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Geology without Borders:

**From the Cape to the Orange Basin -
Evaluating the extension of hydrocarbon
plays from Namibia into South Africa**

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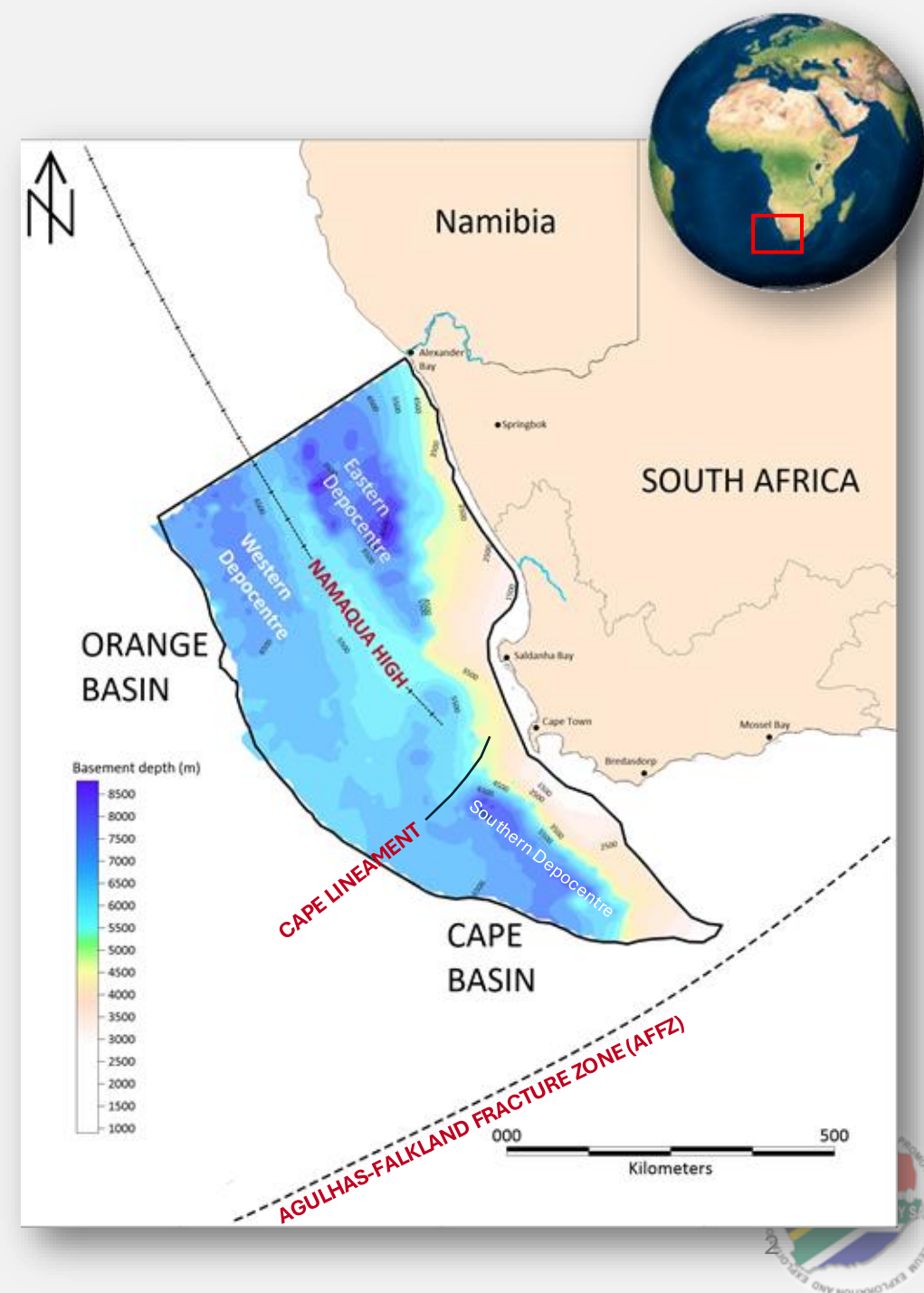
#NamibiaOGC26

Regional Setting

- Classic rift-drift volcanic passive margin.
- Formed during Early Cretaceous rifting (Gondwana breakup) approximately 136Ma ago.
- **SA Portion:**
 - Spanning 320,000 km²
 - Water depths ranging 100 to 4650m.
- **Three depocentres:**
 - Eastern & Western Depocentres (North), spanning into Namibia.
 - Southern Depocentre in the Cape Basin.

Orange Basin - Broad margin with substantial synrift to postrift sedimentary accommodation.

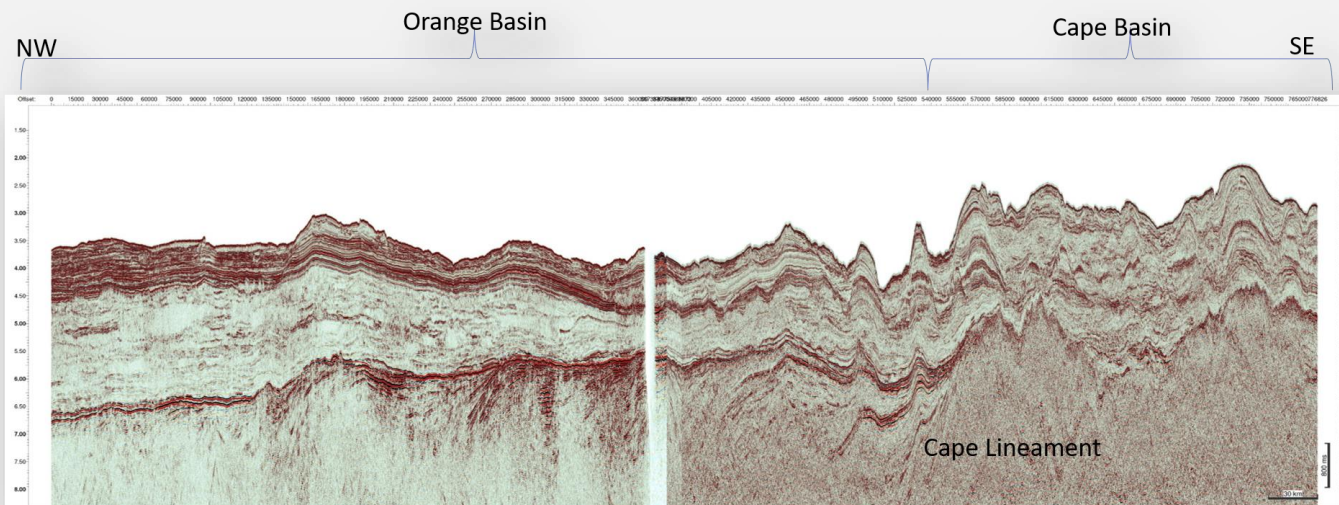
Cape Basin - Structurally segmented, with numerous basement highs, fault blocks and local depocentres.



Basin Architecture:

Cape Lineament

- A **NE-SW-trending** major segment boundary (Hall *et al.*, 2018).
- Distinguishes the Orange from the Cape Basins (Magma-rich to magma-poor).
- Regional change in crustal architecture, rather than a large lateral displacement of oceanic crust.
- Basement highs separates the Cape Basin into mini basins/depocentres.

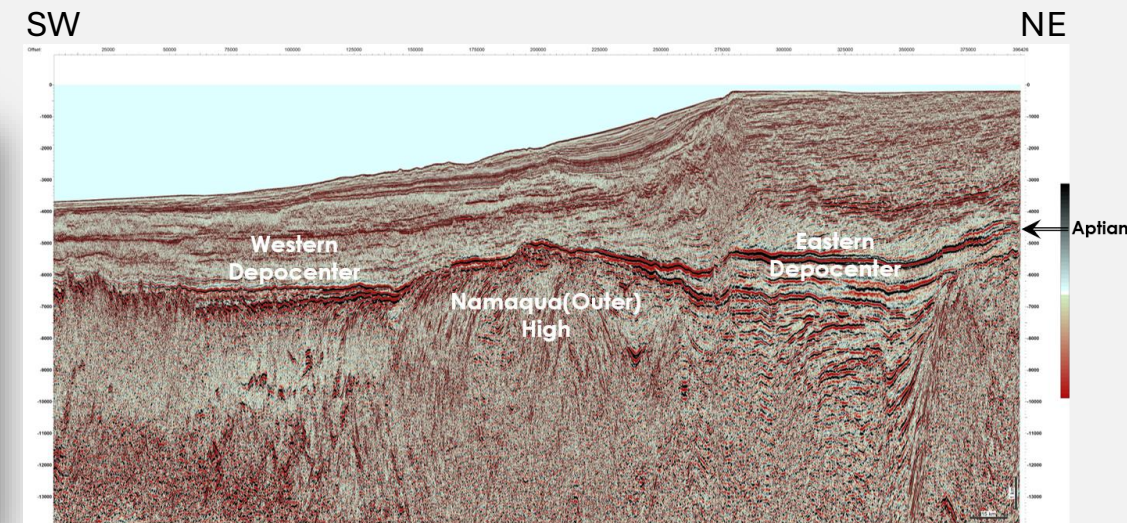


Namaqua High

- A regional **NW-SE trending** basement ridge.
- Separates Orange Basin into the eastern and western depocentres.
- Areal extent on SA side: 450km long, 50 to 150km wide & plunges to the north to depths of 7800 mbsl.

Influence during early basin development:

- Formed restricted environments for source rock development.
- It's relief controlled reservoir distribution and enhanced stratigraphic trapping.



Potential Plays

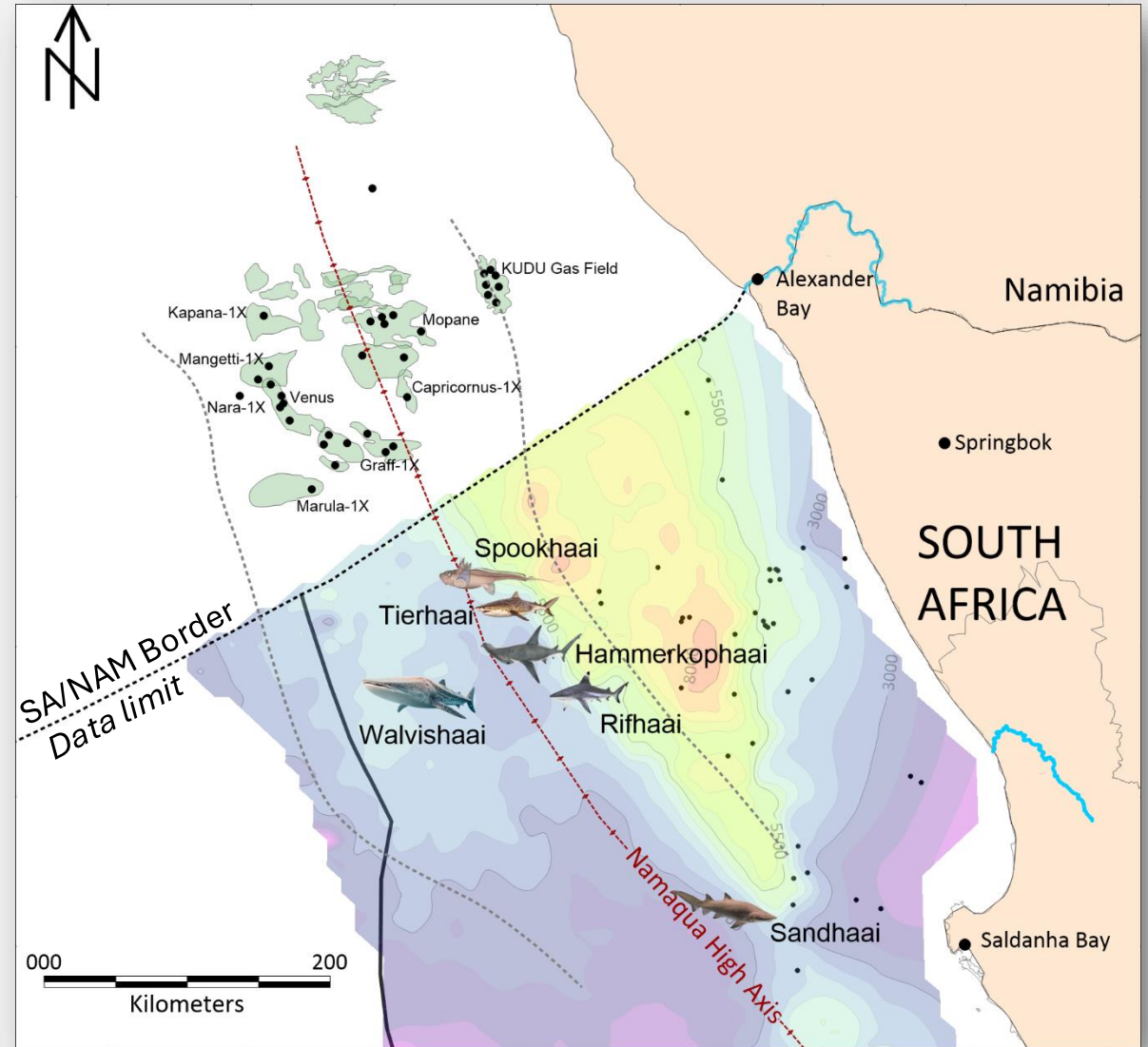
Some key Discoveries Offshore Namibia:

- Venus-1X (TotalEnergies) – ~750 MMboe appraised.
- Graff & Jonker-1X (Shell) – ~400-500 MMbbl and ~300 MMbbl of Light oil, respectively.
- Mopane (Galp) – Estimated ≥ 10 billion barrels oil equivalent in place.
- *Capricornus 1-X (Rhino Resources) – Light oil discovery*
- *Merlin 1-X (Shell) – Light Oil*

Shark Alley Play Fairway

(South African Analogues)

- Walvishaai (Whale Shark) East & West
- Tierhaai (Tiger Shark)
- Sandhaai (Sand Shark)
- Cape Basin leads: Basin floor fans and Mixed depositional systems (BFFs & MDS)



Potential Plays – Lower K

Namaqua in Spring



Lower Cretaceous

Interval thickness:

OB is between 30m and 3280m

CB ranges from 100 to 2600 m

During the Lower Cretaceous, the newly forming South Atlantic was still a young ocean basin with a narrow, immature continental shelf.

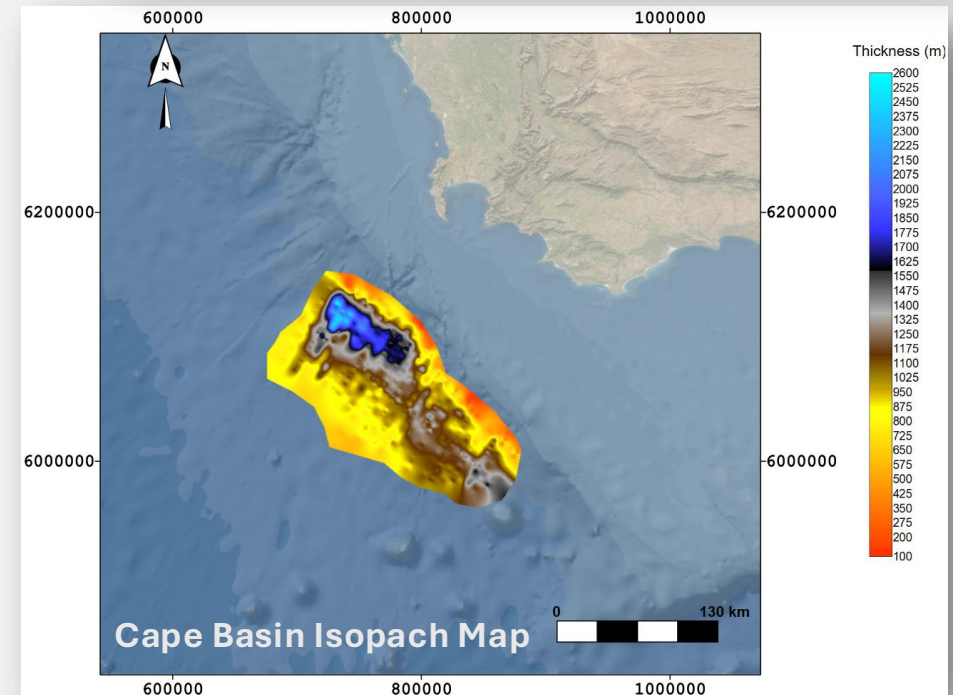
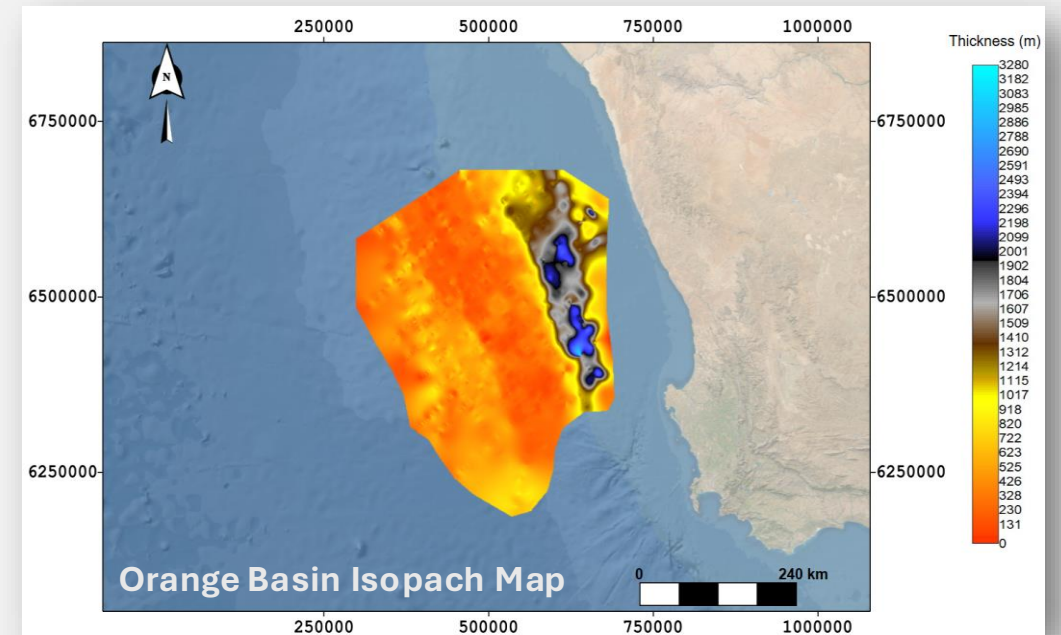
Lower Aptian developed restricted marine conditions of oxygen-starved bottom waters and organic-rich muds/shales.

Lower K – interbedded package of sand, silt, and shales.

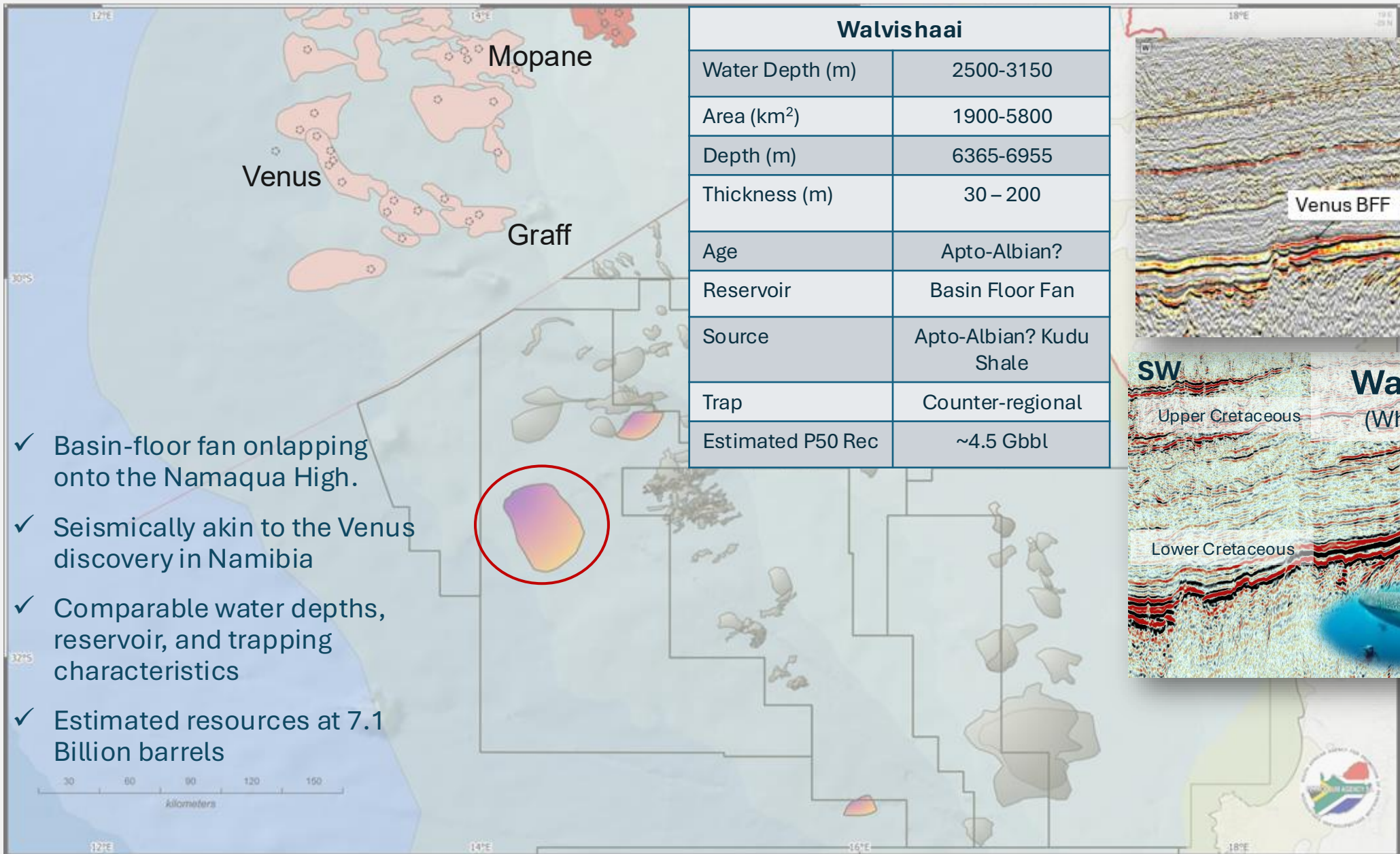
Early depocentre development:

Orange Basin (OB) eastern depocentre was a restricted environment conducive to source rock development.

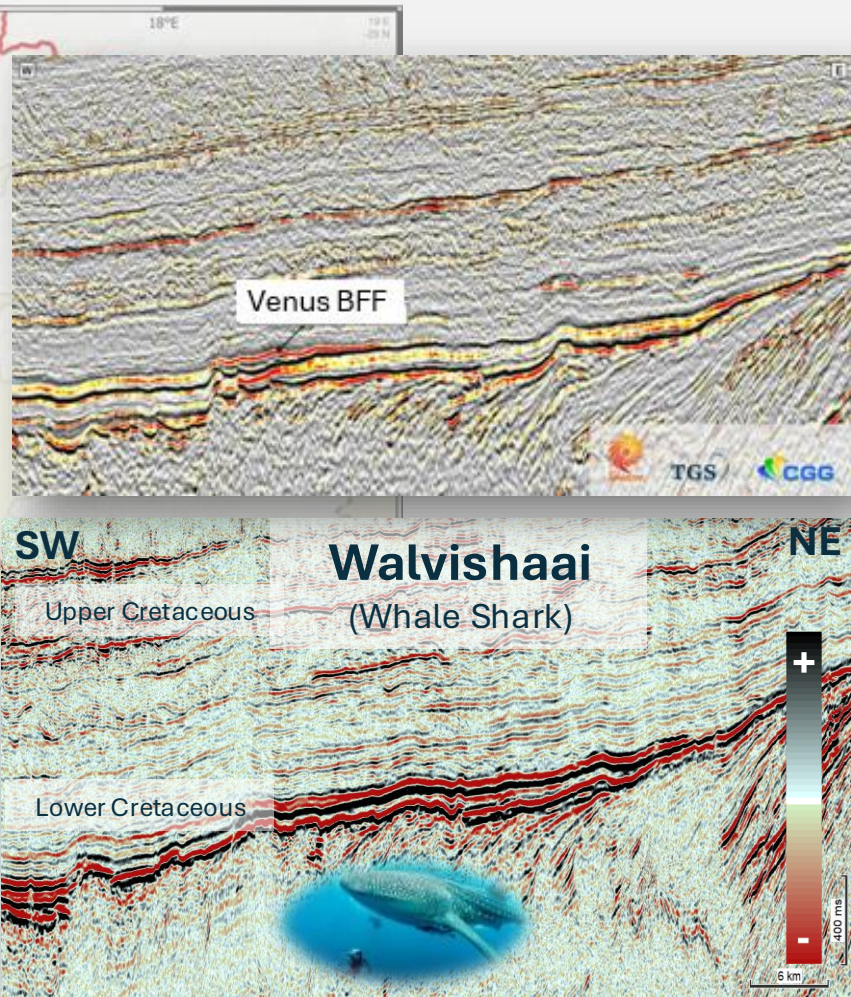
Cape Basin (CB) sediment accumulated in the northern portion of the southern depocentre.



Walvishaai (Venus analogue)



- ✓ Basin-floor fan onlapping onto the Namaqua High.
- ✓ Seismically akin to the Venus discovery in Namibia
- ✓ Comparable water depths, reservoir, and trapping characteristics
- ✓ Estimated resources at 7.1 Billion barrels

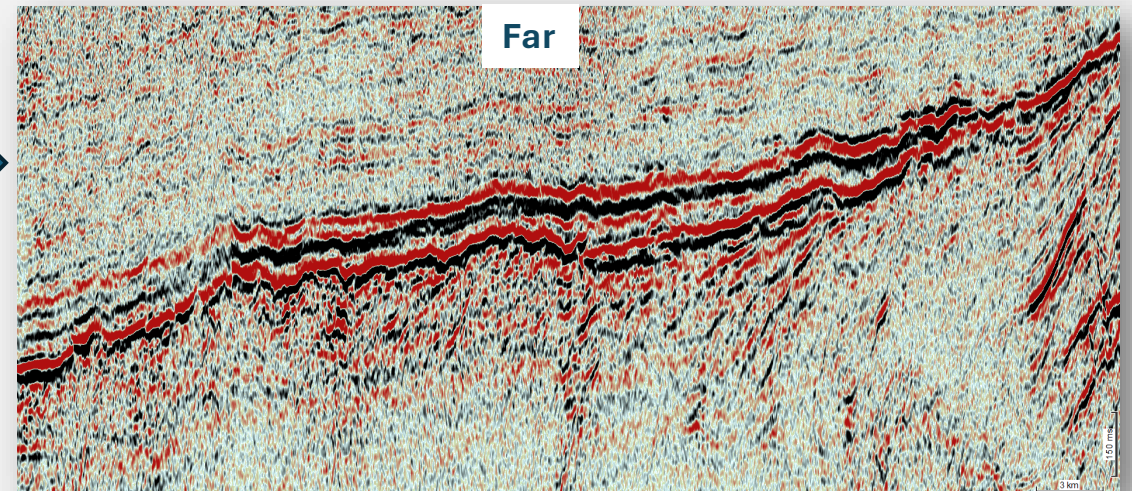
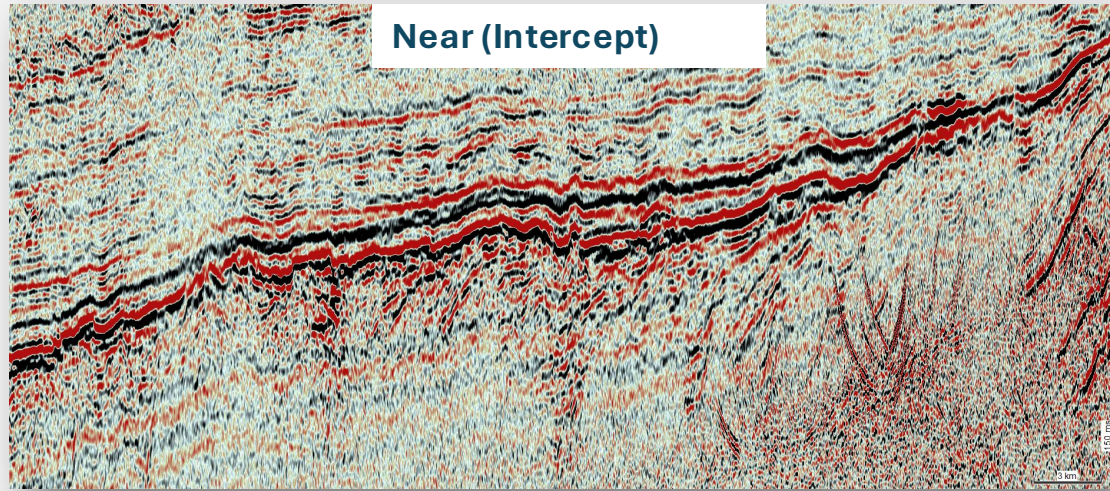


(Salomo et al., 2022; Fielies et al., 2024)

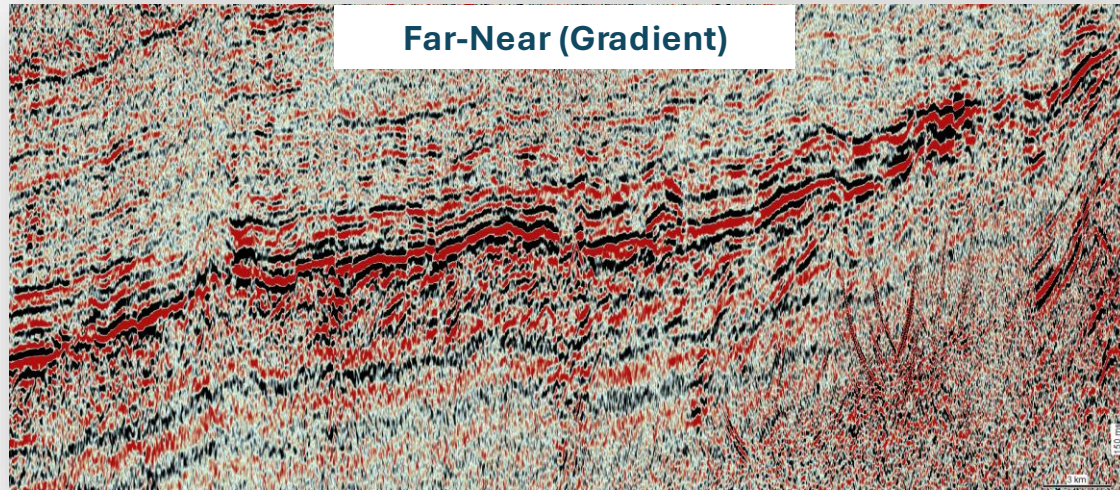
Walvishaai – Angle Stacks

Increase in amplitudes from Near to Far.

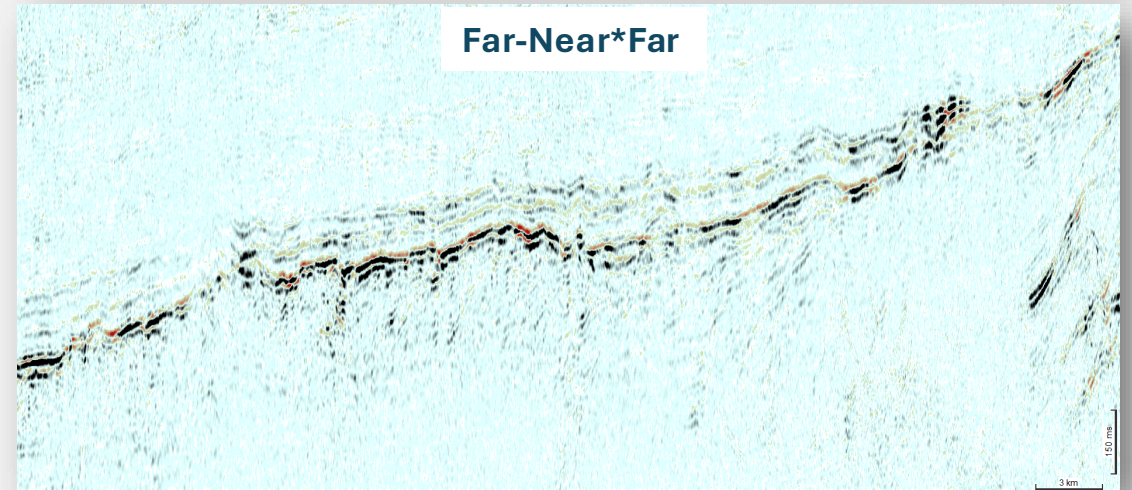
Intercept (Near) vs Gradient (Far-Near) for the seismic



+



Far-Near*Far

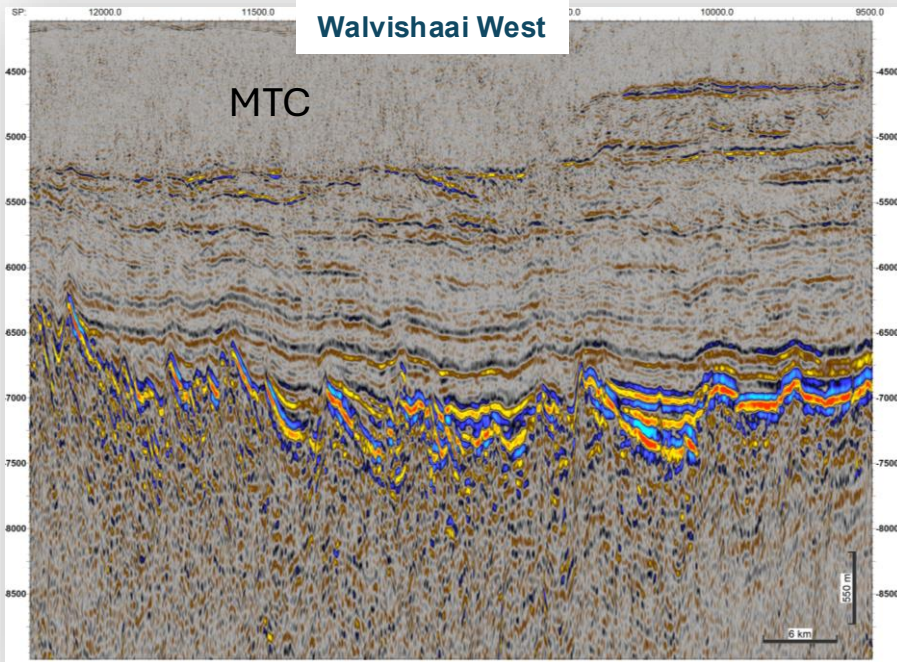


Walvishaai extension

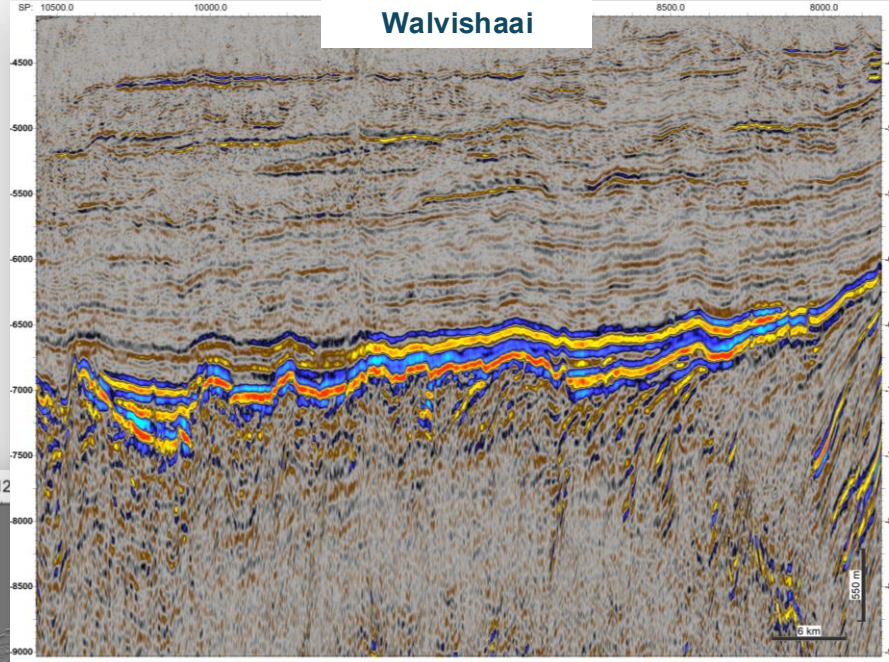


Walvishaai West

Walvishaai West



Walvishaai



Counter-regional dip/trapping

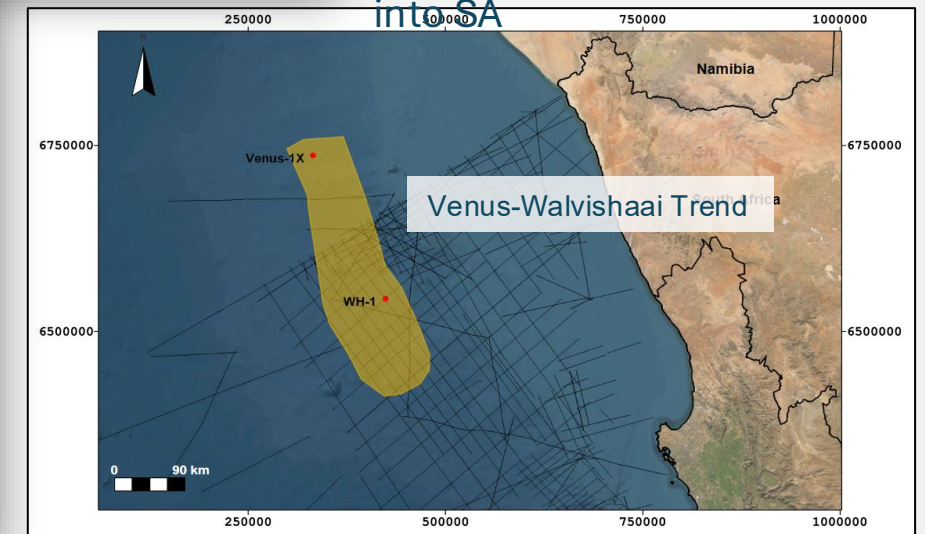
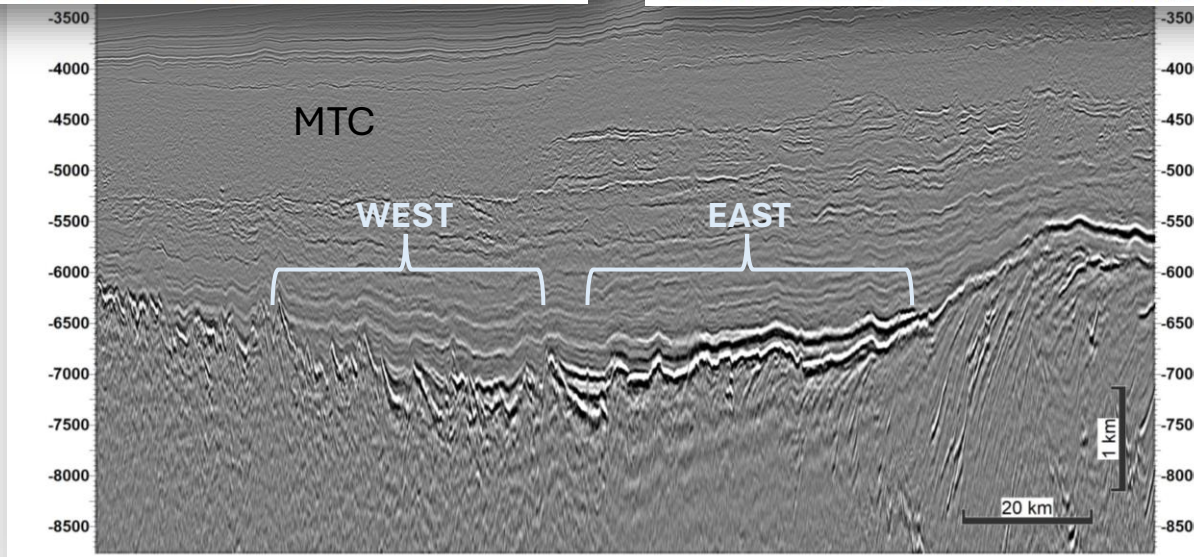
Trap - Differential loading of overlying mass-transport deposits

Up to 2km Mass Transport Complexes (MTCs)

Walvishaai play mapped in area of ~5800 km²

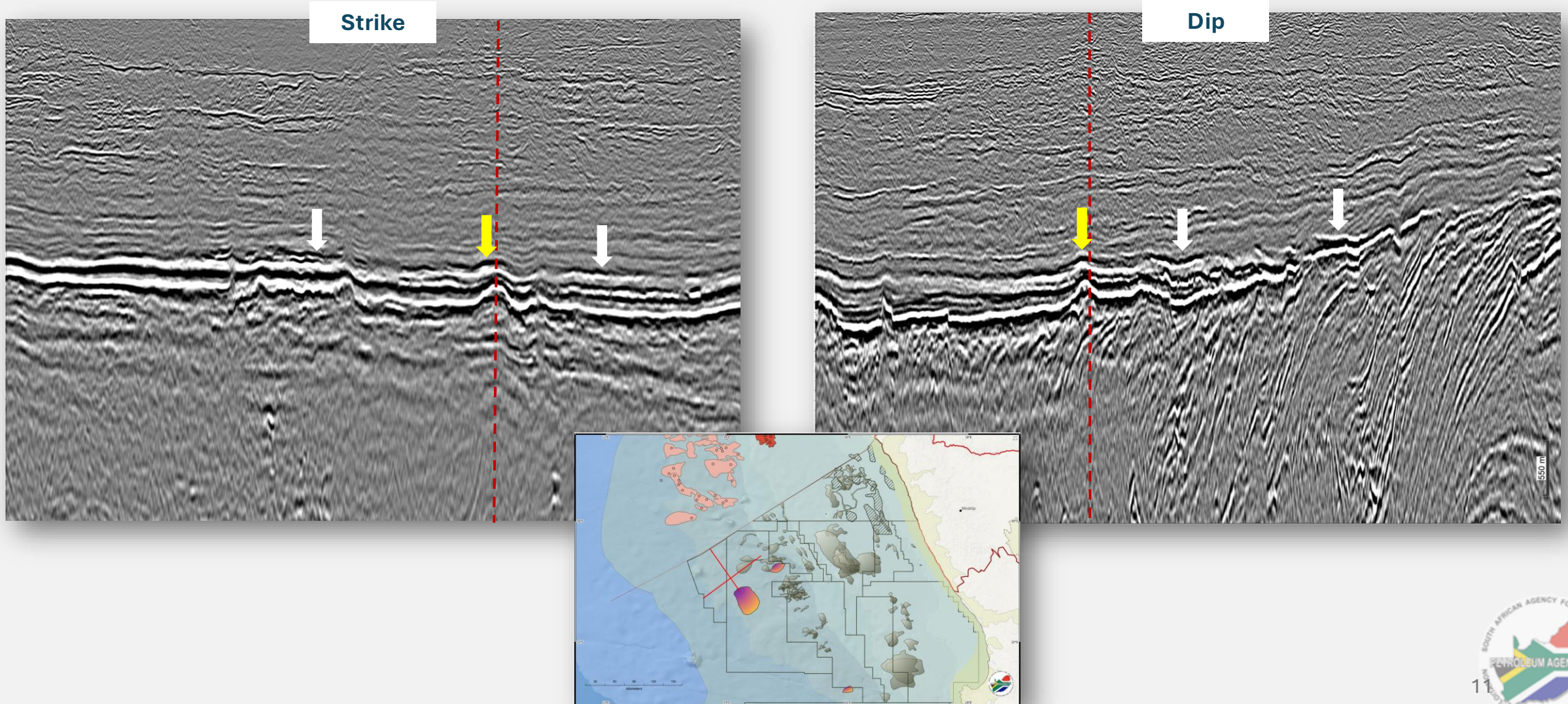
Negative Relative Acoustic Impedance at Walvishaai level.

Trend followed from Namibia into SA



Additional Prospectivity in Lower K – Orange Basin

Additional lower Cretaceous prospectivity identified within a prograding system indicated by bright amplitudes.



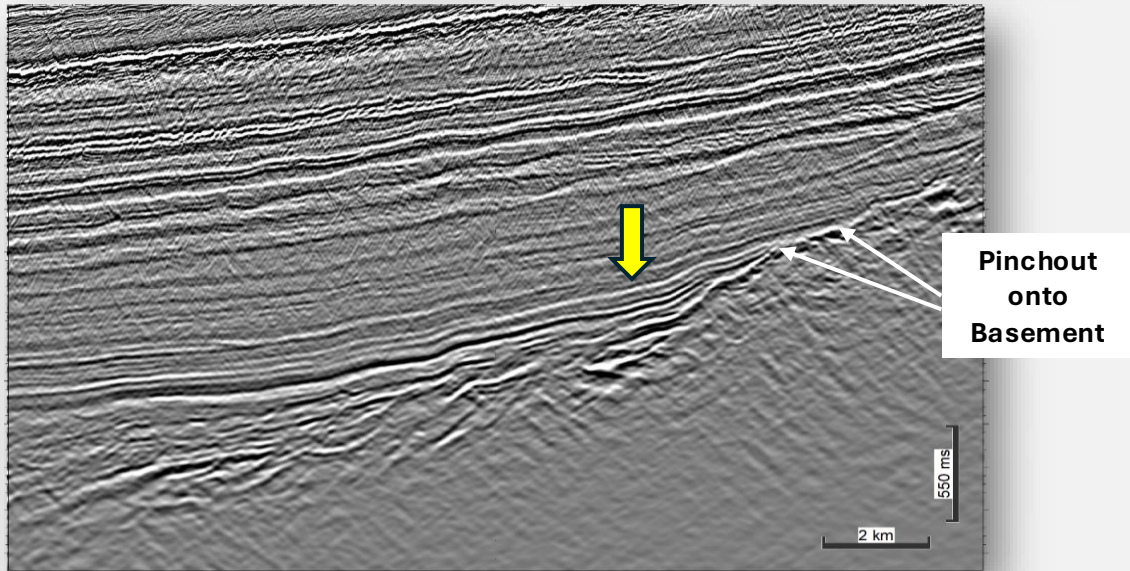
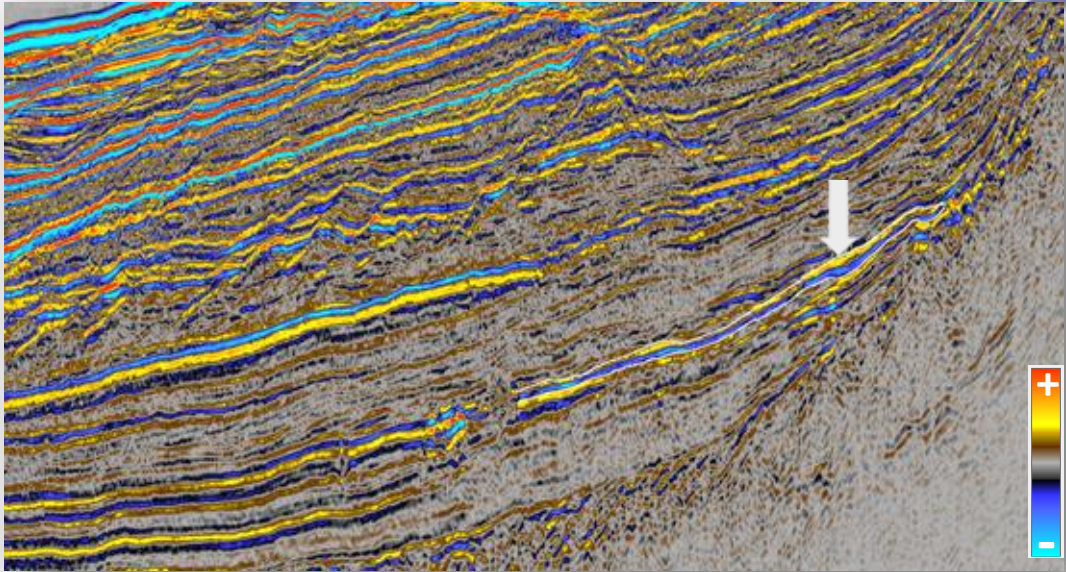
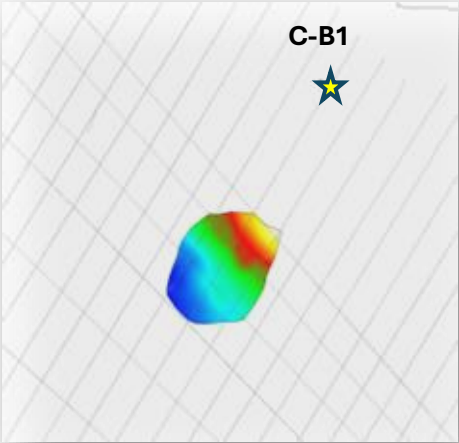
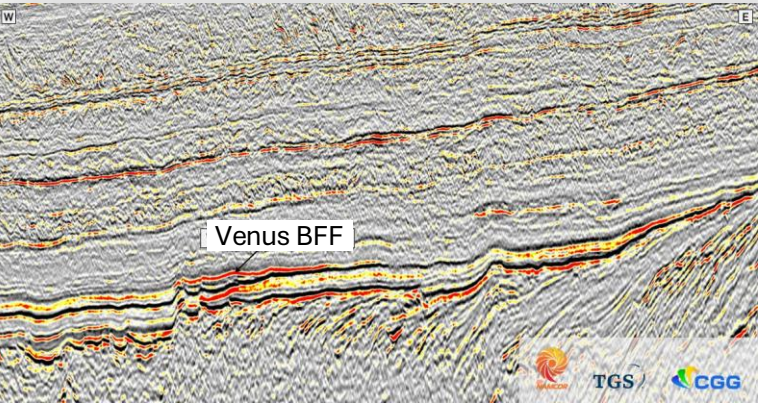
Cape Basin (Venus analogues?)

Increase in acoustic impedance for basin floor fans (BFF).

Lower Cretaceous in age and between 5,75s and 6,75s TWT.

Similar seismic signature and trapping style onto Basement.

Cape Basin Fan Lead	
Water Depth (m)	3060-3150
Area (km²)	113-415
Depth (m)	5375
Thickness (m)	55 – 120
Age	Apto-Albian?
Reservoir	Basin Floor Fan
Source	Apian Shale
Trap	Pinchout onto basement
Estimated P50 Rec	~3.5 Gbbl

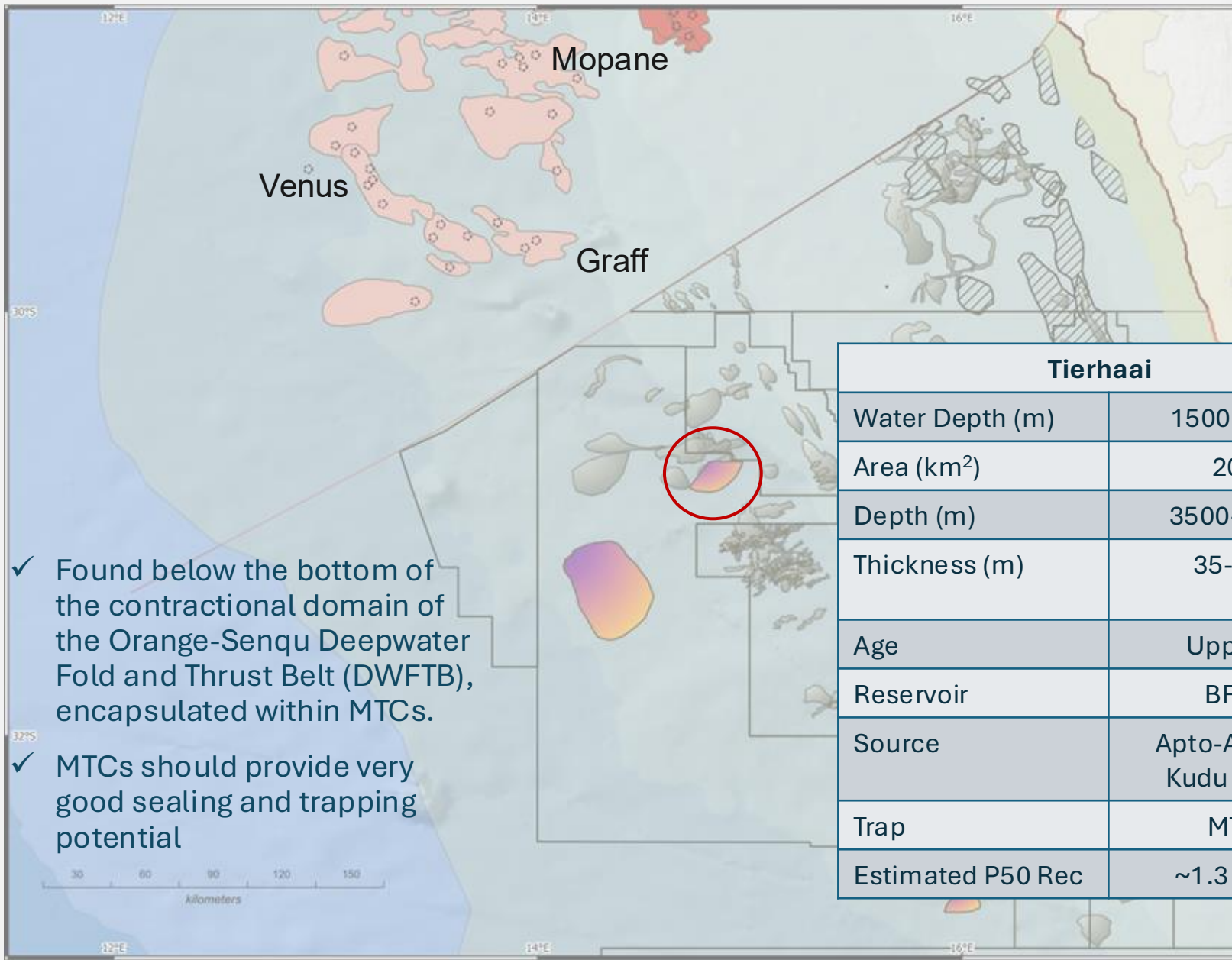


Potential Plays – Upper K

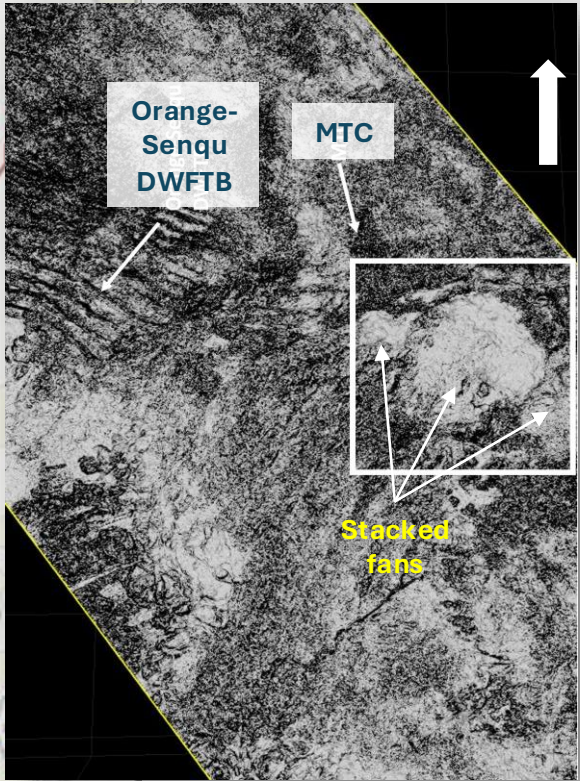
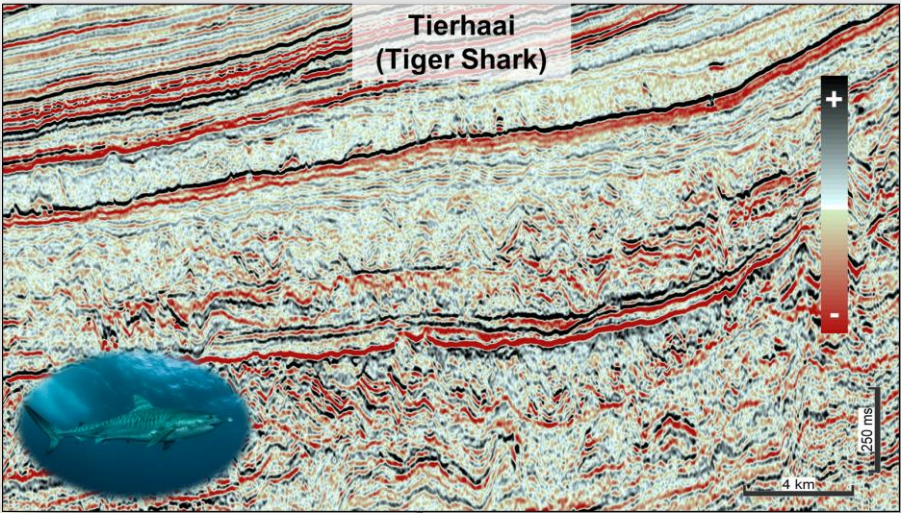
*Spring flowers
in the Western Cape*



Upper K - Tierhaai (Graff analogue?)

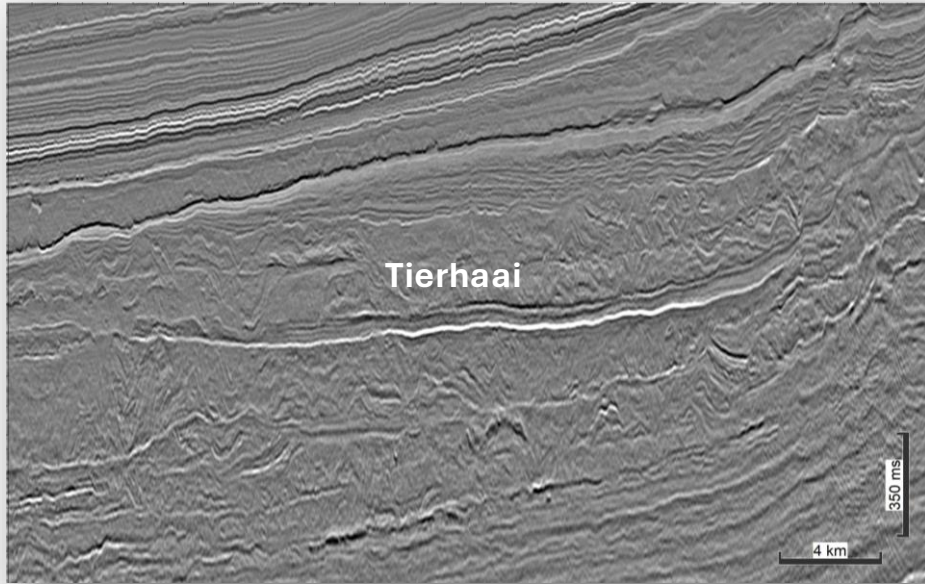


Tierhaai	
Water Depth (m)	1500-1950
Area (km ²)	200
Depth (m)	3500-3700
Thickness (m)	35-150
Age	Upper K
Reservoir	BFF?
Source	Apto-Albian? Kudu Shale
Trap	MTC
Estimated P50 Rec	~1.3 Gbbl



- ✓ Found below the bottom of the contractional domain of the Orange-Senqu Deepwater Fold and Thrust Belt (DWFTB), encapsulated within MTCs.
- ✓ MTCs should provide very good sealing and trapping potential

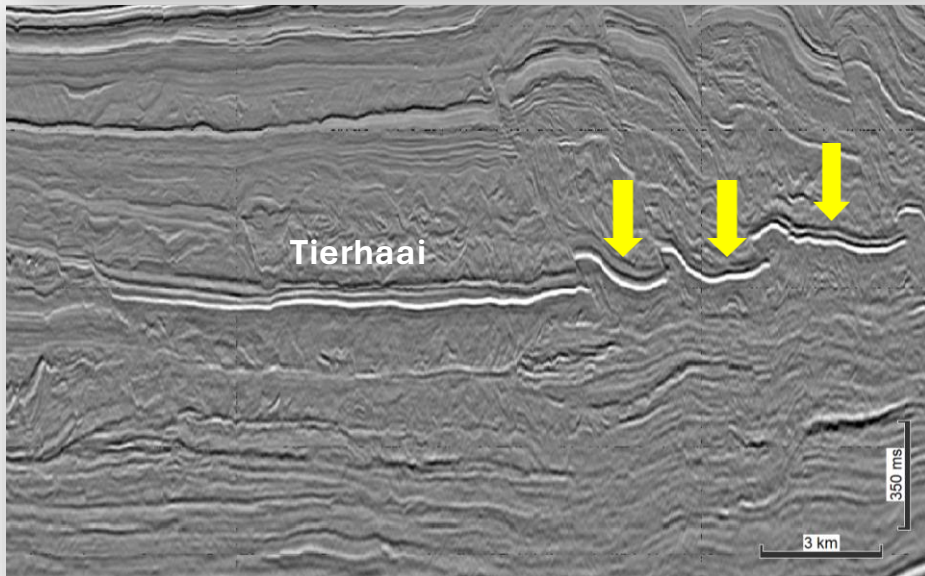
Additional Prospectivity in Upper K – Orange Basin



Intra-MTC play (Graff-type play)

Example of an Intra-MTC play showing mostly folded sandstone beds within a shale/muddy matrix (El Gordo, Spain)

DWFTB continuation of Tierhaai



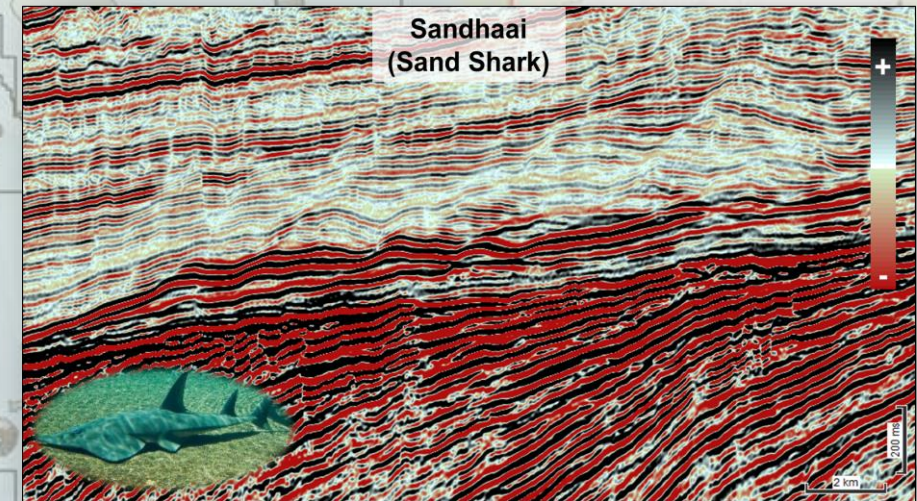
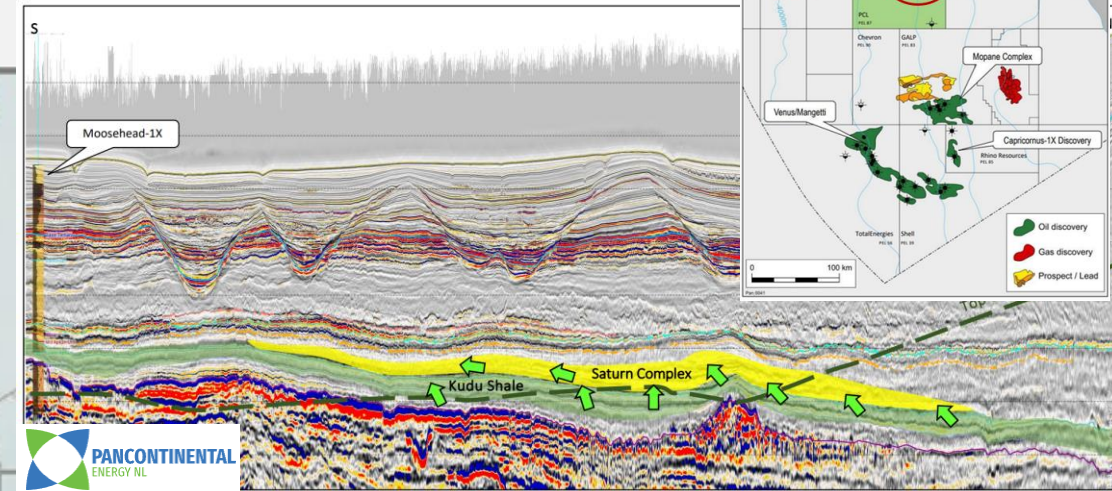
El Gordo mega bed; Tabernas Basin, Almeria, Spain

(Africa and Fielies, 2024)

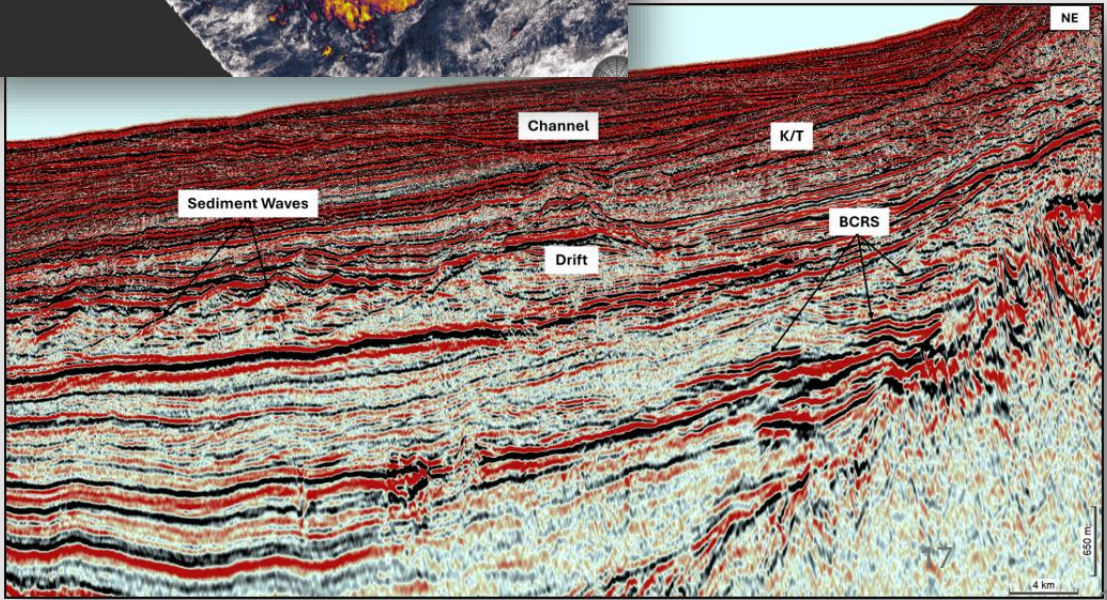
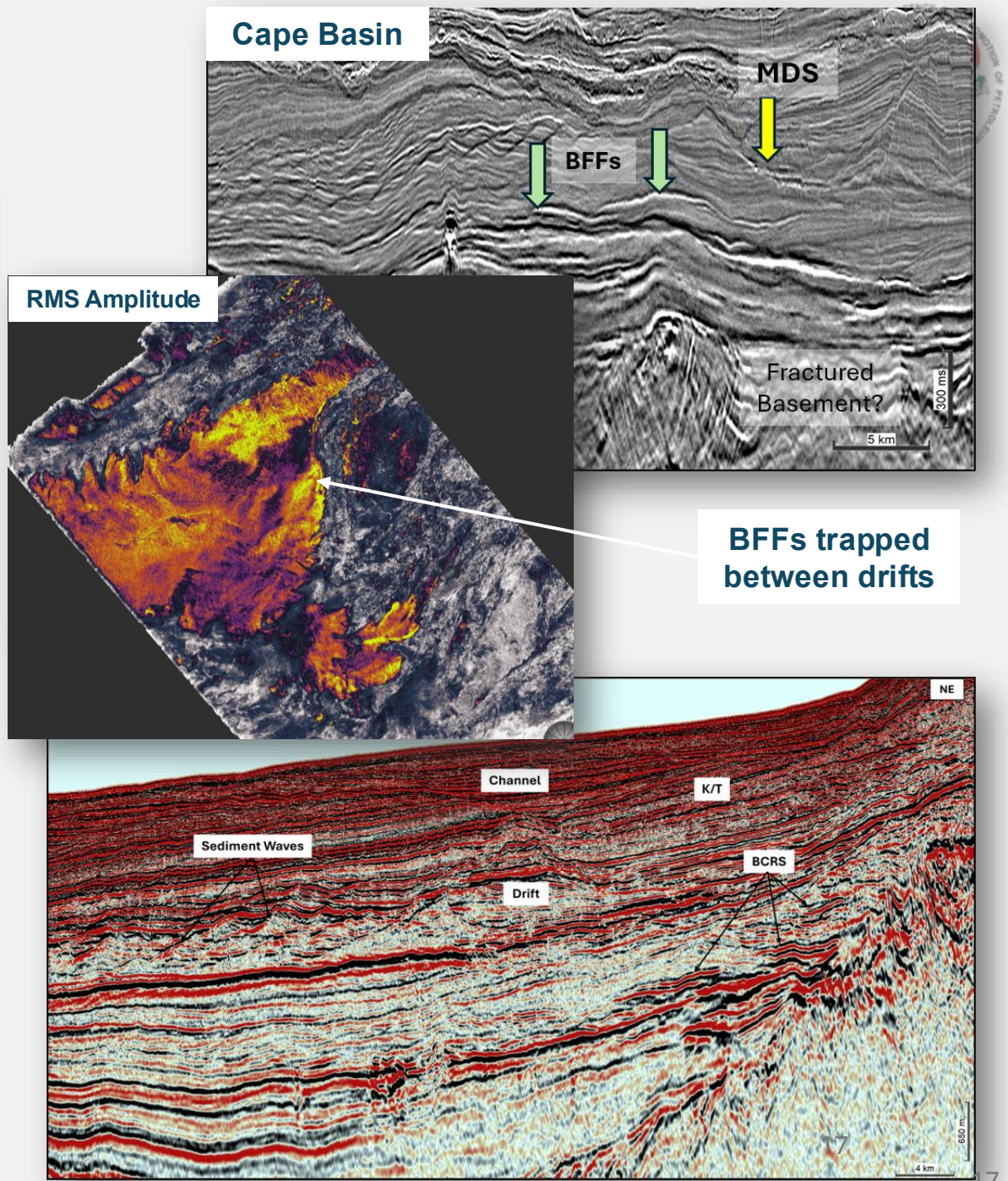
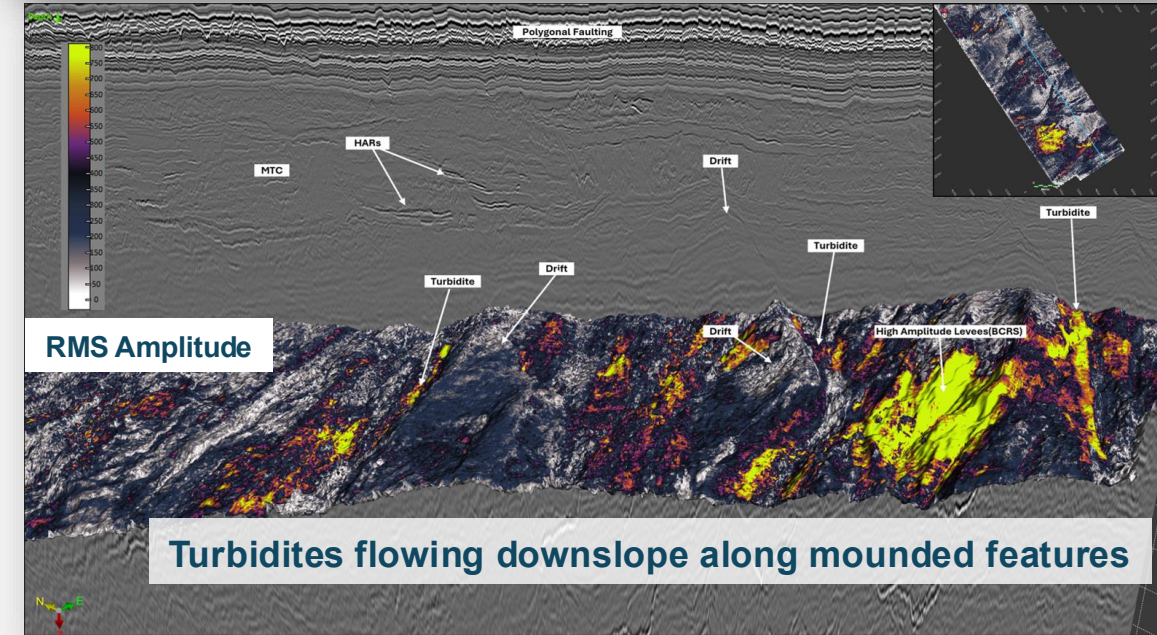
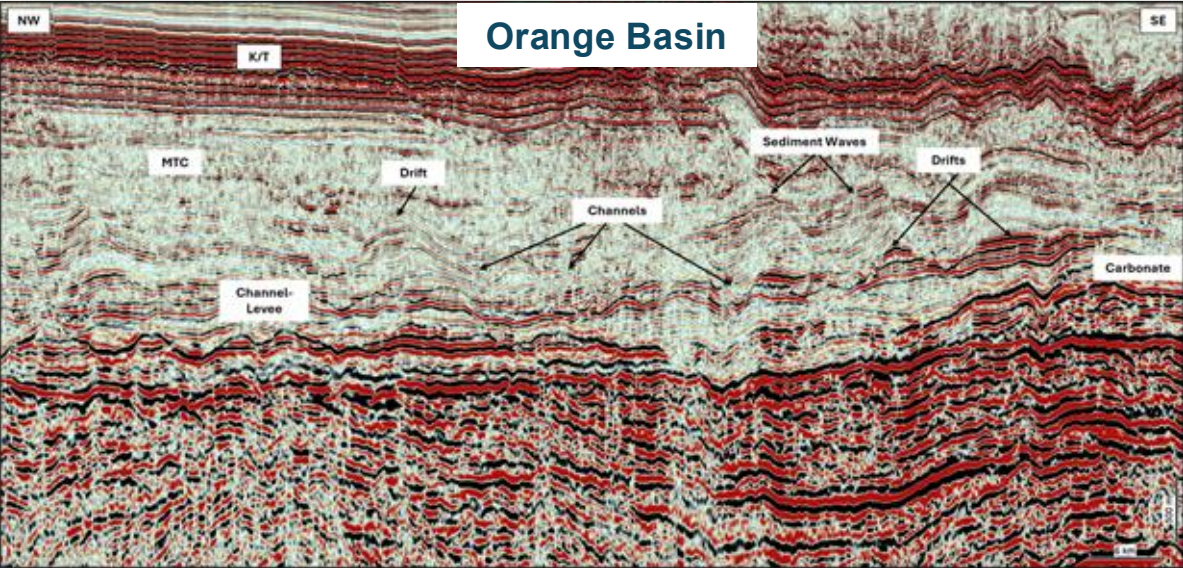
Sandhaai (Novel Play)

Sandhaai	
Water Depth (m)	2300-2700
Area (km ²)	423
Depth (m)	4300-4800
Thickness (m)	200
Age	Upper K
Reservoir	BFF
Source	Aptian
Trap	Stratigraphic
Estimated P50 Rec	0.5 Gbbl

- ✓ Mixed turbidite-contourite play representing a Mixed Depositional System
- ✓ Sandhaai: Basin-floor fan reshaped by later bottom-water activity and sealed by sediment waves.
- ✓ MDS has led to large global discoveries, like the Coral and Mamba super-giant gas fields in Mozambique (100TCF)
- ✓ Analogues to Saturn Complex?



Additional MDS and BFFs Plays



Key Take-Aways : Geology Without Borders



When we look at a map, we see a boundary/border between Namibia and South Africa, BUT when looking at geology that boundary is not there.

There is tremendous shared opportunity across Namibia and South Africa.

These are demonstrated by the significant exploration opportunities in the Orange and Cape Basins.

Although Seismic data confirms the geological trends towards the south there remains uncertainty within South African waters.

A significant discovery is needed to derisk the area and unlock value within our offshore.

The Orange and Cape Basins represent a unique opportunity for growth and energy security in Southern Africa. With the right partnerships and strategic decisions, we can unlock its full potential.

Thank You

