



# Insights for Oil Exploration in Mozambique

AAPG  
Cape Town, November 2018

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# Sedimentary Basins

## Explored basins

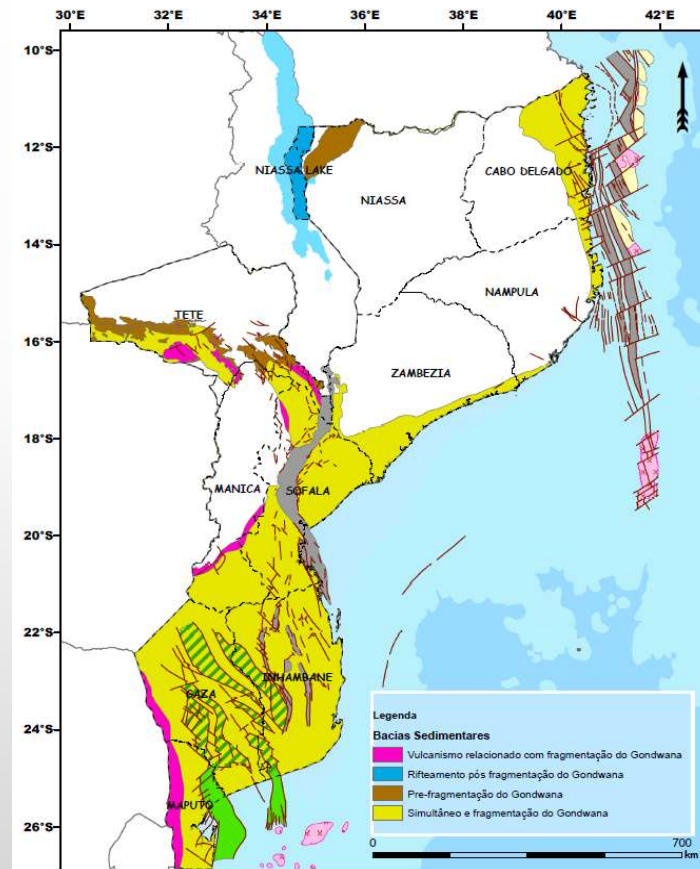
### Passive Continental Margin basins:

- Rovuma Basin (1)
- Mozambique Basin (2)

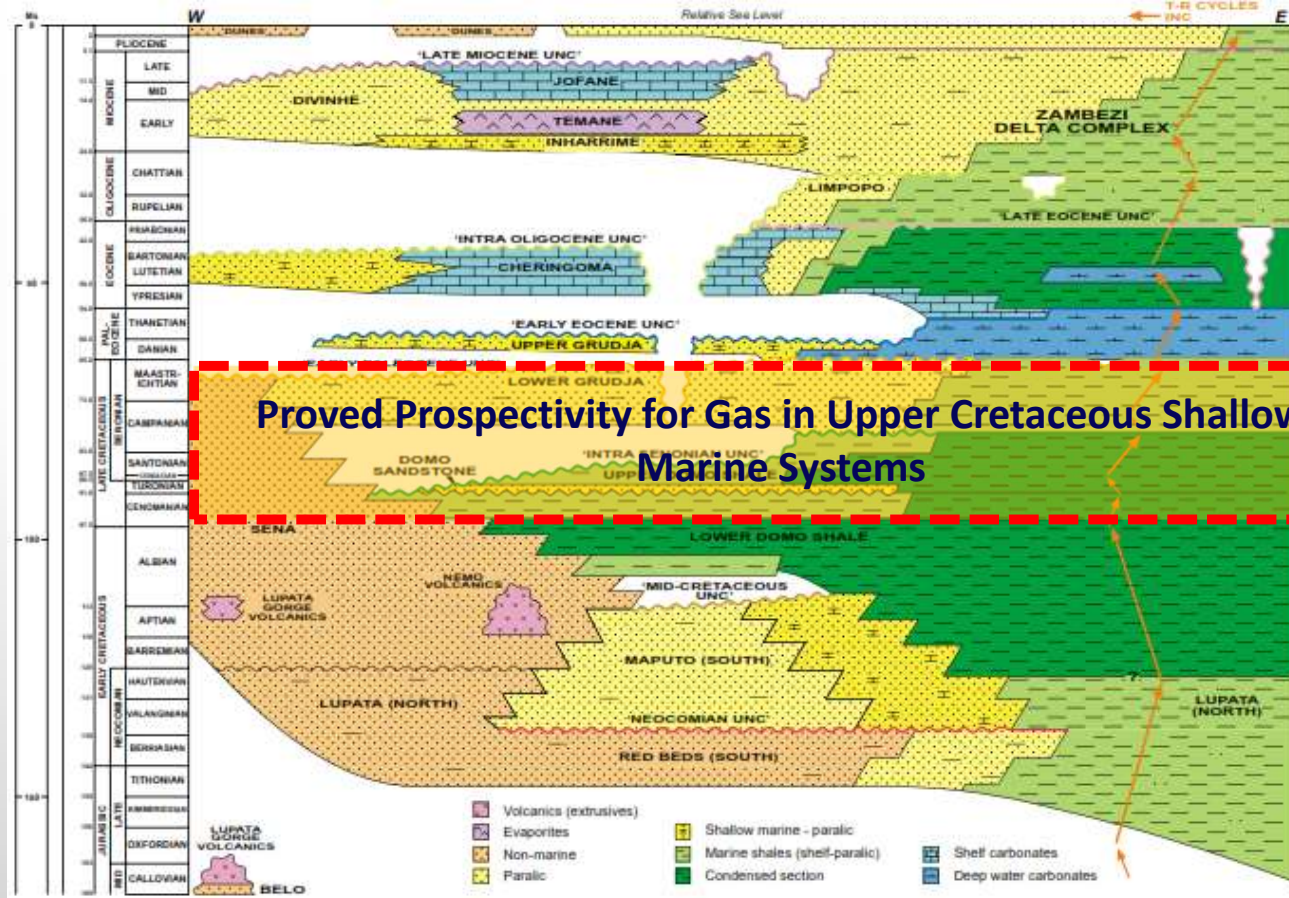
## Unexplored basins

### Graben and Rift Type basins:

- Maniamba Basin (3)
- Lake Niassa Basin (4)
- Lower Zambeze Graben (5)
- Middle Zambeze Basin (6)

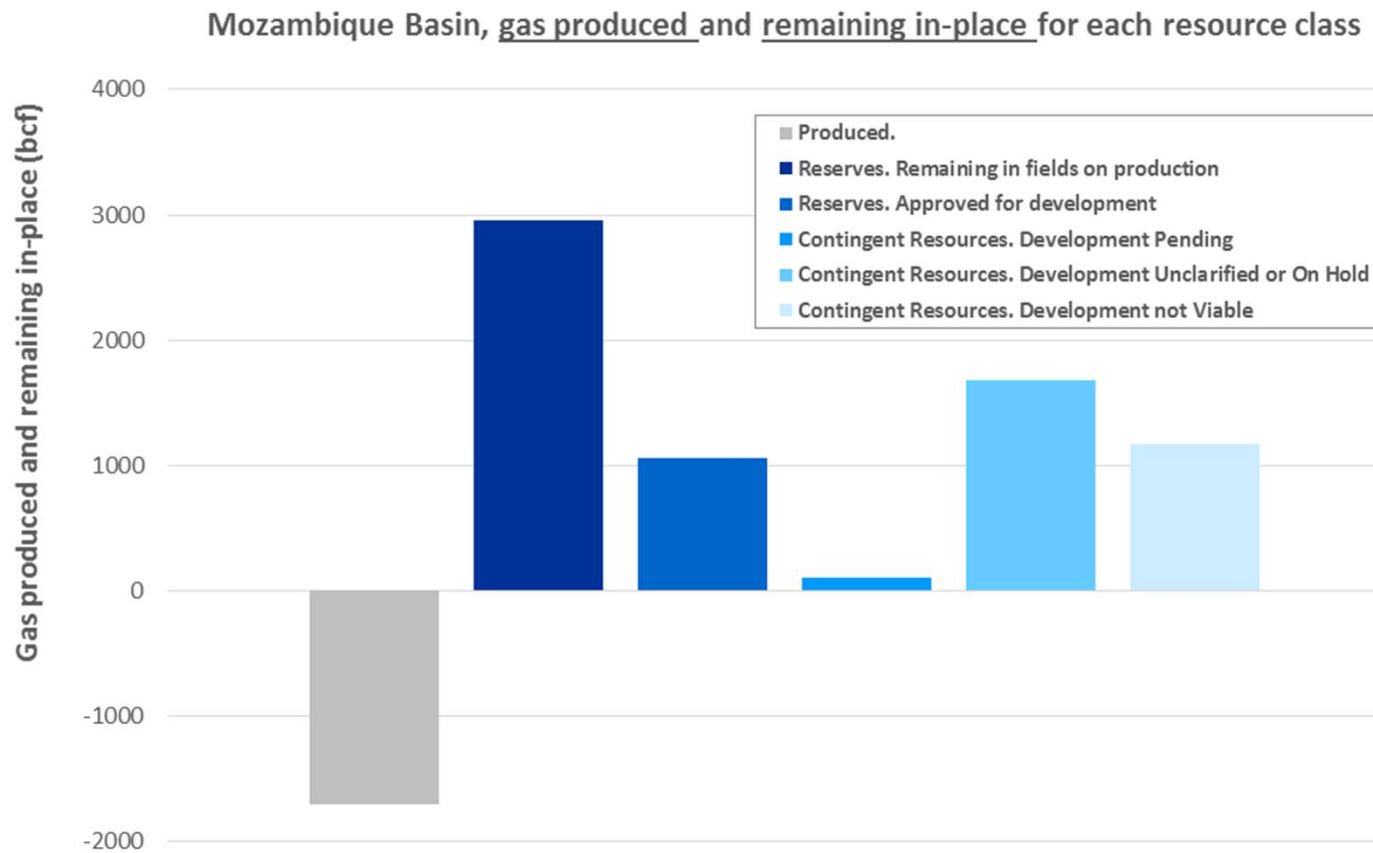


# Stratigraphy - Mozambique Basin

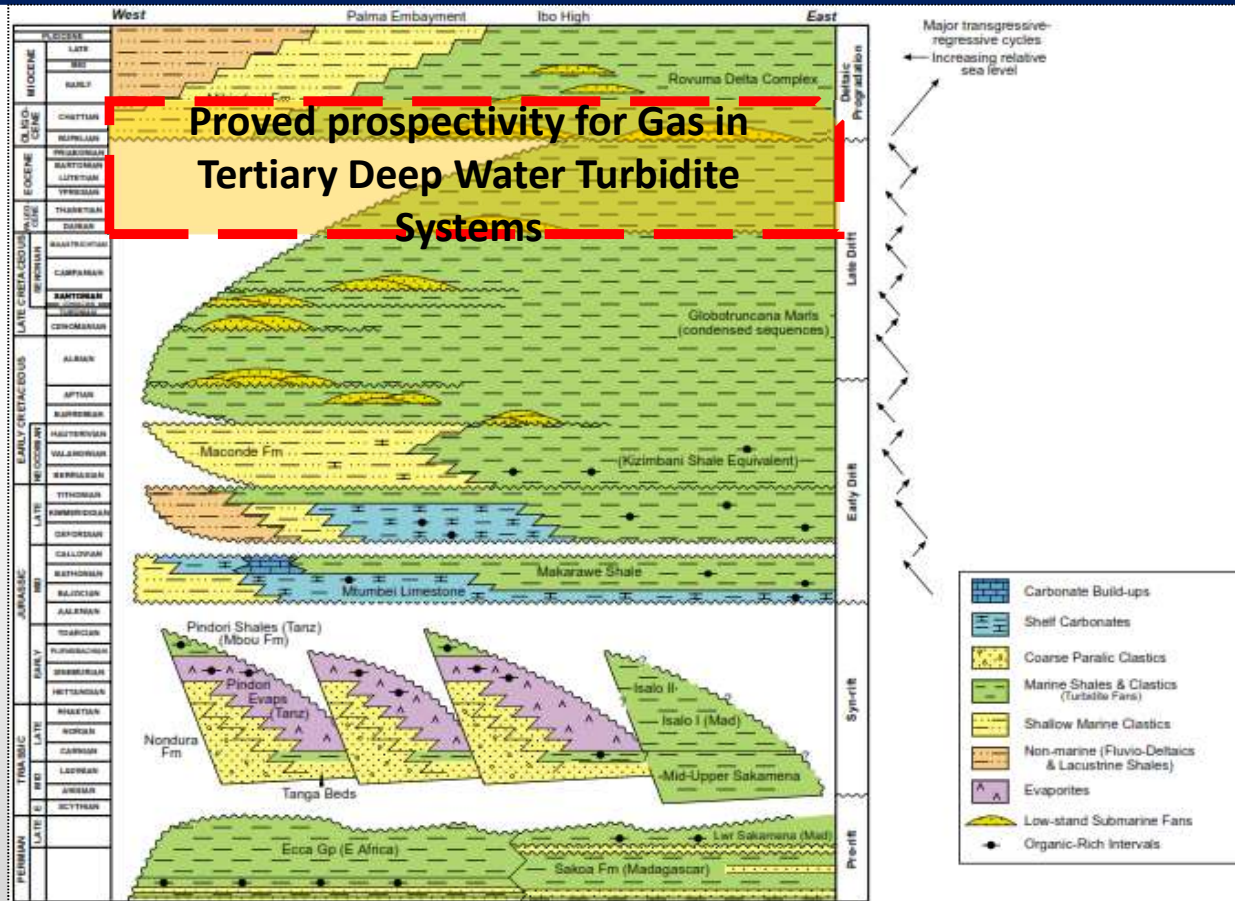


**Proved Prospectivity for Gas in Upper Cretaceous Shallow Marine Systems**

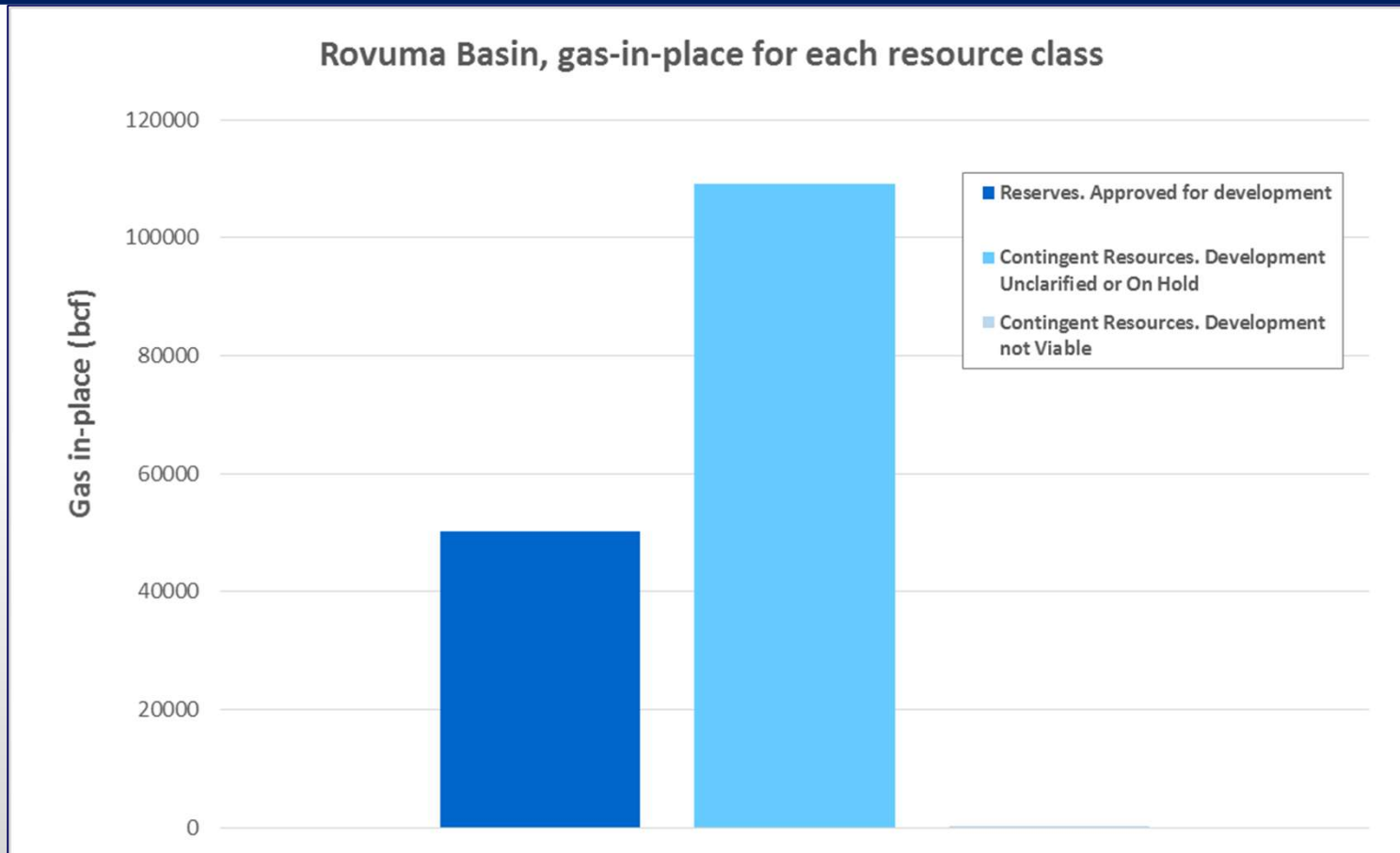
## Mozambique Basin Resources



# Stratigraphy - Rovuma Basin



## Rovuma Basin Resources

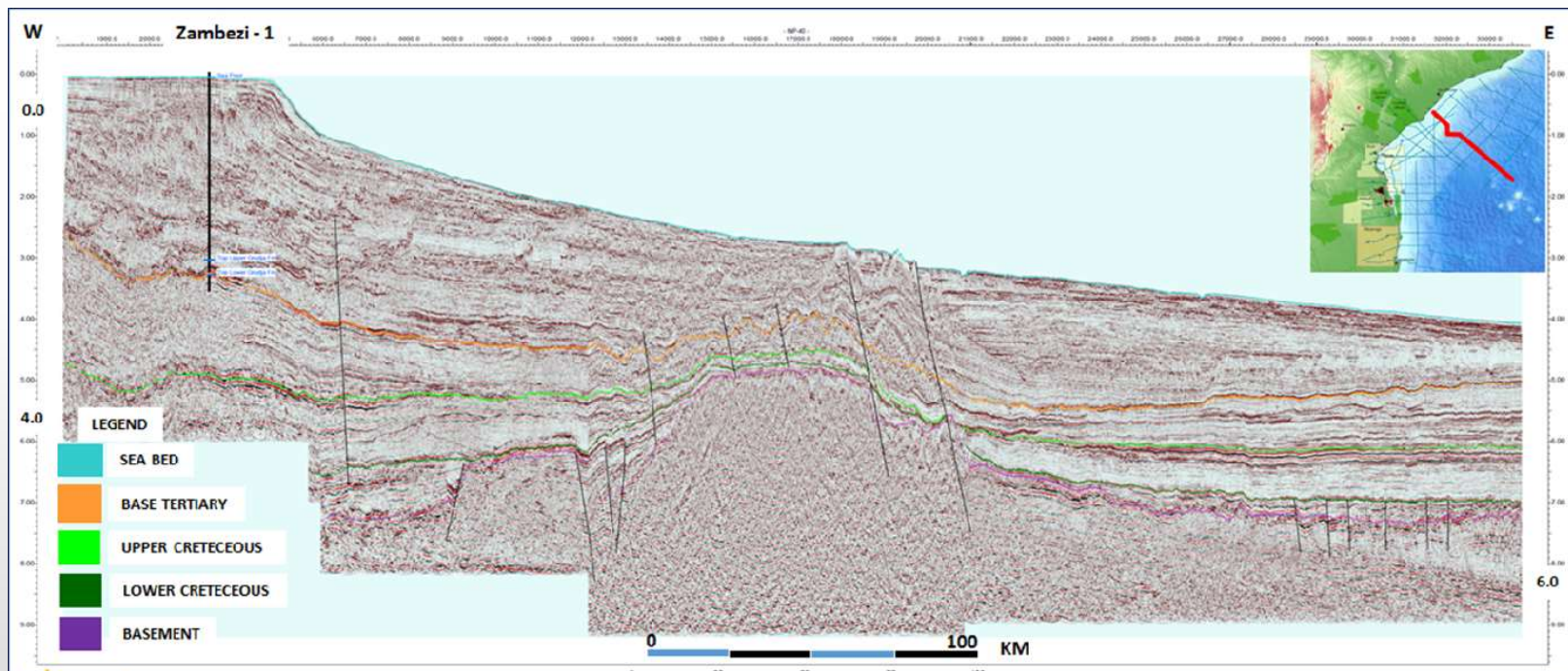


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**Petroleum Potential in Zambeze Delta, Angoche and Southern  
Mozambique Basin**



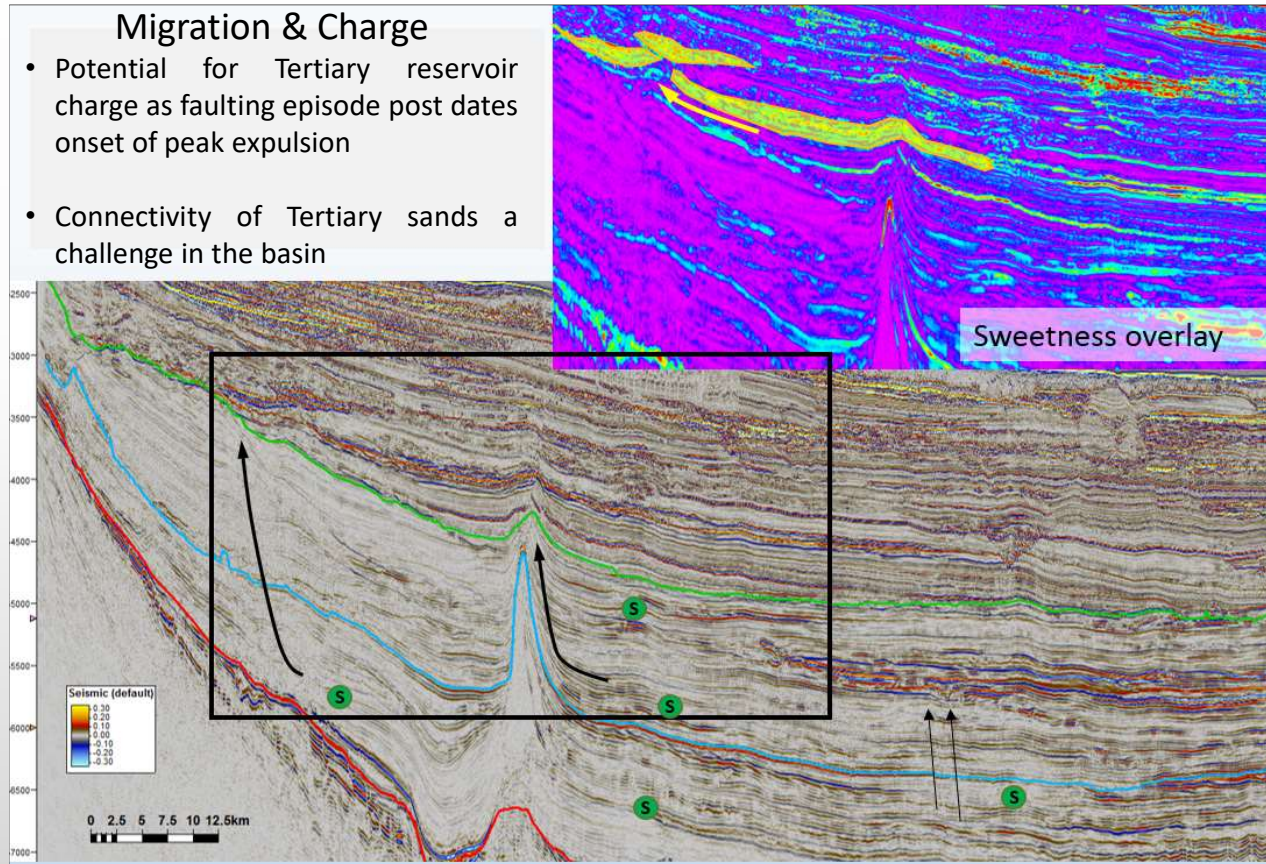
# Zambezi Delta



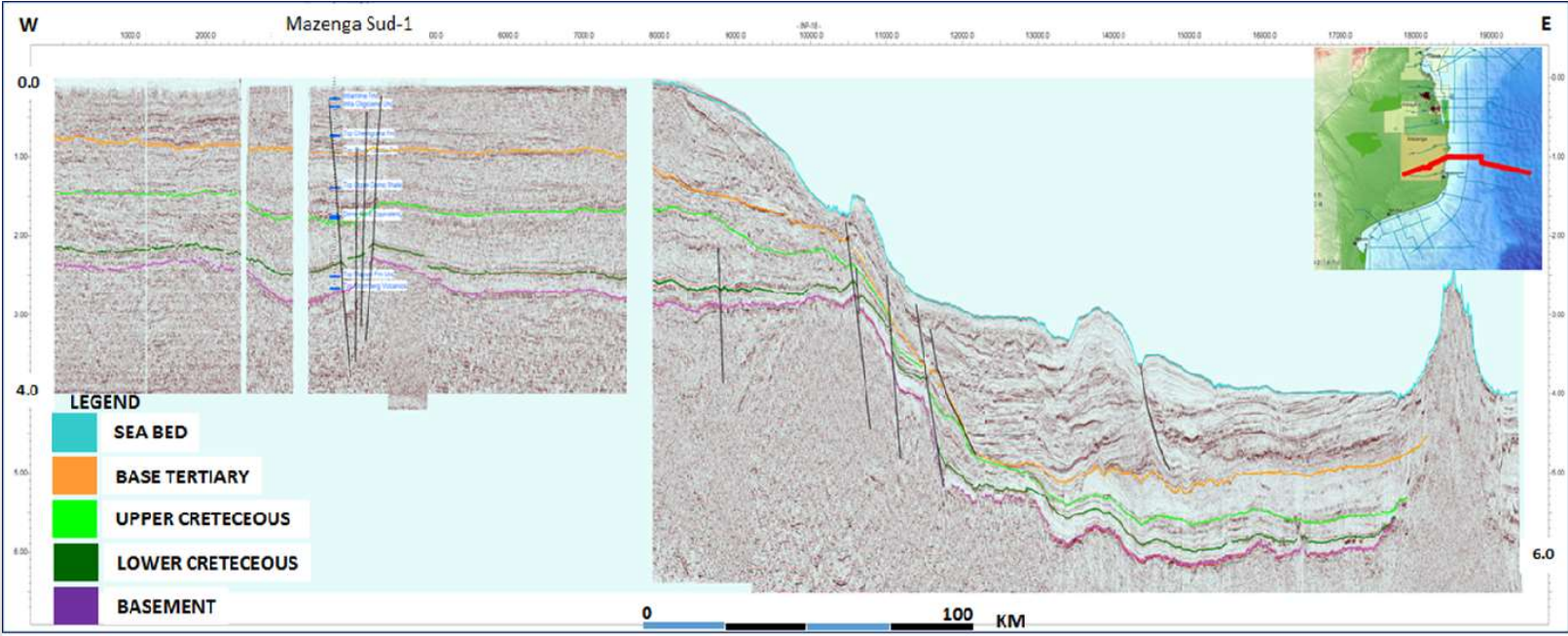
# Angoche Area

## Migration & Charge

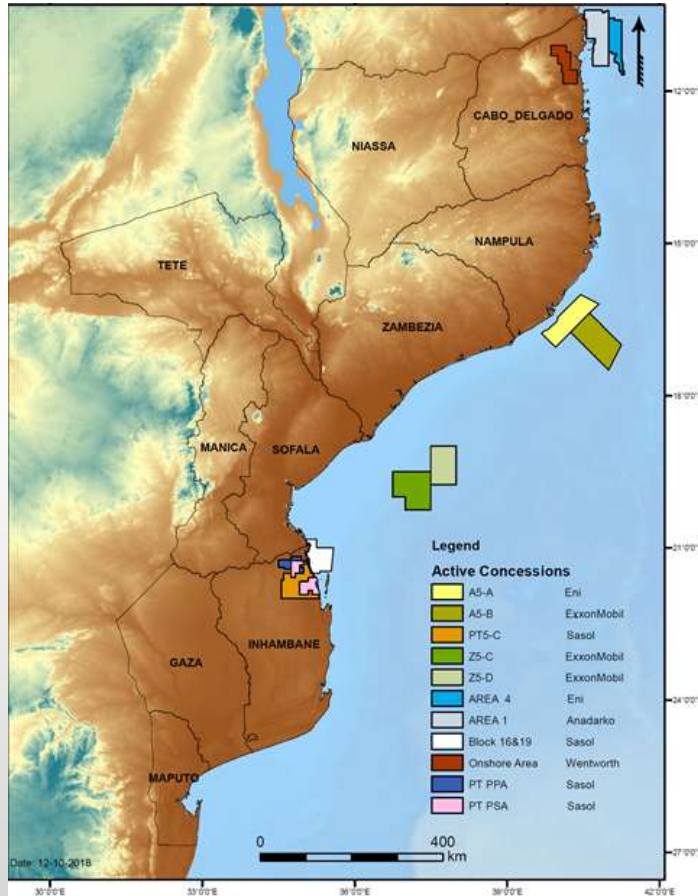
- Potential for Tertiary reservoir charge as faulting episode post dates onset of peak expulsion
- Connectivity of Tertiary sands a challenge in the basin



# Mazenga Graben

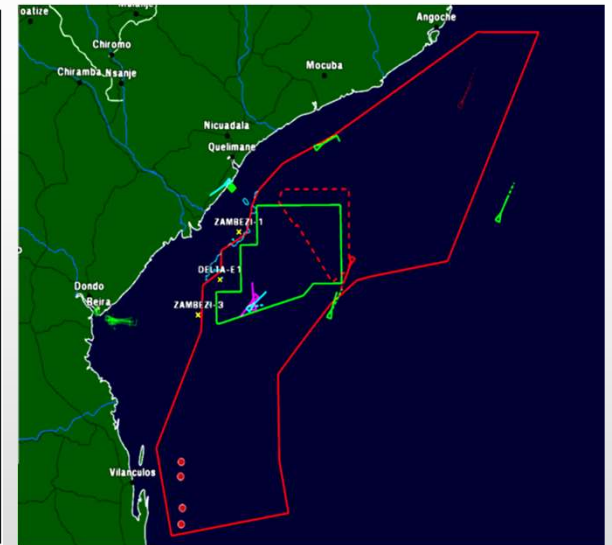
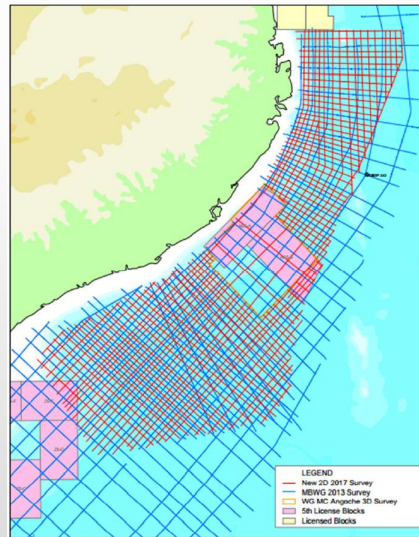


# Promising Findings For Oil



Start of the exploration activities in Angoche and Zambezi Delta Areas;

Acquisition of new 2D and 3D seismic surveys along the Mozambique Channel



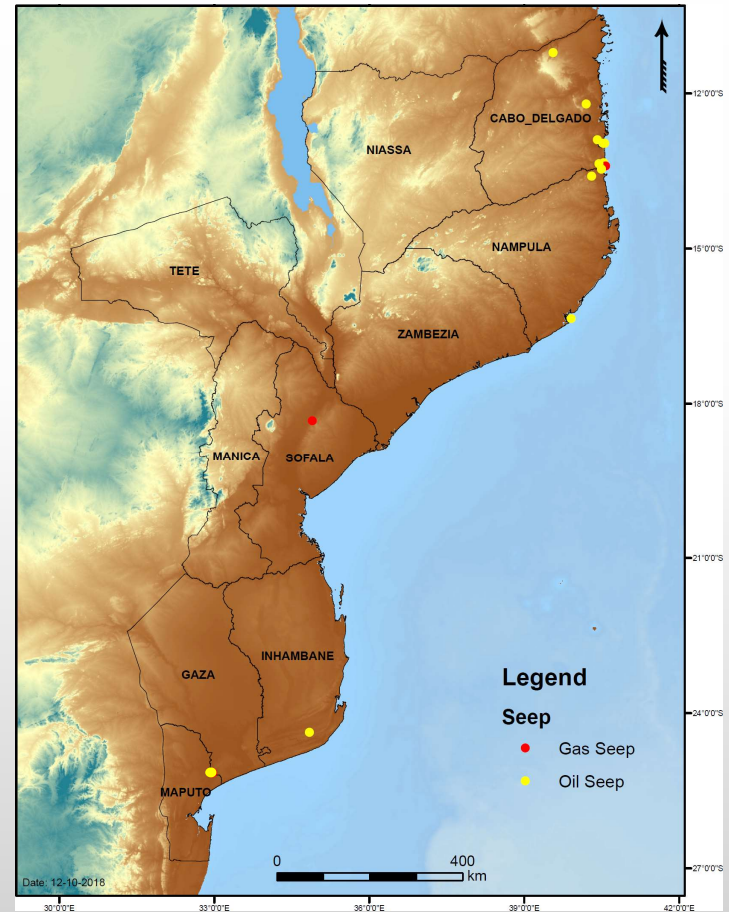
# Oil Shows & Seeps

## Oil shows

- Mocimboa #1: Oil & gas shows
- Sunray wells: Oil show
- Ironclad #1: Oil show
- Zambezi #3: Oil show
- Nemo #1: Oil Show
- Rio Nhanguazi #: Oil Show

## Seeps

- Pemba oil seep
- Angoche oil seep
- Palmeiras oil seep



# Possible Source Rock for Oil

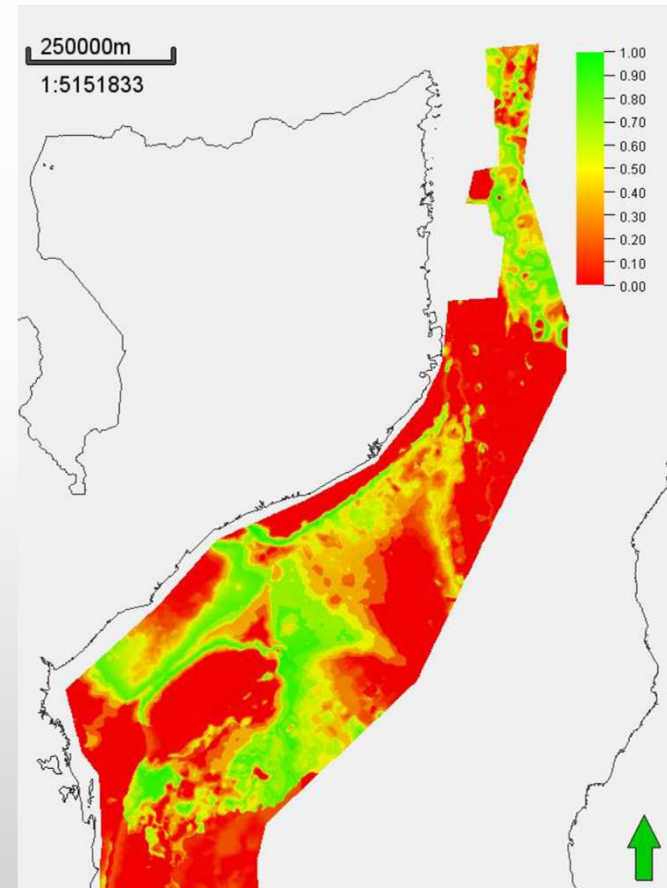
**Deep Water Rovuma** – Upper Jurassic source rock may charge Neocomian to Upper Cretaceous interval

**Angoche Basin** – Lower Cretaceous and Upper Cretaceous source rocks may contribute

**Zambezi-Save** – Upper Cretaceous source rock and Upper Jurassic Reservoir

Source: Dr. Kristijan (Duplo) Kornpilh, Eva Hollebeek, Olivia Osicki: Petroleum Systems Modelling offshore Mozambique – Why is there gas and where is the oil?, 6 EAGE Vienna 201

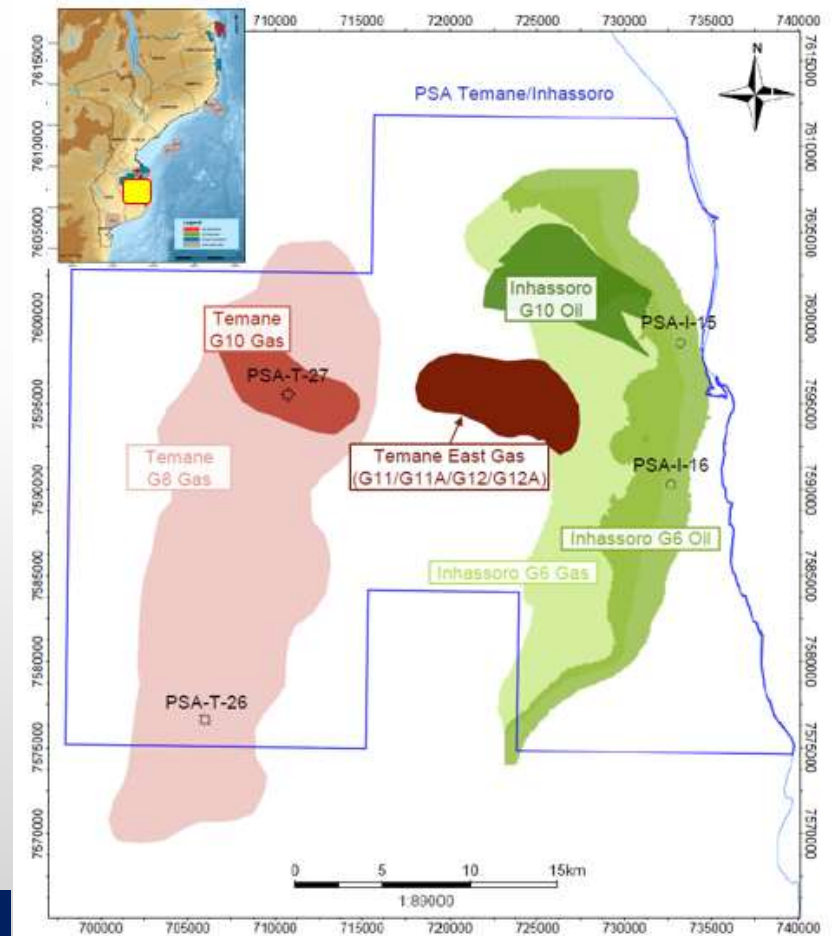
Combination. SR's / Upp. Cret Reservoir for Oil case



## Oil shows & Discovery

- 2003 – Inhassoro #4 discovered light oil in G10;
- 2003 – Inhassoro #6 discovered light oil in G6;
- 2012 - Conducted extended well test through Inhassoro #9Z and produced over 250,000 barrels of light oil;
- 2016/2017 – Drilling campaign of 13 wells for development of Inhassoro field;
- 2017 – Temane #27 new oil discovery in G11 & G12 .

Source: Sasol Africa Oil Week Presentation – October 2016



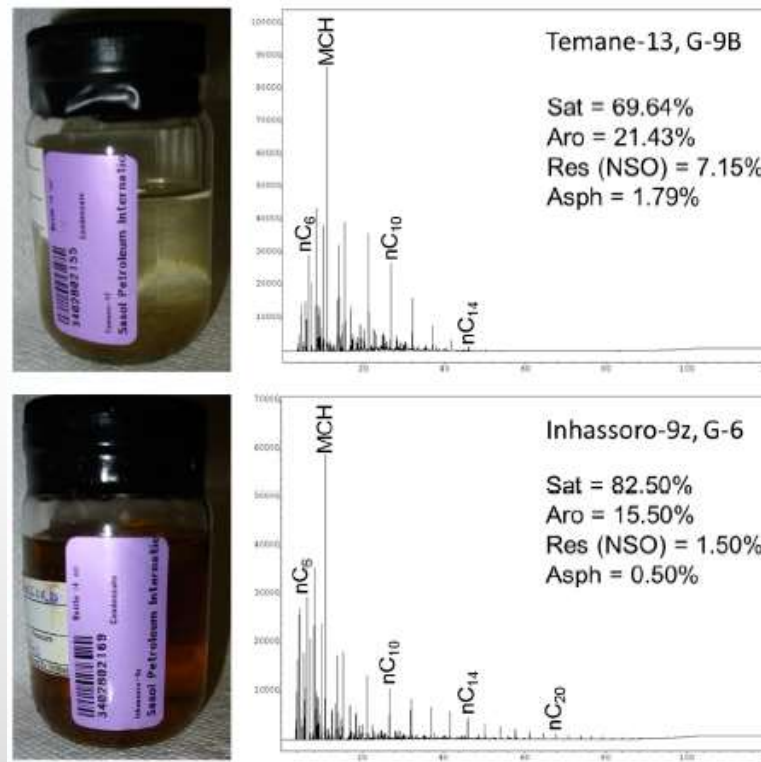
## Geochemistry of Inhassoro, Pande and Temane fields

The biomarkers indicates that the light oil in Inhassoro, Pande and Temane fields were sourced from marine shales

The geochemical analyses suggest that Aptian-Coniacian Domo Shale is the most likely source rock for the petroleum in the Inhassoro, Pande and Temane fields;

The maturity trend observed across the Inhassoro, Pande and Temane area suggests that the fluids migrated from the west or northwest;

Another possibility is that the fluids migrated from a very large kitchen located below the Zambezi Delta depression;



Oil gas chromatographic (WOGC) traces and SARA composition of condensate from Temane-13 well (reservoir G-9B) and light oil from Inhassoro-9z well (reservoir G-6)



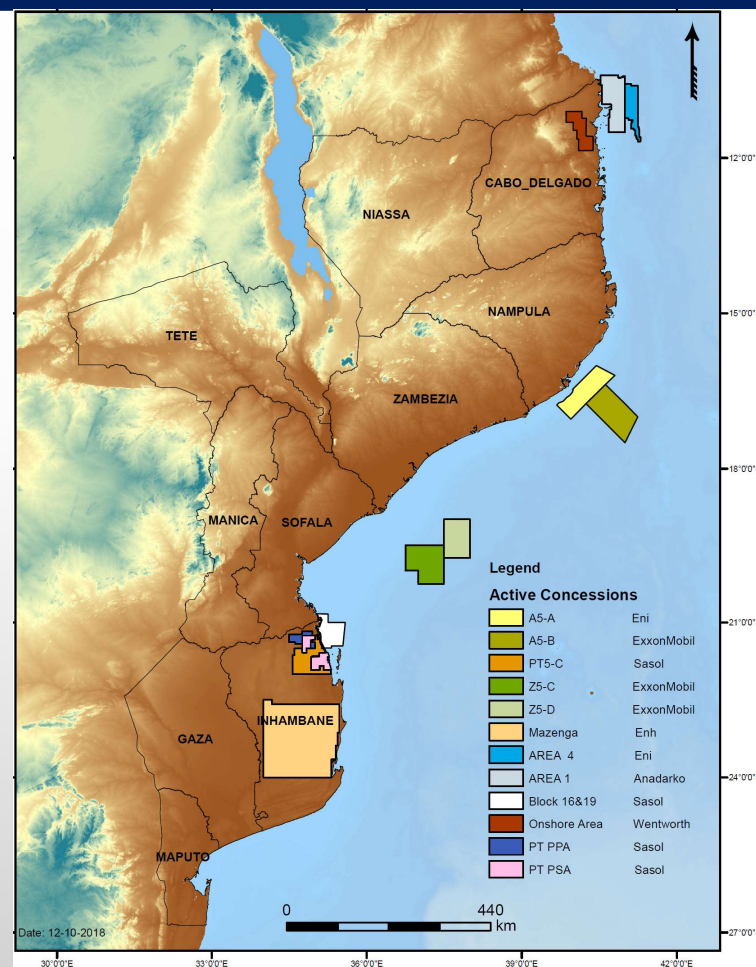
# Frontier Exploration

## Areas from 5<sup>th</sup> round

- Signed EPCC contracts (October 2018)

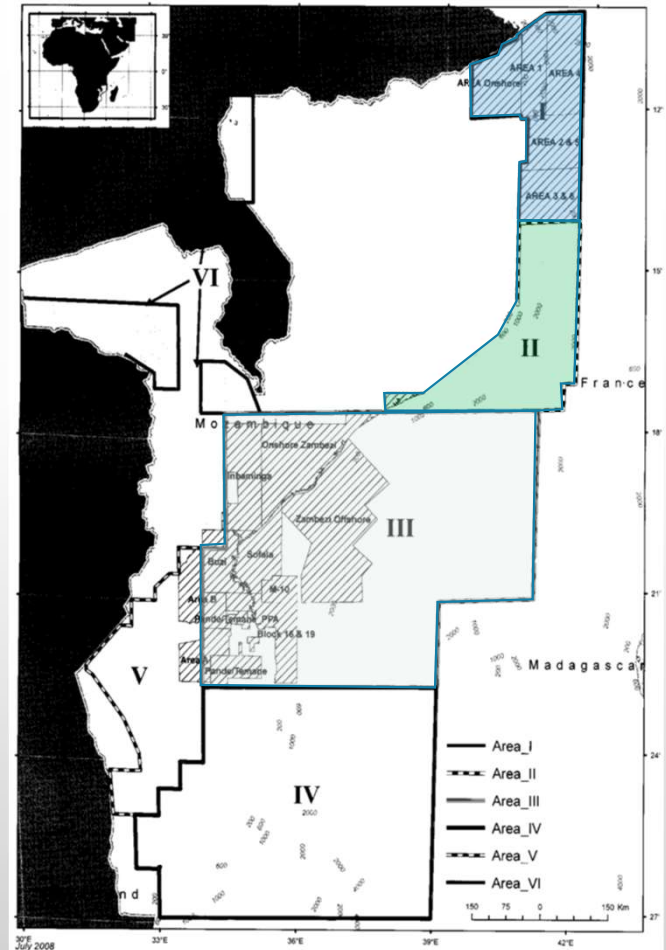
## Expected minimum work commitments

- 10 exploration wells (8 offshore & 2 onshore)
- Seismic acquisition (3.000,00 Km of 2D and 18,400.00 Sqkm of 3D)
- Training schedules, Social Projects and other EPCC commitments
- Expected > USD 700 Mi of investments.



## Final Remarks

- Significant potential exist for exploration successes in:
  - Tertiary plays - Angoche, Zambeze Delta and Rovuma Basin;
  - Cretaceous plays - Angoche, Mozambique Basin;
- Oil seeps are indicators of hydrocarbon occurrence still in liquid phase (More geological work and mapping need to be considered).
- New 2D and 3D seismic data available offshore Zambezi Delta and Angoche regions.
- New licensing process being considered which wil have a nomination process starting point.



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**COME TO SEARCH OIL IN MOZAMBIQUE**

**THANK YOU!!!**