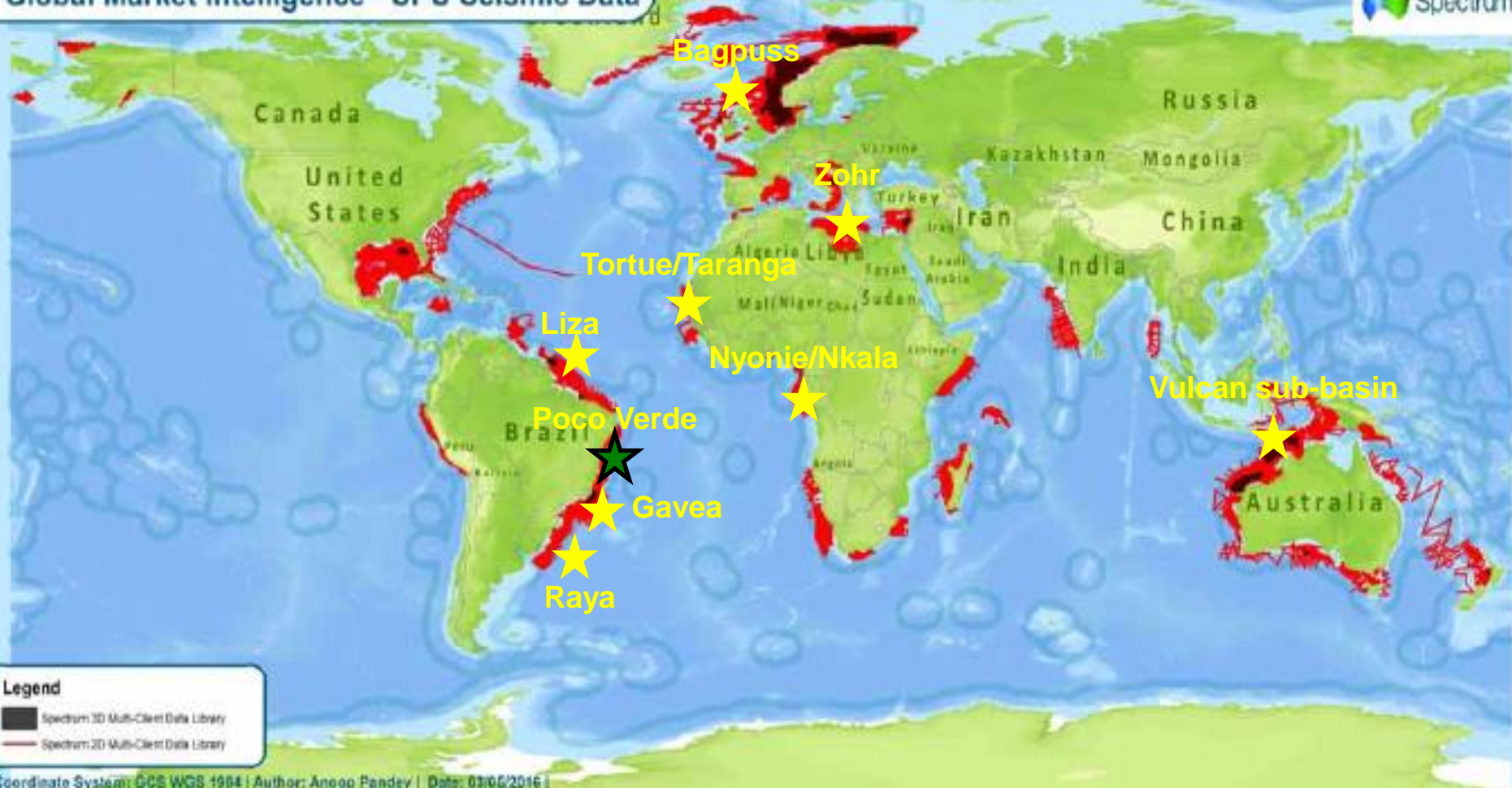
- Base of slope channel filled with chaotic high amplitude reflections
- Distal slope channels
- Prograding Delta sequence with a thickness of up to 1300 ms

Basin HC Potential

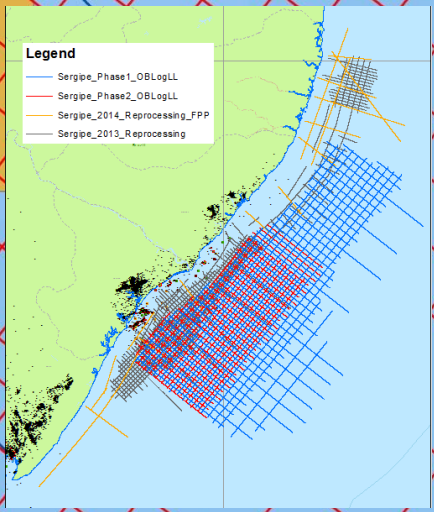
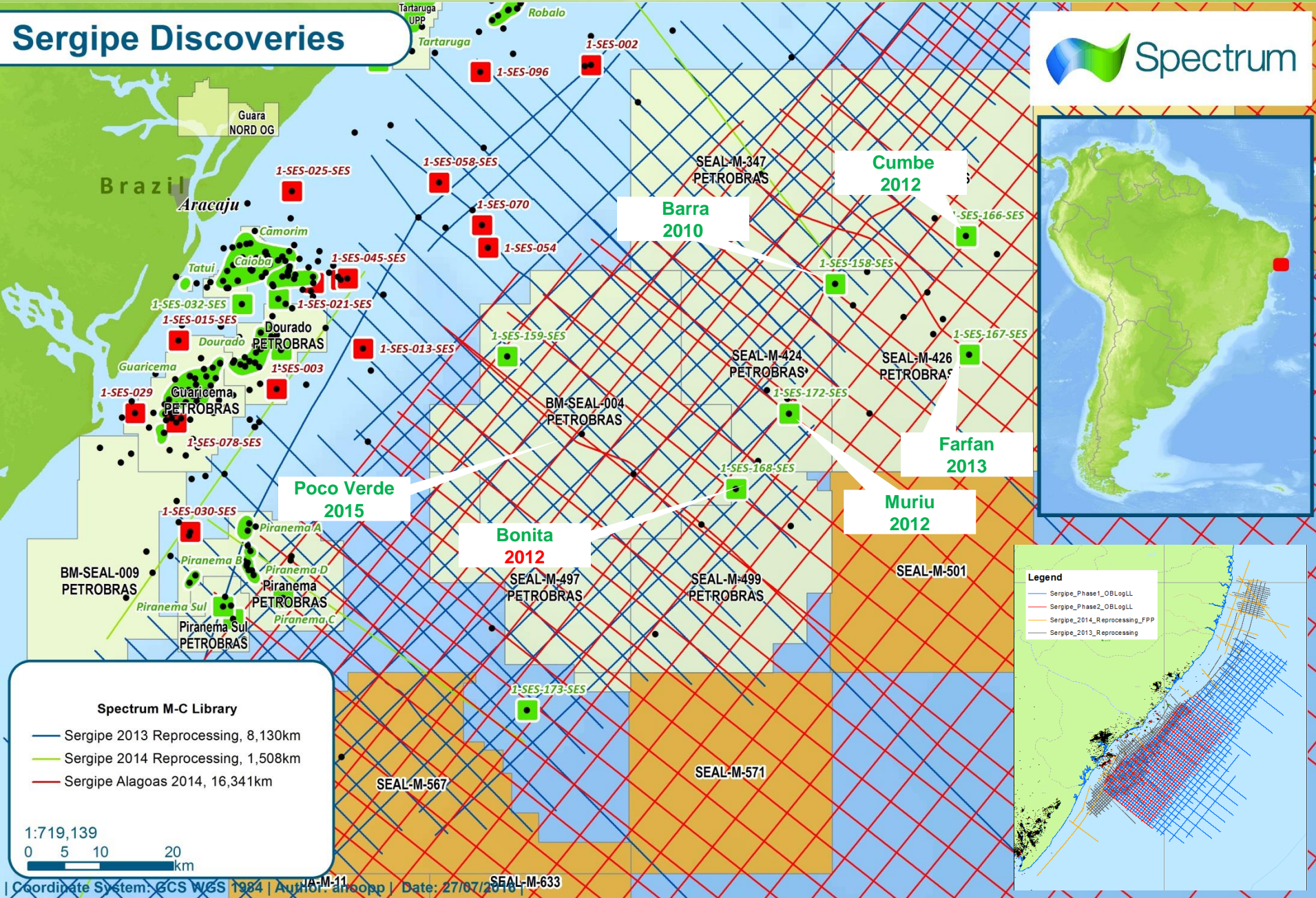
- USGS 15 BBO
 - 0.8 – 1.4 BBO in Liza
 - 13.5 BBO YTF
- SPECTRUM 24 BBO
 - 22.5 BBO YTF

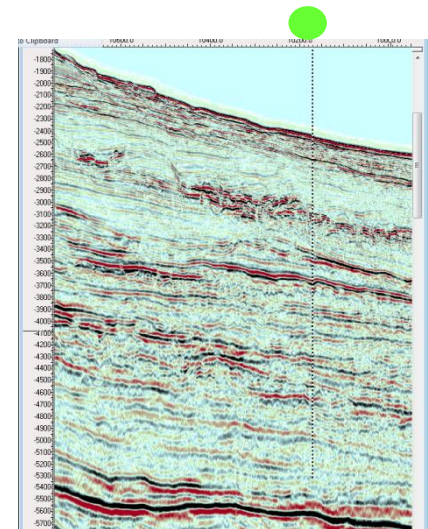
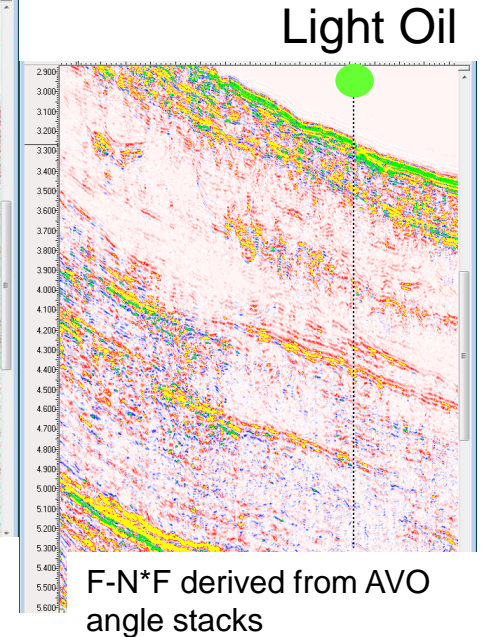
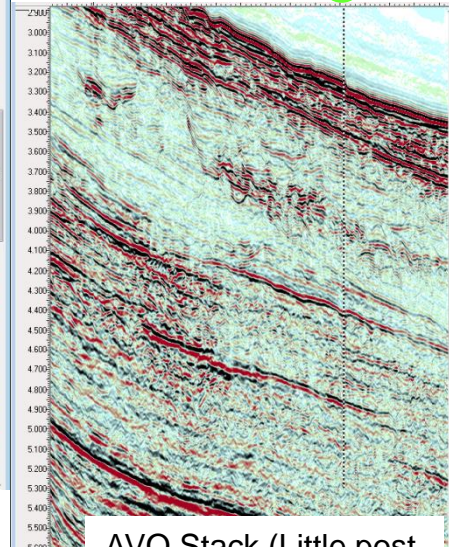
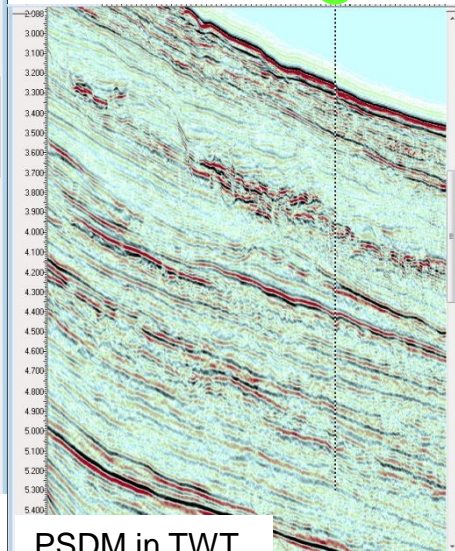
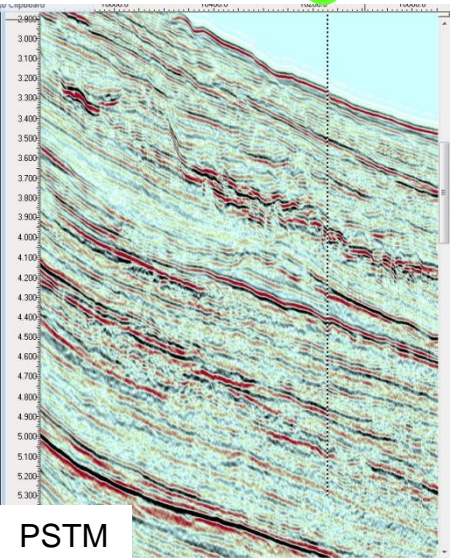
Key Post-Well Result Evaluation

Global Market Intelligence - SPU Seismic Data



Sergipe Discoveries





Petrobras announced on June 1st 2015 that the 3-SES-189 well (Poco Verde 4) encountered light oil in 85 m of good porous and permeable sands.

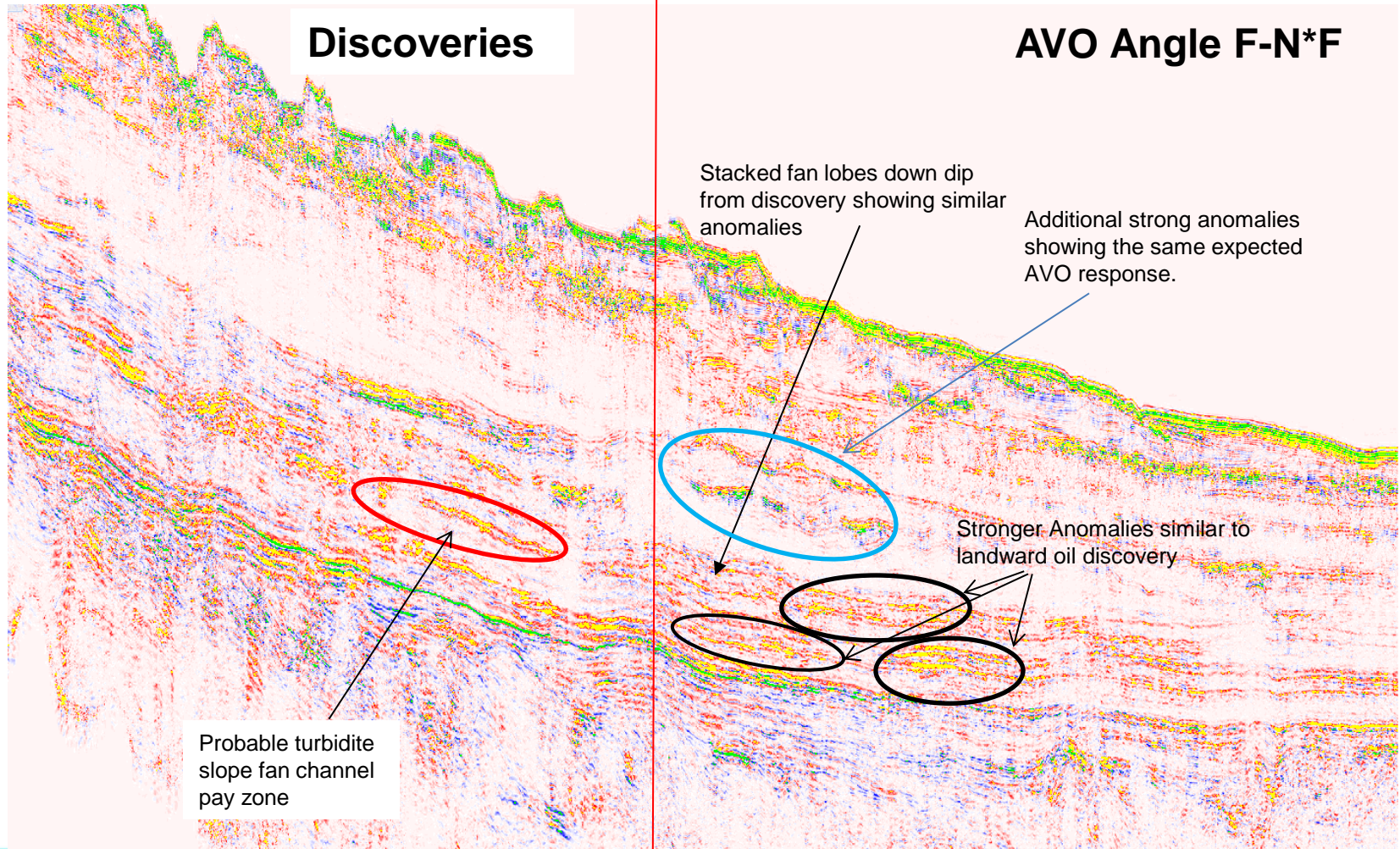
The reservoir could be represented by one of the numerous AVO anomalies visible on the Spectrum 2D dataset and the most likely pay unit would be the deepest anomaly down dip of the dry 1-SES-156 well where the AVO response is different.

Post-Well Calibrated Anomalies

NW

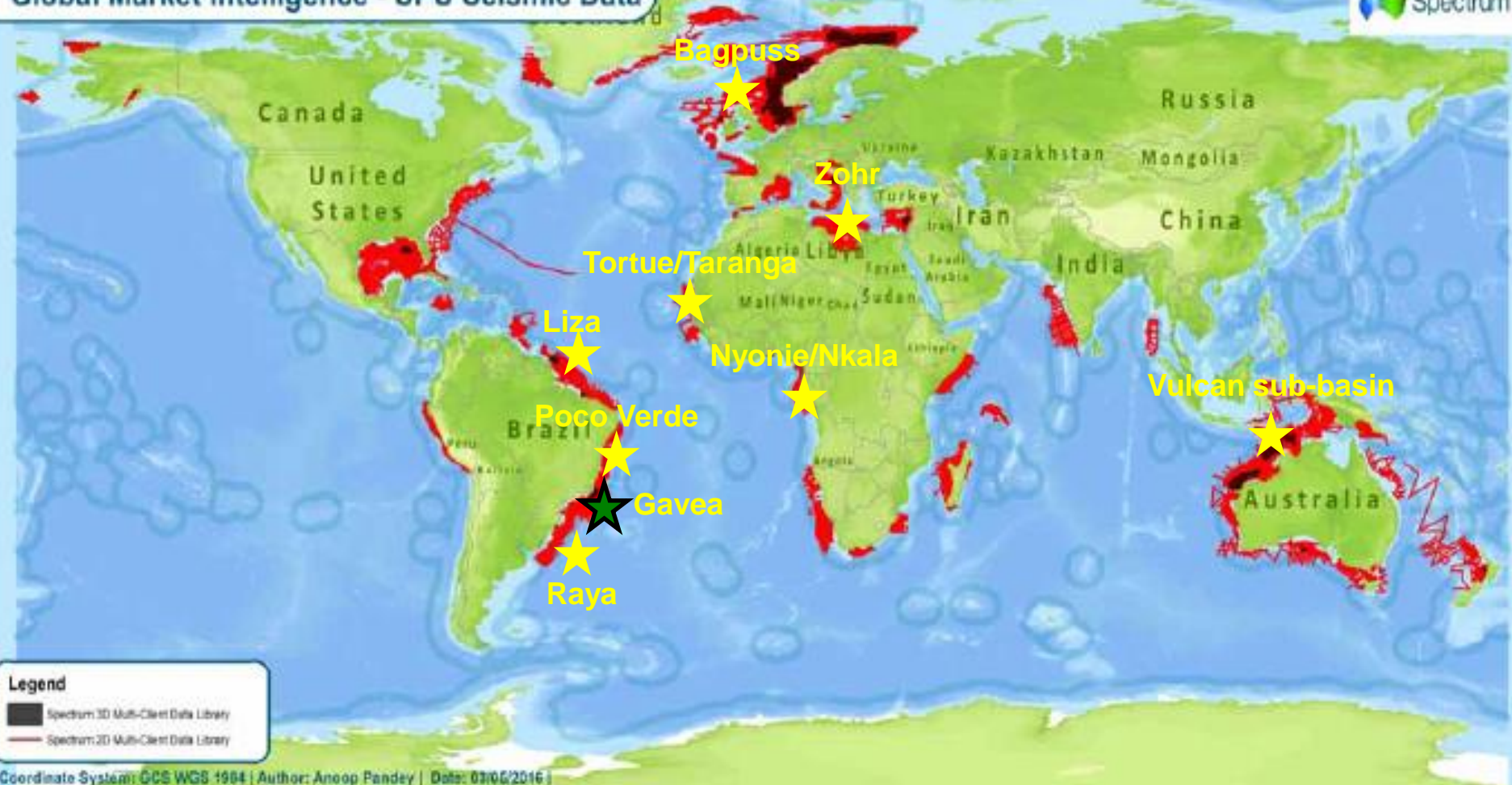
Open Acreage

SE

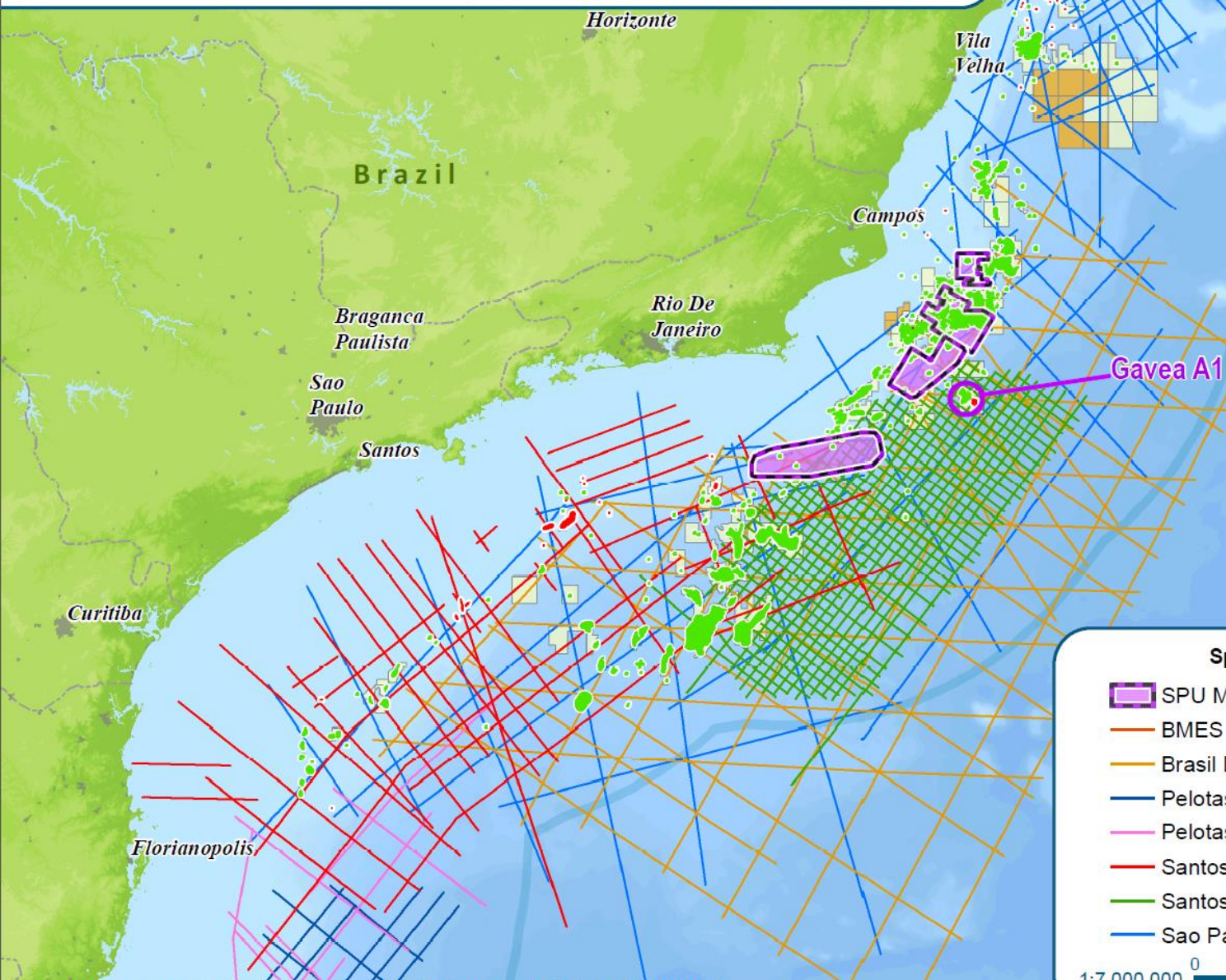


Key Post-Well Result Evaluation

Global Market Intelligence - SPU Seismic Data



Gavea A1 well location, Campos basin, Brazil



Spectrum M-C Library

- SPU MC3D
- BMES 6,
- Brasil Deep Focus, 15,845km
- Pelotas Acquisition,
- Pelotas Reprocessing, 12,045km
- Santos 2015 Reprocessing, 6,776km
- Santos Campos, 13,650km
- Sao Paulo Plateau 1999, 17,265km

1:7,000,000

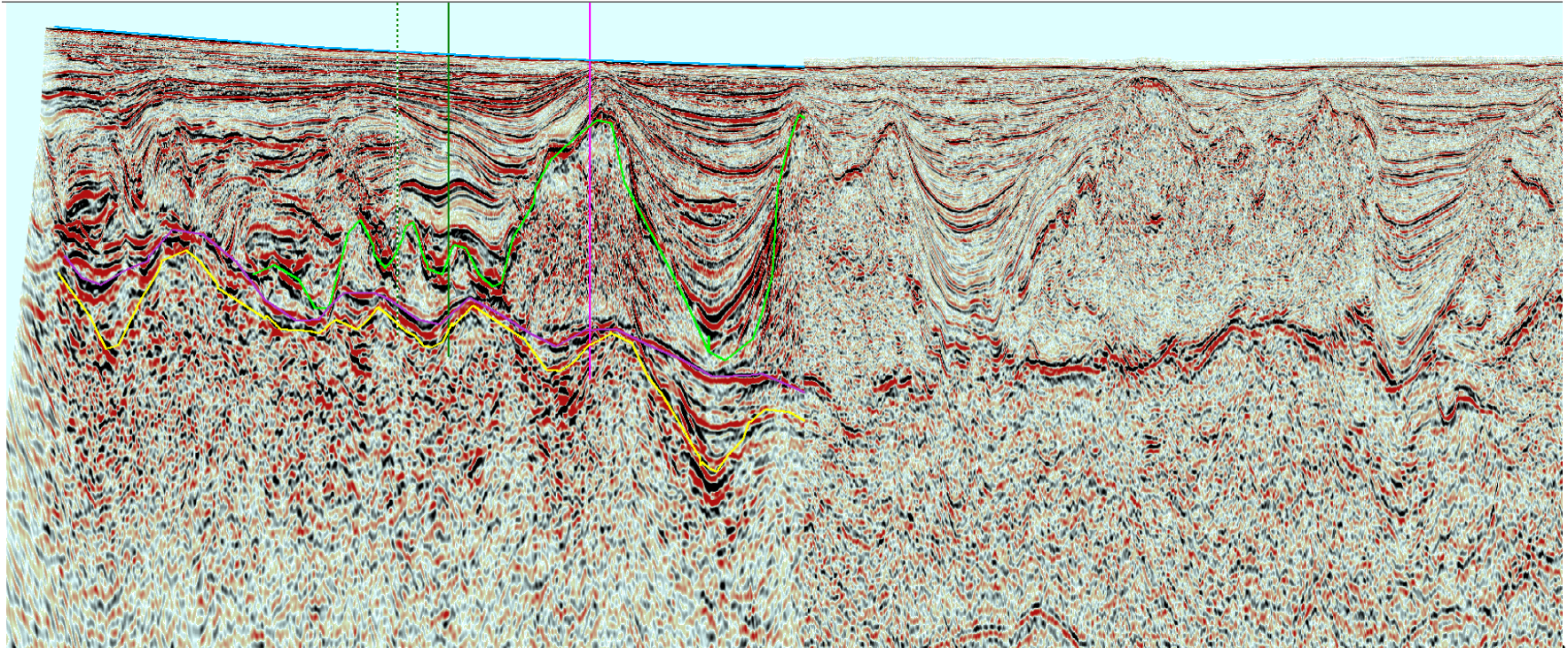
0 90 180 360 km

SC and SP99 (Public) Arbitrary Line

NW

SE NE

SW



SC Spectrum data

- Separate discovery structures visible
- Indications of presalt downdip potential

Public SP99 data

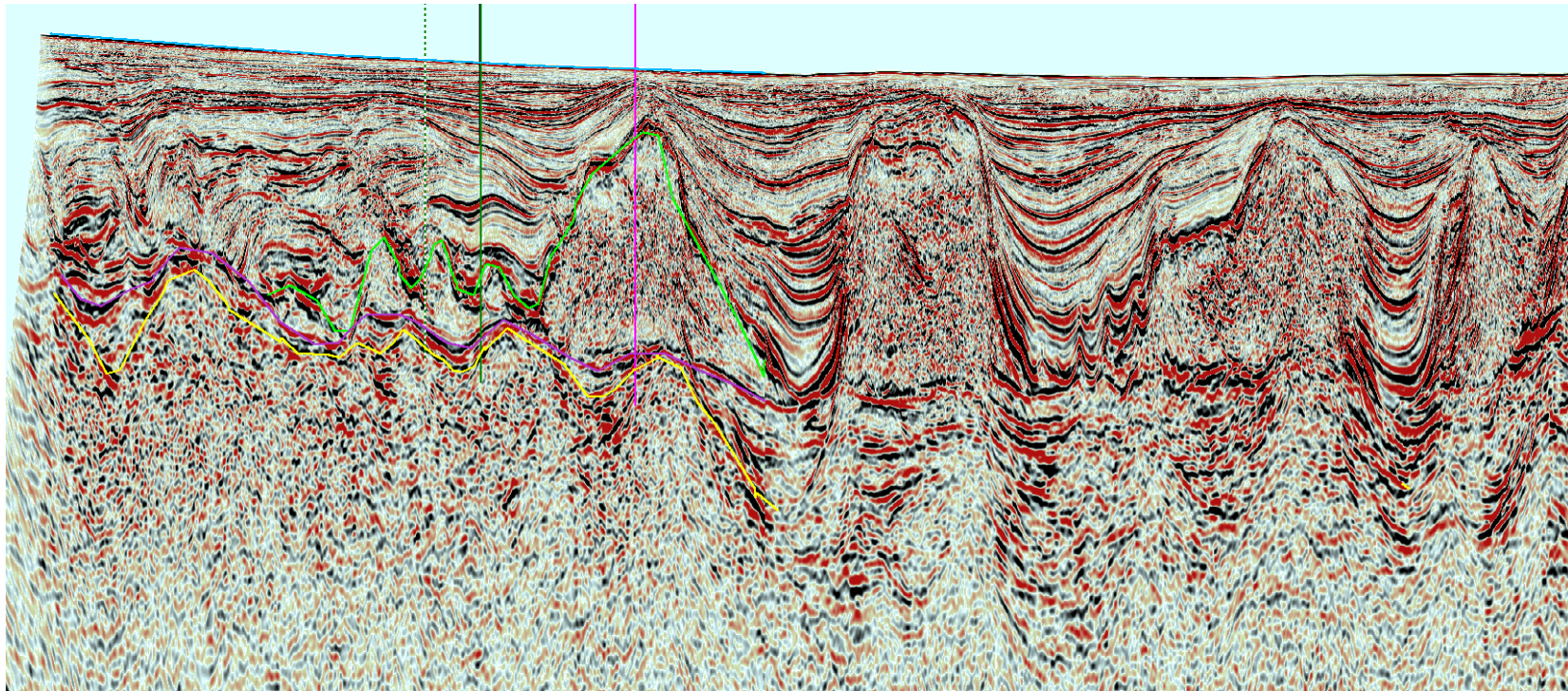
- Presalt structures not clear towards SW
- No indications of presalt additional potential

SC Arbitrary Line

NW

SE NE

SW



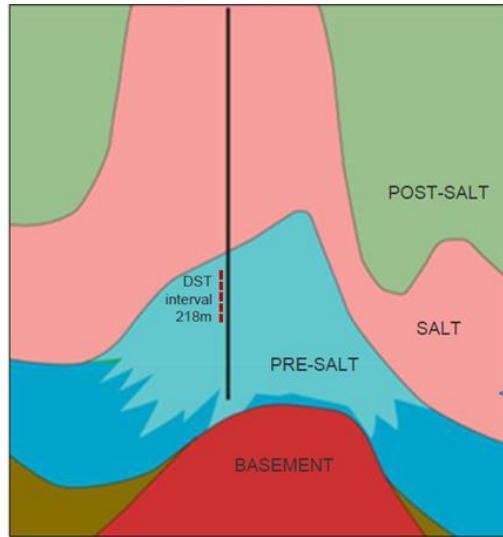
SC Spectrum data

- Separate discovery structures visible
- Indications of presalt downdip potential

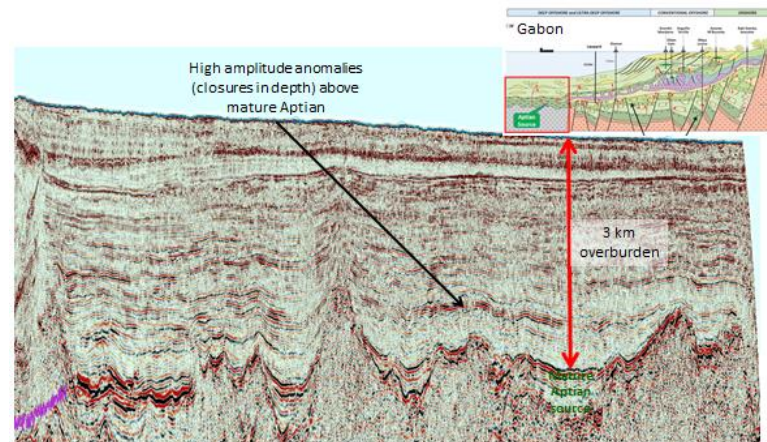
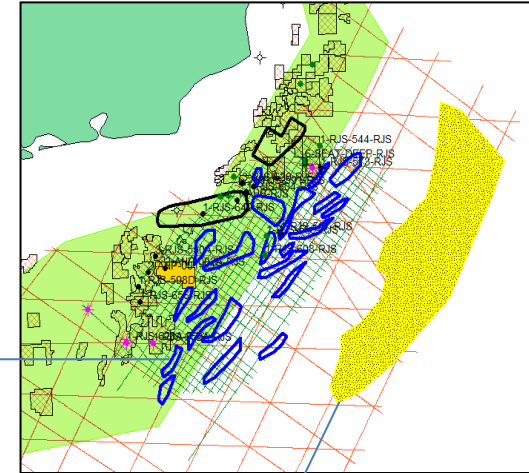
SC Spectrum data

- Presalt structures visible towards SW

Post-Gavea Evaluation and Beyond....

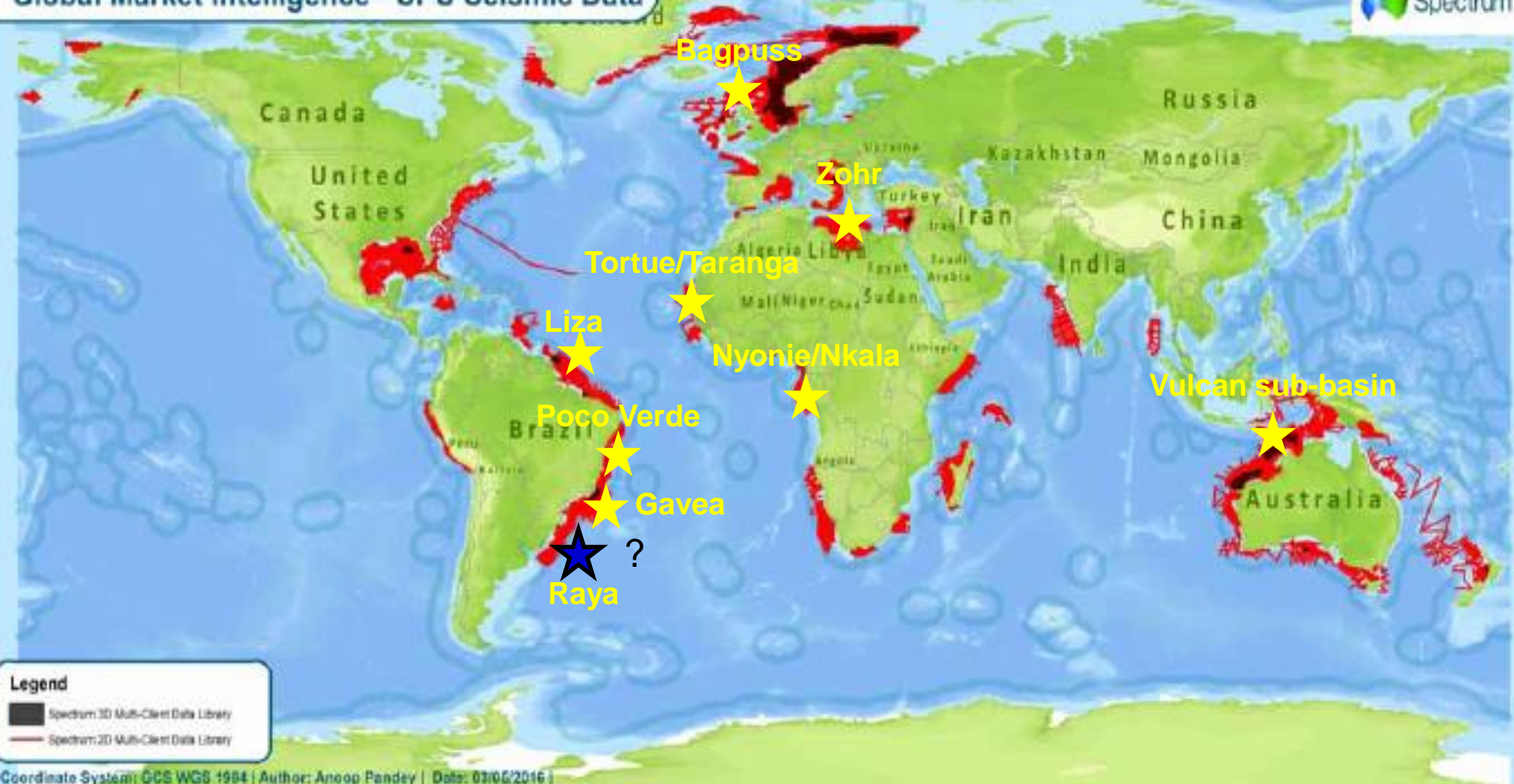


From Statoil Presentation



Key Post-Well Result Evaluation

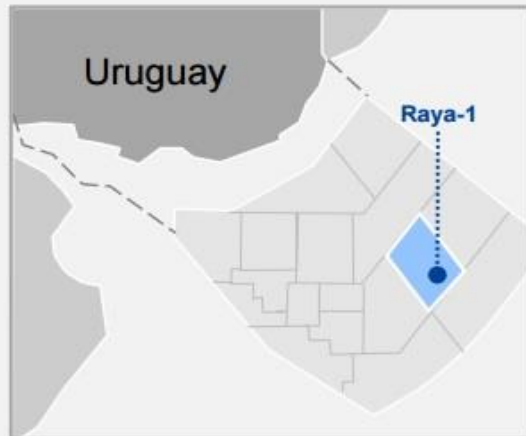
Global Market Intelligence - SPU Seismic Data



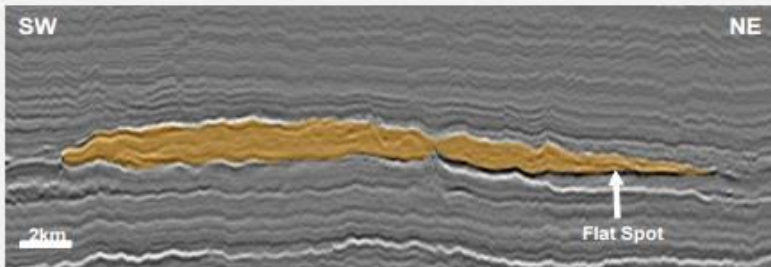
The Target

Frontier exploration with strong value creation potential

Uruguay Atlantic Margin, Block 14



Raya seismic section



* DHI: direct hydrocarbon indication

Total 65%, operator

Successful farm-out completed

High-potential **frontier** prospects de-risked with 3D and DHIs*

Raya, a **giant** ultra-deep offshore prospect

- **Exploration well** in **2016**
- Success to de-risk several other targets

Total's Investors Day on September 23, 2015

<http://www.total.com/en/investors/institutional-investors/presentations/totals-investors-day-september-2015>

Results

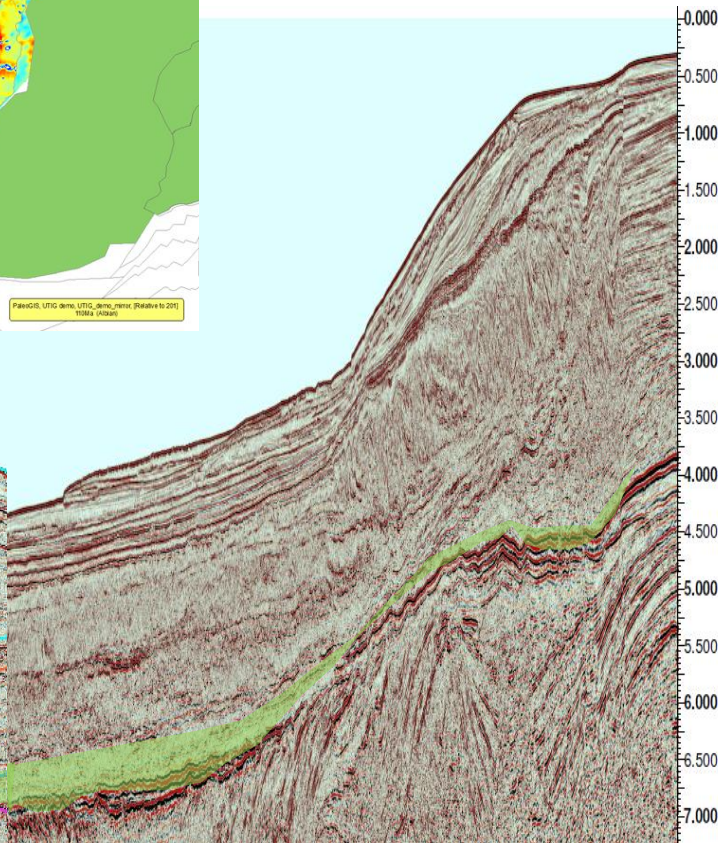
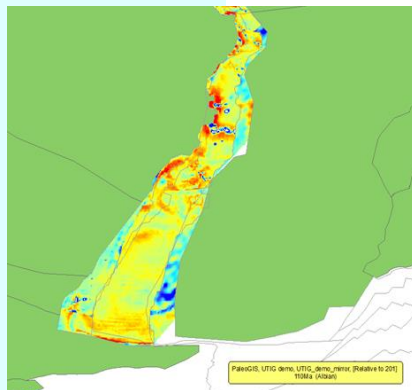
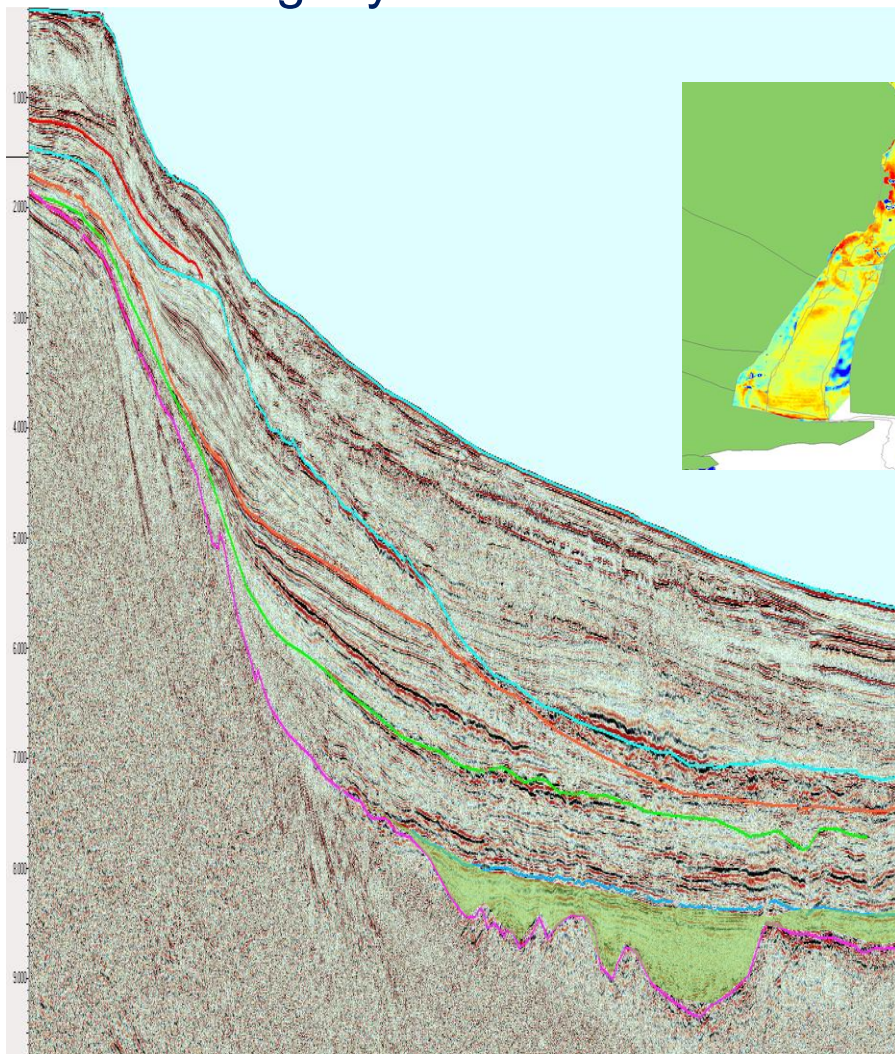
- ANCAP at AAPG ICE 2016
 - “Ministry has reported “dry well” results as the well did not deliver the results expected by Uruguay”
- Rumours
 - Well data sent to French laboratories for testing
- Fact
 - Total farmed into adjacent BG Block after completing Raya well

Source Rock?

UDW Uruguay

UDW Namibia

Proven Aptian Source Rock



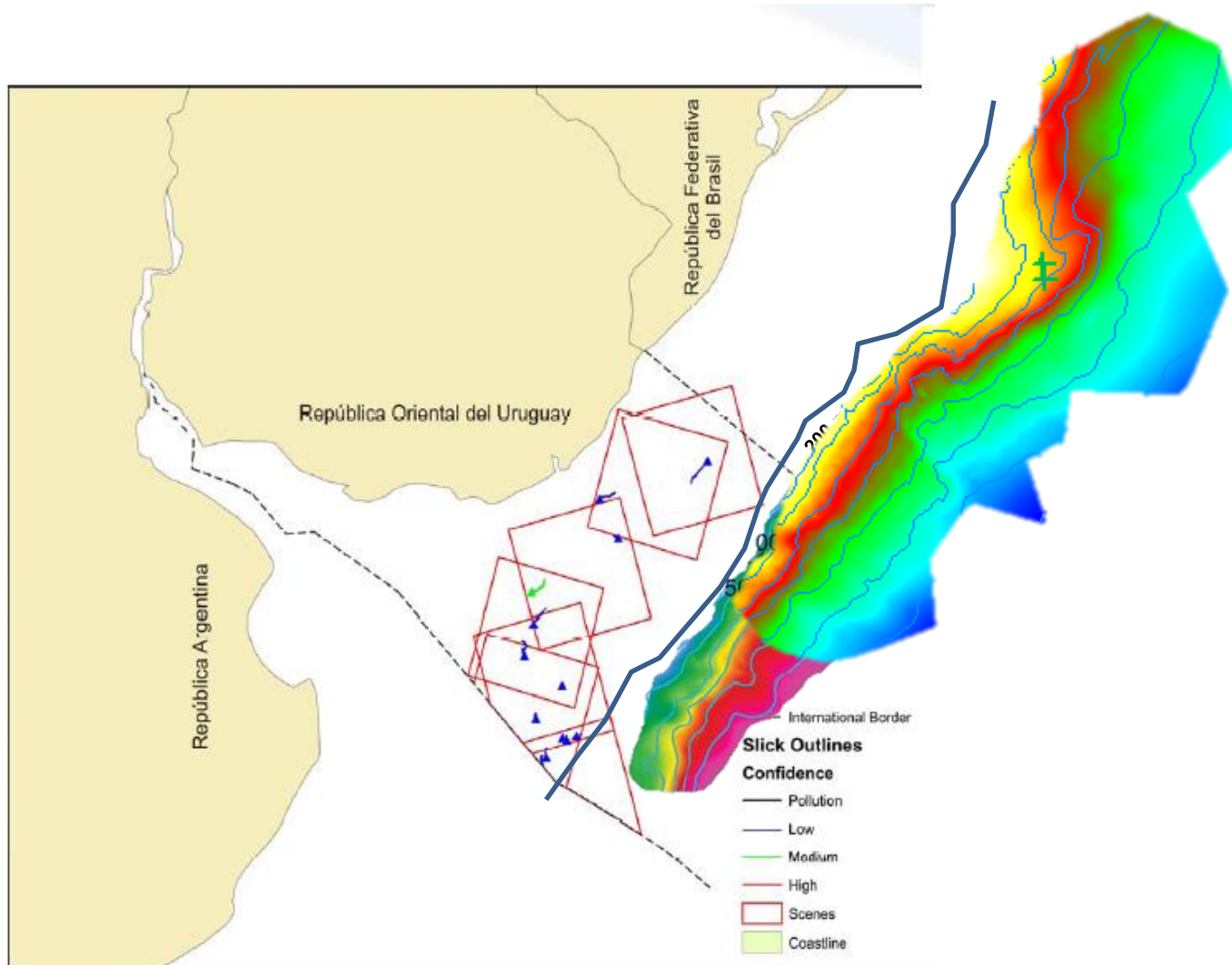
TWT
PSTM

PSTM

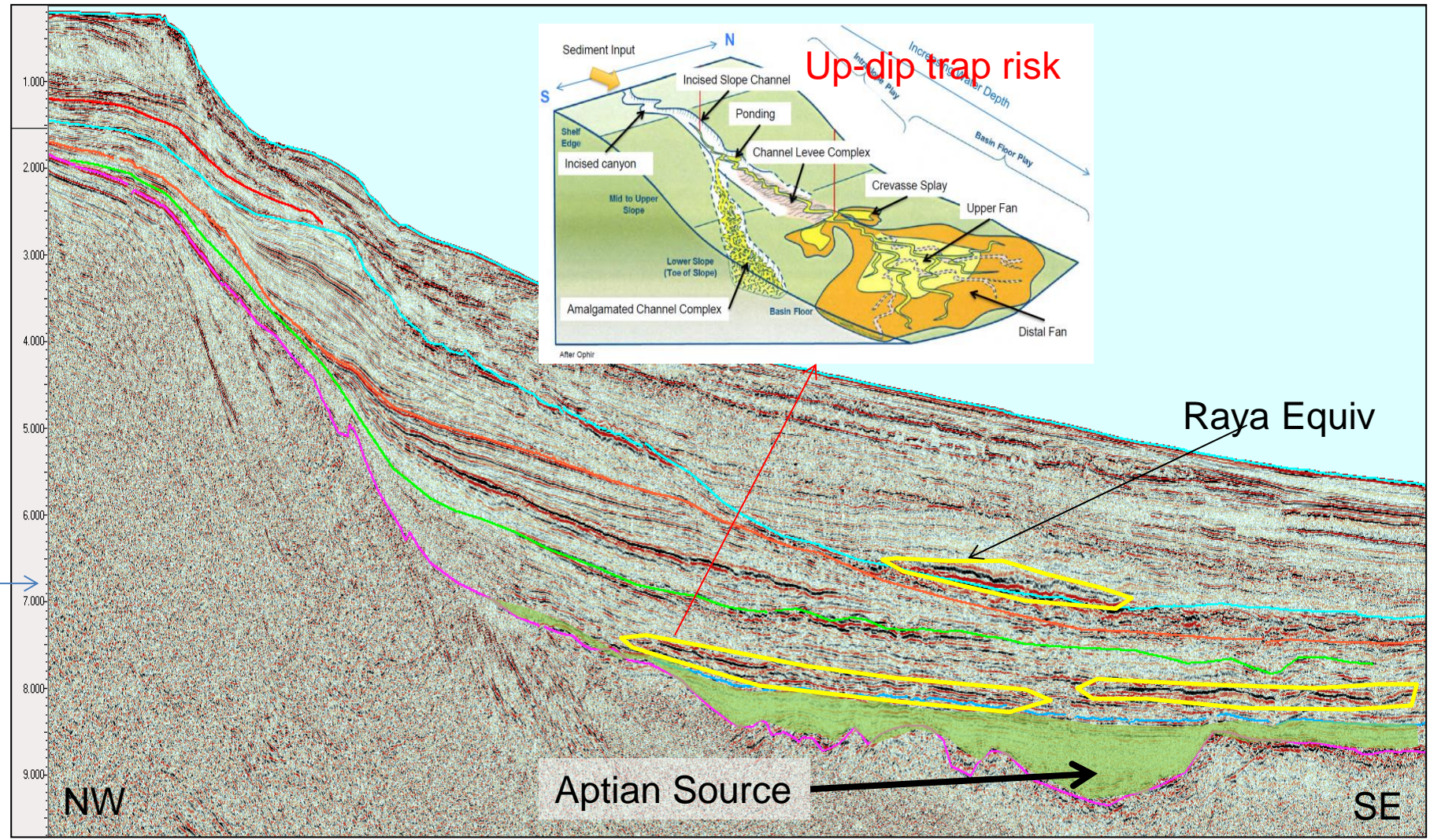
Line length 248 km

Line length 221 km

Oil Seeps and BSR Extent



Post-Raya Well – Deeper Targets



Up-dip trap risk

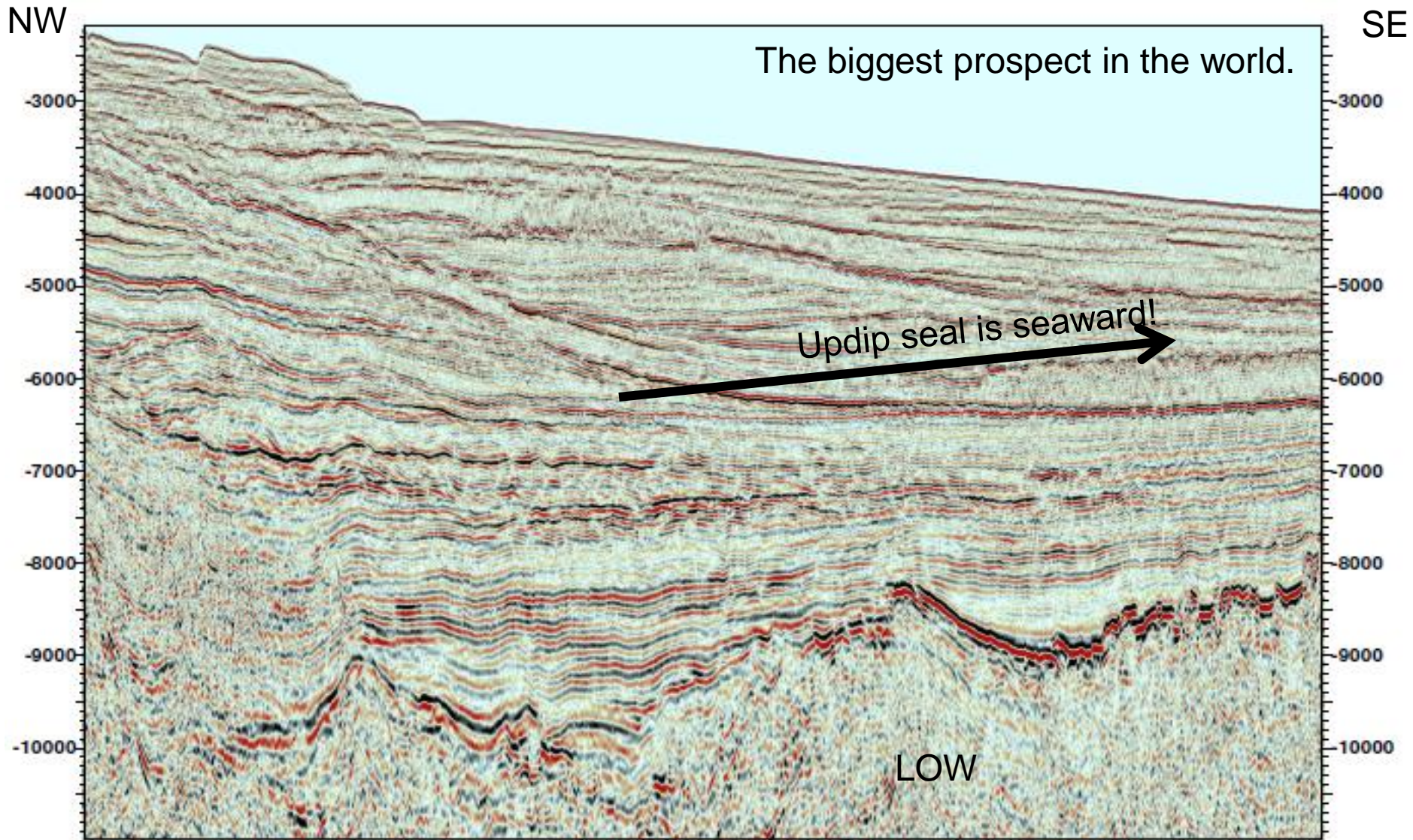
Raya Equiv

Aptian Source

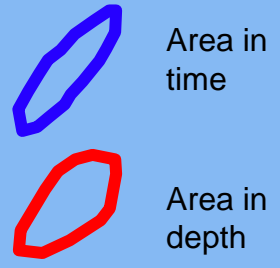
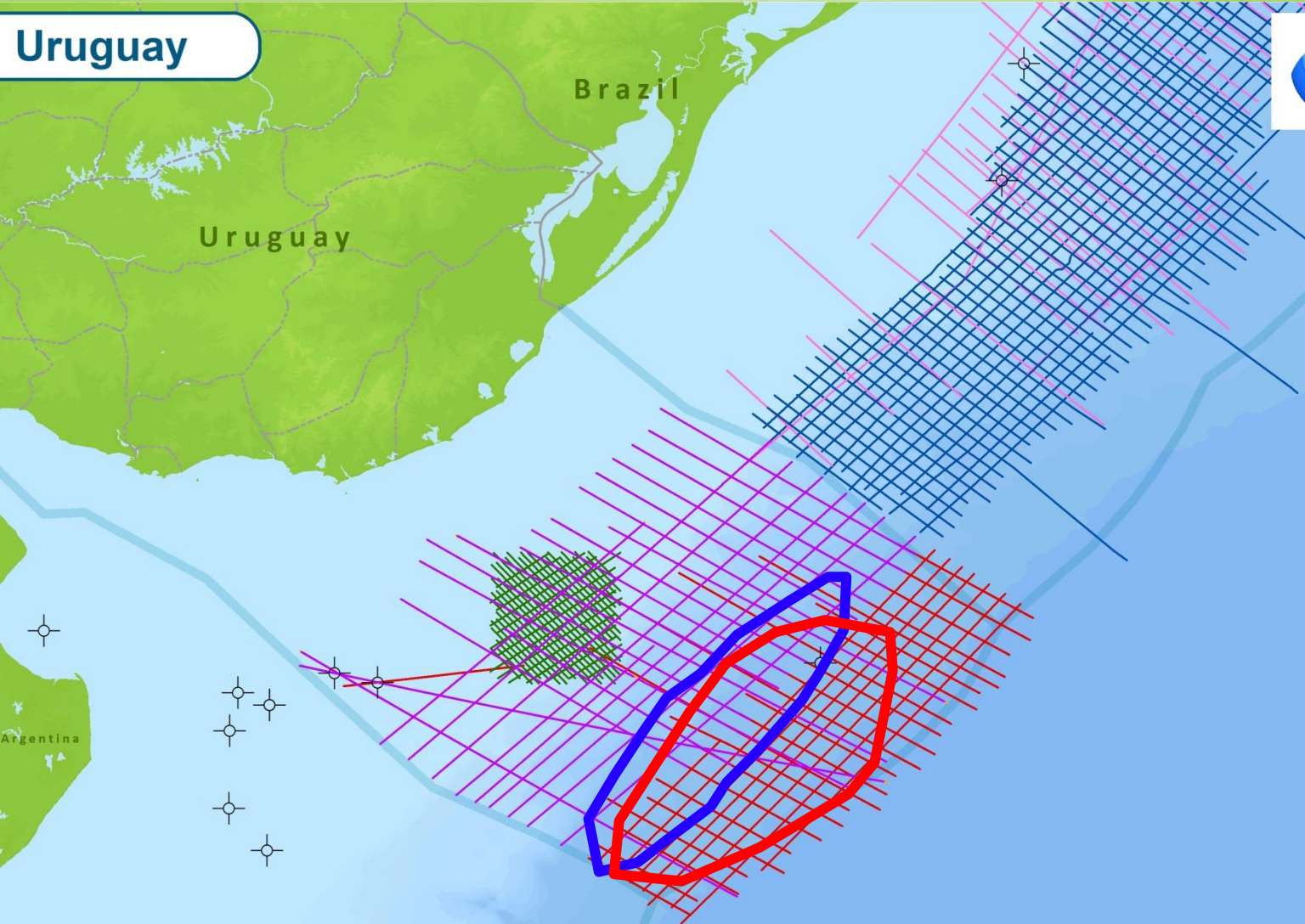
Basin Floor Fans

Line length 248km

Basin Floor Fans in DEPTH



Uruguay



Supermasivo

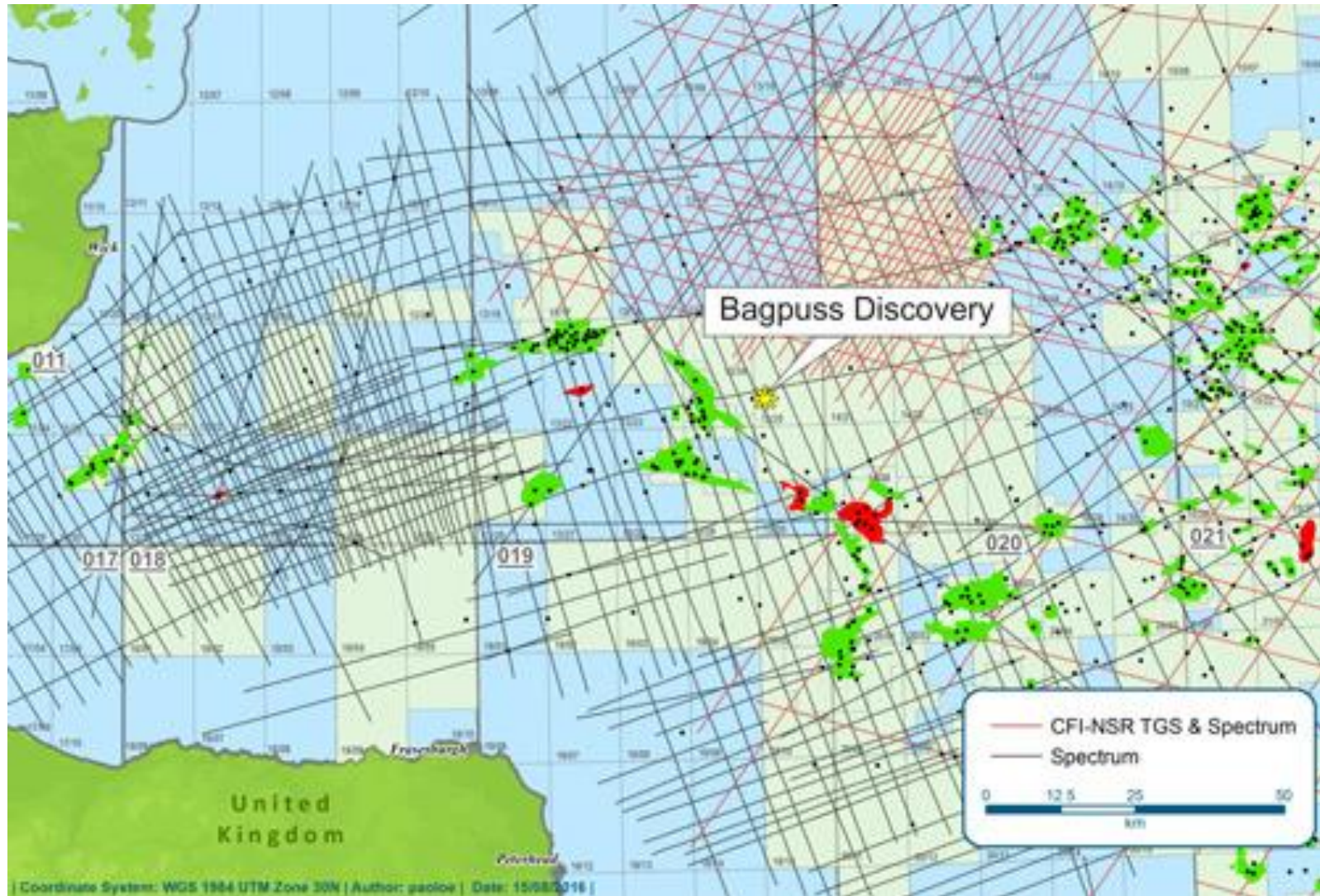
Biggest Prospect in the World – Larger in Depth

Key Post-Well Result Evaluation

Global Market Intelligence - SPU Seismic Data



Bagpuss Location



Post -Bagpuss On Trend Analogues

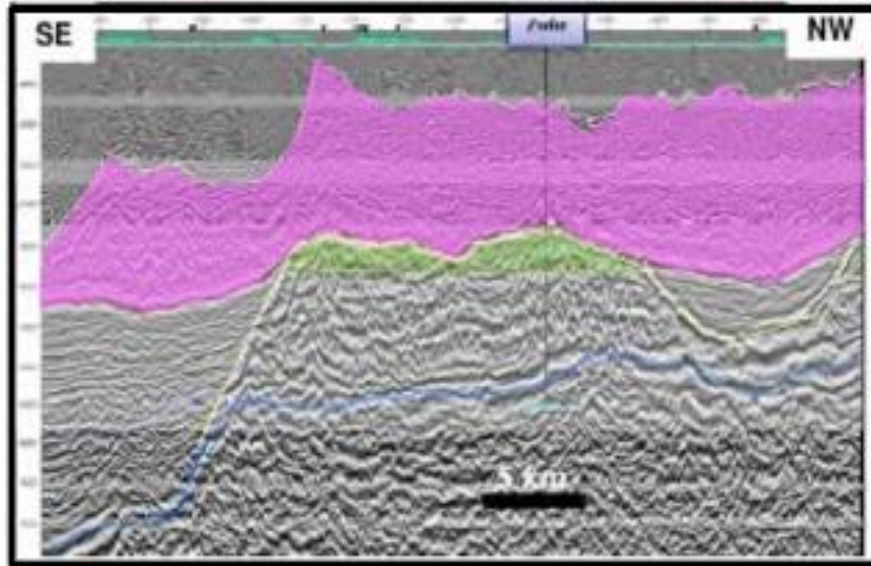
Culmination of Halibut Horst, encountered 12.5 m of hydrocarbon bearing sands 25% – 33% porosity and indications of heavy oil. Drilling stopped at 466.95 m in granite basement. Faults and stratigraphic boundaries guided the hydrocarbon up dip and laterally from Jurassic shale source rocks. In the shallow overburden, a number of stratigraphic terminations, marked with strong amplitude anomalies, suggest additional stratigraphic plays in the shallow Cenozoic section, as proven in the Central Graben.

Key Post-Well Result Evaluation

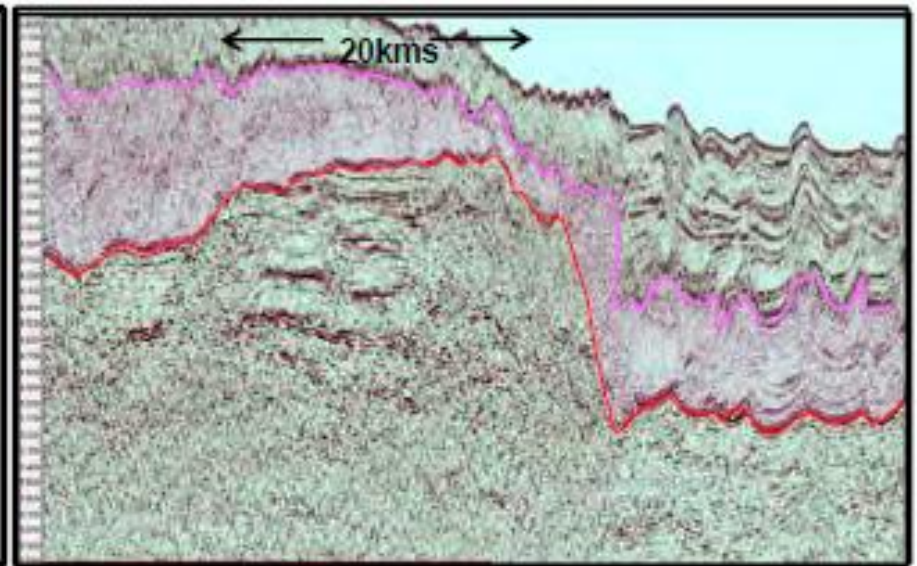
Global Market Intelligence - SPU Seismic Data



Post-Zohr Analogues

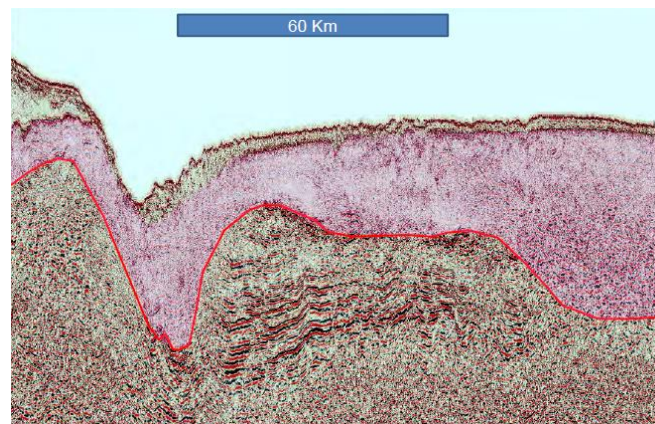


Zohr-1 well 2015 Eni published line



North of Zohr – ca 5 times the Area of Zohr

- 300m net pay
- 30 TCF



South of Zohr ca
1,000km² closure!

Key Post-Well Result Evaluation

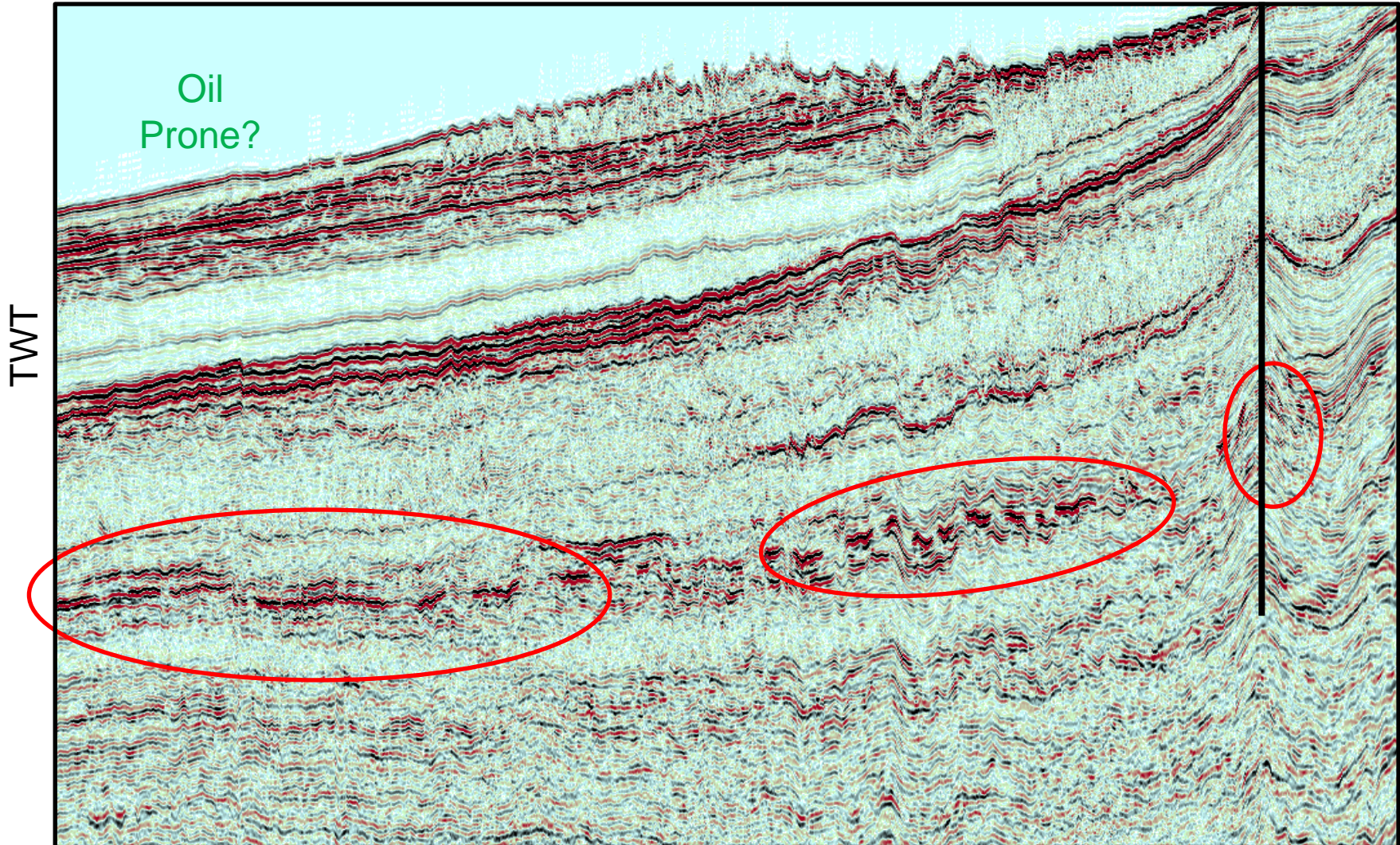
Global Market Intelligence - SPU Seismic Data



MSGBC Well Trend PSTM

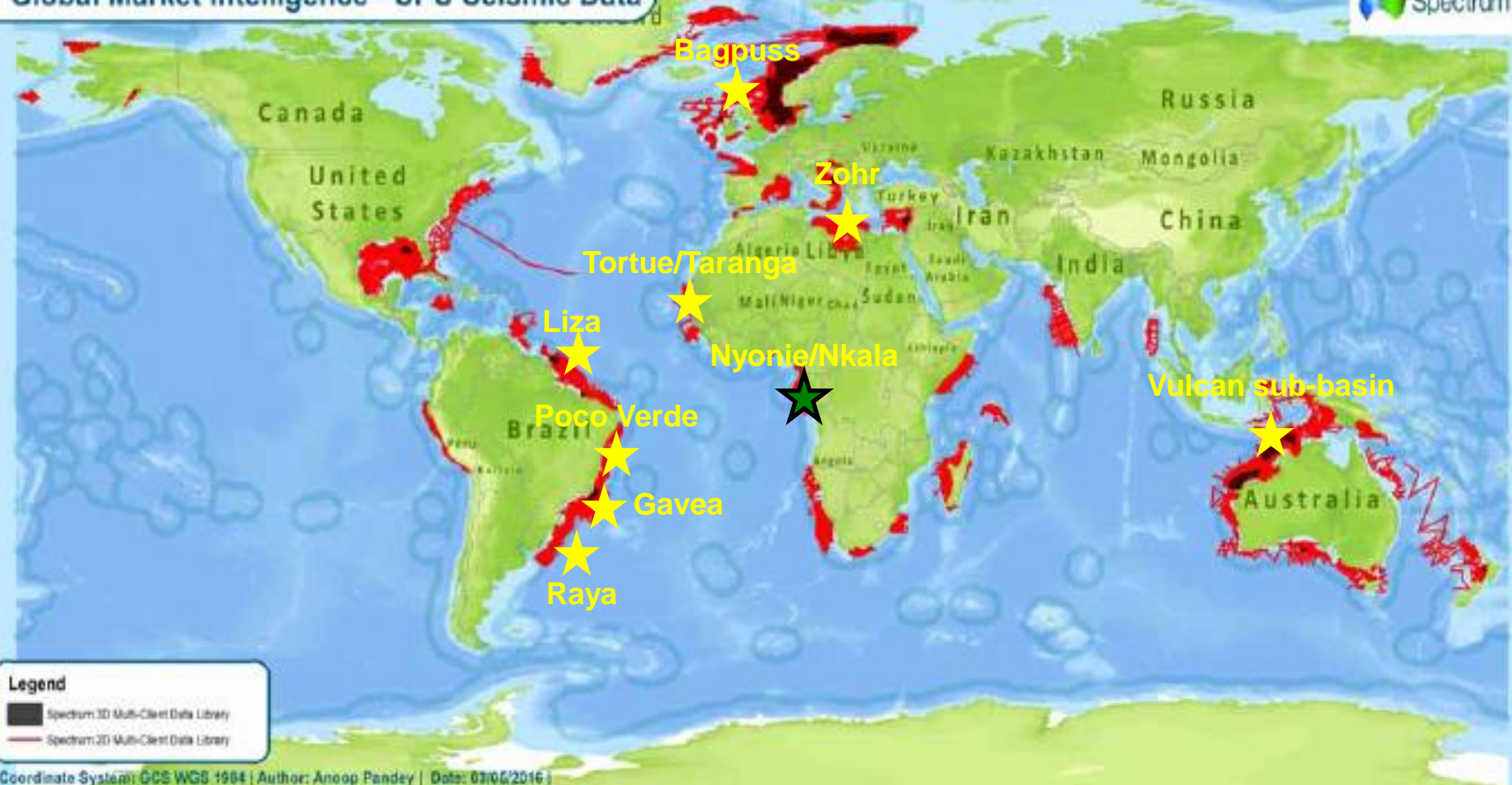
W

E



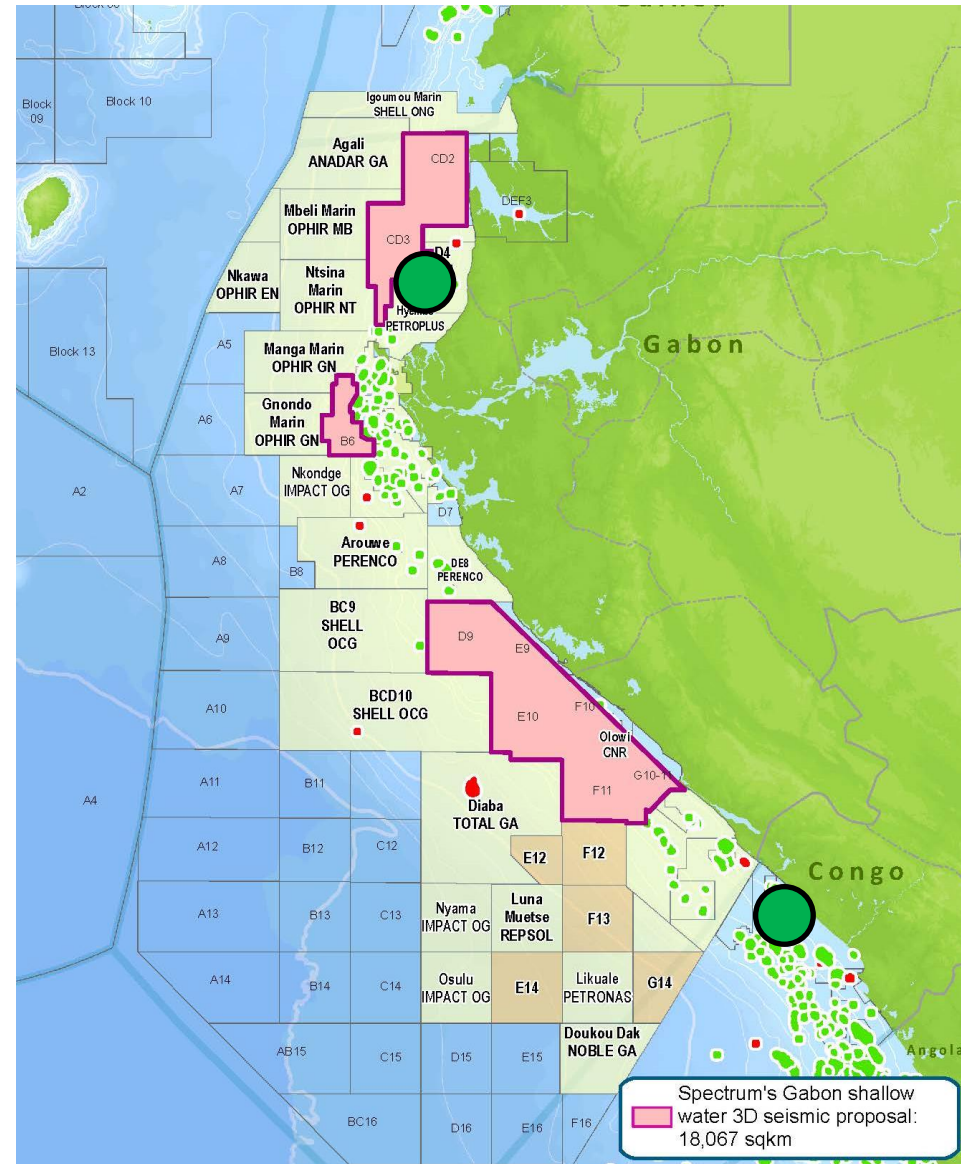
Key Post-Well Result Evaluation

Global Market Intelligence - SPU Seismic Data

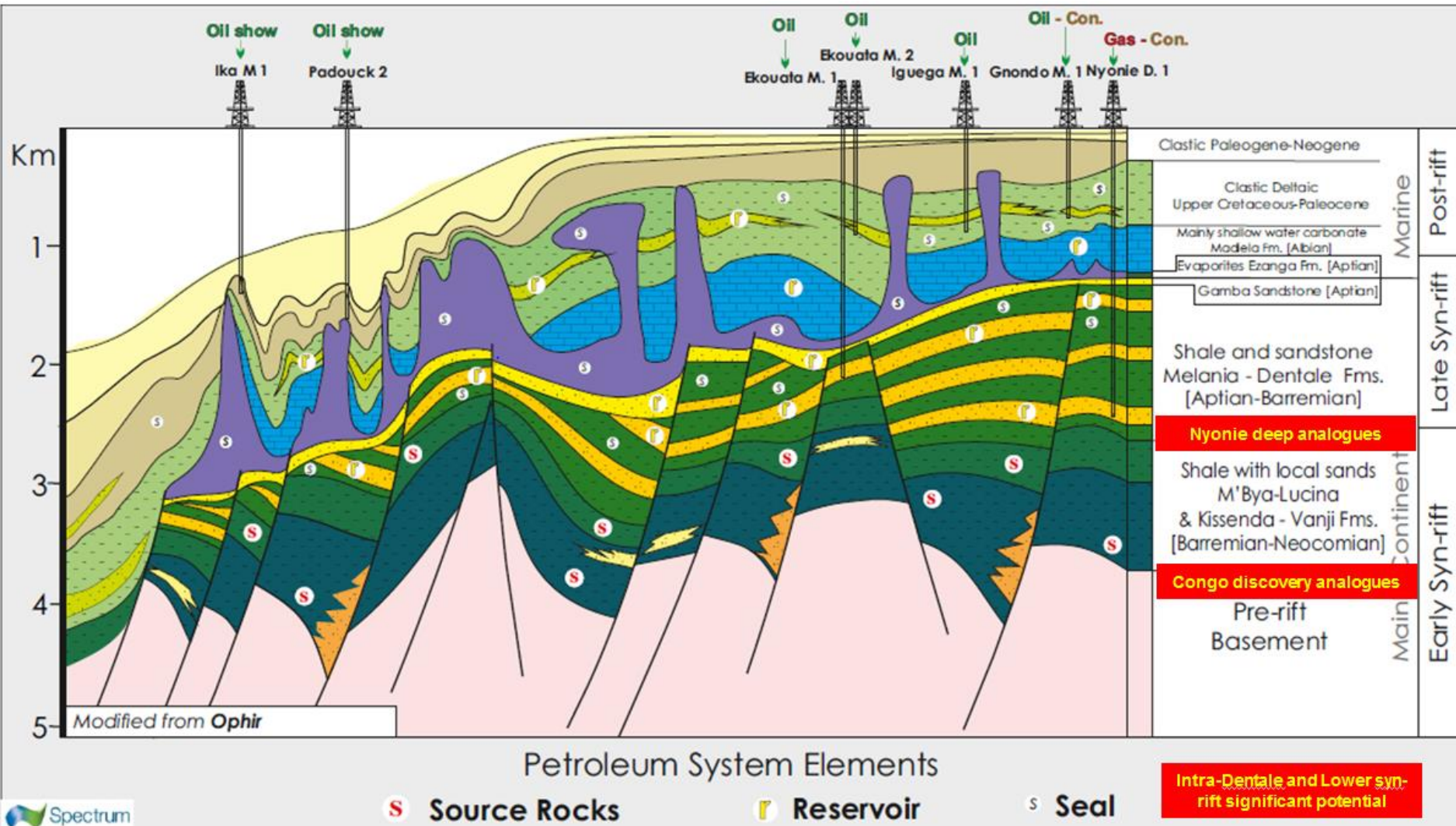


Shallow Water Summary

- Two major discoveries in shallow water
 - Nyonie Deep (500 mmboe)
 - Nkala Marine (350 mmboe)
- Oil in Shallow Water
- Unlicensed acreage for 10 - 15 years
- Legacy Wells
 - Drilled on poor 2D with shows at pre-and post-salt levels



Exploration Targets



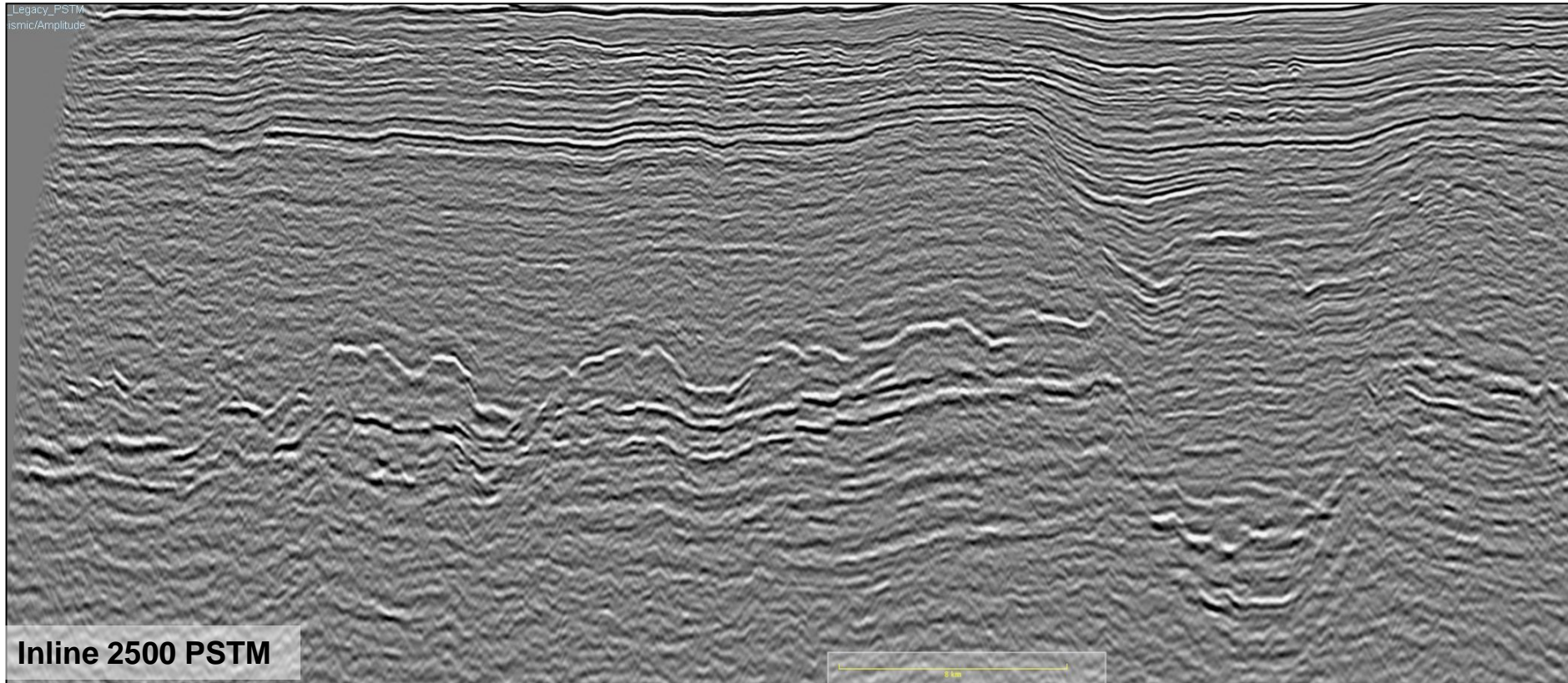
Key Post-Well Result Evaluation

Global Market Intelligence - SPU Seismic Data



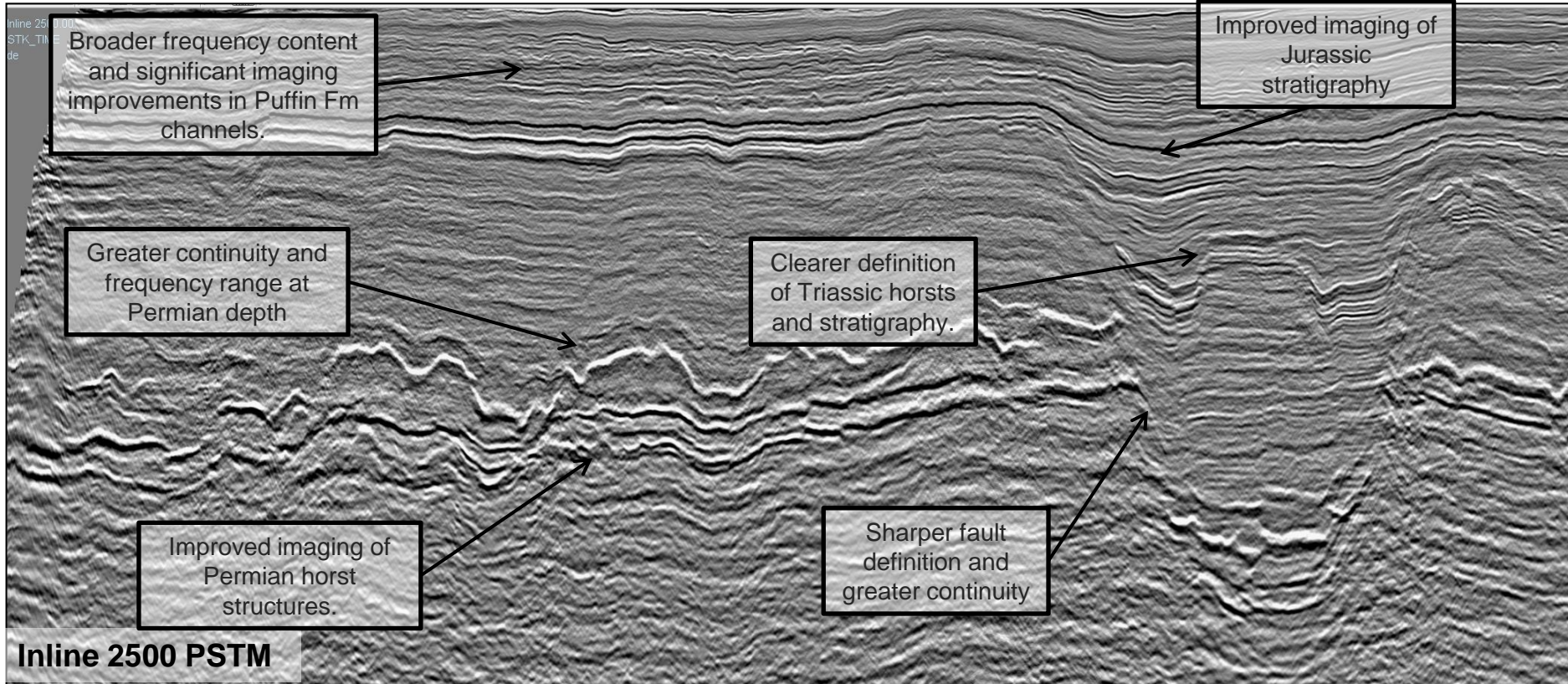
Reprocessing Examples

Original Processing



Reprocessing Examples

2015 Broadband Repro



Play Cross Section

AC/P 45 (Finder)

Open acreage

Sinopec

Recently dropped AC/P 34

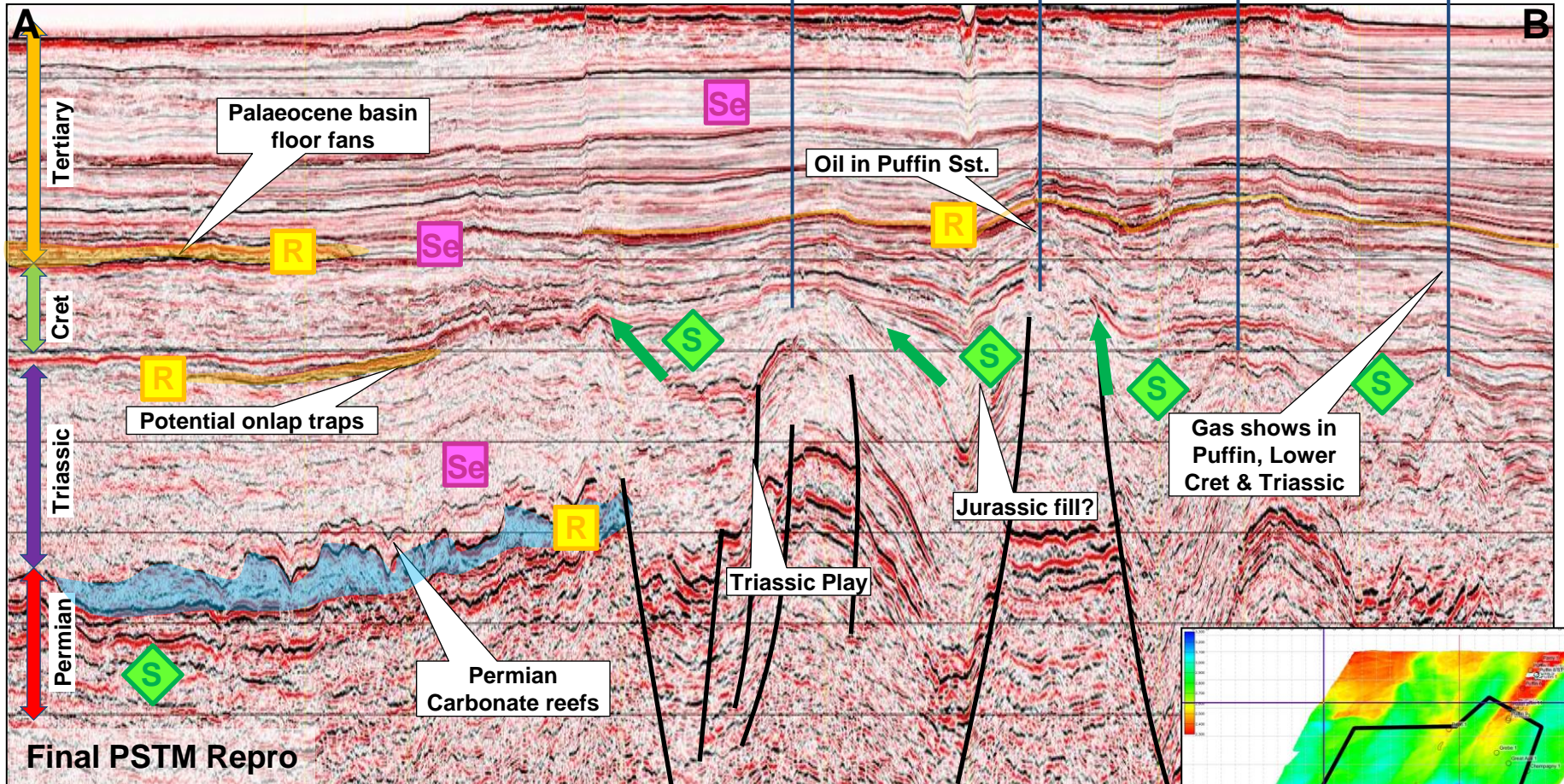
Alpha Prospect

Prion-1

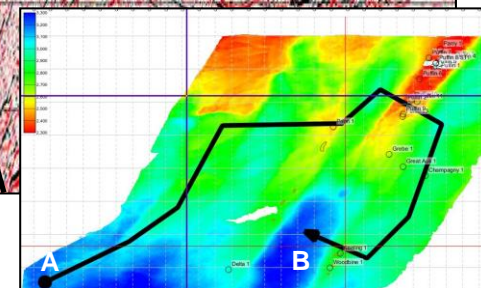
Puffin-2

Champagny-1

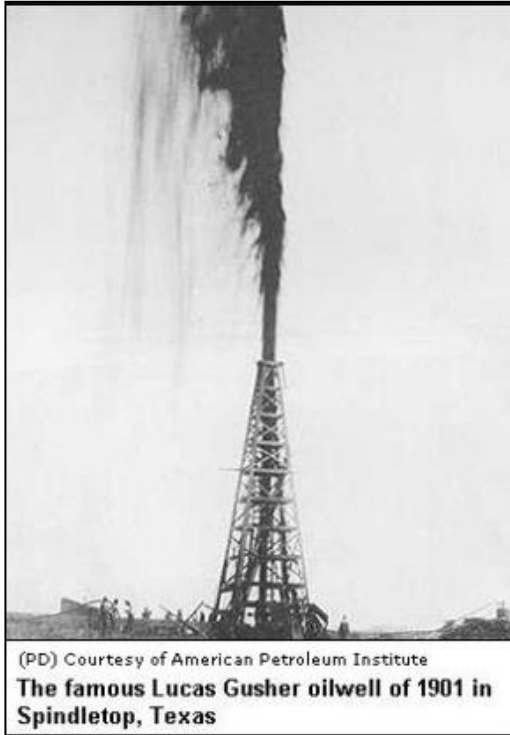
Keeling-1



Potential migration pathways



Summary



- Play opening
- Calibration
- On trend analogues
- New play type ideas

- Prove petroleum system elements
- Dry wells may be drilled with outdated technology
 - 2D, blind, old 3D
- Deeper potential

BEWARE OF DRY WELL CLASSIFICATIONS

FUTURE EXPLORATION IDEAS LARGELY FROM CAREFUL POST-WELL EVALUATION

