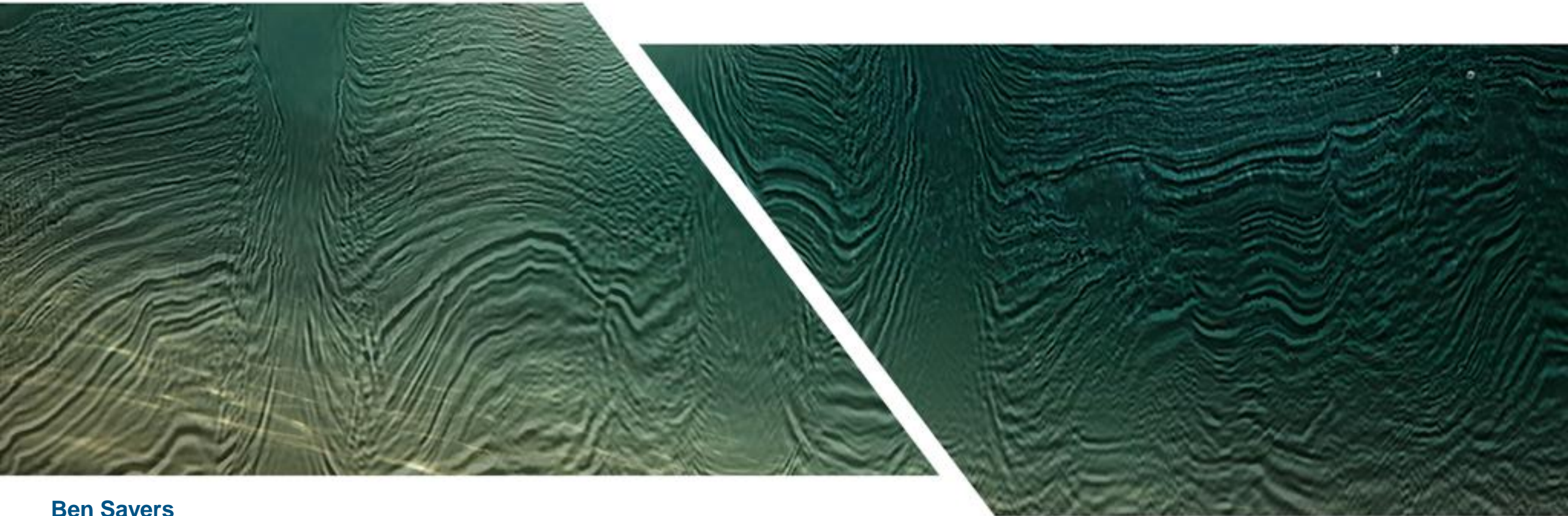




# Status and true future potential of the MSGBC Basin



**Ben Sayers**

Project Developer – Africa, Mediterranean & Middle East

2<sup>nd</sup> March 2017

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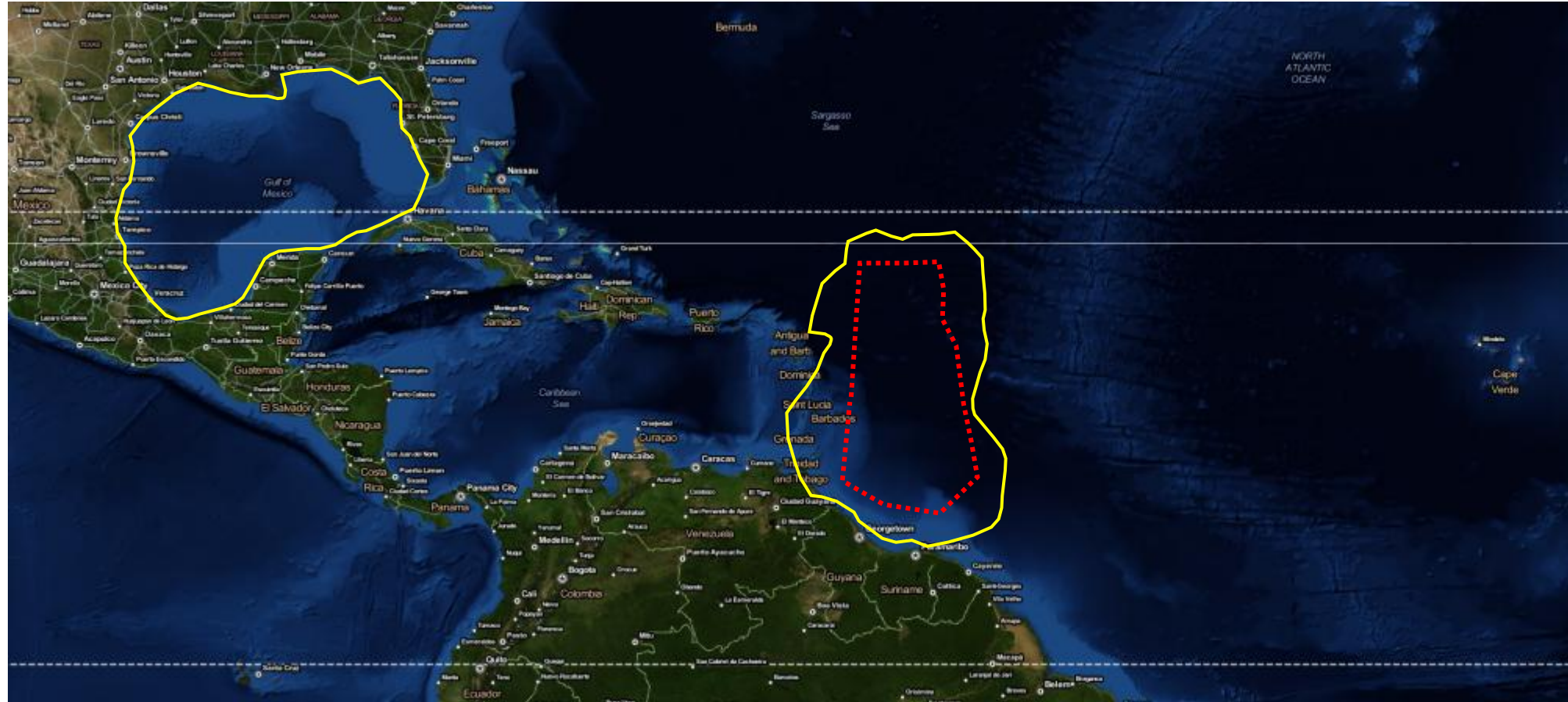
# What is the MSGBC Basin?

Mauritania, Senegal,  
Gambia, Bissau, Conakry  
(MSGBC)  
Basin

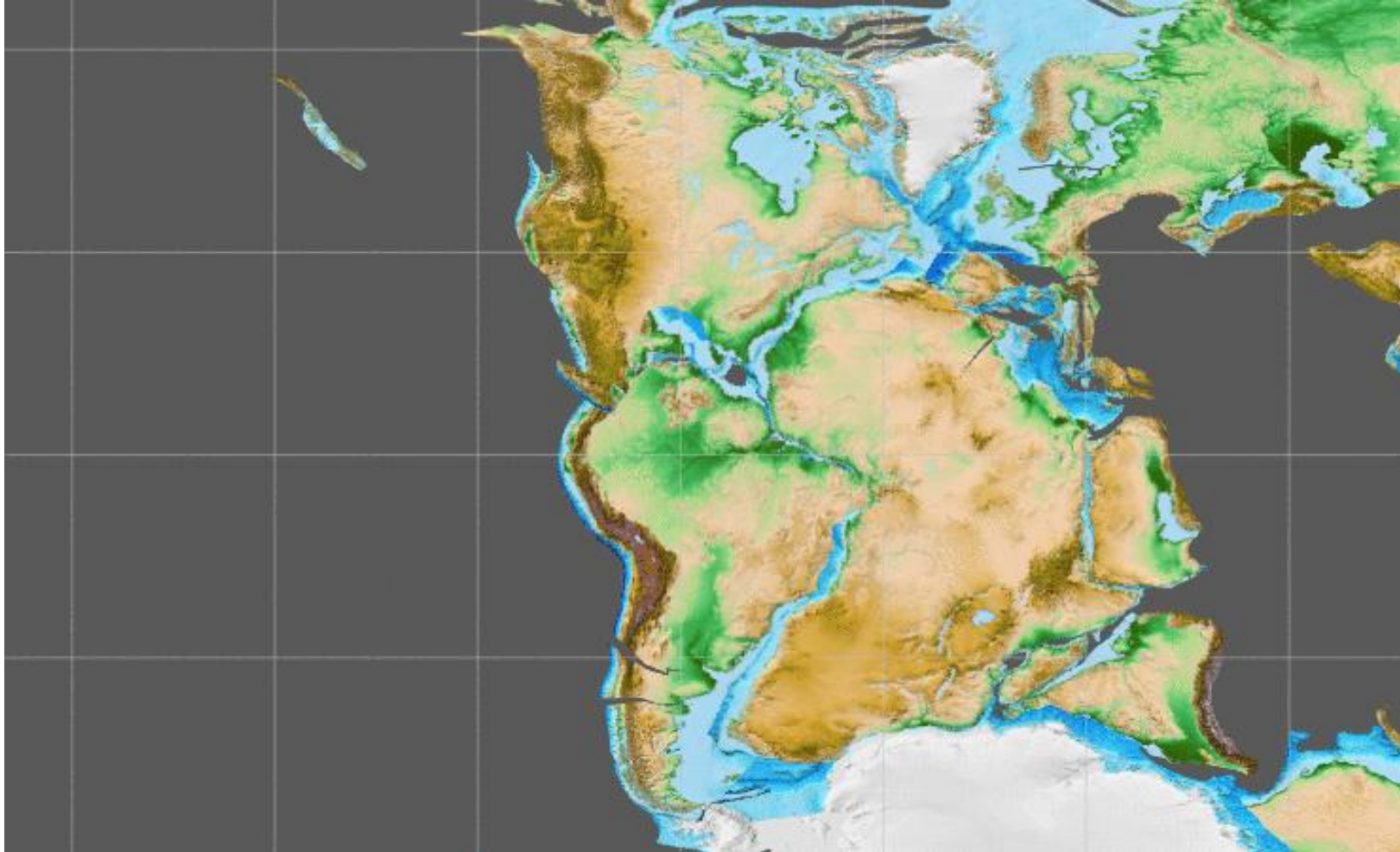




# MSGBC Basin extent



# Plate Reconstruction



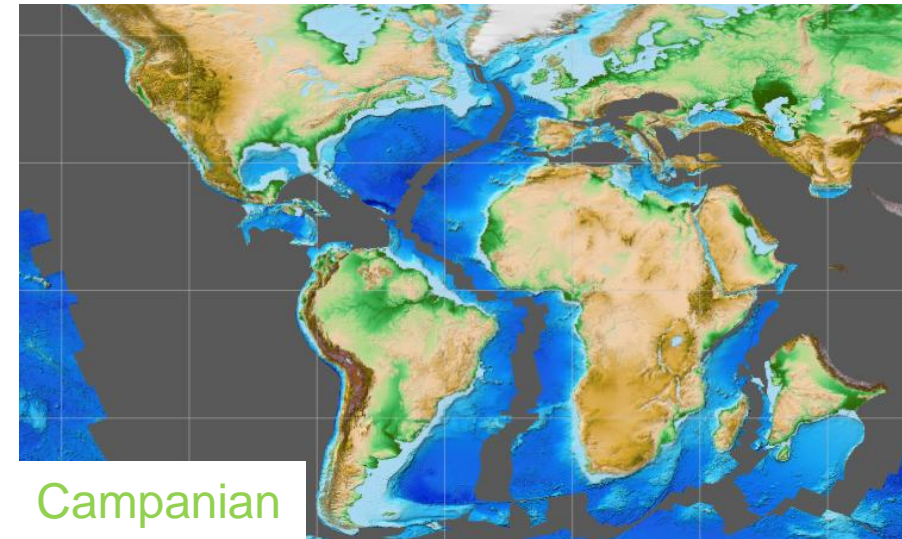
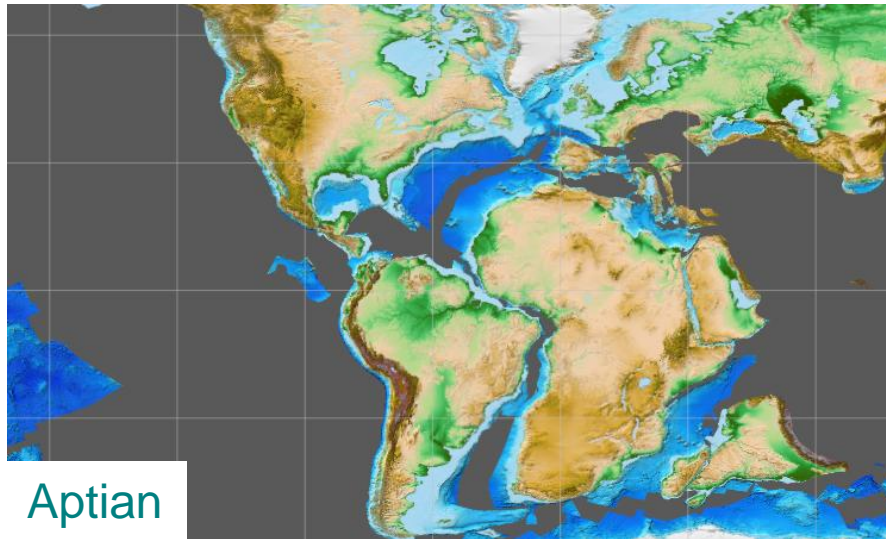
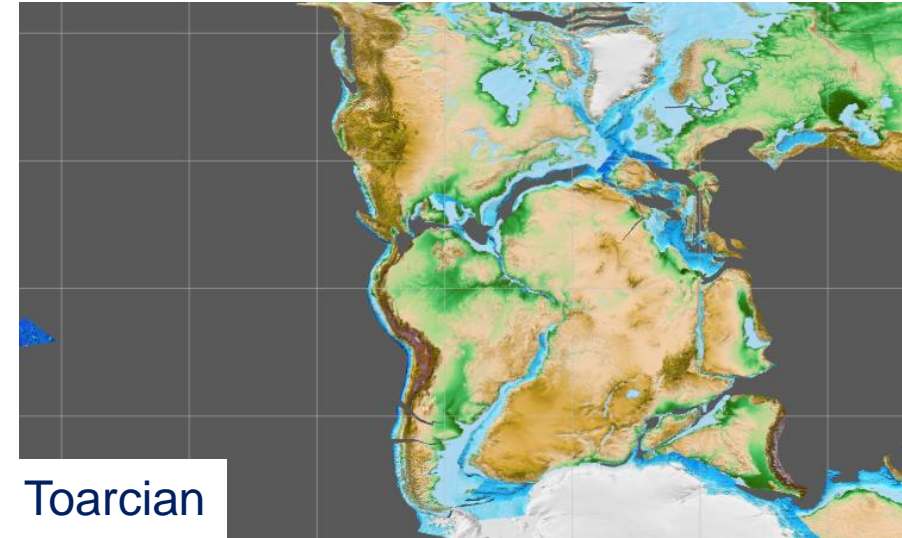
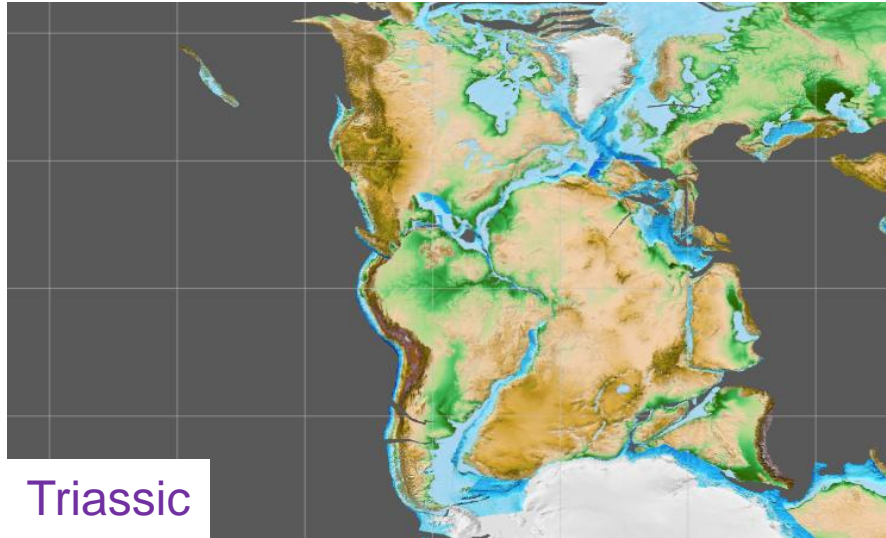
The Basin has undergone a complex history that can be divided into 3 main stages of development:

- the pre-rift (Precambrian to Paleozoic)
- syn-rift (Permian to Early Jurassic)
- post-rift (Middle Jurassic onwards)

Adapted from outputs from Gplates - EarthByte Research Group, School of Geosciences, The University of Sydney, Australia

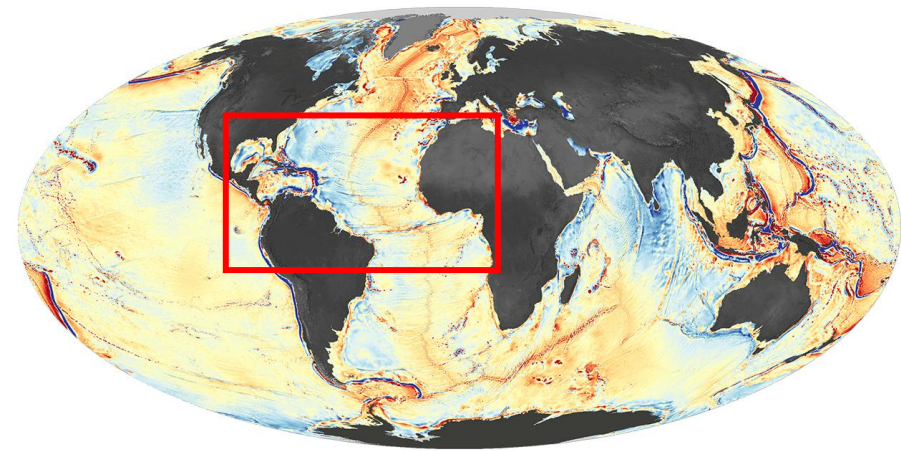


# Plate Reconstruction



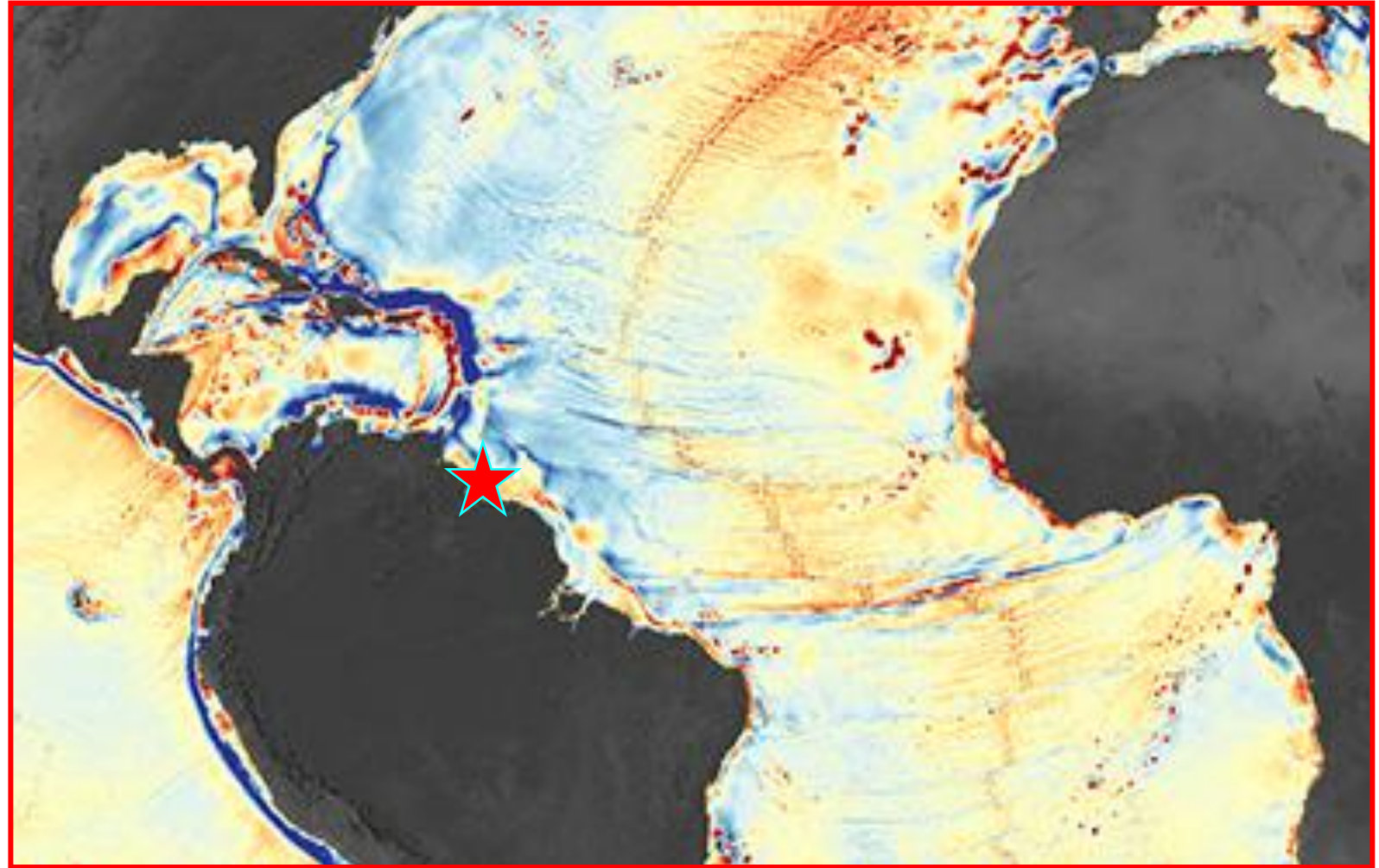


# Conjugate Success



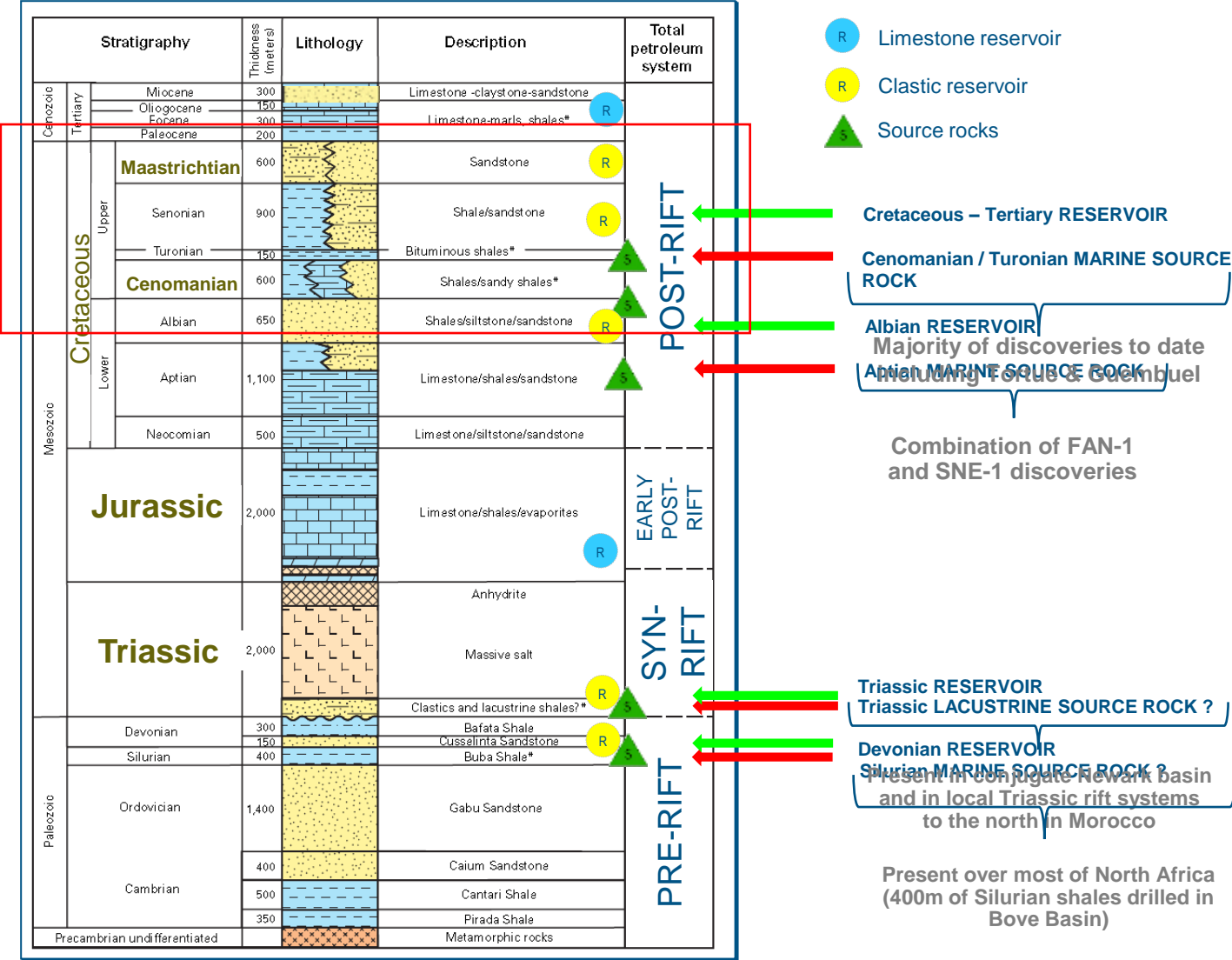
2016 success in Guyana by ExxonMobil with Liza-1 and recent appraisals in Liza-2&3, followed by Payara-1 put reserves at **1 billion barrels** of oil equivalent recoverable

New wildcat spudded 27<sup>th</sup> February 2017.



Source: NASA Global Gravity Ocean Floor

# MSGBC regional stratigraphy



M. Brownfield and R. Charpentier, 2003





# Exploration History

# Exploration history

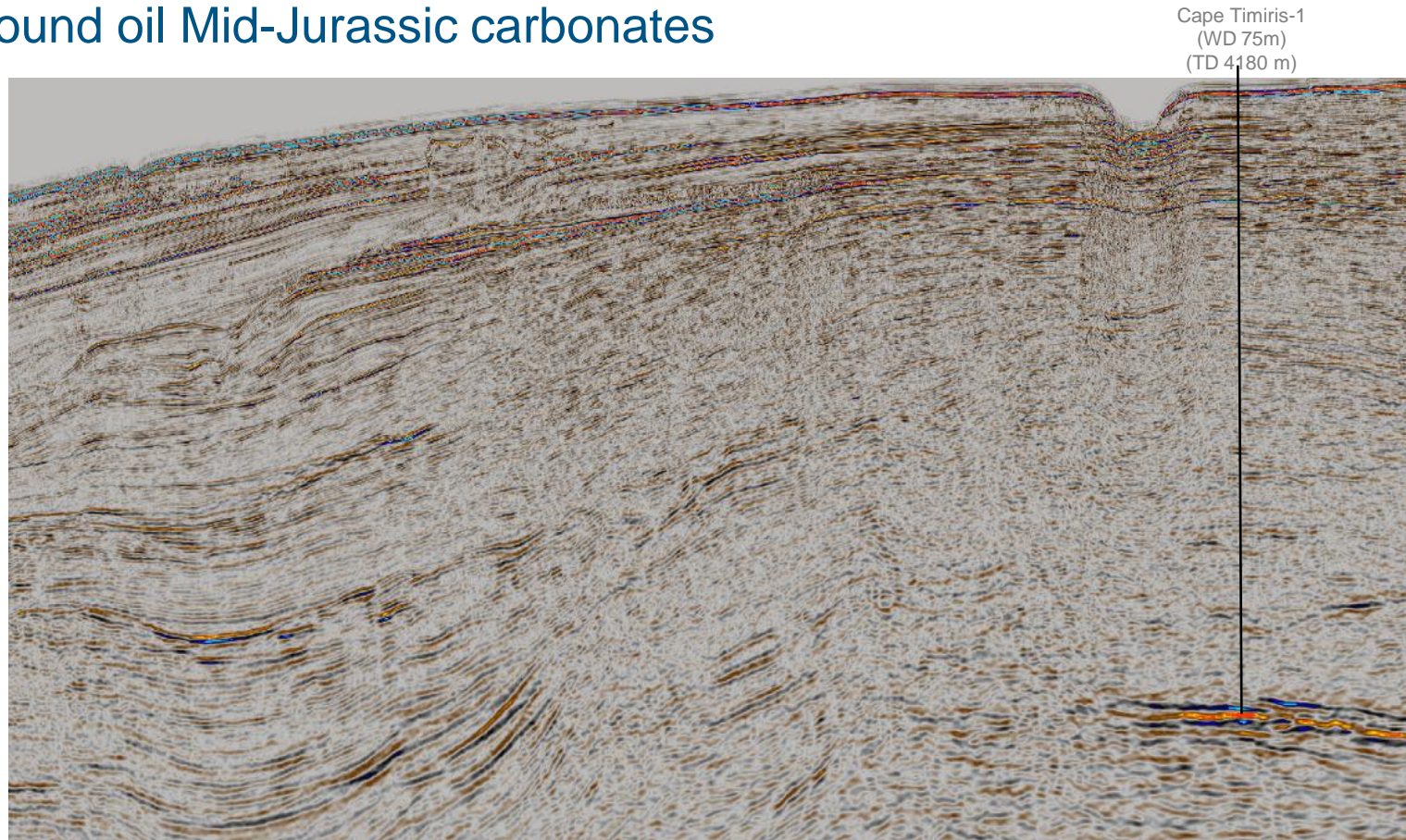
- Active drilling since 1950s
- 1954 Tienba-1 was first 'modern day' well which had hydrocarbon shows (gas)
- 1955 Dakar-1 first 'modern day' well that had oil shows proving the correct thermal regime
- 1966 – Casamance Marine 1 (CM-1) was the first well drilled offshore, though dry
- 1967 – CM-5 & CM-6 found very heavy oil 10-11°API



# Exploration history –

## Carbonate reservoirs in Mauritania

- Late 60s – Carbonate reservoirs with oil shows in Mauritania were drilled, opening up a new play
- Cape Timiris-1 found oil Mid-Jurassic carbonates

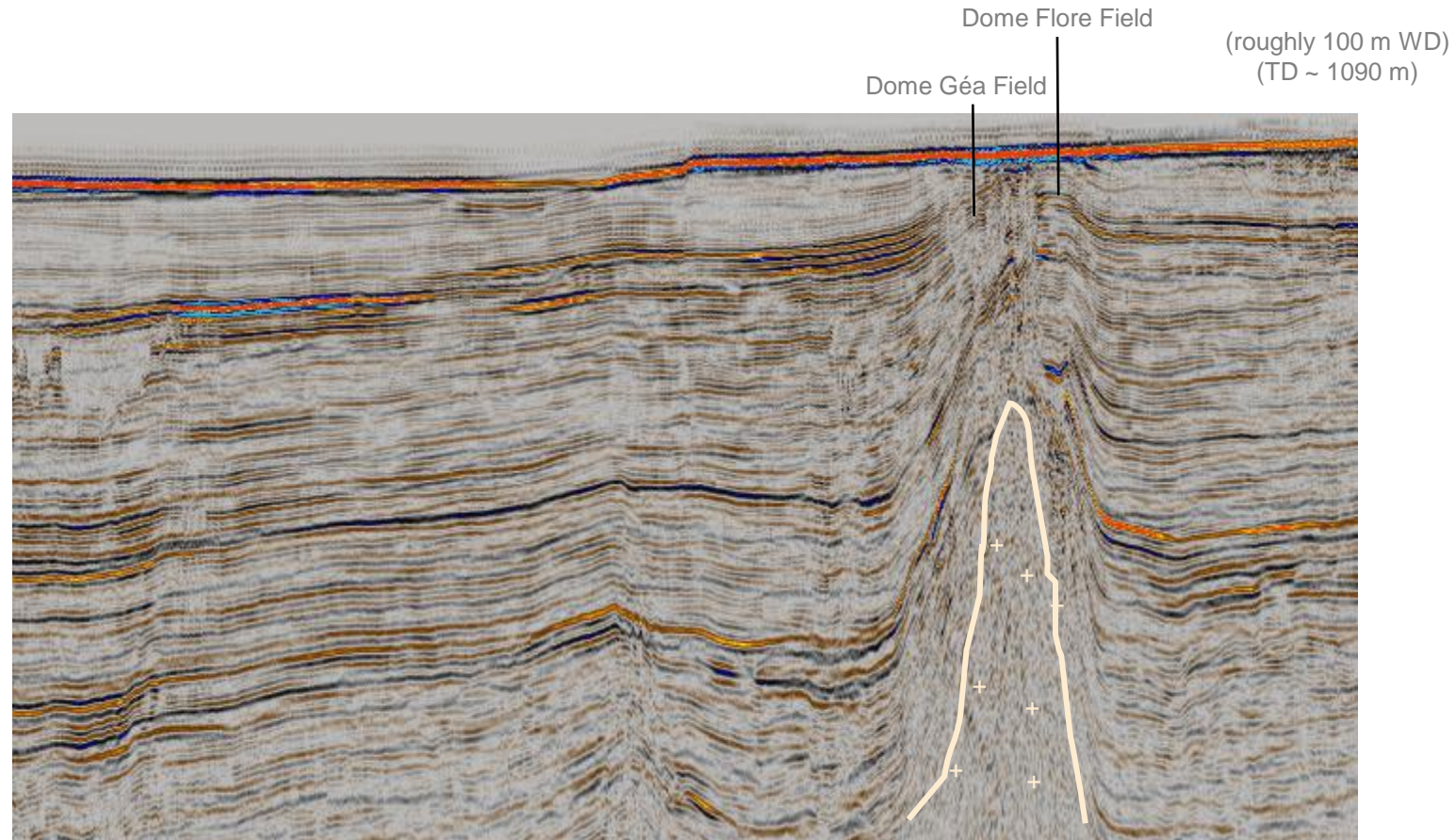




# Exploration history –

Dome Flore and Dome Géa fields discovered AGC

- In the early 70s the Dome Flore and Géa wells were drilled discovering over a Billion Barrels over heavy oil in Oligocene

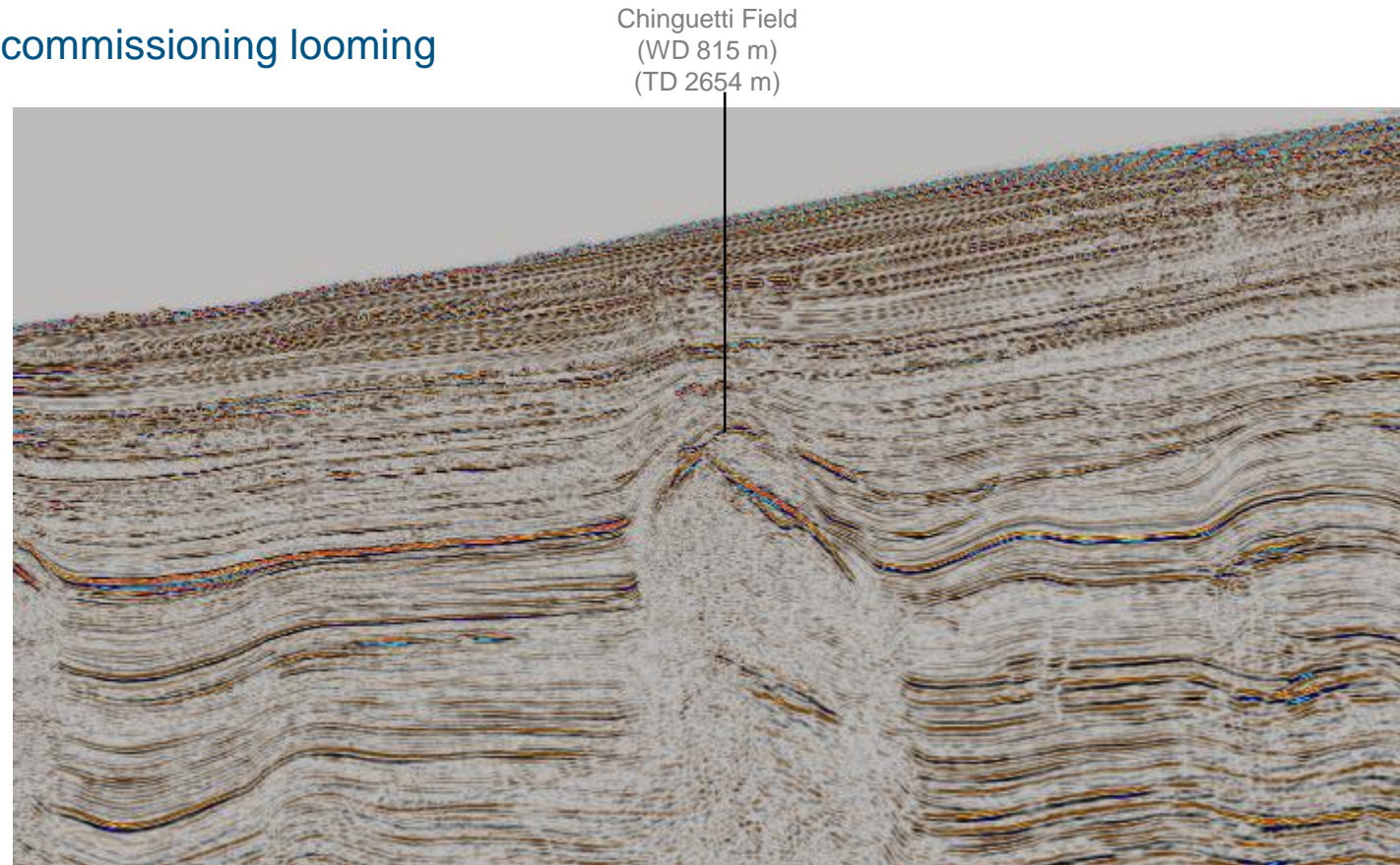




# Exploration history –

## Chinguetti field discoveries in Mauritania

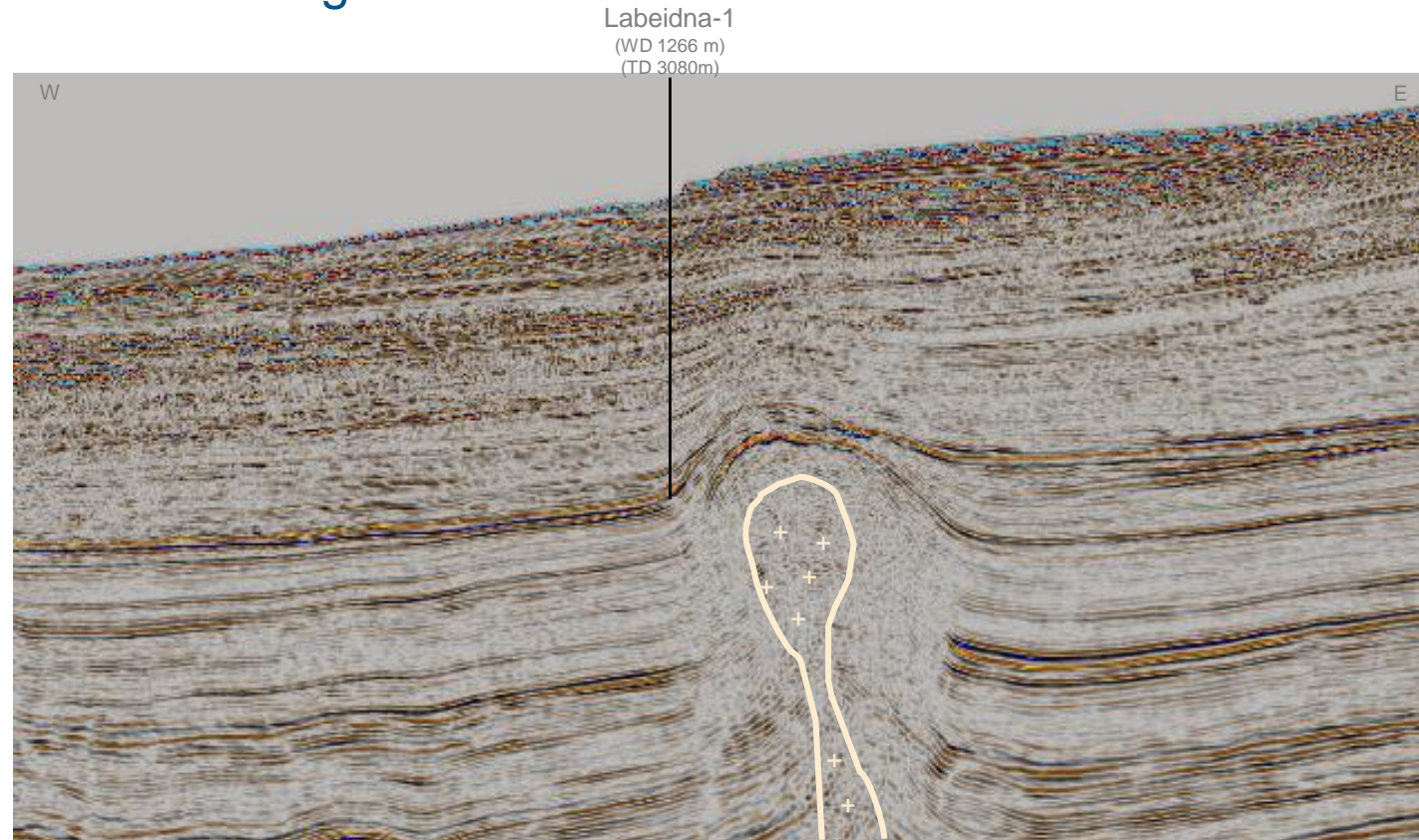
- Discovered by Woodside in 2001 ~ 34 MMBOE (2P reserves)
- 80 km offshore Mauritania – 12km<sup>2</sup> closure
- Currently being produced by Petronas at about 6,000 bpd from Tertiary Sandstones - Only current offshore production
- Production declining – decommissioning looming



# Exploration history –

Miocene Turbidite Play (drilled 2005)

- Labeidna-1 Miocene turbidite 4WD sand play onlapping salt diapir
- Drilled by Woodside found 160 m gross oil interval ~ 50 MMBO

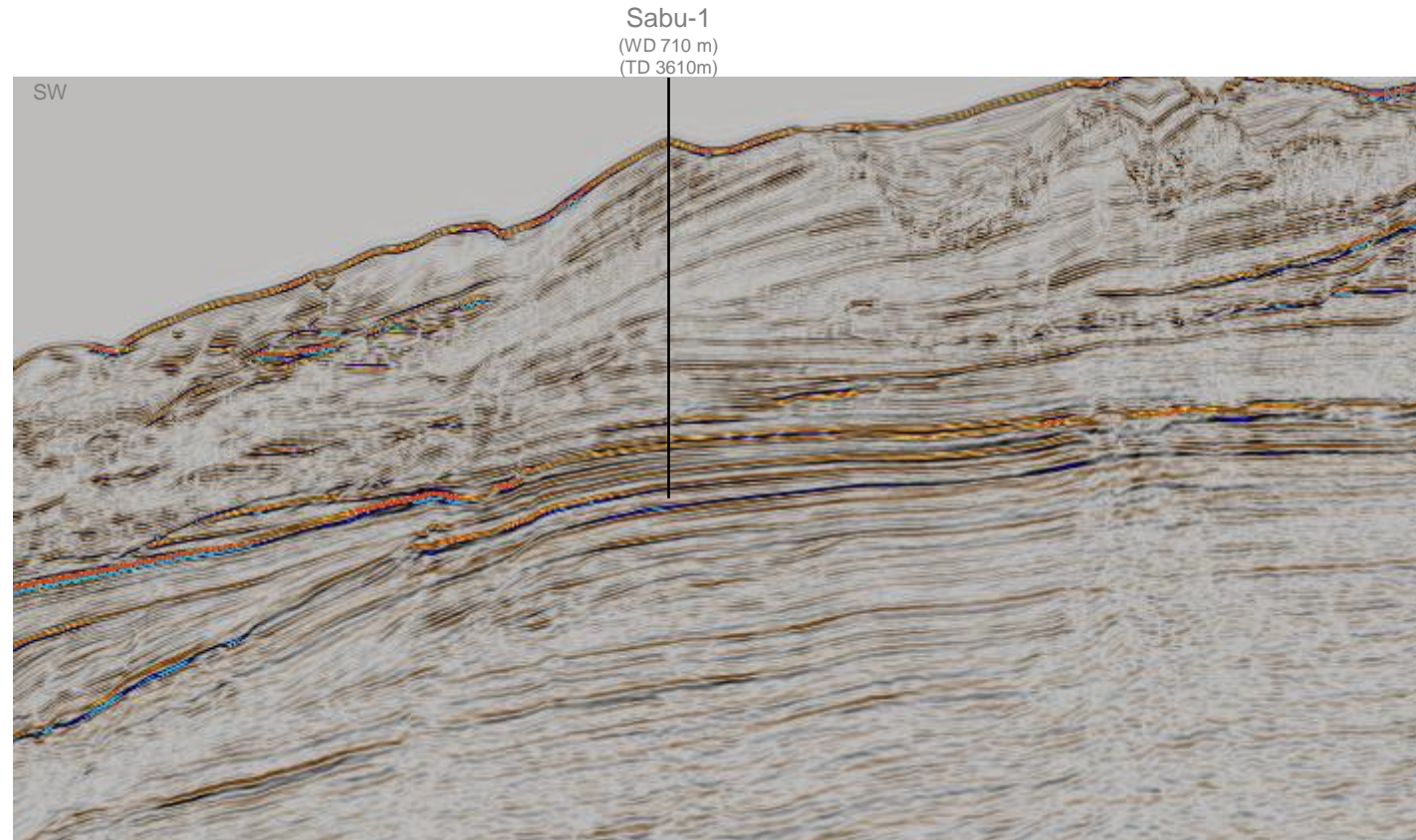




# Exploration history –

First oil discovered in Guinea Conakry (2012)

- Sabu-1 was second and last well drilled in Guinea Conakry
- Turonian-Santonian reservoir sands with signs of oil migration pathway or breached seal







# **Recent discoveries**



## Drilling resumed in Senegal after 26 year hiatus

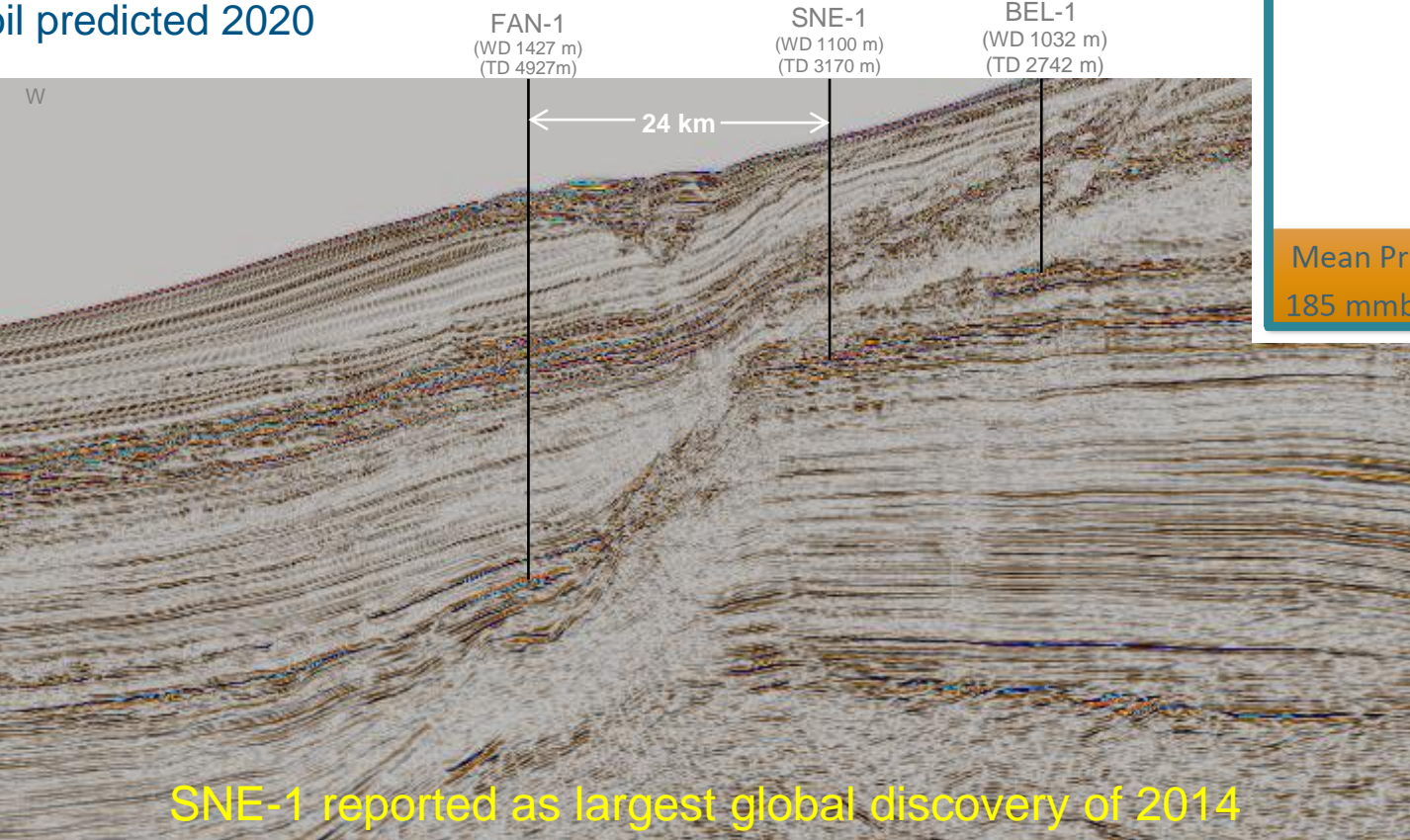
- ian reservoir
- W
- FAN-1  
(WD 1427 m)  
(TD 4927m)
- 24 km
- SNE-1  
(WD 1100 m)  
(TD 3170 m)
- BEL-1  
(WD 1032 m)  
(TD 2742 m)
-



# Exploration history –

SNE-1, SNE-2, SNE-3, SNE-4 – Lupa Lupa

- 30 m net reservoir interval over 60-100 km<sup>2</sup> area
- SNE-2 flowed 32°API oil at a rate of ~9,000 BPD from two zones
- Same age reservoir and source as FAN-1 but not the same mix of APIs
- First oil predicted 2020



Pre Drill  
(October 2014)



0 1 2 3 4 5  
Km

Mean Prospective Resource  
185 mmbbls (Albian Clastics)

Post SNE-4  
(August 2016)



0 1 2 3 4 5  
Km

STOIIP (mmbbls)

1C 1860 2C 2740 3C 4150

Contingent Resource (mmbbls)

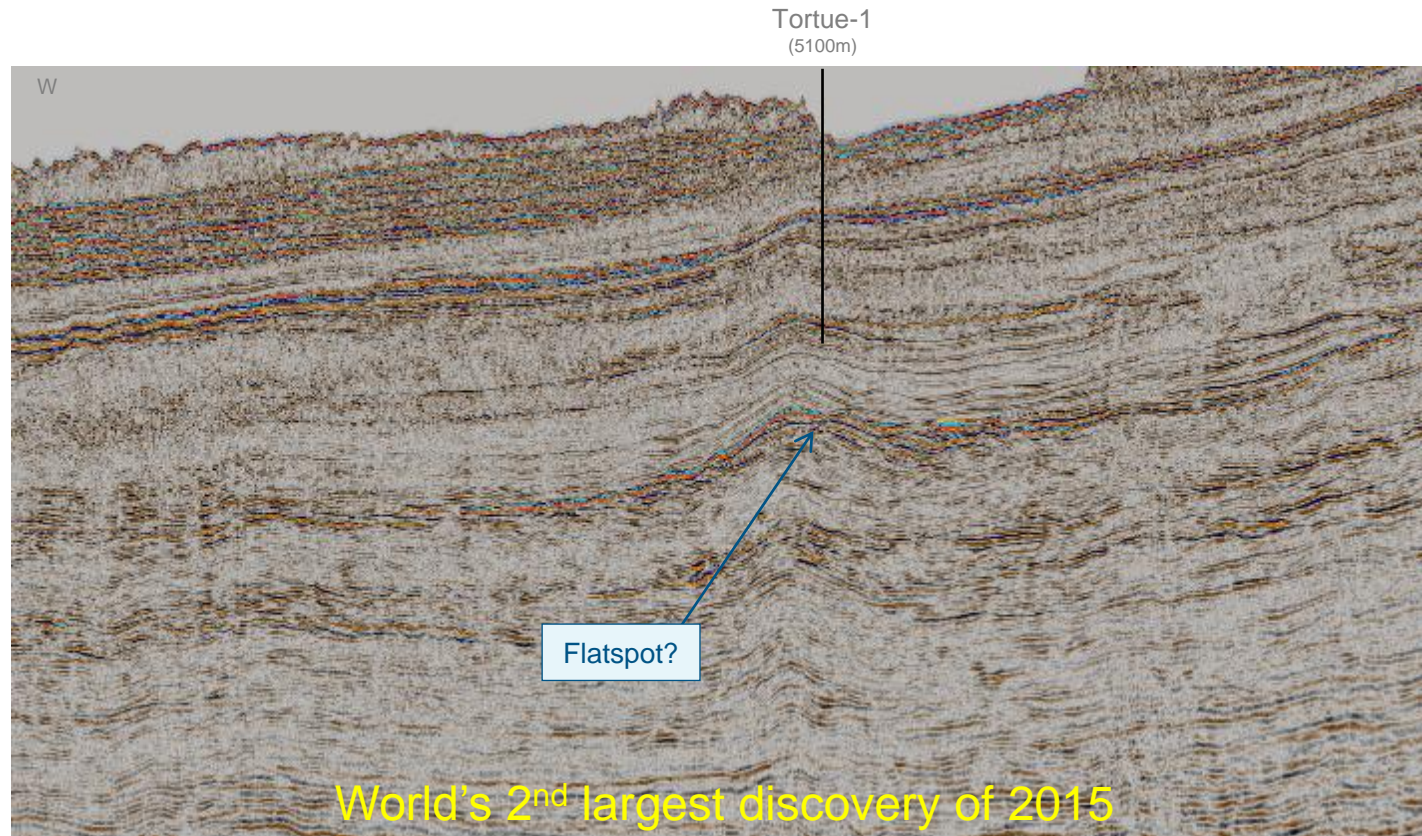
1C 274 2C 473 3C 906



# Exploration history – 2015

Ahmeyim Discovery → Tortue-1 (Mauritania)

- Tortue-1 found 117 m of net gas pay in excellent poro-perm Cenomanian & Albian reservoirs
- Slope/channel reservoirs in structural /stratigraphic trap
- 5-8 TCF

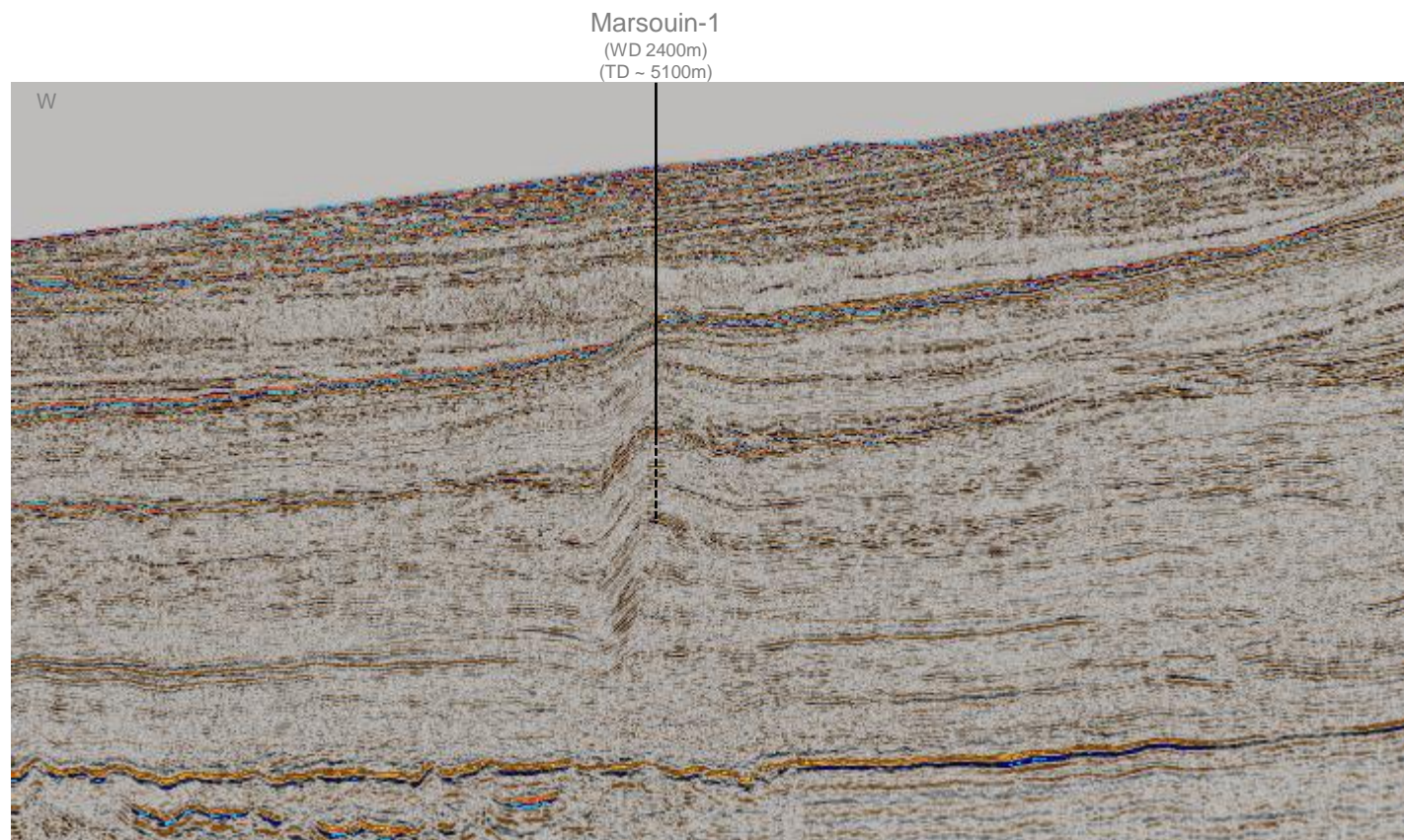




# Exploration history – 2015

## Marsouin-1 (Mauritania)

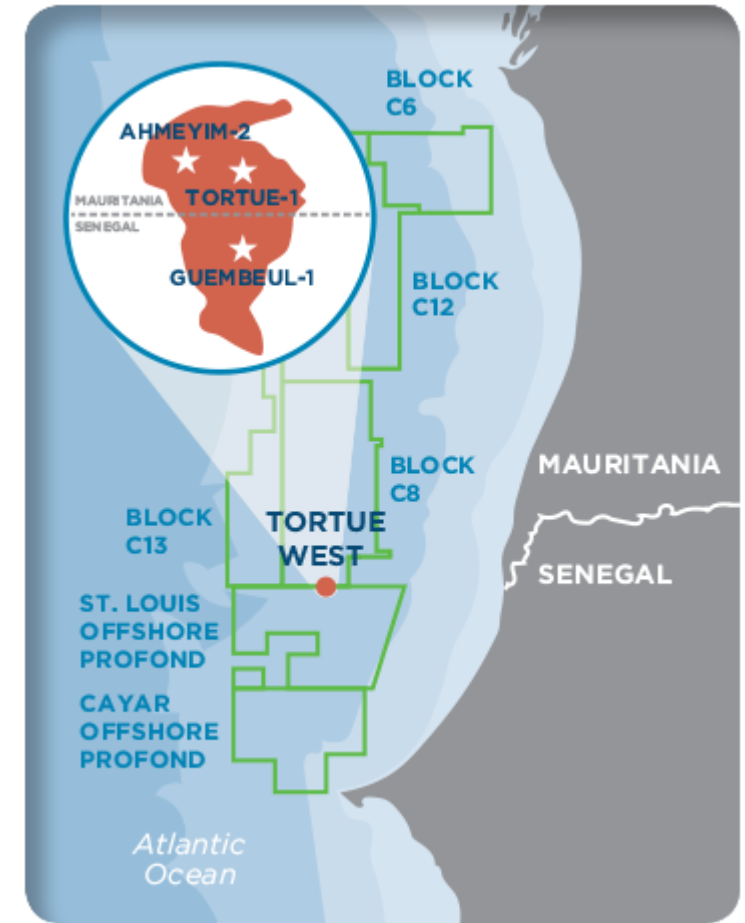
- Marsouin-1 found 70 m of net gas pay in excellent poro-perm Upper and Lower Cenomanian reservoirs
- 60 km north of Tortue
- ~5 TCF gas





## Ahmeyim Discovery → 2016 Guembeul-1 (Senegal)

- Guembeul-1  
(WD 2700 m)  
(TD 5245 m)

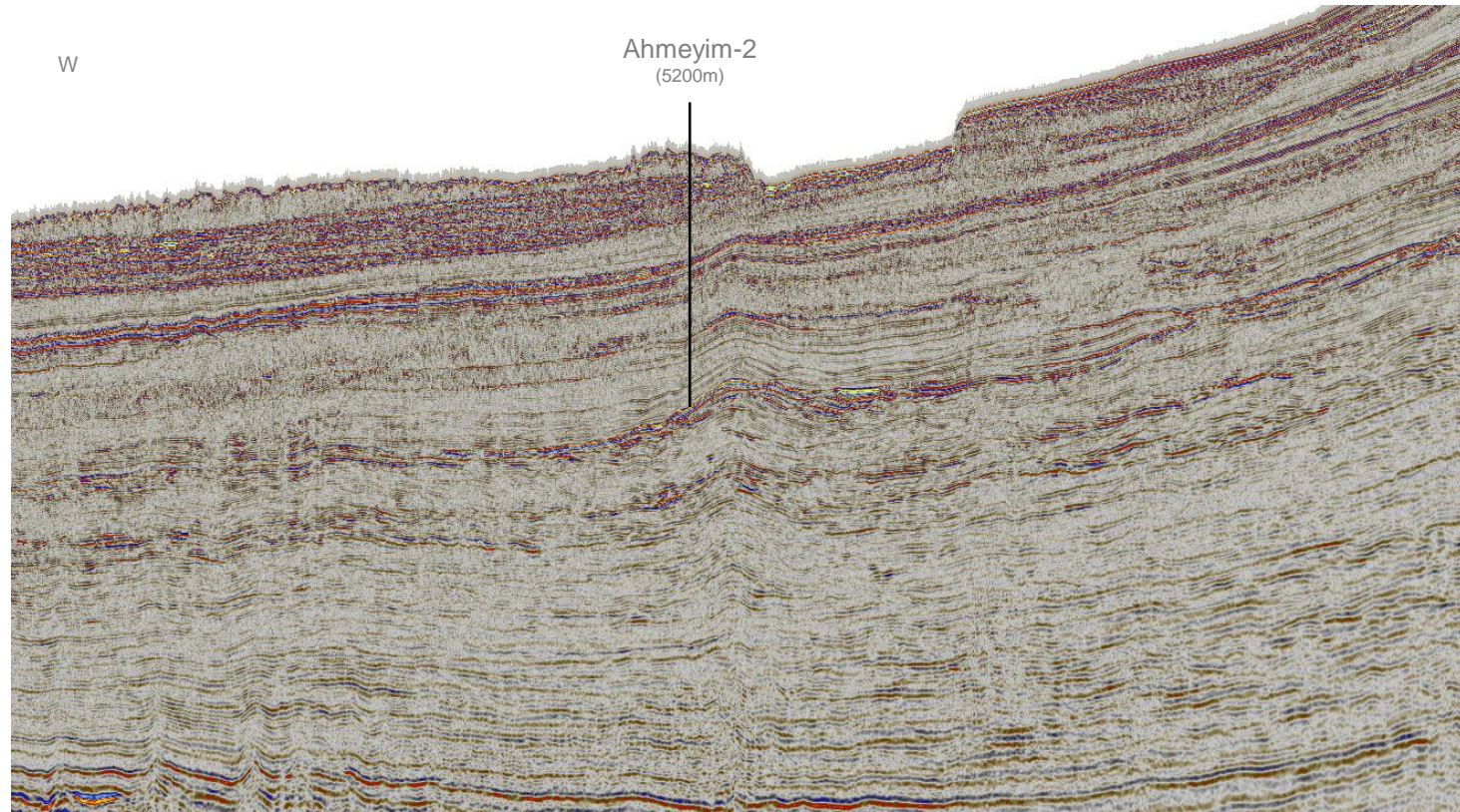




# Exploration history –

Ahmeyim Discovery → Ahmeyim-2 (Mauritania)

- Ahmeyim-2 found thickening of gross reservoir sequences with excellent quality Cenomanian & Albian reservoirs.
- Defined the field limit and extended the productive field area from approximately 50 km<sup>2</sup> → 90 km<sup>2</sup>





# Discovered Volumes

- **BP / Kosmos Group**= Greater Tortue Complex is 25 TCF = 4.3 BBOE of C2 Reserves
- **CAIRN Group**= 0.6 -1.0 BBO of C2 Reserves
- **Dome Flore**= 1.3 BBO Heavy Oil in place, > 3.0 BBO generated

This means the MSGBC Basin is now a  
**Supergiant Petroleum System**  
with more than 5 BBO (or oil equivalent)  
reserves already discovered.



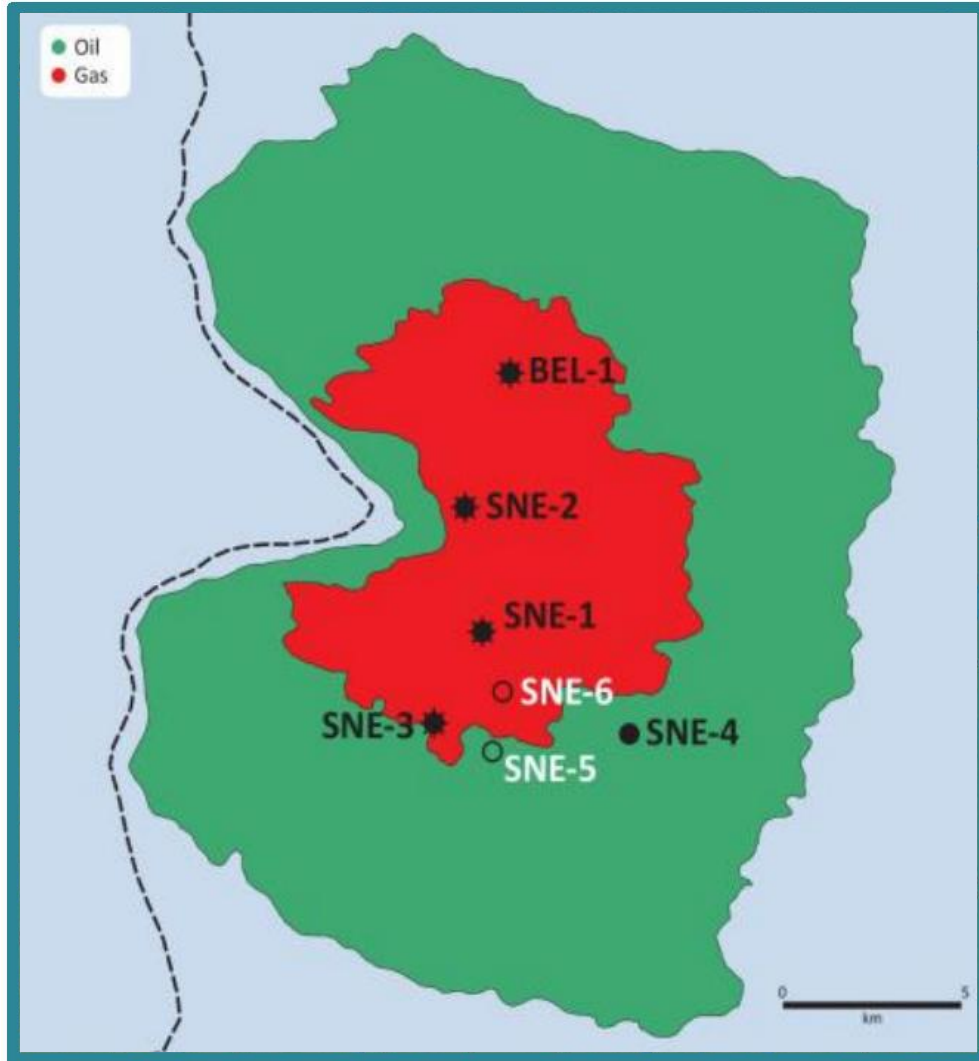




**Recent drilling**



# SNE-5



SNE Complex is now over 180 km<sup>2</sup>

SNE-5 reached TD at 2,852 m below seabed on 23<sup>rd</sup> February 2017

SNE-5 drilled to evaluate the potential of the LupaLupa field ready for optimum location of production wells.

Logging completed → Drill Stem Testing underway

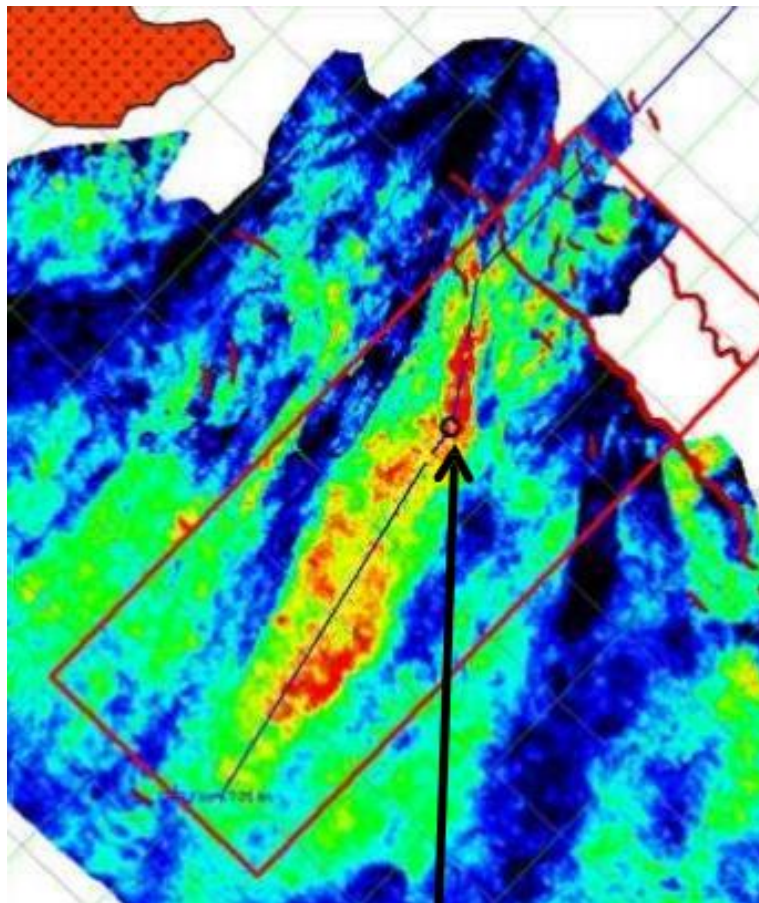
Drill ship moving to SNE-6 location for immediate drilling





# Fatala-1

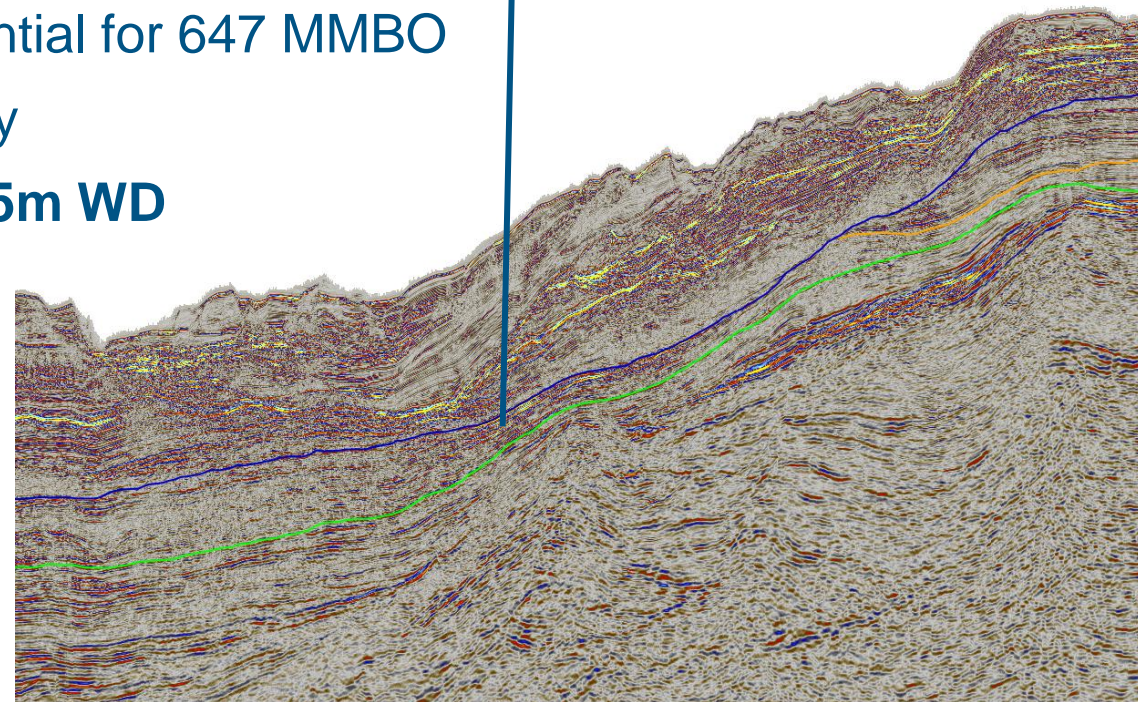
3<sup>rd</sup> Offshore well in Republic of Guinea



Fatala-1  
location



Mean resource potential for 647 MMBO  
Cenomanian fan play  
\$40-50m cost – **2895m WD**



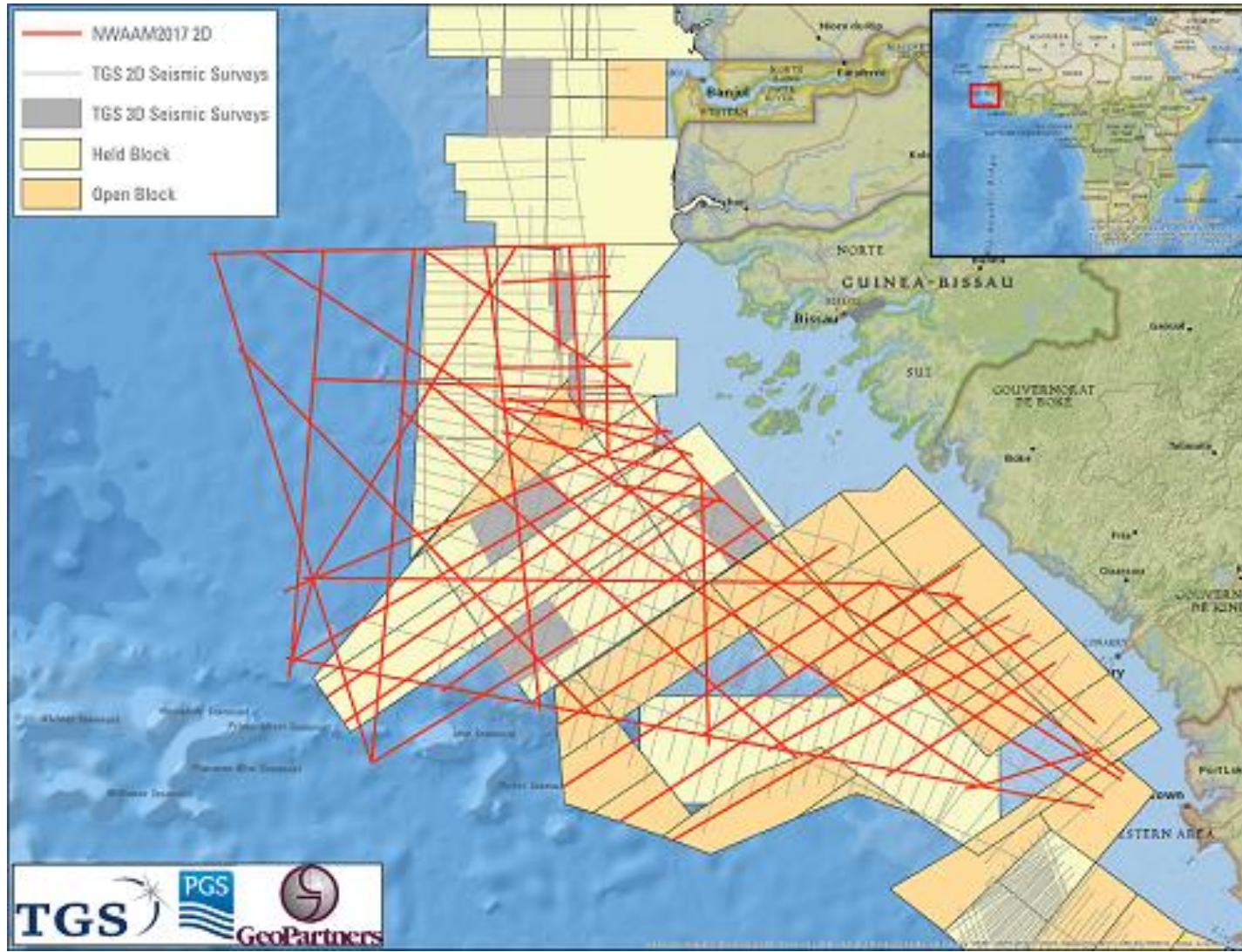




# New Data



# New Seismic Acquired in Basin



Gun Depth: 8 meters  
Shotpoint Interval: 25 meters  
Streamer Depth: 18 meters  
Streamer Length: 12 km  
Record Length: 14050 ms  
Sample Interval: 2 milliseconds  
Nominal Fold: 240

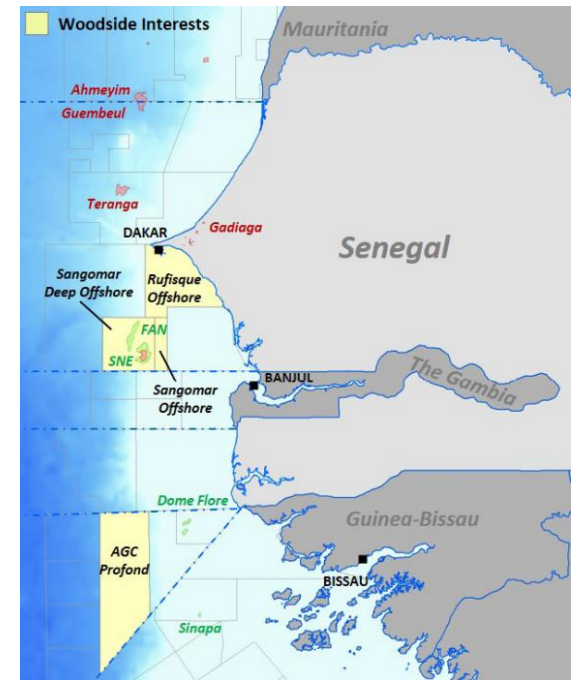
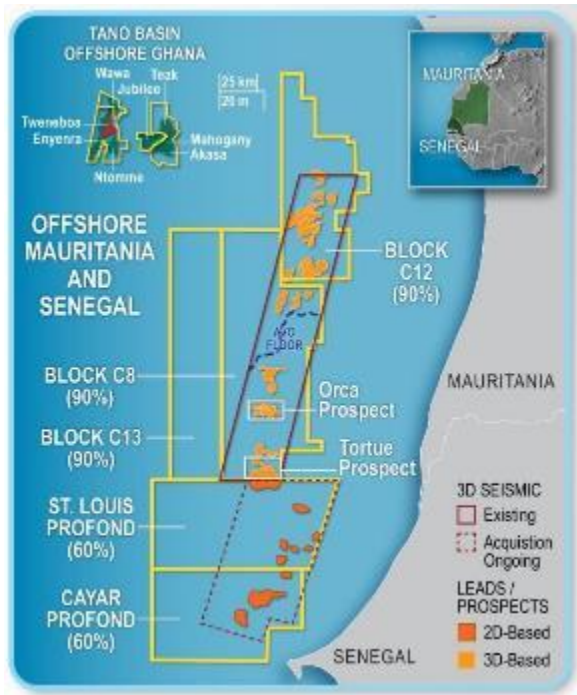




**Deals**

# Farm-ins

- Woodside acquired ConocoPhillips interest in Senegal blocks to partner with Cairn and Far for \$315 million July 2014
- Delayed due to FAR believes a valid pre-emptive rights notice was not been issued to the JV partners by COP
  - PetroSen urges swift resolution



- BP acquired 62% interest and operatorship in Kosmos Energy's blocks in Mauritania and a 32.49% effective working interest in Kosmos' Senegal exploration blocks
- The total acreage, by Kosmos' estimates, could contain roughly 50 tcf of gas resource potential and in excess of 1 billion barrels of liquids resource potential.
- BP will invest nearly \$1 billion mostly in the form of a multi-year exploration and development carry.





# Country Updates

# Country Updates

- Mauritania
  - President Abdel Aziz declared in October that he intended to stand down at the end of his term in 2019.
  - New ministry officials
- Senegal
  - New Petroleum Law expected mid-2017
  - Bid round intention
- Islamic Republic of The Gambia
- AGC
  - Extension of the agreement between Guinea-Bissau and Senegal
- Guinea-Bissau
  - New Director General of PetroGuin
- Republic of Guinea
  - New Petroleum code 2015
  - 3<sup>rd</sup> Well being spudded April 2017

**PETROLEUM LICENSE & RIGHT**

Regularly, PETROSEN organize a licensing round of the free block, on the behalf of the Government:

- Blocks and data package are presented to the oil industry, through announcement and international conference,
- The companies have a period of 6 months to buy the data, to evaluate the potential and make a proposal to the Ministry of energy
- A date of the opening of the proposal is notified to all the bidder, which is a month after the closing of the licensing period.
- The opening of the bid is public and the companies can attempt to the event.
- After a full evaluation of the bid, the Minister call the winner company for negotiations of the PSA.

However direct negotiations are possible for licensing blocks considered as "frontier area"

New Petroleum Code – Conference MSGBC 2016

the guardian

UK world politics sport football opinion culture business lifestyle fashion environment tech travel

home world africa middle east cities development europe US americas asia australia

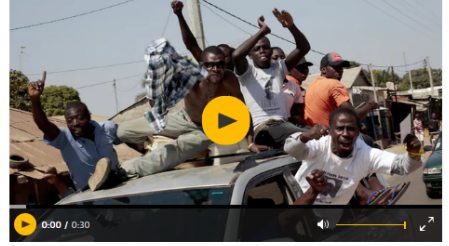
## The Gambia

### The Gambia's President Jammeh concedes defeat in election

Incoming president, Adama Barrow, says Jammeh called him offering his congratulations after shock result

This article is 2 months old

< 7,016 Ruth Maclean in Banjul and Emma Graham-Harrison Friday 2 December 2016 19:27 GMT



Gambians celebrate shock election result

The Gambia's autocratic president, Yahya Jammeh, who once claimed a "billion-year" mandate to rule, has conceded defeat after a shock election loss to a real-estate developer who once worked as a security guard in London.


Jammeh had kept the tiny west African country under an iron grip for more than two decades, and there were fears that the eccentric 51-year-old would use violence or fraud to maintain power.

Instead he became a rare dictator to accept defeat in a democratic election, agreeing to hand power to challenger Adama Barrow, a softly spoken businessman who previously had little public profile.

Barrow told the Guardian that Jammeh had called him to concede defeat with the words: "Congratulations. I'm the outgoing president, you're the incoming president."

**'Fear has faded': Gambian election could finally end dictator's grip on power**

Read more





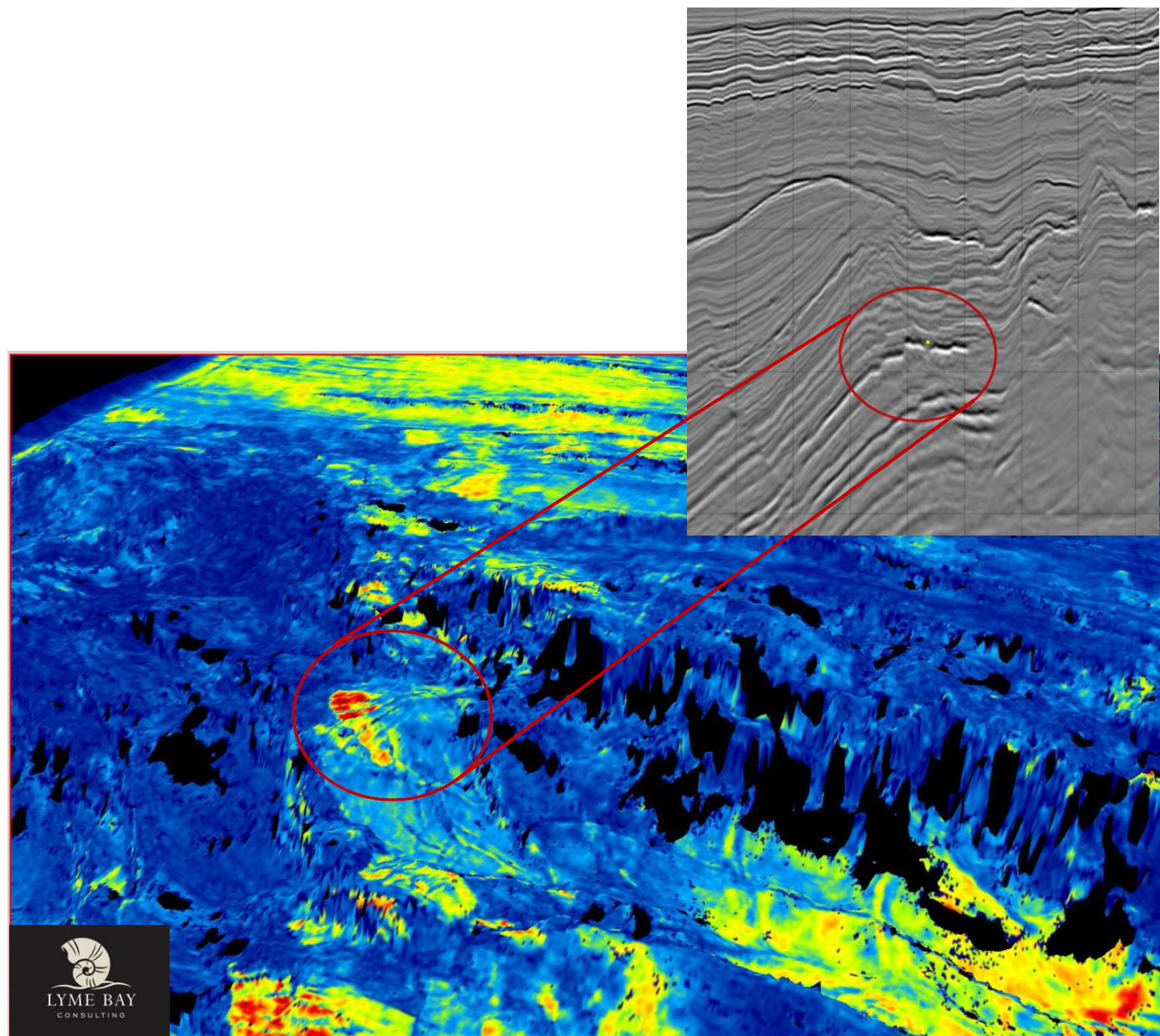


**Looking forward....**



# Future

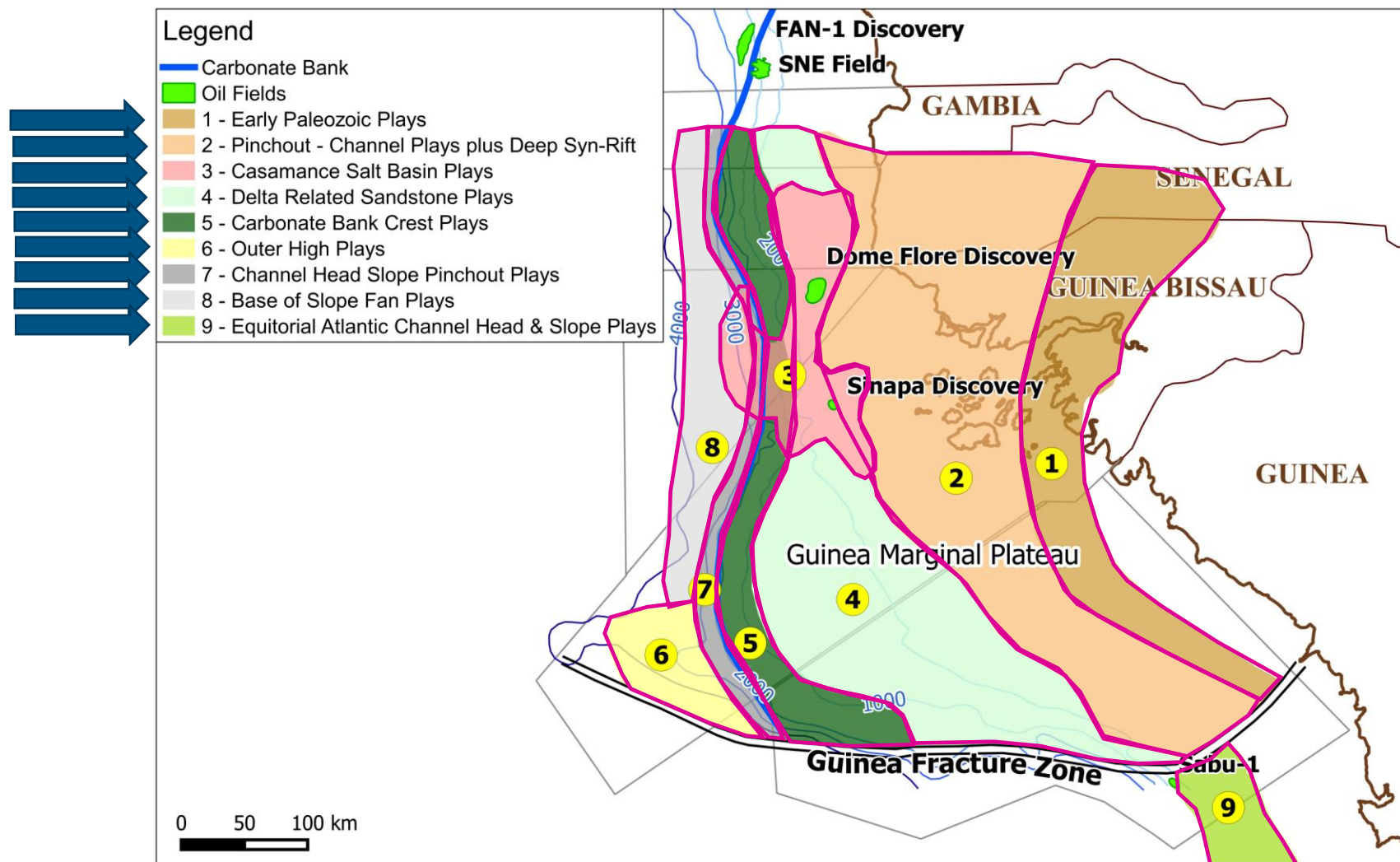
- Exploration:
  - Chasing the next SNE
  - Other plays offshore
    - Albian Play behind the SNE trend
    - Jurassic oil play
    - Deepwater play
    - Triassic / Silurian play
    - Basement plays?
  - Gas north of Dakar / Oil to the South
- New gas production facility.
- Fast followers entering the basin:
  - BP
  - Other Super-majors and majors



RMS Amplitude extraction



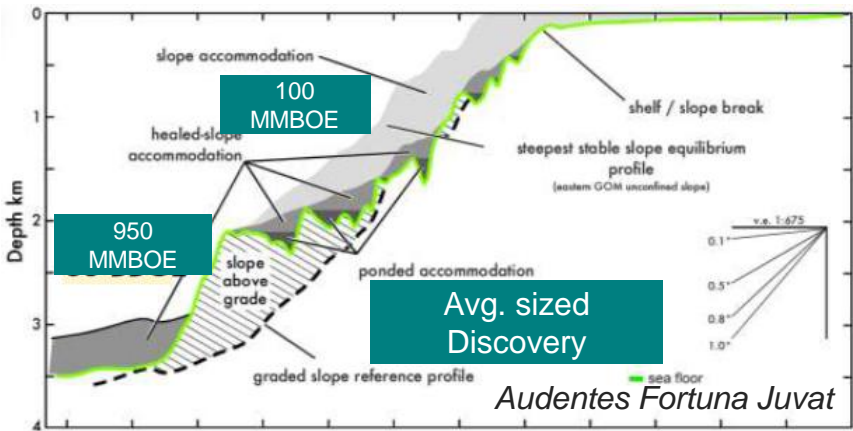
# Plays waiting to be unlocked....



GeoExpro, February 2017

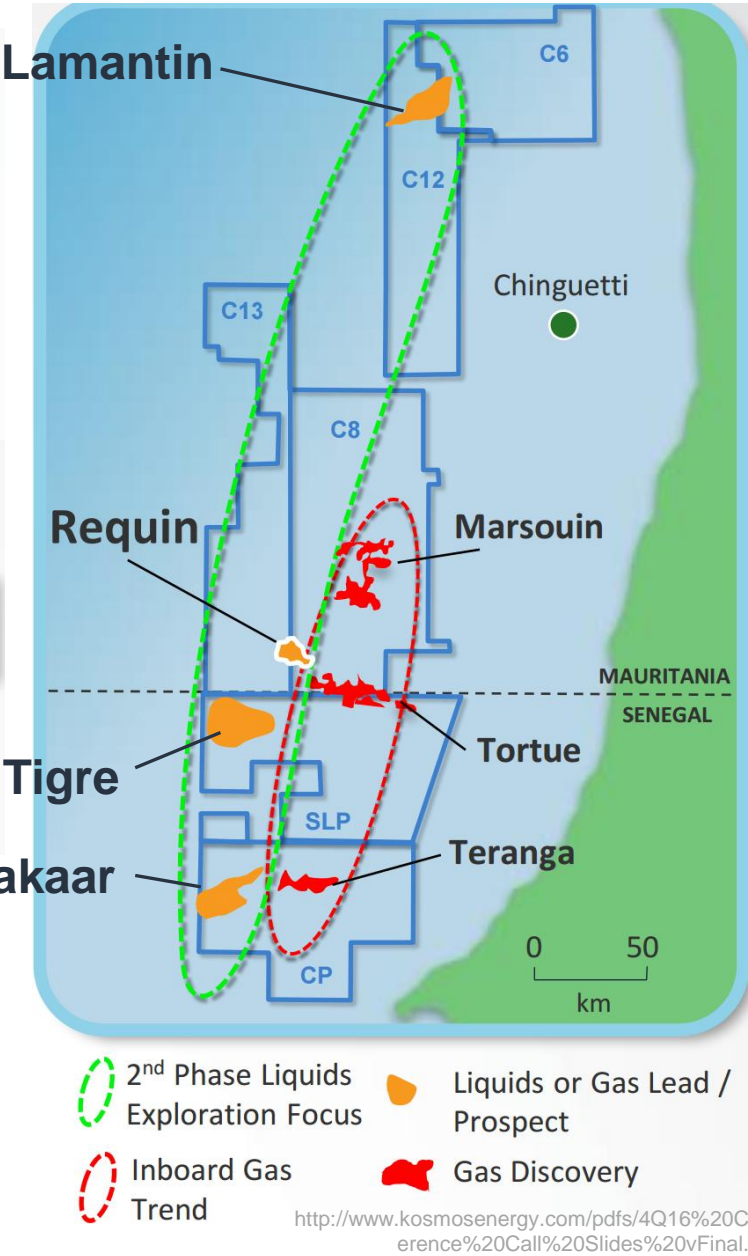
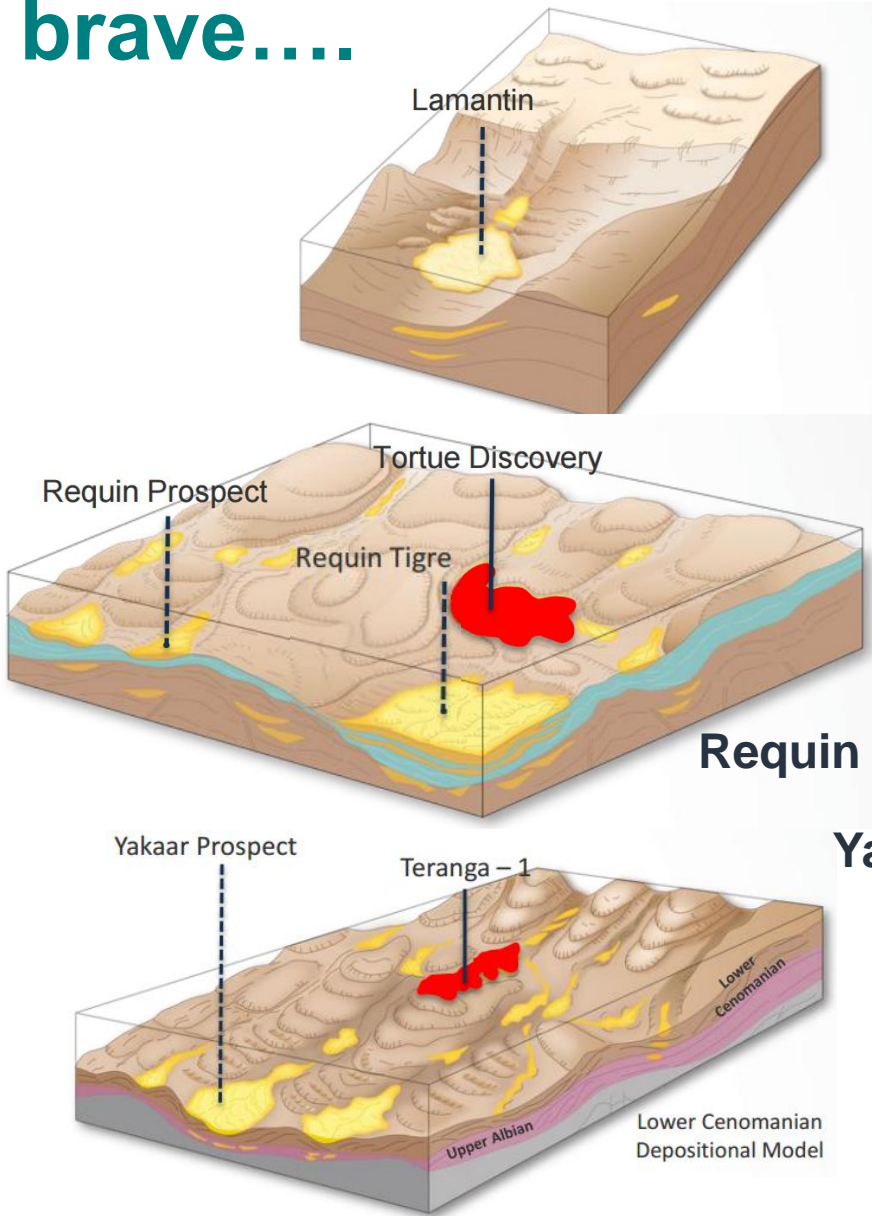


# Fortune favours the brave....



Adapted from Grant et al. 2013. Copyright SIEP BV.

Kosmos announced belief of an older, deeper source rock in the outboard area where they believe there is potential for HUGE basin floor fans 10x the size of what they have discovered so far!



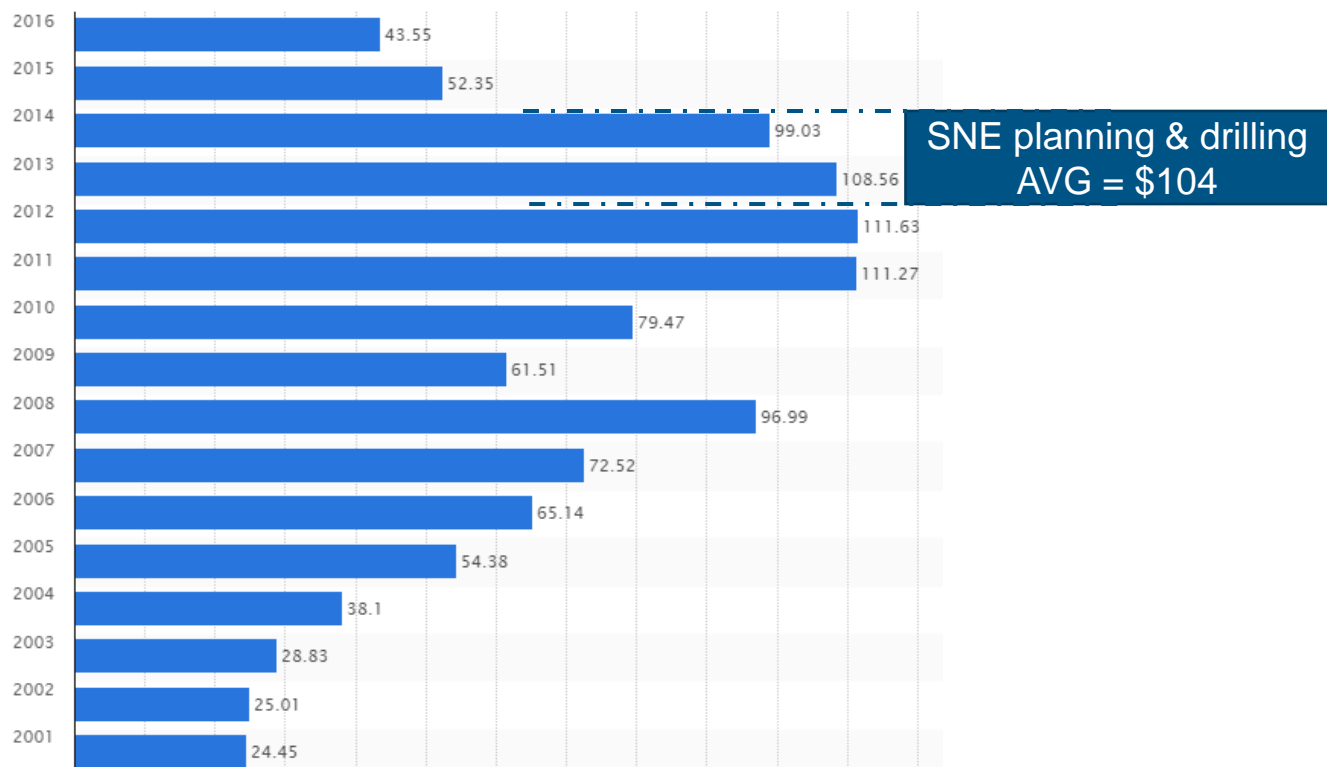
<http://www.kosmosenergy.com/pdfs/4Q16%20Conference%20Call%20Slides%20vFinal.pdf>



# Oil price

## 2001-16

- Average price of \$48 /barrel in 2016



Source: <https://www.statista.com/>

## 2017 Prediction

- Average price forecast of \$55 /barrel



Source: US Energy Information Administration



# Bright future....



# Thank you



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