New Opportunities in the Shallow Offshore of Suriname

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STAATSOLIE BOOTH 458

29 August 2023

Content

- Staatsolie introduction
- Exploration strategy and role of Staatsolie
- A year in a glance
- Looking forward
- Shallow Offshore Opportunities
  - Geochemical insights and Source Rocks
  - Play types, Reservoir and Seals
  - Leads & Prospect inventory
  - Bid Round details

1. Staatsolie Maatschappij Suriname N.V.

Founded on 13 December 1980
Shareholder: Republic of Suriname
State agent acting on behalf of the Government on hydrocarbon potential

Dual Role

Institutional:
State agent acting on behalf of the Government on hydrocarbon potential

Commercial:
Vertically integrated energy company

Staatsolie Hydrocarbon Institute N.V. (SHI)

- 100% subsidiary of Staatsolie
- Contracting & supervision of Production Sharing Contracts (PSCs)
- Acreage & Data Management
- Policy and regulation formulation

Creating optimum conditions for investment

Staatsolie - Integrated Energy Company +

- 43 years operational
- First oil 1983
- 1131 staff
- 32% ♀

- Reserves 90 MMbbls
- Production 6.14 MMbbls pa
- Annual sales 5.8 MMbbls
- Revenue USD 840 MM
- Thermal power: 96 MWhx1000
- Hydropower: 1880 MWhx1000
- 25% of 524,000 oz gold

Overview Offshore

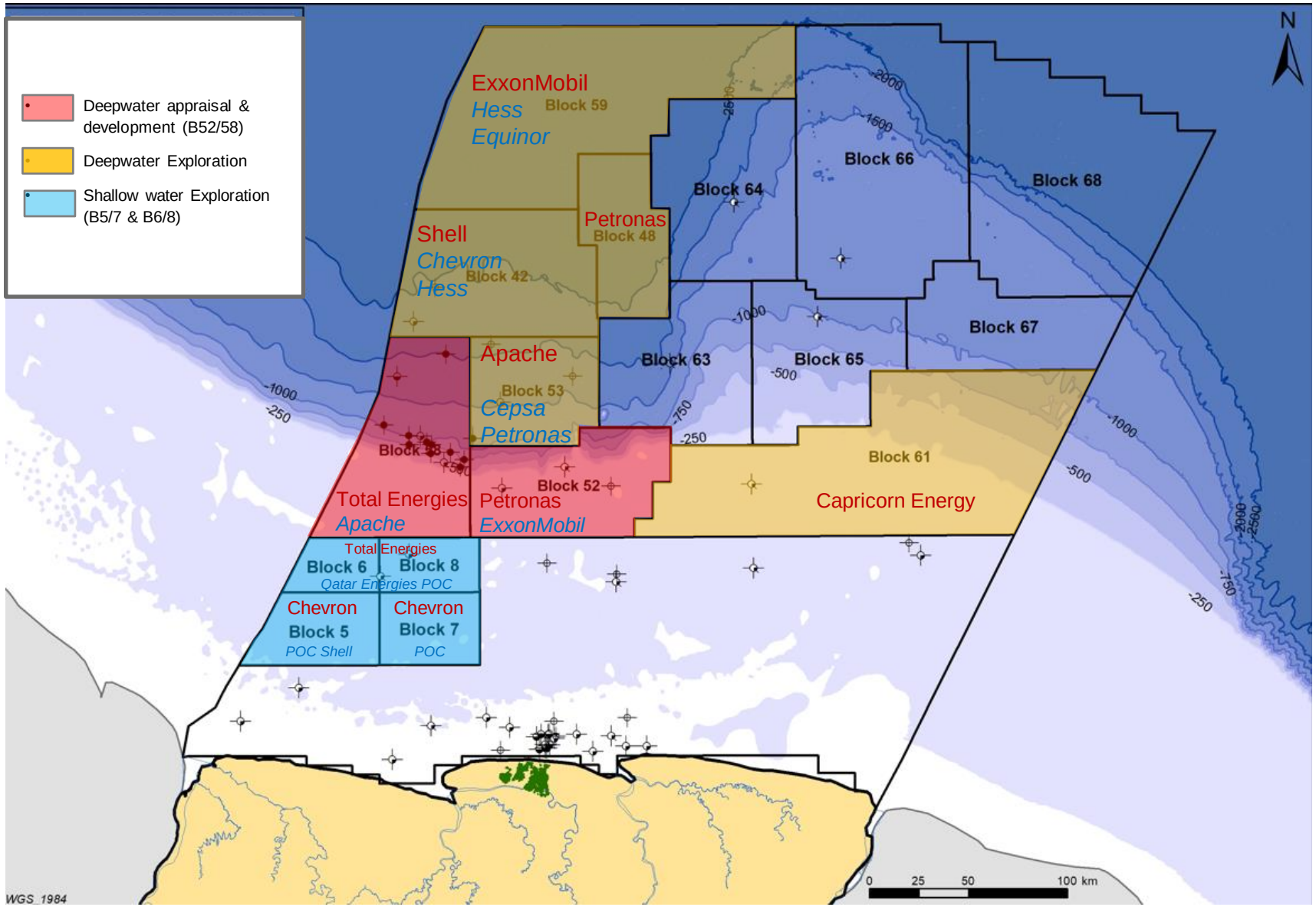
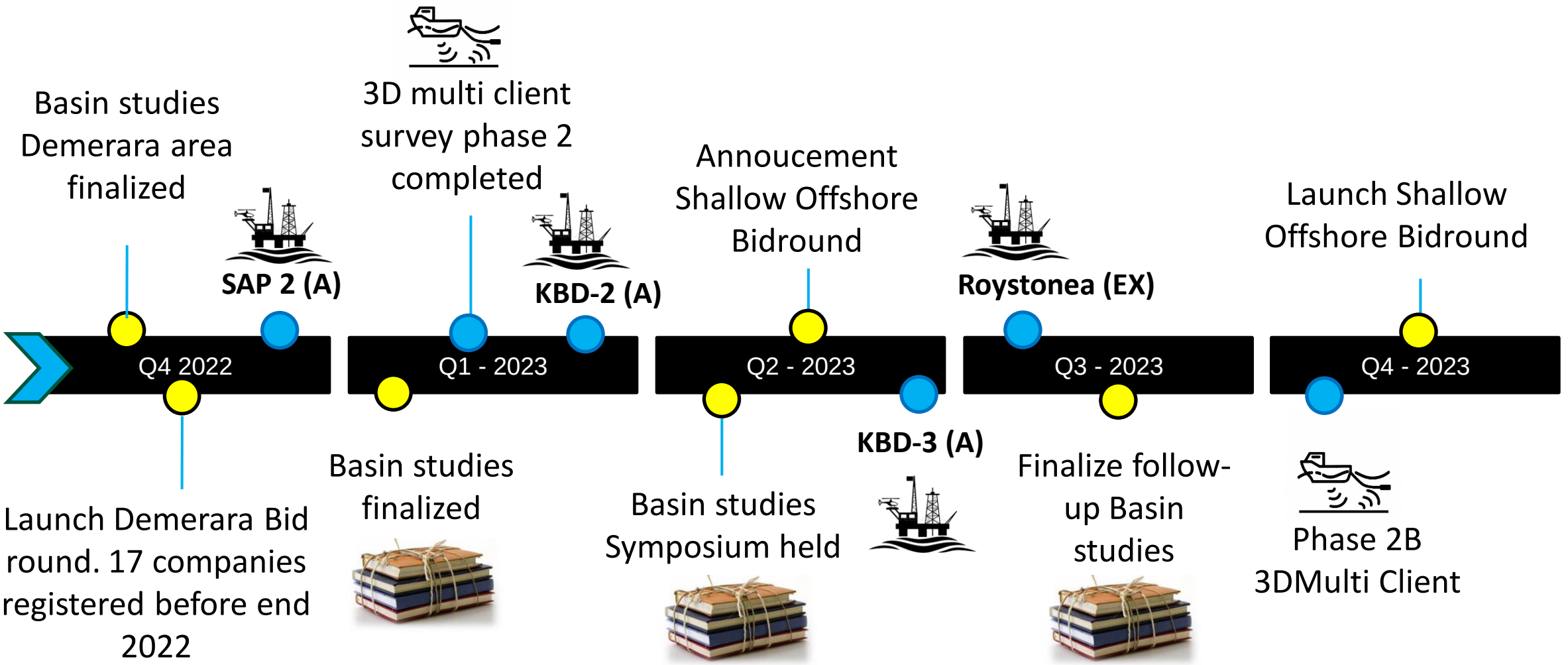
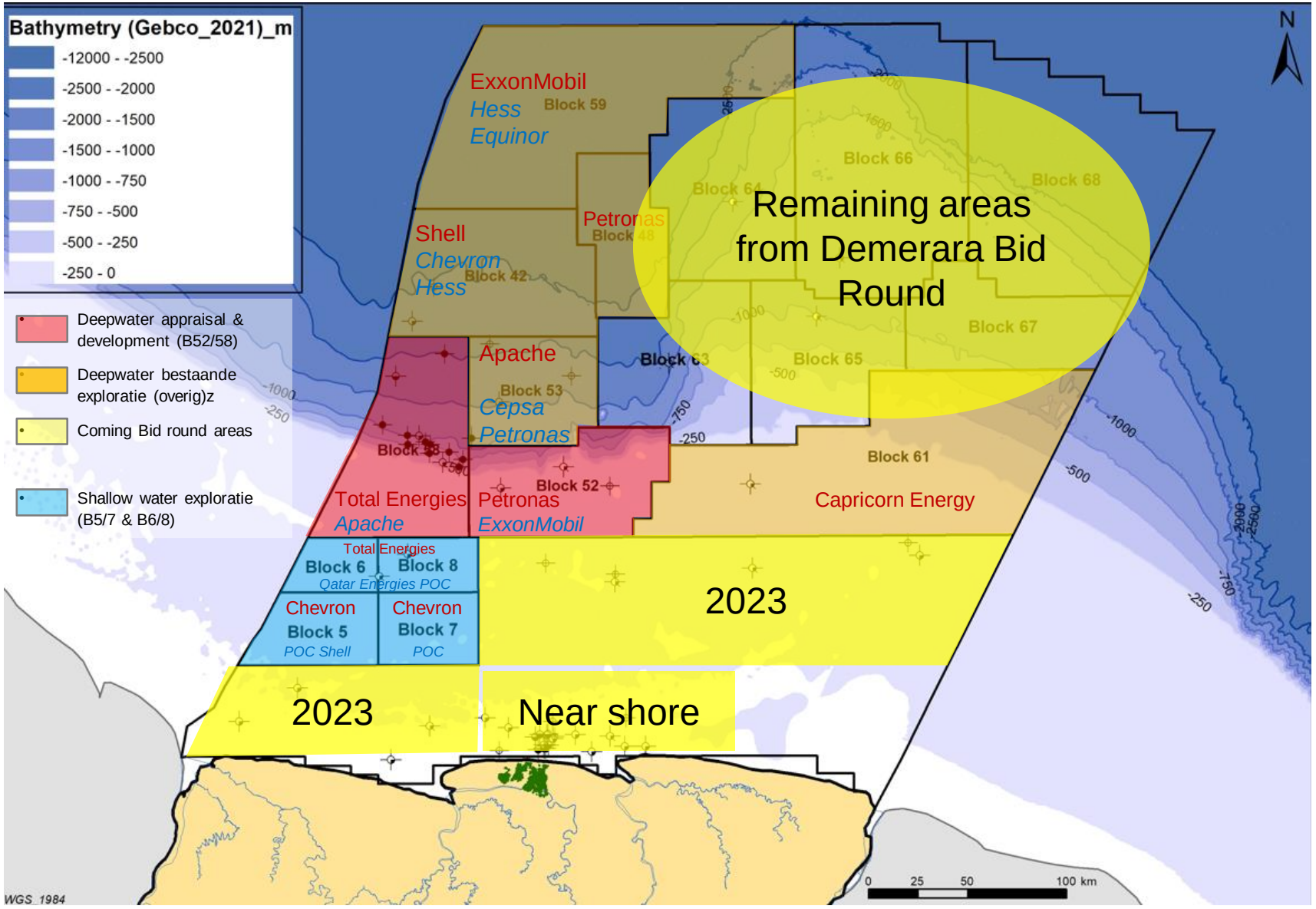


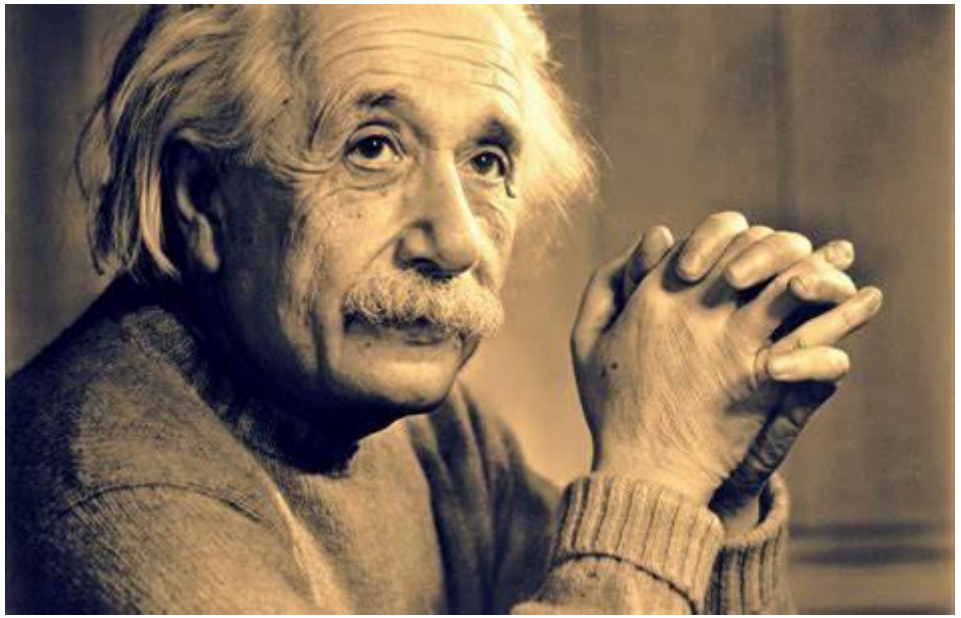
Image 2022 – Image 2023



Looking forward



- Shallow bid round 2023 already announced.
- New areas of interest (Nearshore and deepwater areas).
- Additional Multi client 3D seismic and Geochem survey being prepared projected in future bid round areas
- Follow-up basin and sub regional studies in progress (Diagenesis, Migration) and being prepared (Source to sink)



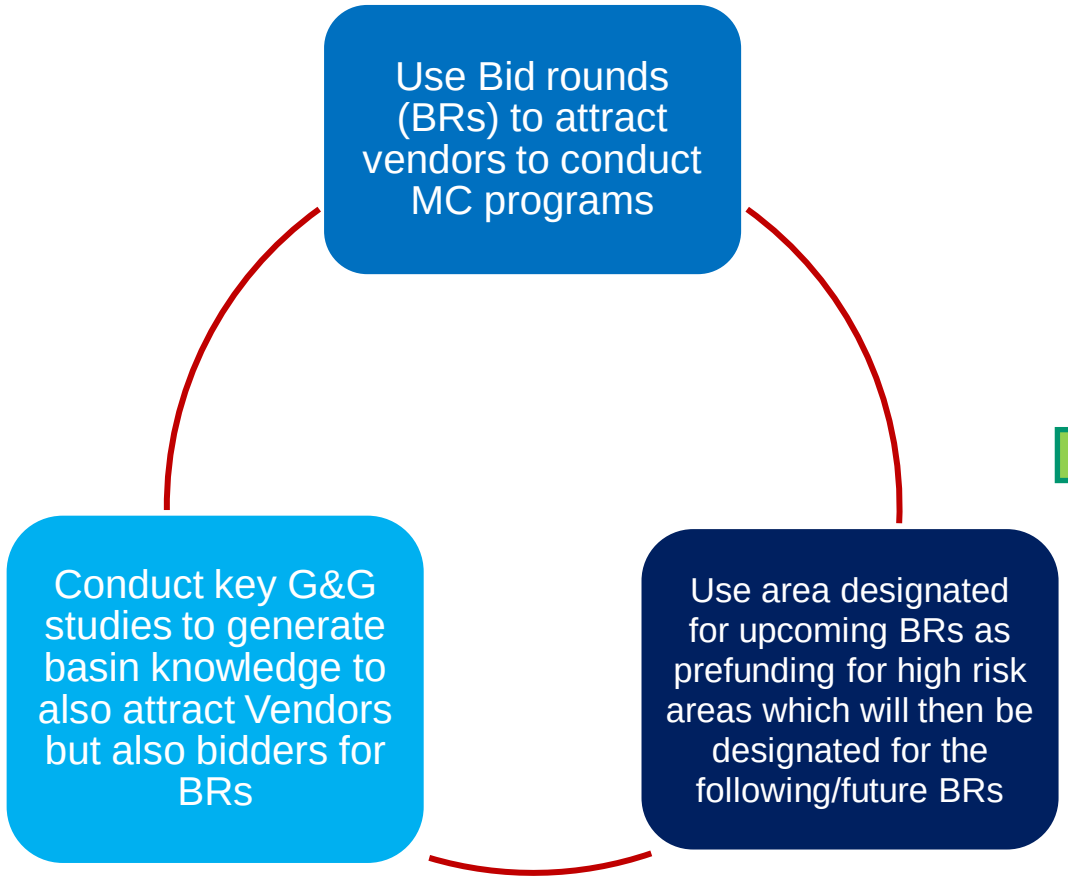
$$K : A = S^{2}$$

Alleen door te delen kunnen we vermenigvuldigen

Only by (Dividing) Sharing we can Multiply >> SUCCESS

$$Knowledge : All = Success^{2}$$

Framework of Exploration strategy



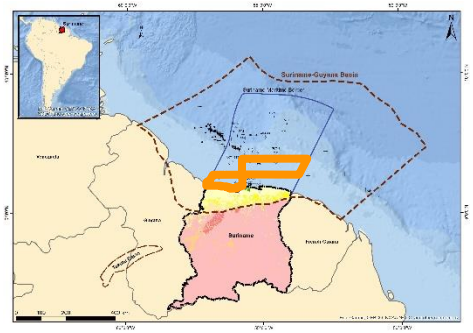
- High Quality data
- Adequate basin understanding
- Attractive terms & conditions
- Adequate marketing and promotion

→ Successful Bid rounds (Attractive multiple bids)

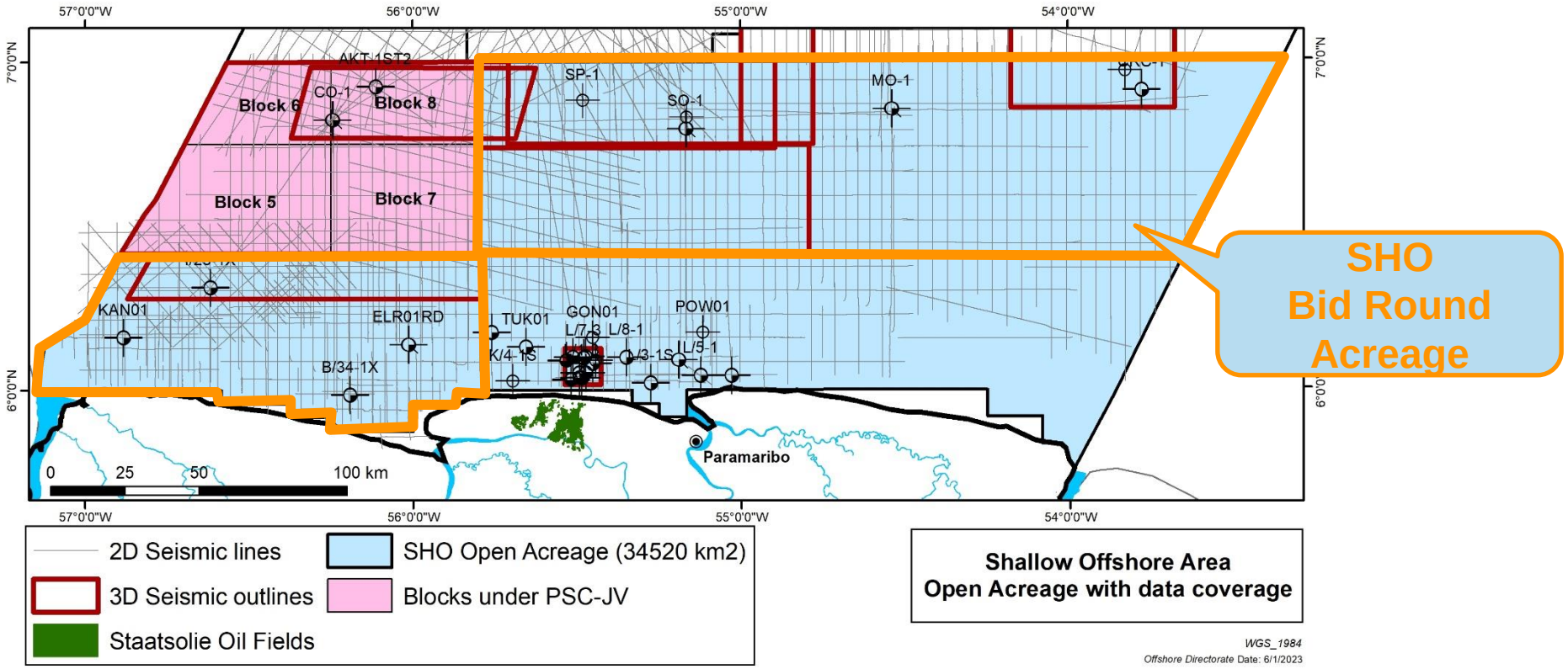
→ Abundance of Petroleum activities

→ **DISCOVERIES**

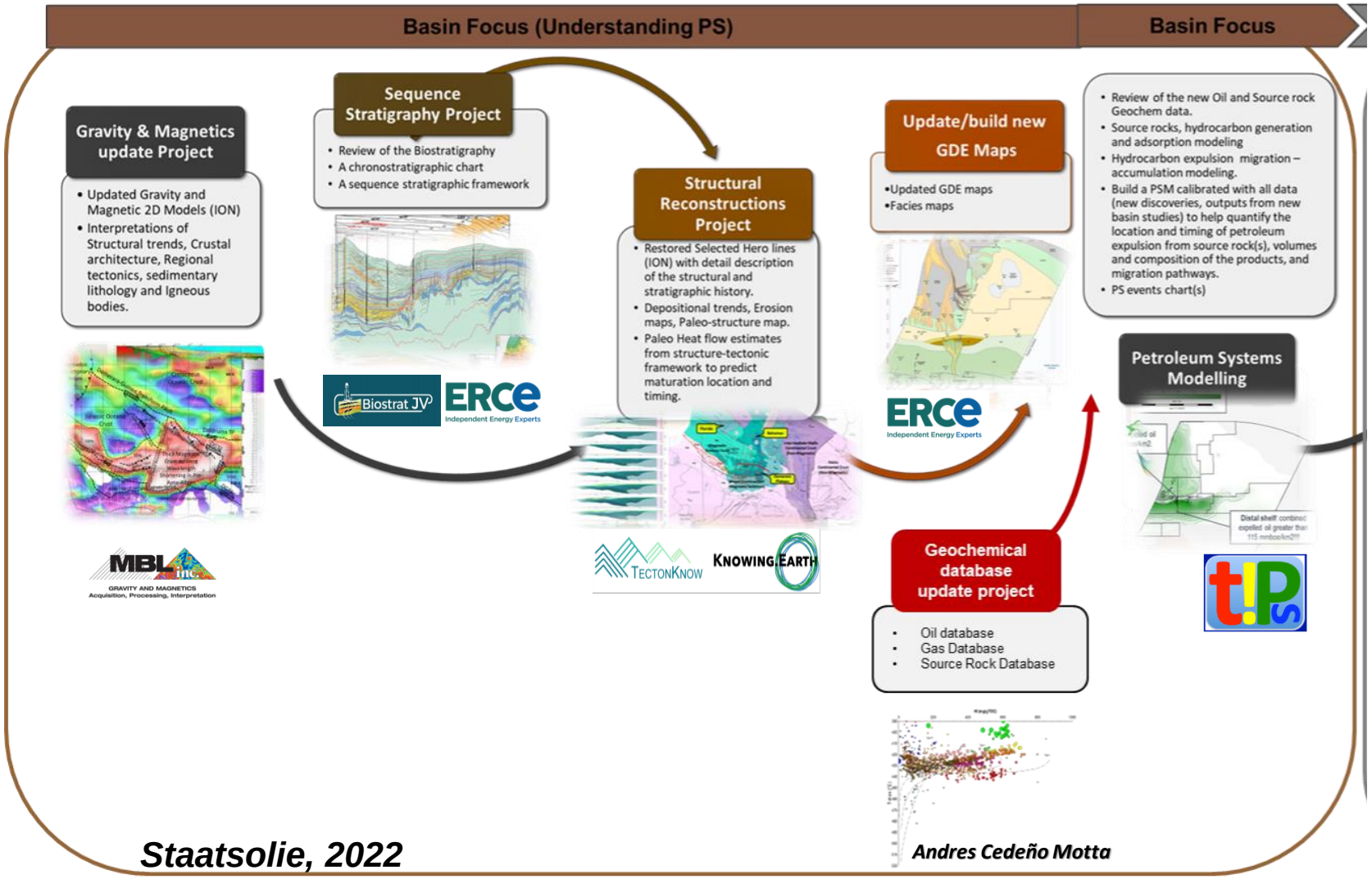
SHALLOW OFFSHORE OPPORTUNITIES



- **Acreage Size: 34,520 sqkm**
- **Water depth: < 60m**
- **15000 km 2D Seismic data**
- **11,200 sqkm 3D Seismic data**
- **Acreage lies between Deep-Water Discoveries and the Onshore Producing Oilfields**
- **Mainly Stratigraphy traps**

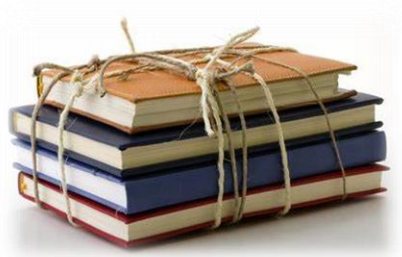


2022 Basin Studies Highlights – Insights on the Shallow Offshore



- **Basin Evolution**
- **Basin Fill: Source Rock, Reservoir & Seal**
- **Petroleum Systems: Expelled Volumes**

We offer this as a customized knowledge bundle

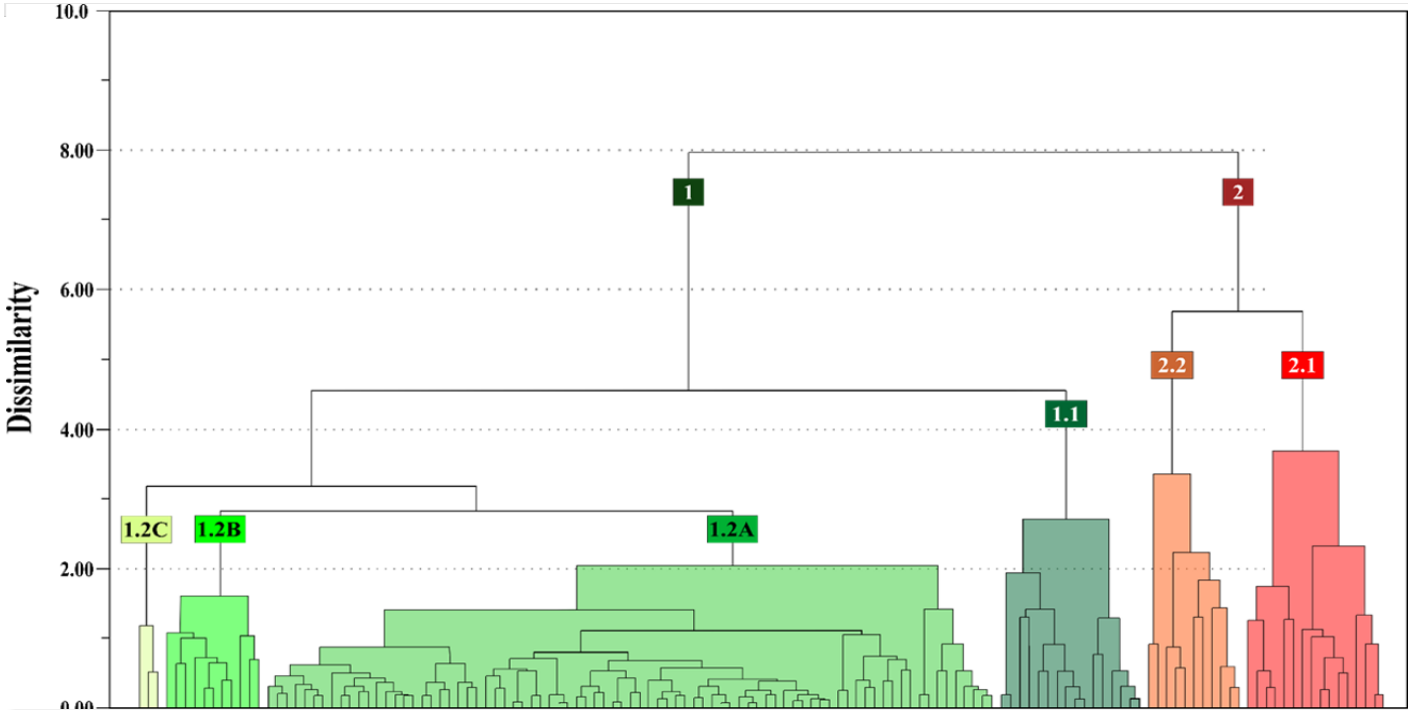


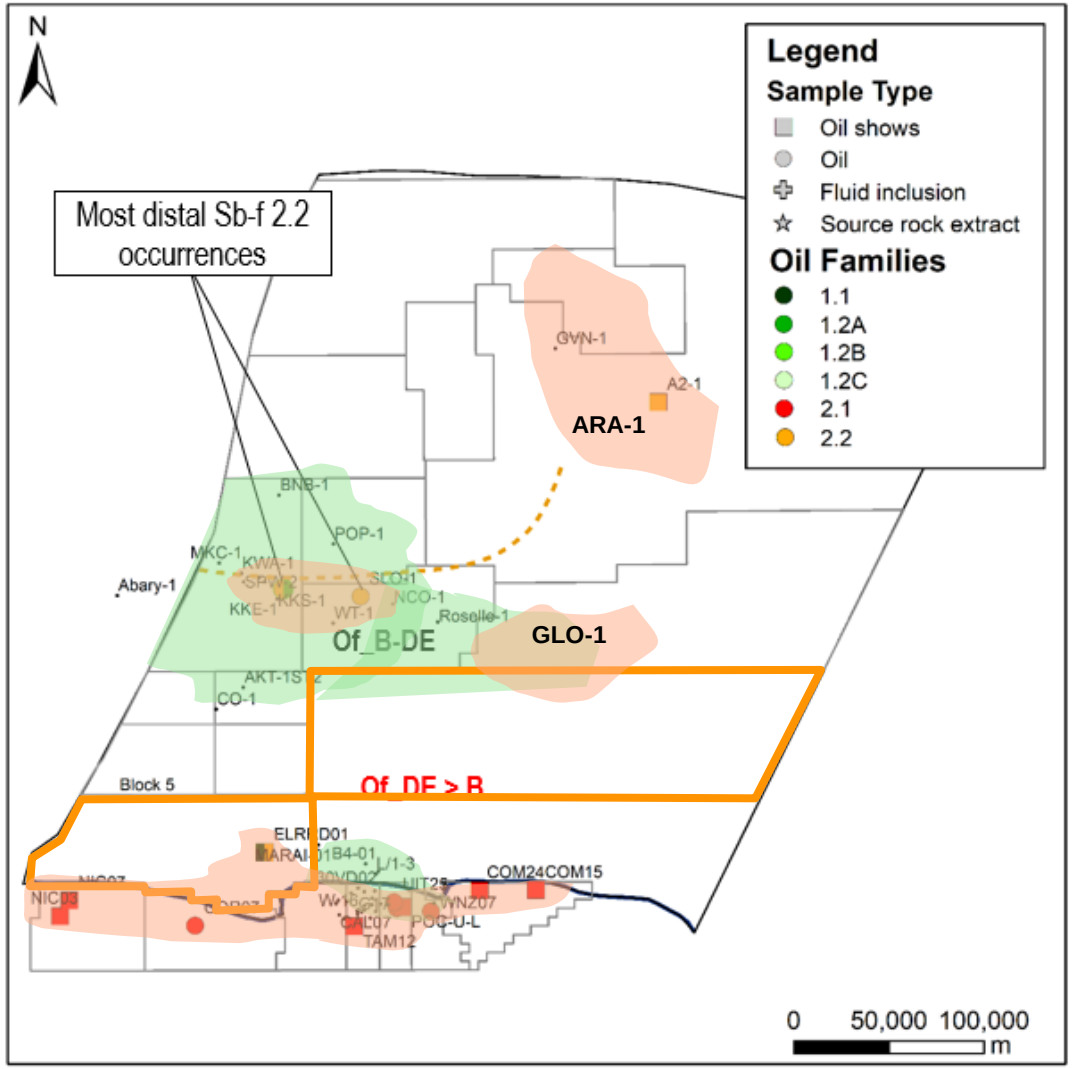
GEOCHEMICAL INSIGHTS AND SOURCE ROCKS

Geochemical Analysis Insights

Cluster analysis dendrogram:

- A dendrogram shows groups of geochemically similar oils.
- The dendrogram based on 14 facies-dependent biomarker ratios separates the data set into two main families: Family 1 (Green colors) and Family 2 (Warm colors).
- Sub-families are also recognized. Current division captures well the geochemical variation observed through the basin.

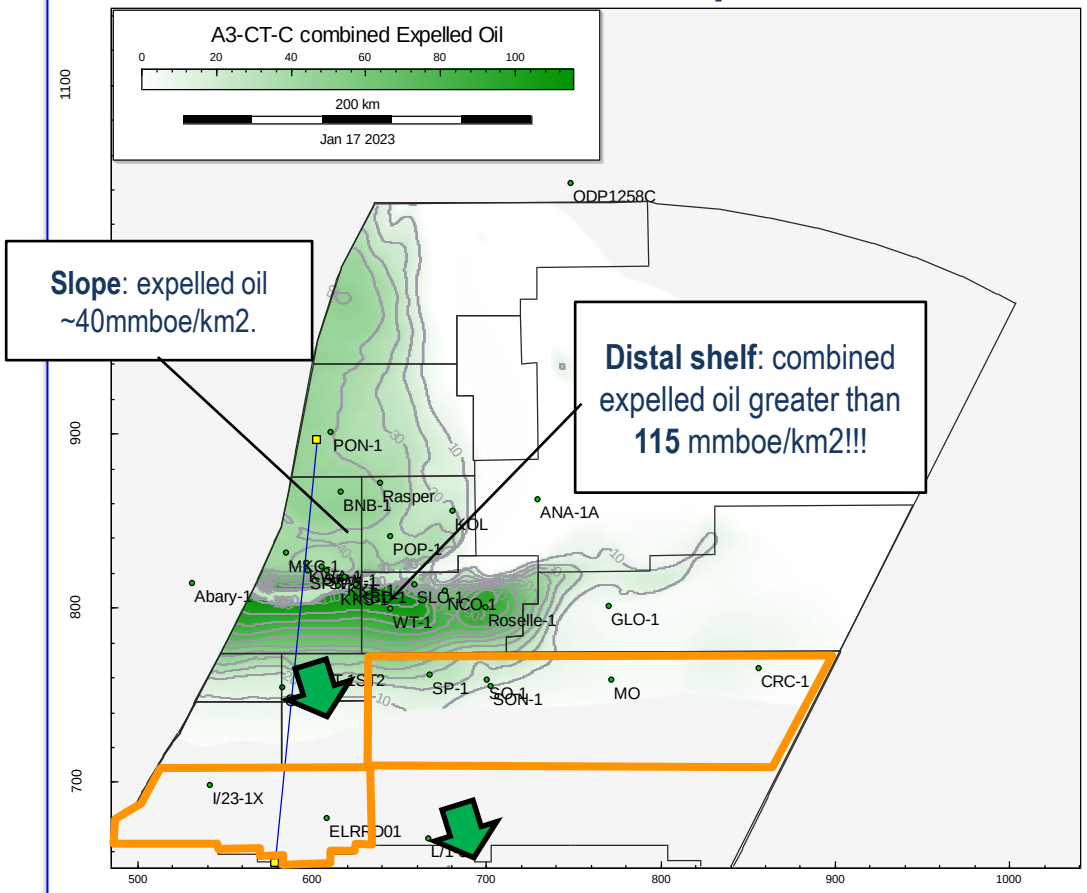




A.Motta, 2022

PSM (2022): Proven ACTC Source Rocks

A3-CT-C combined expelled oil

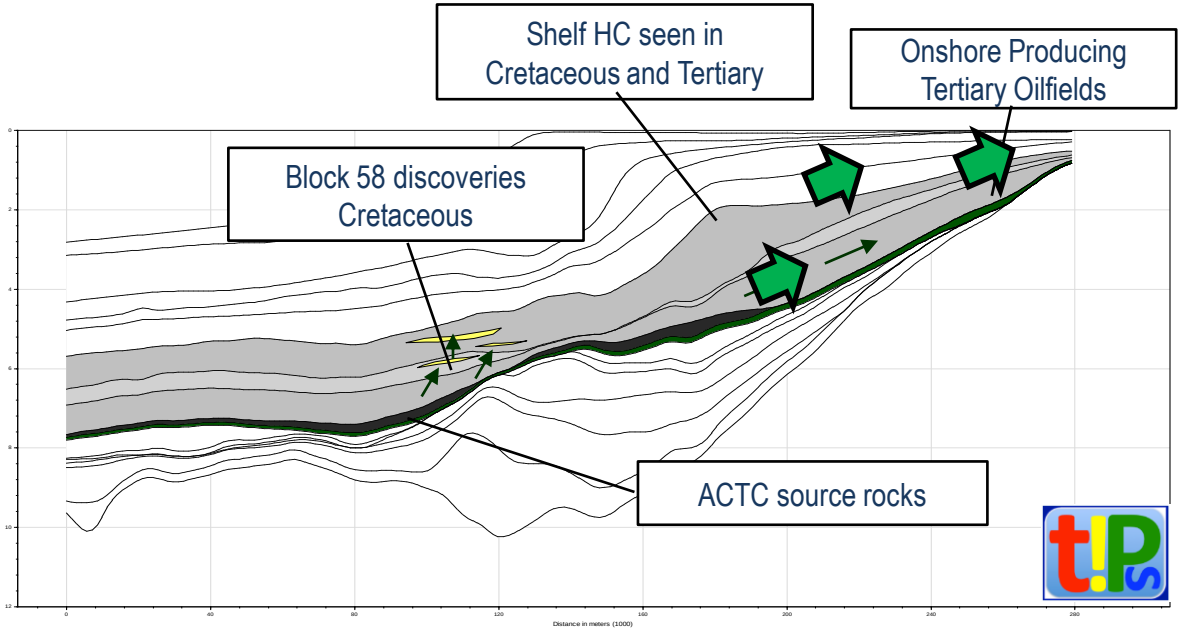


Slope: expelled oil ~40mmboe/km2.

Distal shelf: combined expelled oil greater than **115** mmboe/km2!!!

- In the distal shelf, the combined A-CT-C expelled oil exceeds 115 mmboe/km^2. These values are sensitive to the source rock analog used for restoring the initial source potential that goes into UEP mapping.
- Interestingly, the Block 58 discoveries sit beyond the distal-shelf highest and seem to be draining only the slope kitchen.

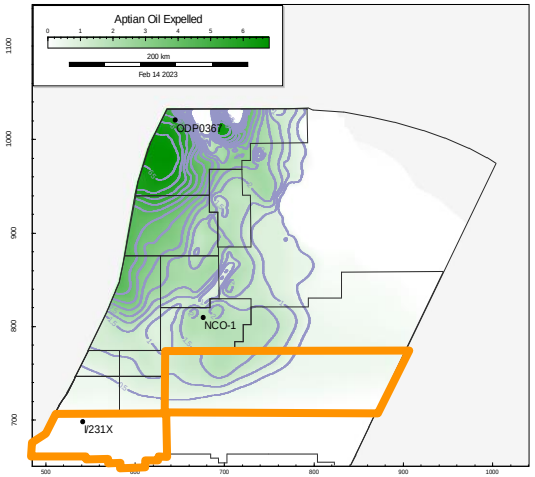
Where has the distal-shelf oil gone?



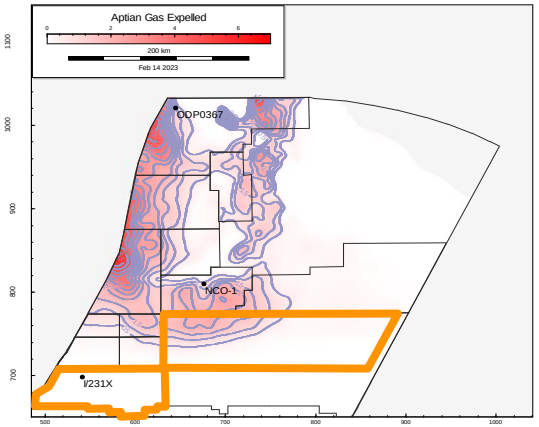
- **Currently ongoing is a migration modelling project by Andres Motta and Andrew Pepper from to improve the understanding of how hydrocarbons migrated from the deepwater Source rock up to the Onshore oilfields. This will tremendously improve our understanding on the migration pathways.**

PSM (2022): Potential Aptian Source Rock

Aptian Oil Expelled



Aptian Gas Expelled

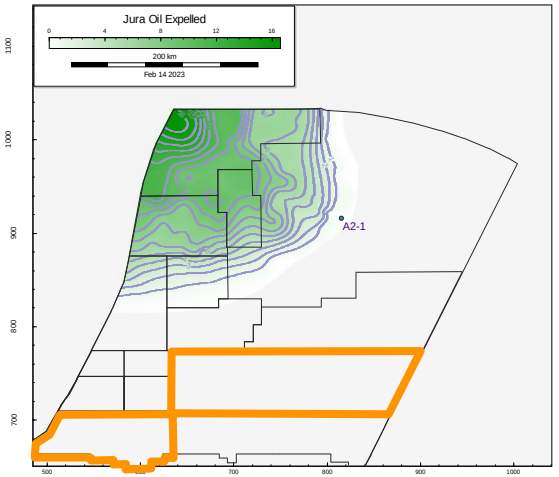


A.Motta & A.Pepper, 2022

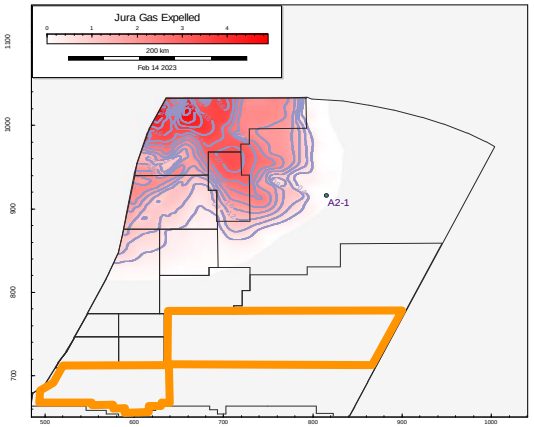
- **EA Conjugate Margins:** On the African Conjugate deposition of restricted deep marine sources rocks during OAE-1. This was seen in ODP 0367 with Global Acme A122 indicated.
- **Well GVN-1**: Terpane Fingerprint indicates a High Gammacerane which suggests a source rock age of Late Aptian-Early Albian as per similarity with oils seen in the African conjugate margin.
- **Well GLO-1:** Deeper Terpane fingerprint supporting a second active SR facies at Aptian/Albian.
  - **Assumptions for Modelling:** TOC & HI in distal shelf and basin analogue to ODP 0367. As for shallow shelf, knowledge of ACT source rock distribution combined with GDE maps. Assumed a mixed marine-terrigenous source rock (Of_B/DE) as per GDE and scarce HI values.

PSM (2022): Potential Jurassic–Early Cretaceous Source Rocks

Jurassic Oil Expelled



Jurassic Gas Expelled



A.Motta & A.Pepper, 2022

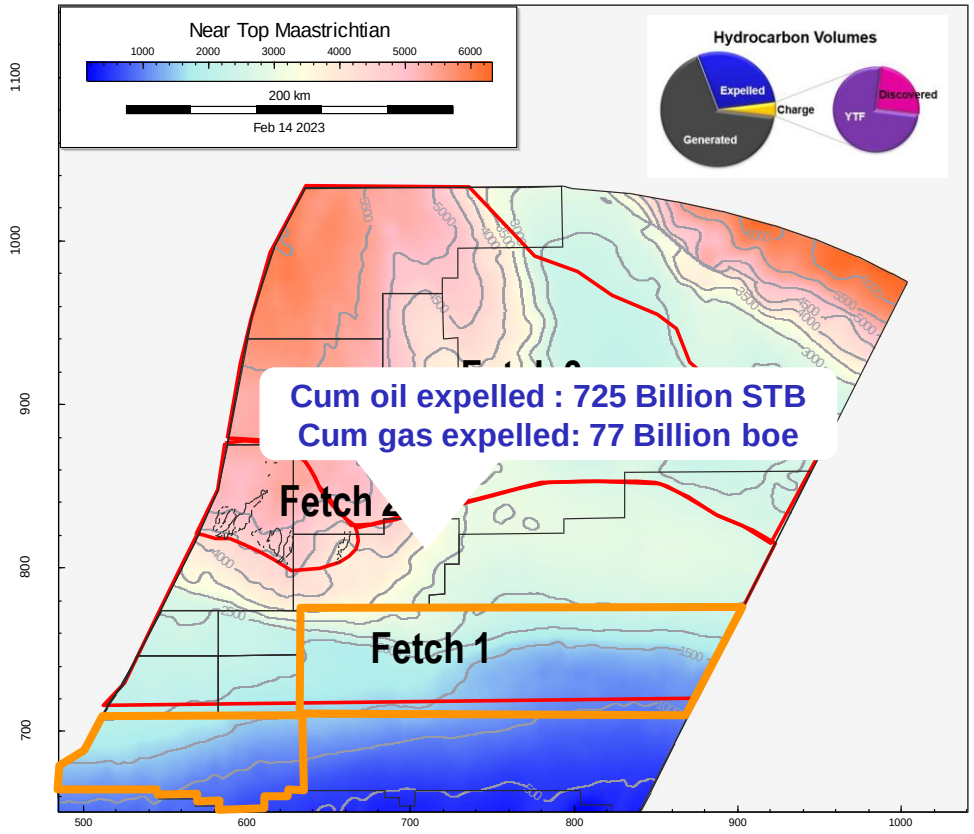
For modelling purposes, possible Oxfordian to Valanginian source rock has been centered to Tithonian.

- **CA Conjugate Margins**: Prolific Oxfordian to Valangianian organofacies A and A-B sources proven in eastern GoM and Cuba our CA Conjugates.
- **Structural Restoration indicated**: Early Jurassic localised depocenters for potential source rock sedimentation. Significant water depths in the Late Jurassic for marine source rock deposition.
- **Well A2-1 analysis**: Well TD's in Tithonian sediments. The oil shows in the Tithonian to Berriasian sediments support the presence of a nearby deeper active (Jurassic) source rock.

➢ **Assumptions for Modelling:** Assumed combined UEP based on shelf-to-deep water analogue in GoM: increasing rate of 0.12mmboe/km2 (of which 23% is gas) per km of lateral distance basinwards. Mixed marine organofacies A and B assigned (Type II/IIS).

PSM (2022): Estimated Expelled Volumes per SR

Map of fetch areas



Oil and gas expelled volumes per fetch area and SR

	Fetch 1		Fetch 2		Fetch 3	
	Oil	Gas	Oil	Gas	Oil	Gas
Coniacian	52	4	11	0.8	2.5	0.02
CT	411	31	165	14	275	9
Albian3	227	18	93	9.5	73	2.8
Late Aptian	33.5	24	14	12	85	34
Jurassic	1.05	0.2	8.2	1.7	233	57

Total oil and gas expelled volumes per SR

	Oil per source	Gas per source	Total per SR
Coniacian	65.5	4.82	70.32
CT	851	54	905
Albian3	393	30.3	423.3
Late Aptian	132.5	70	202.5
Jurassic	242.25	58.9	301.15

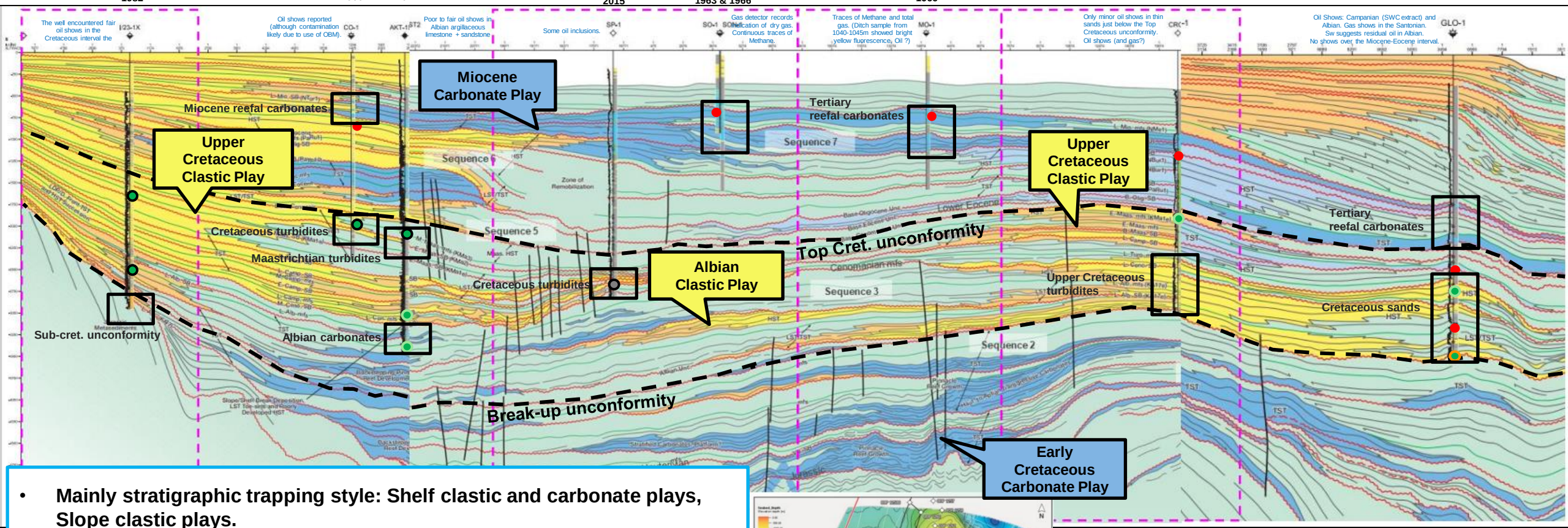
All values in bb (billion barrels)

A.Motta & A.Pepper, 2022

PLAY TYPES, RESERVOIR AND SEALS

Play types in the Shallow Offshore

GULF 1982 | GULF 1966 | INPEX 2011 | INPEX 2015 | PETROSUR 1963 & 1966 | PETROSUR 1966 | MURPHY 2011 | ELF 1971

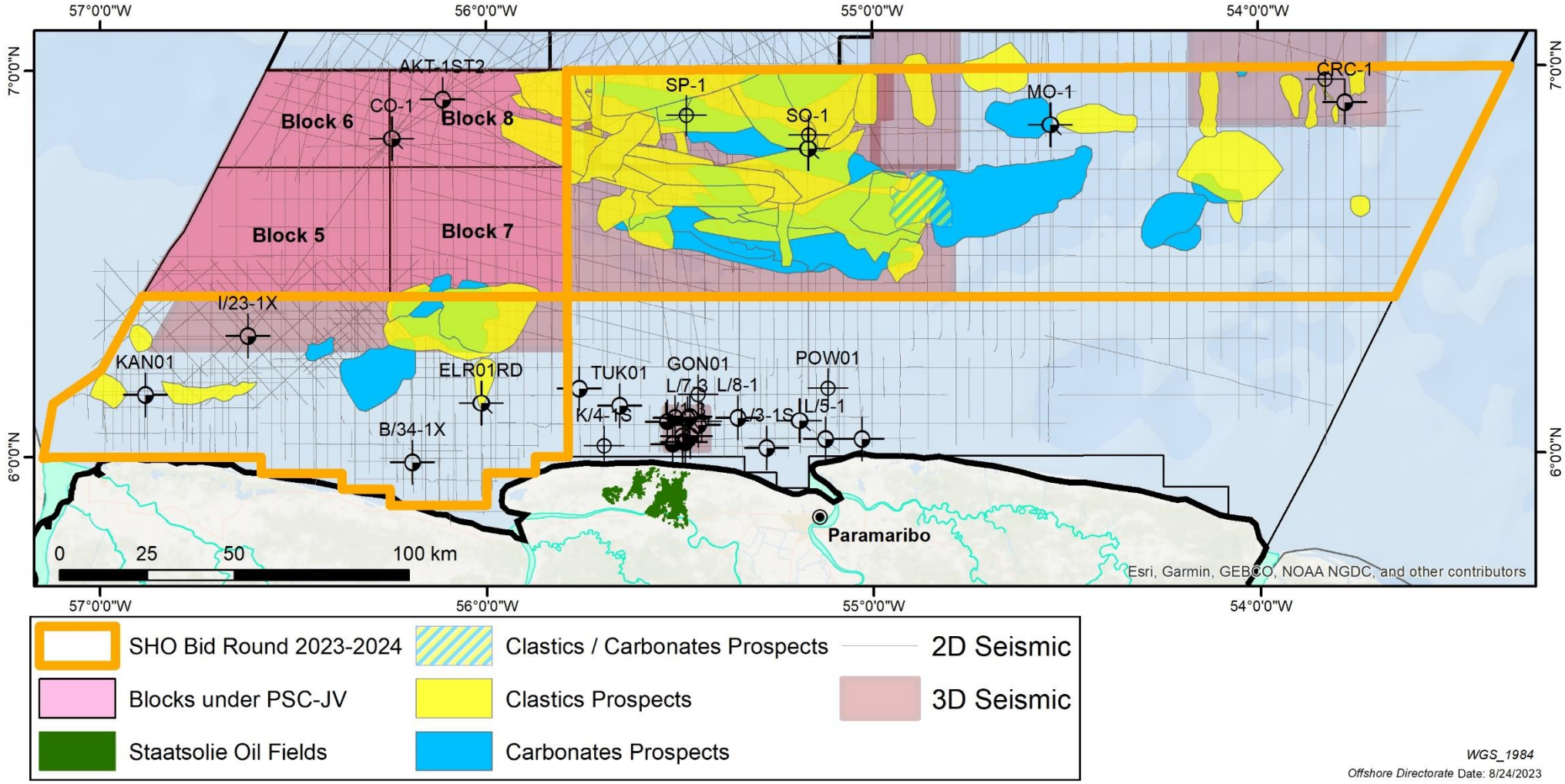


- **Mainly stratigraphic trapping style: Shelf clastic and carbonate plays, Slope clastic plays.**
- **Exploration to date in the SHO has focused on the Cretaceous clastics play, which includes deltaic, shallow marine and turbidite targets. The common failure mechanisms for this play include trap (although proven oil column in ELR 01 RD) and reservoir (SP-1, AKT-1ST2 & ARC-1. There is evidence of a working charge system in most wells.**

Coloured segments indicate that the petroleum element is present and effective. Grey indicates that the presence &/ effectiveness of the play element is uncertain. A partial charge segment indicates where hydrocarbon indications were encountered
Key: R (reservoir), S (seal), T (trap) and C (charge).

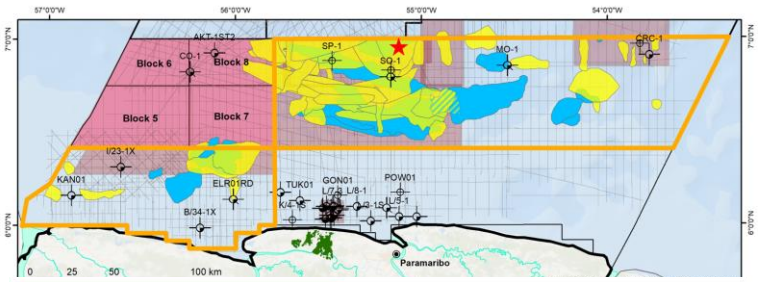
LEADS & PROSPECT INVENTORY

Lead and Prospect Inventory

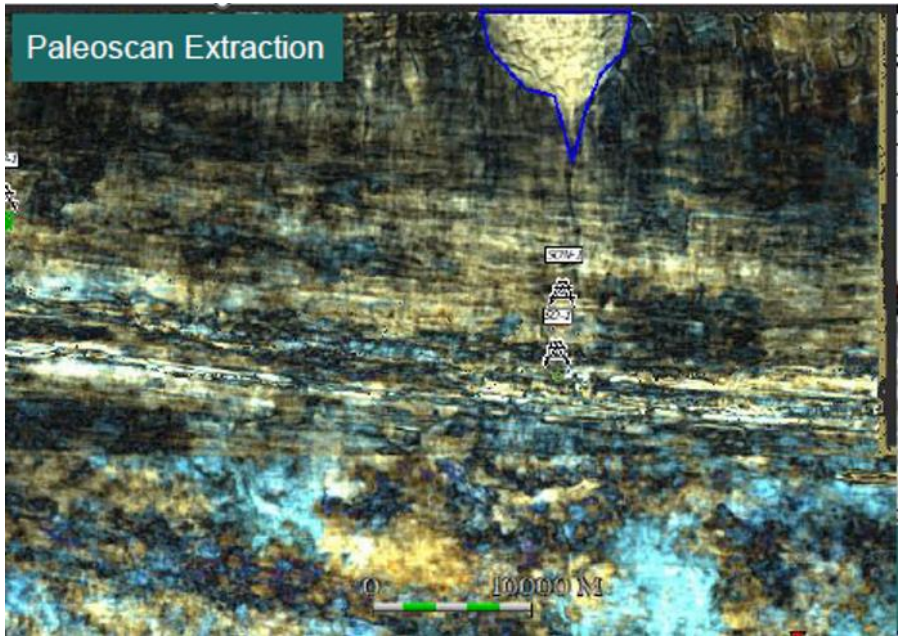


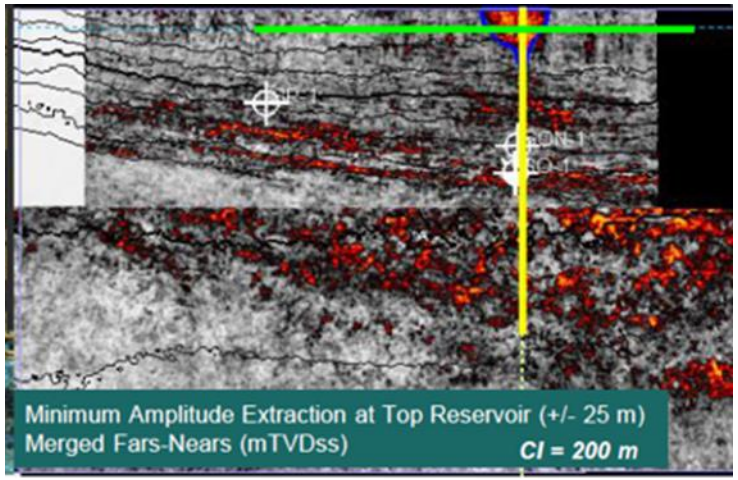
- 60 plus leads and prospects mapped. Currently ongoing are risking and volumetrics.

Eocene Clastic Slope Lead in SHO Central



Lead	P_172A
SHO Area	A
Age	Late Eocene
Play Type	Eocene slope clastics
Reservoir	LST sandstone turbidite channels and lobes
Trap	Updip pinchout within slope, channel and fan geometry
Seismic Amplitude Support	Yes, bright trough over peak, clear definition of feature
Nearby Wells	SP-1, interbedded muds and sands
Depth to Crest (mTVDSS)	2210
Area at 200m Fill (km2)	17





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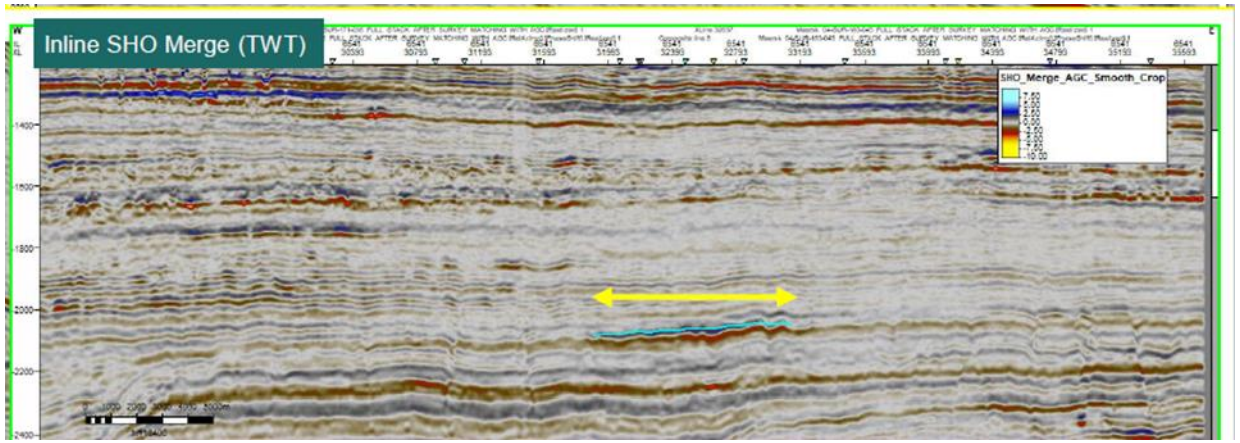
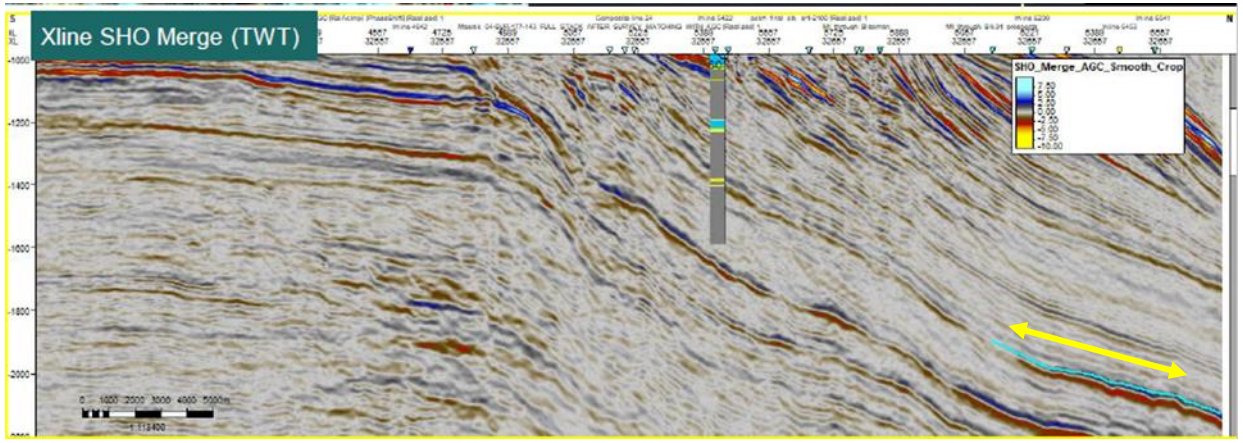
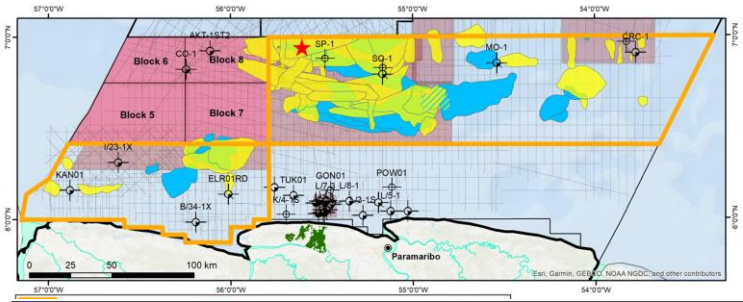
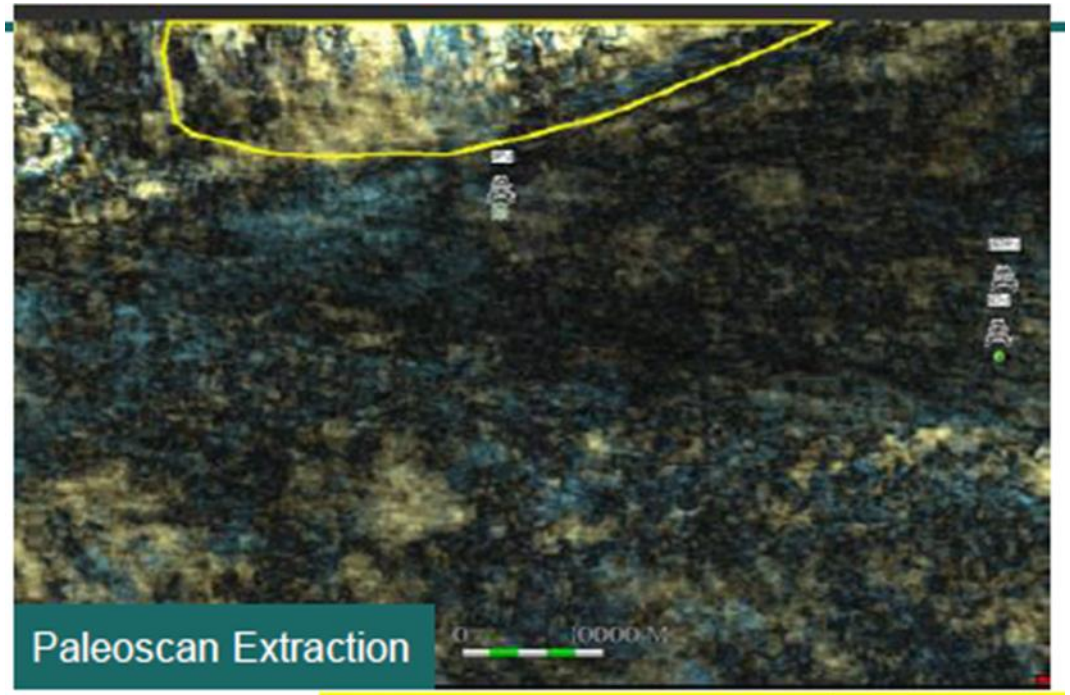


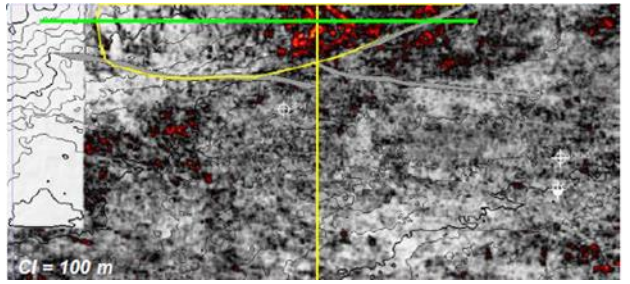


Turonian Slope Clastic Lead in SHO Central



Lead	Krawkraw
SHO Area	A
Age	Turonian
Play Type	Turonian slope clastics
Reservoir	LST sandstone turbidite
Trap	Updip fault and lateral fault and facies change
Seismic Amplitude Support	Yes, brightening on fars-nears
Nearby Wells	SP-1, muds in Turonian
Depth to Crest (mTVDSS)	3780
Area at 200m Fill (km2)	56





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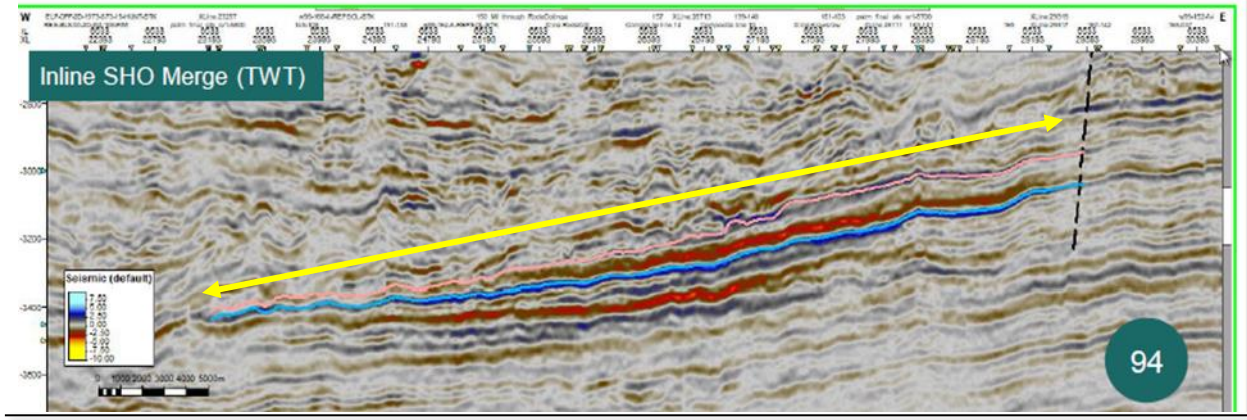
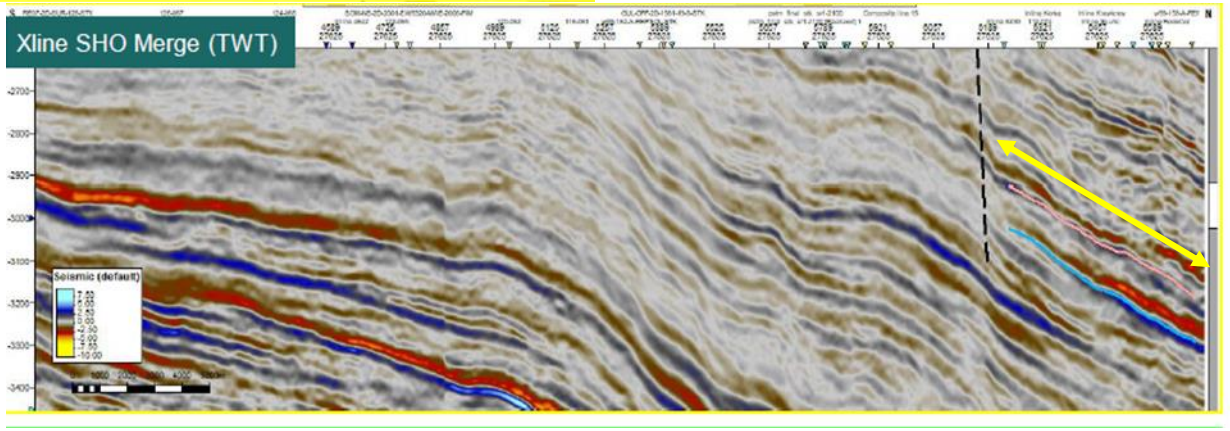
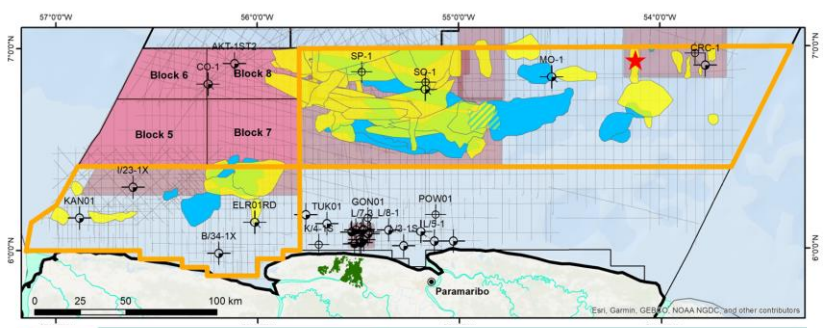
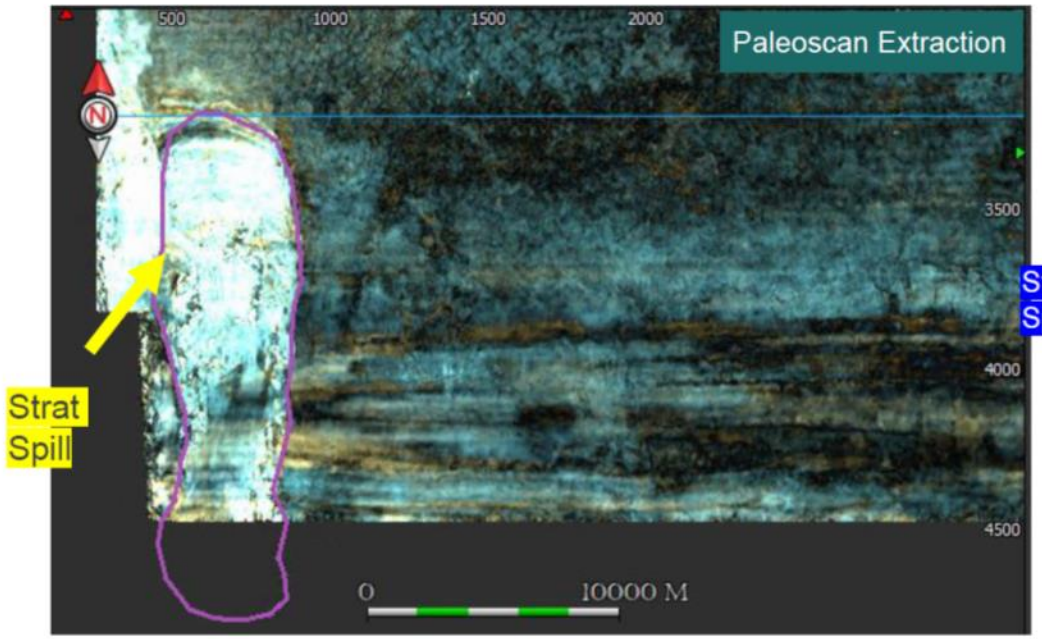


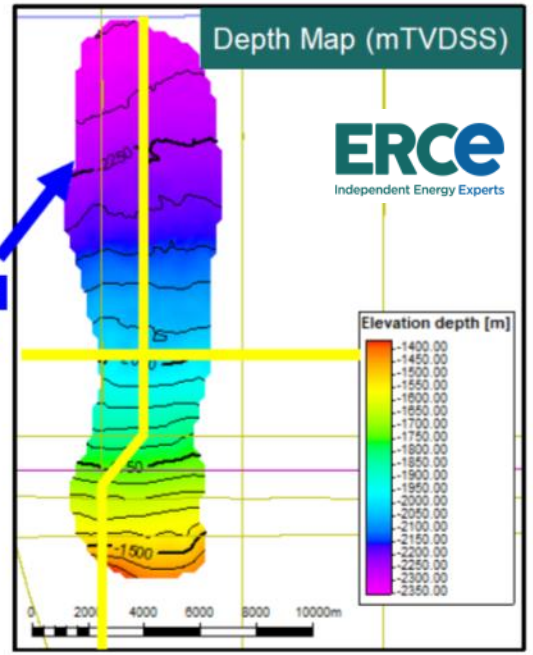


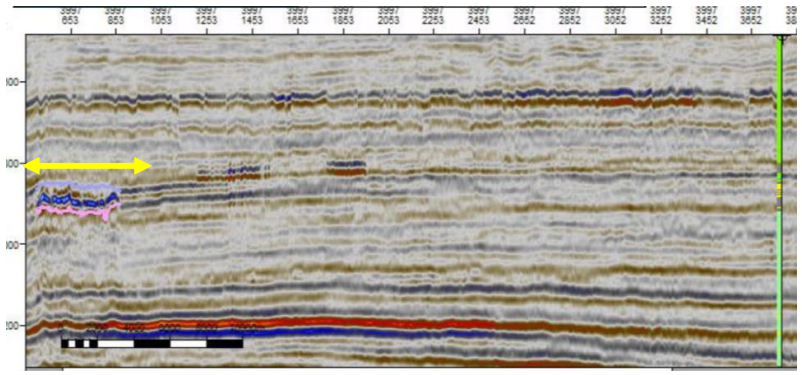
Eocene Slope Clastic Lead in SHO East

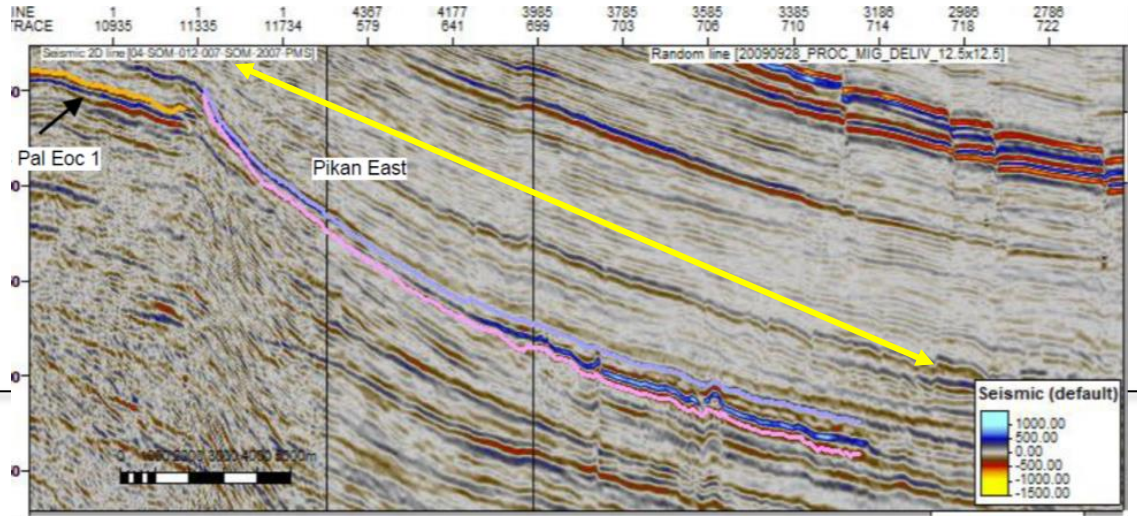


Lead	Pikan East
SHO Area	C
Age	Paleocene-Eocene
Play Type	Eocene slope clastics
Reservoir	Mixed clastic-carbonate MTD
Trap	Updip and lateral pinchout
Seismic Amplitude Support	Bright amplitude anomaly on fullstack
Nearby Wells	CRC-1, ARC-1, carbonate stringers, marls and muds
Depth to Crest (mTVDSS)	1360
Area at 200m Fill (km2)	8
Possible Strat Spill (mTVDSS)	2255

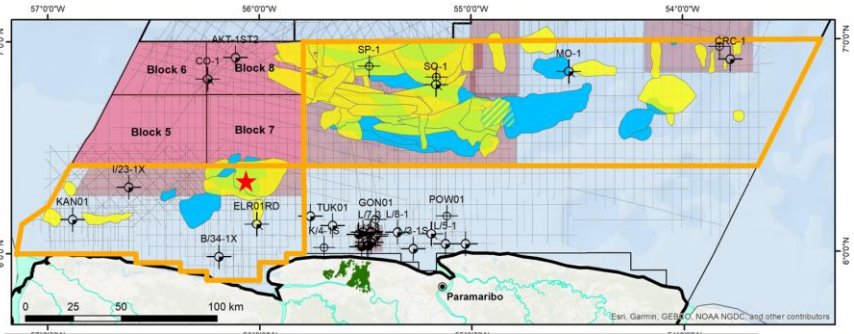




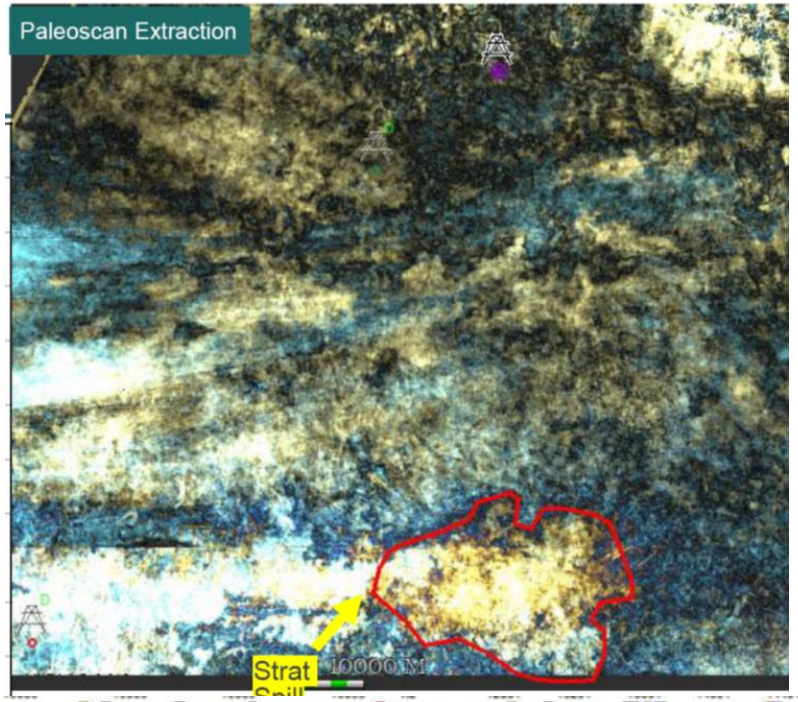


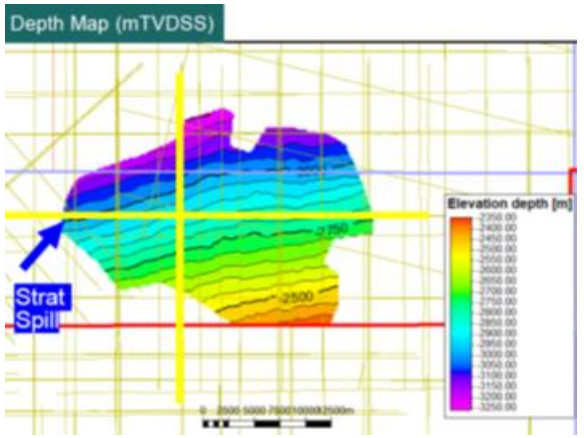


Coniacian Shelf Carbonate Lead in SHO West



Lead	D_085A
SHO Area	D
Age	Coniacian
Play Type	Coniacian shelf carbonates
Reservoir	Isolated carbonate reef, limited growth seen on seismic - fine grained
Trap	Updip and lateral facies change
Seismic Amplitude Support	-
Nearby Wells	KAN-01, muds and thin sands; AKT-1ST2, sands and muds
Depth to Crest (mTVDSS)	2350
Area at 200m Fill (km2)	47
Possible Strat Spill (mTVDSS)	3000





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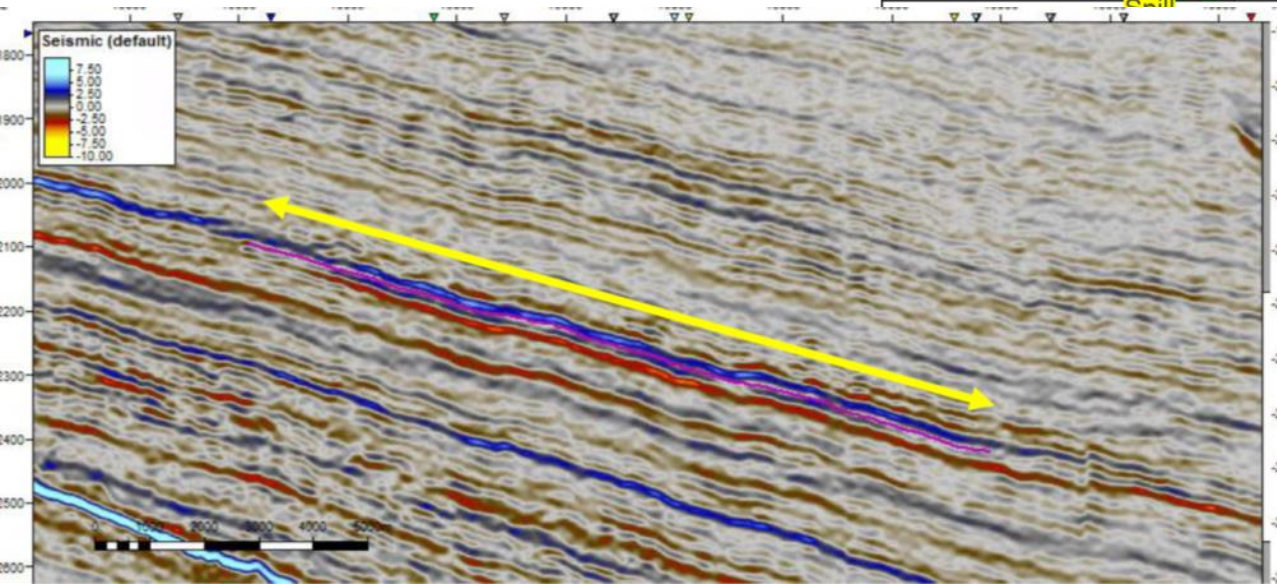
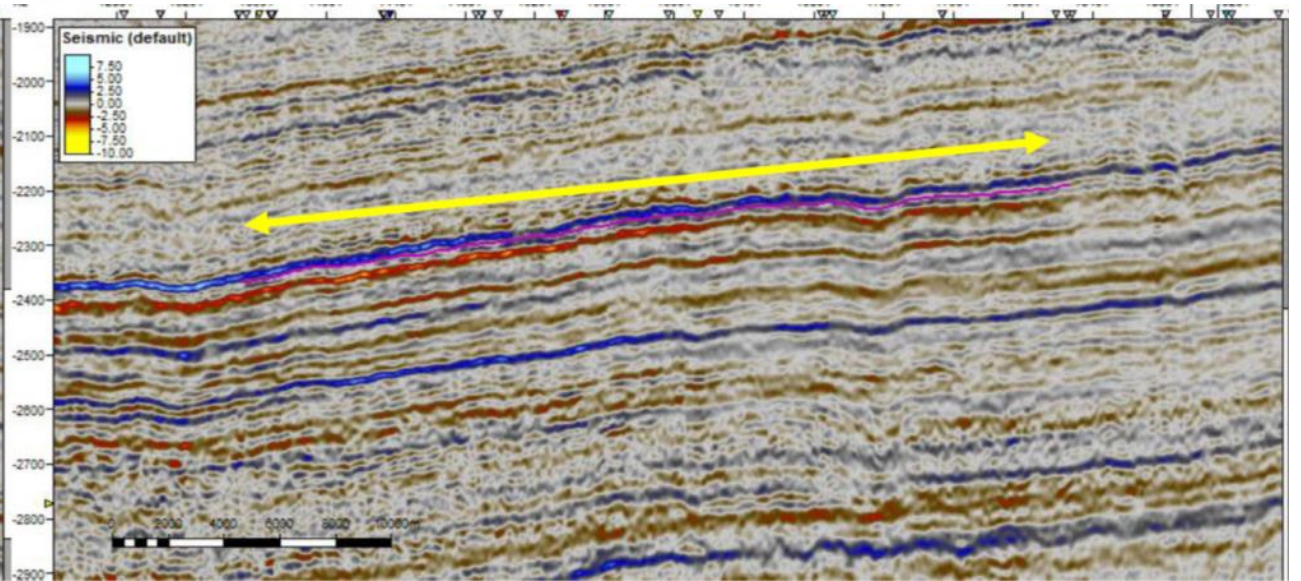
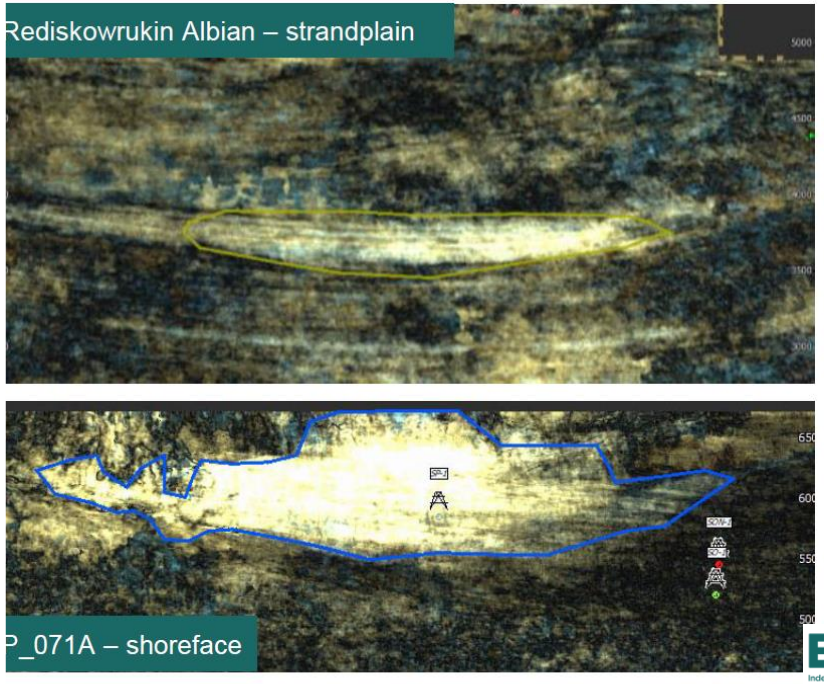


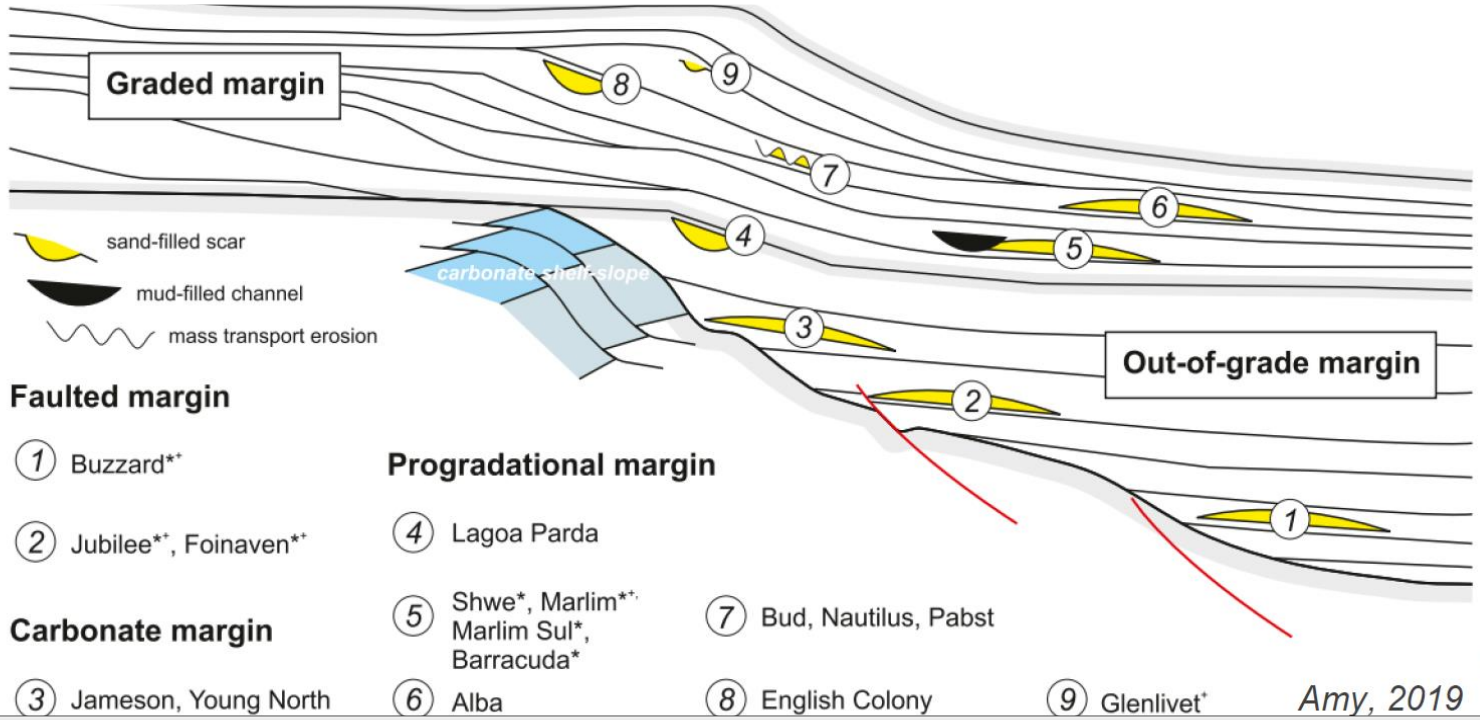


Trapping styles & Analogues

- **For the SHO, the primary trapping mechanism is stratigraphic pinch out and lateral facies change:**
  - Intra slope pounded deposits, Updip mud filled channels, Slope pinch out, MTC truncation
  - Carbonate shelf slope

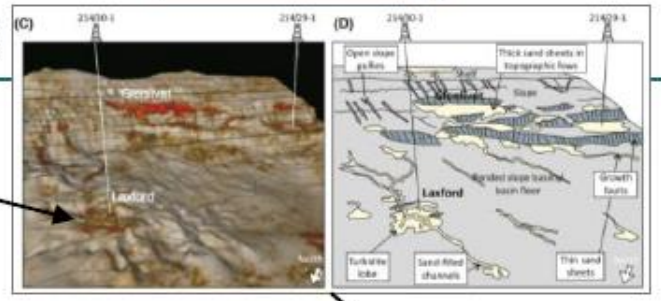
- **The figure below shows the depositional setting of commercial discoveries made in upslope, intra slope and toe of slope stratigraphic traps.**



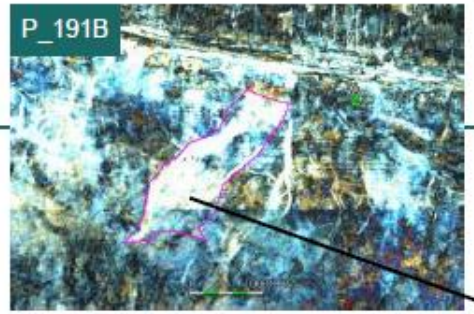


Analogue examples

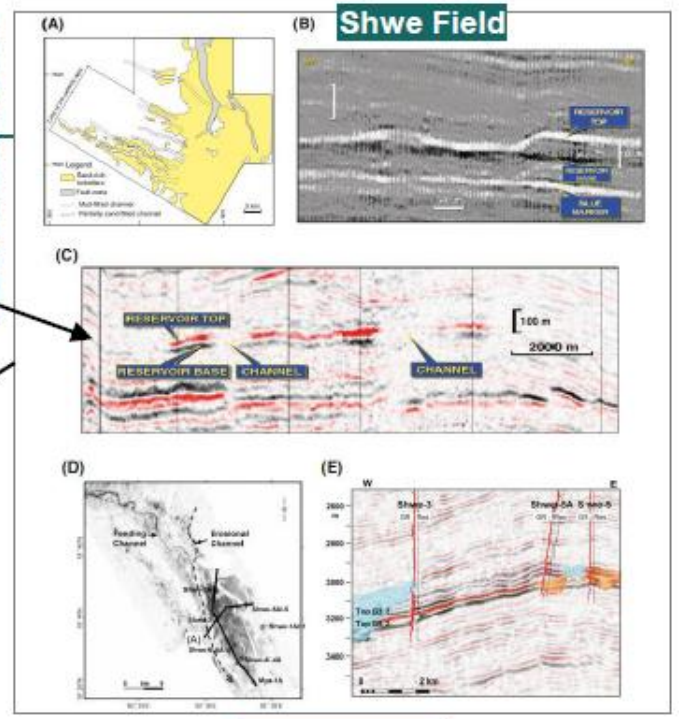
Laxford Discovery



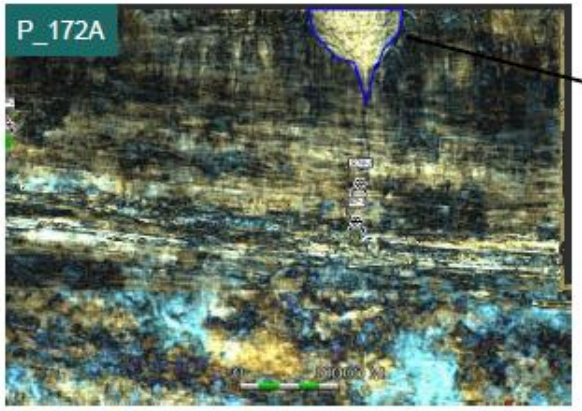
P_191B



Shwe Field

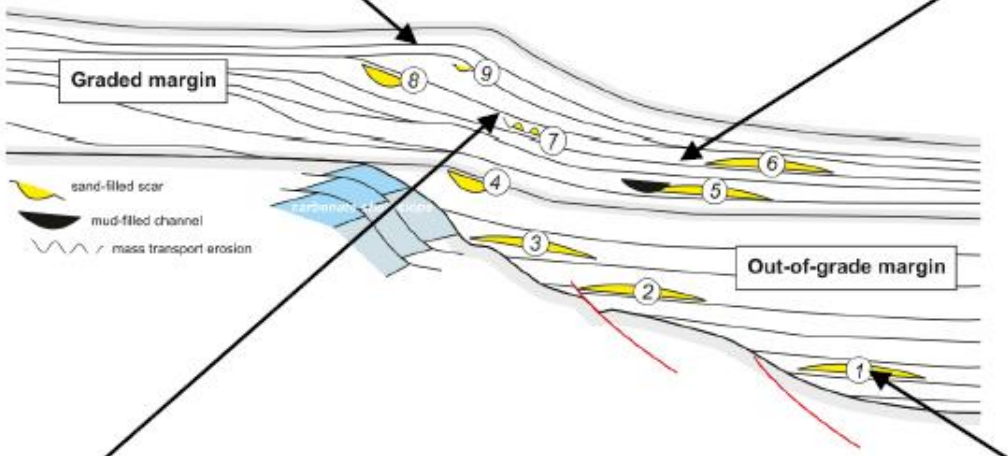


P_172A



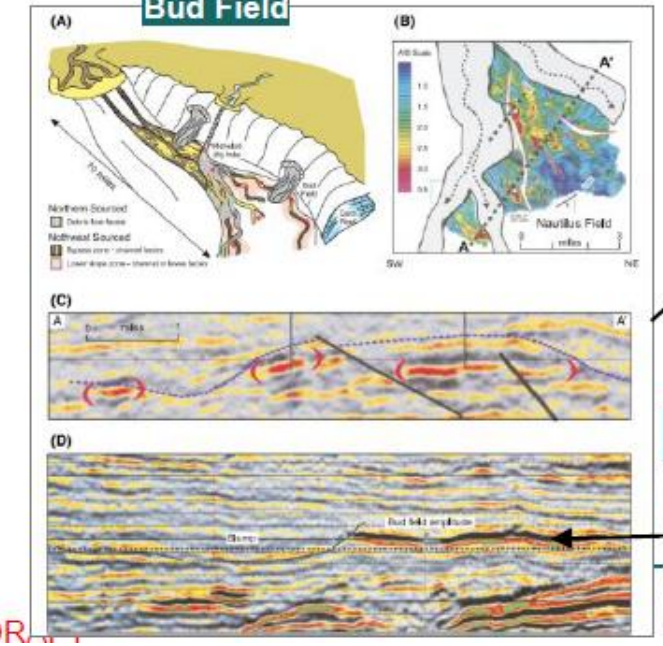
Intra-slope ponded deposits

Updip mud filled channels

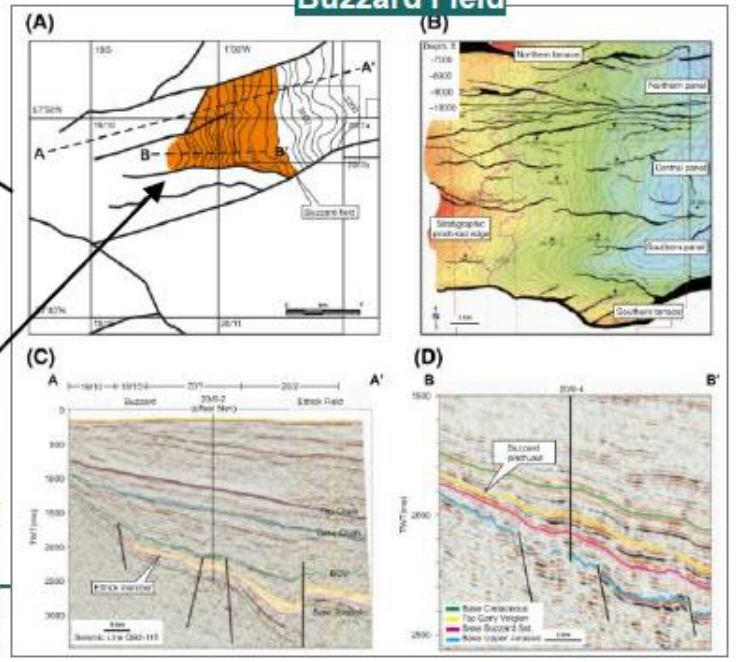


Analogous to the Dorado discovery
NW Australia

Bud Field



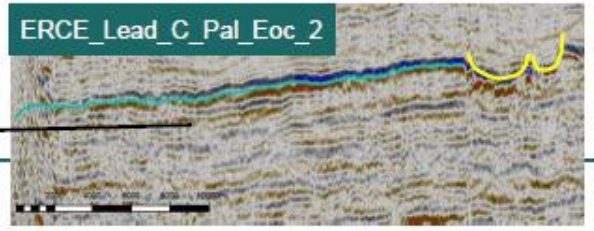
Buzzard Field



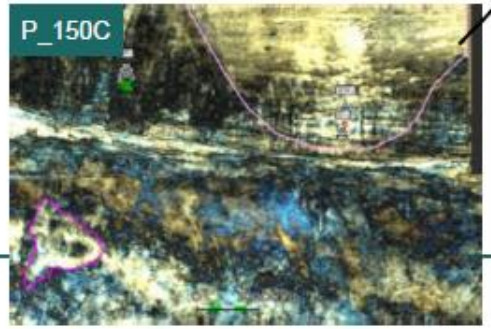
Slope pinchout

MTC truncation

ERCE_Lead_C_Pal_Eoc_2



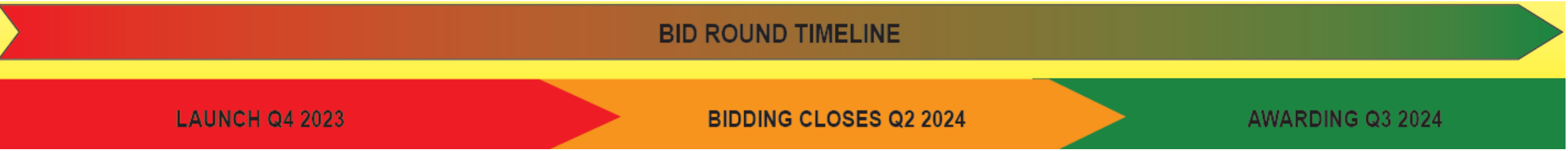
P_150C



Shallow Offshore Bid Round 2023 details

- Launch projected in mid Q4 2023 with closing of bidround in Q2 2024
- Data room will be opened within month after launch until one month before closing of bidround
- Multi Client data available in most of the Shallow Offshore area
- Deep dive technical sessions will be provided to registered companies
- Basin Knowledge bundle available
- Bidround covers large area segmented in 4 main areas driven by existing high quality 3D data, projected and planned data acquisitions areas and Geology.
- Environmental Permit (ESIA) for seismic already in place
- Some 10 – 15 blocks are expected to be offered
- Terms and conditions will vary depending on sub surface risks, data availability & quality and geographical location.

Shallow Offshore Bid Round 2023 schedule



Thank you
For more information
Visit us at booth # 458