

# Is there any oil offshore East Africa?

“Improved technology helps to oil  
the wheels for East Africa”

The Times, 7<sup>th</sup> January 2012

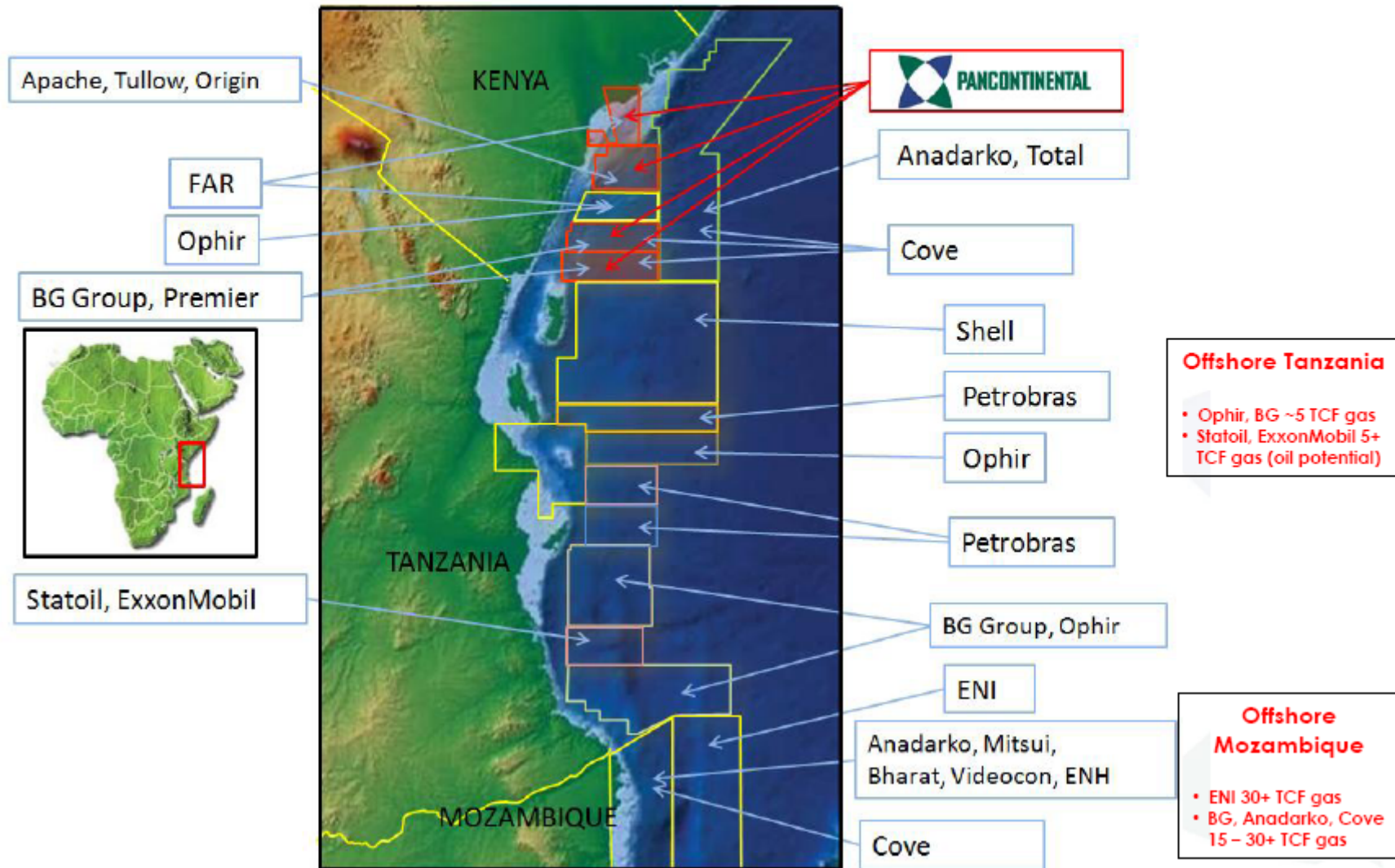
# So just what has been discovered? (Exploration wells: 2008 – present)

| Country    | Gross Expln Wells | Gross Disc | Gross Comm Disc | Gross Oil (mm bbls) | Gross Gas (Tcf) |
|------------|-------------------|------------|-----------------|---------------------|-----------------|
| Mozambique | 13                | 8          | 8               | 0                   | ~32.1           |
| Tanzania   | 13                | 6          | 1               | 0                   | ~2.4            |
| Kenya      | 1                 | 1          | 0               | 0                   | 0               |
| TOTAL      | 27                | 15         | 9               | 0                   | ~34.5           |



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# East Africa – Main Offshore O&G Players

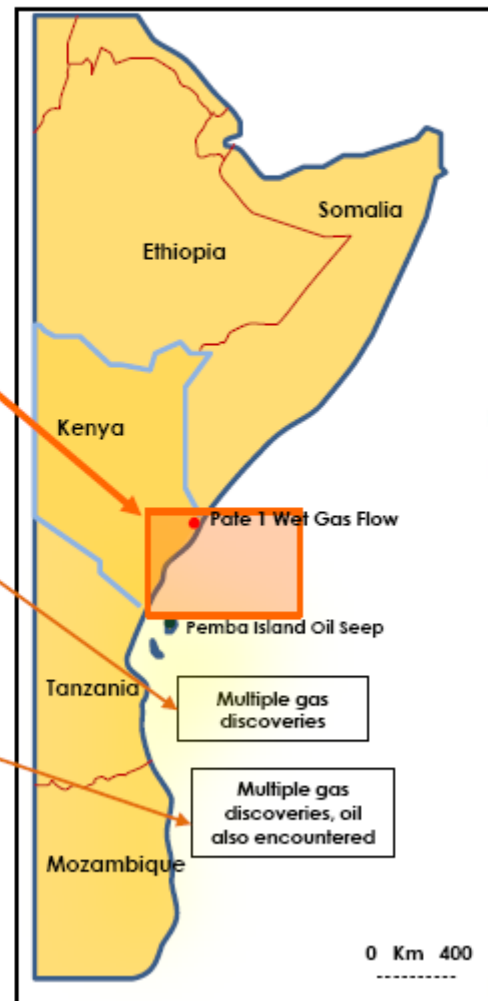


# East Africa Hotspot - Offshore Kenya



**Tanzania – 4 discoveries  
from 4 wells with >8TCF  
potential resource**

**Mozambique – 8 discoveries  
from 10 wells with >60TCF  
potential resource**



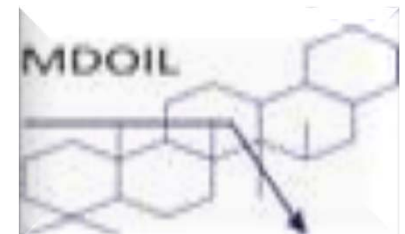
## OFFSHORE KENYA:

- Similar depositional environment to Rovuma basin in Mozambique
- PCL consider offshore Kenya to be an oil play, rather than gas
- Evidence of petroleum system (flat spots, oil seeps), multiple play types
- Under explored – only 4 wells drilled offshore Kenya, one in the last 20 years
- PCL & JV partners (Apache, Origin, Tullow) to drill 1 well offshore Kenya in or before Q3 2012

# UNDER-EXPLORED - EAPC 2005 & later

## Myths .. Myopia .. Misinformation ..

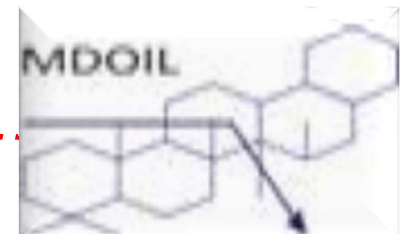
- “*East coast Africa is at best gas prone*”  
Gas actually maybe anomalous
- “*There are no contiguous source rocks*”  
Not supported by the evidence
- “*The Campanian is a recognised source rock in Tanzania*”  
Actually not encountered as a source anywhere in East Africa
- “*The Jurassic is too mature*”  
New basin modelling puts Jurassic in hydrocarbon window  
Low heat flow
- “*The Eocene can generate*”  
Unlikely as too immature
- “*We have explored East Africa; we drilled a well there didn’t we?*”  
Result: East Africa received scant modern attention until  $\pm 1$  year ago



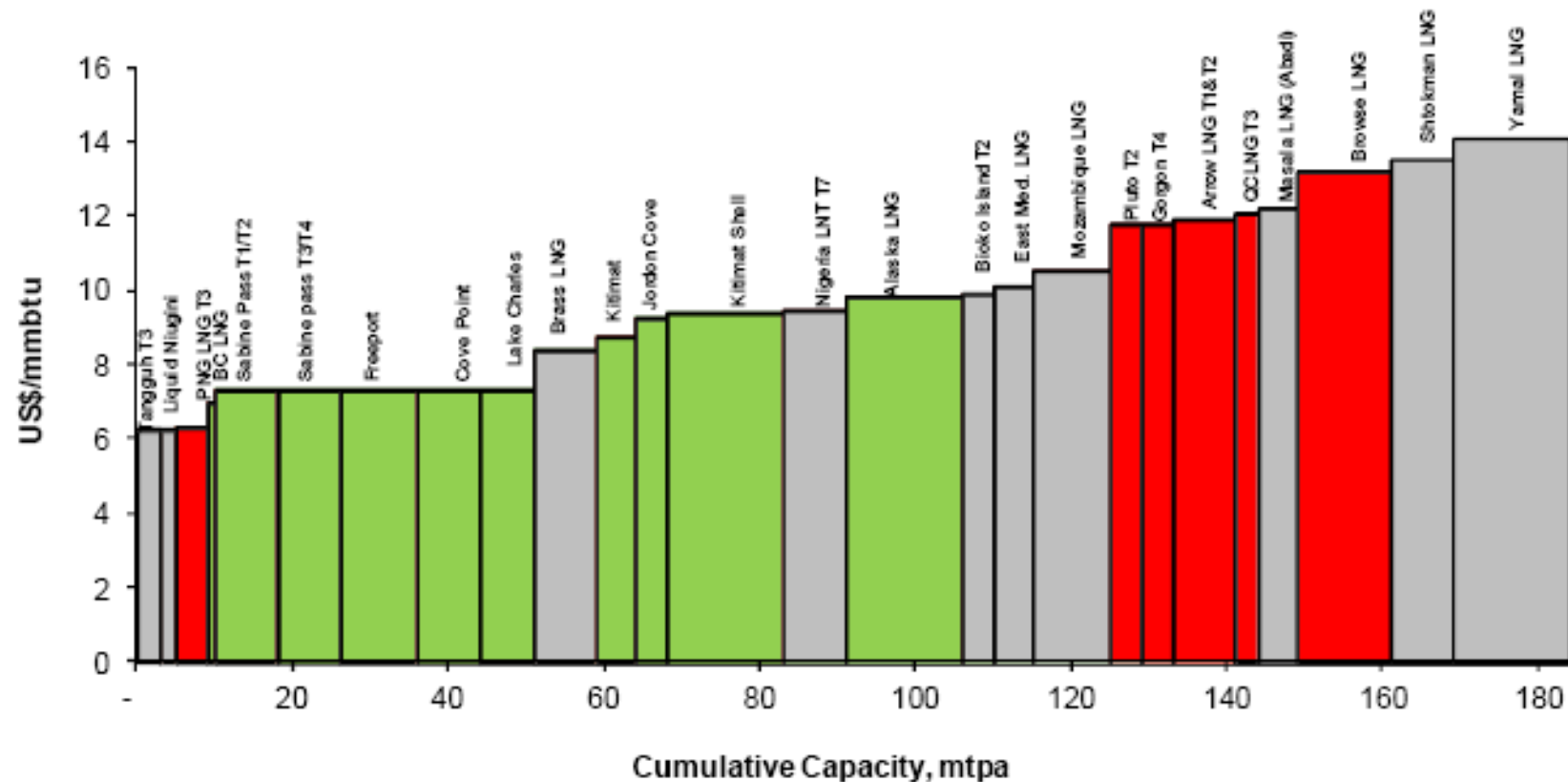
# EXPLORATION > 2008

## More Data ..

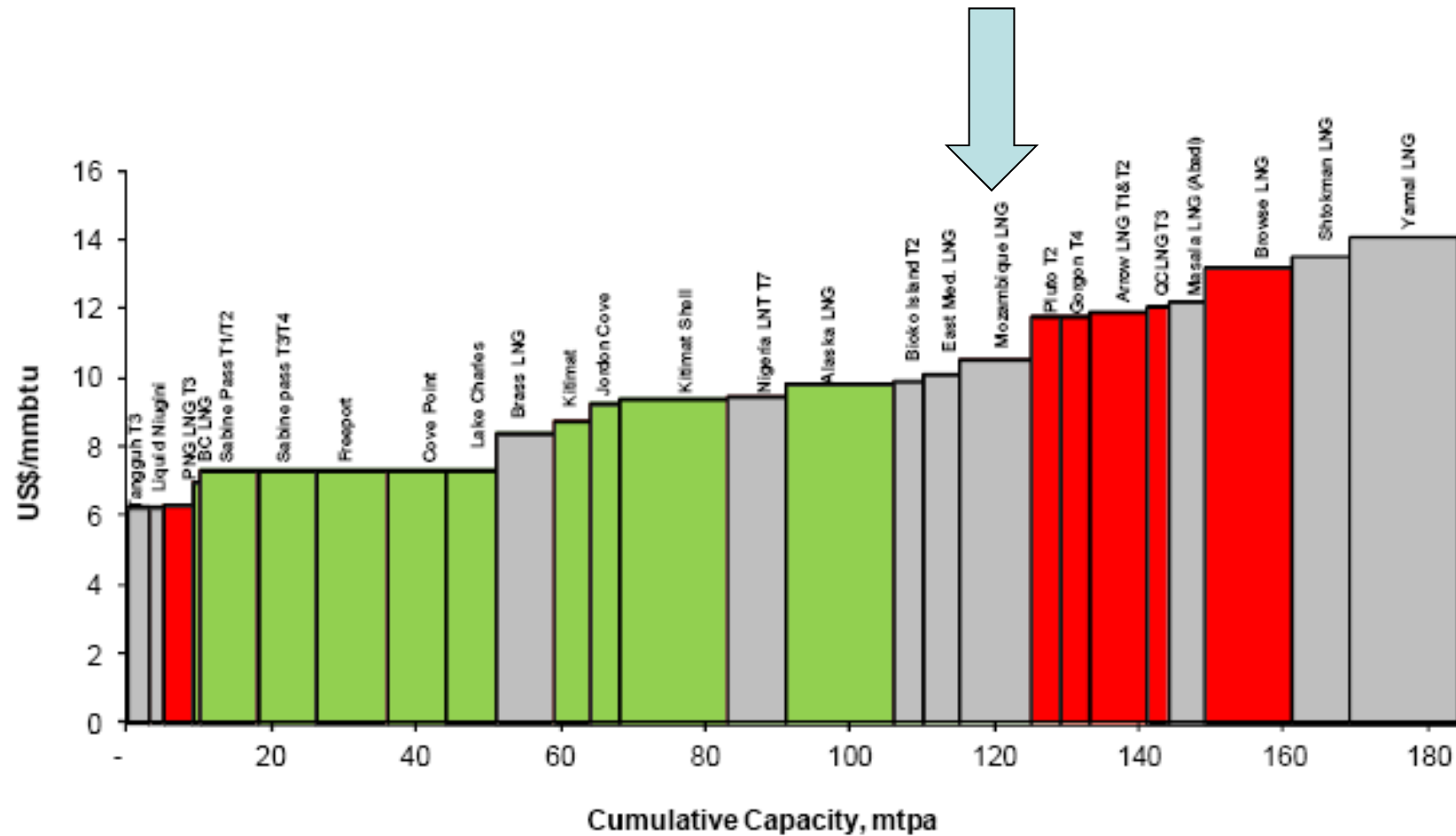
- “*East coast Africa is at best gas prone*”  
Lots of gas, where's the Oil?
- “*There are no contiguous source rocks*”  
Not supported by the evidence
- “*The Campanian is a recognised source rock in Tanzania*”  
The youngest source rock is Mid-Jurassic
- “*The Jurassic is too mature*”  
Jurassic in gas window, buried by great thicknesses in deltas  
Low heat flow
- “*The Eocene can generate*”  
The youngest source rock is Mid-Jurassic
- “*We are exploring offshore East Africa.....*”  
East Africa now receiving ‘attention’  
AND: Governments have woken up to the Capital Gains  
Tax issue if small companies try to sell out.....



# Global LNG Cost Curve – source : Bernstein analysis and estimates

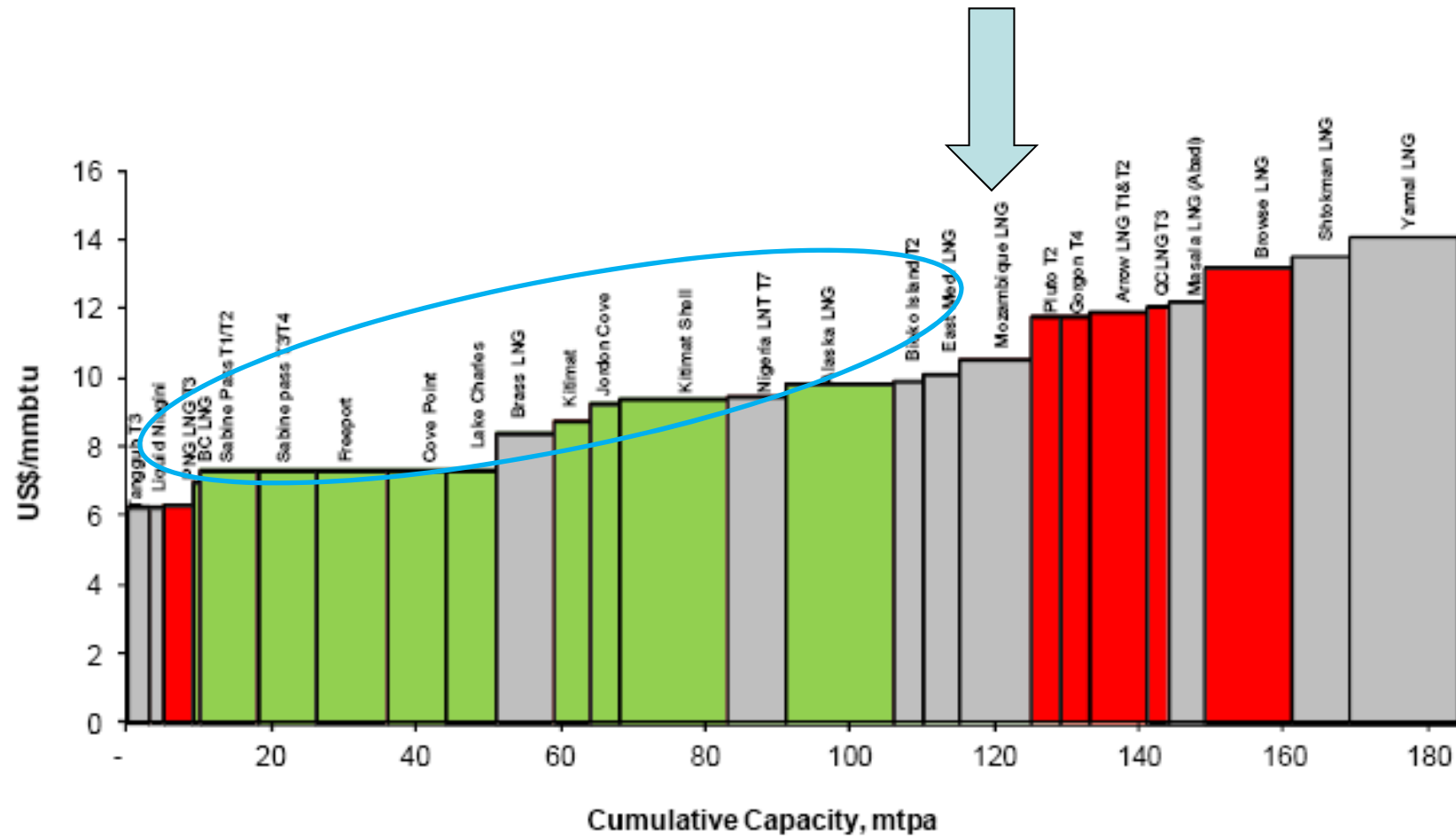


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| Kenya      | 1                 | 1          | 0               | 0                   | 0               |
| Uganda     | 18                | 15         | 14              | 877                 | 0               |
| TOTAL      | 45                | 30         | 23              | 877                 | ~34.5           |



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# Is there any oil offshore East Africa?

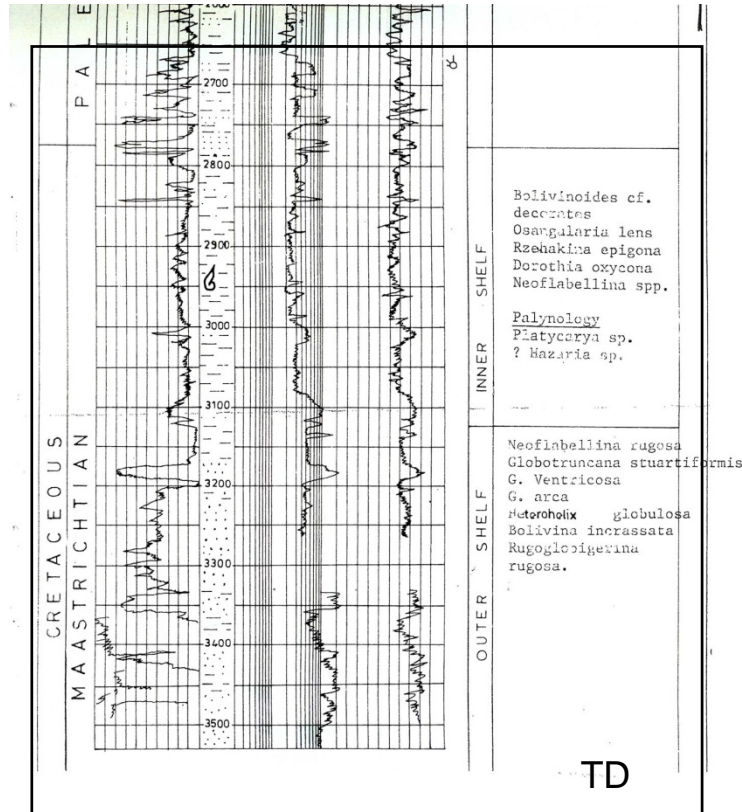
“Improved technology helps to  
‘gas up’ East Africa”

*Not The Times, 7<sup>th</sup> January 2012*

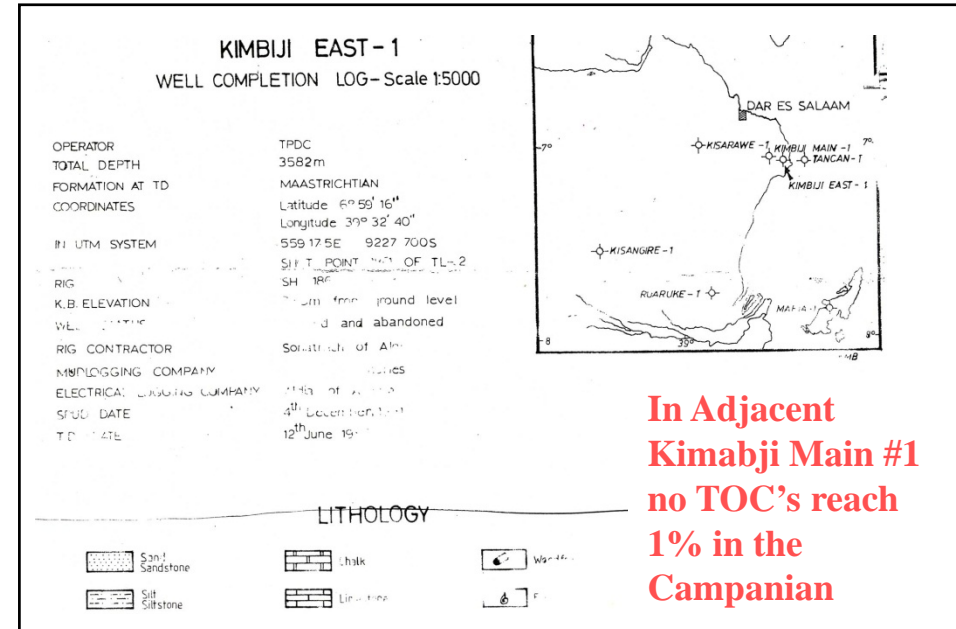
# Misinformation: A source rock is created

## Ref EAPC 2005

### Kimbiji East #1 “The Type example”



|           | TOC   | HI  |
|-----------|-------|-----|
| 3550      | 1.78  | 152 |
| 3582 (TD) | 12.20 | 129 |



**In Adjacent  
Kimbiji Main #1  
no TOC's reach  
1% in the  
Campanian**

### Kimbiji East #1

3564 - 3566: SLTST a/a.

LST lt gy - gy, occ drty wh, sft - frm-hd, micxln.

3566 - 3572:

SLTST ltgy-gy, ltbrngy, v calc, ethy - lam, non fiss - fiss with intercalations of SD gy - dk gy mic, lam, blk, frm. Trace of coral sponge, vuggy.

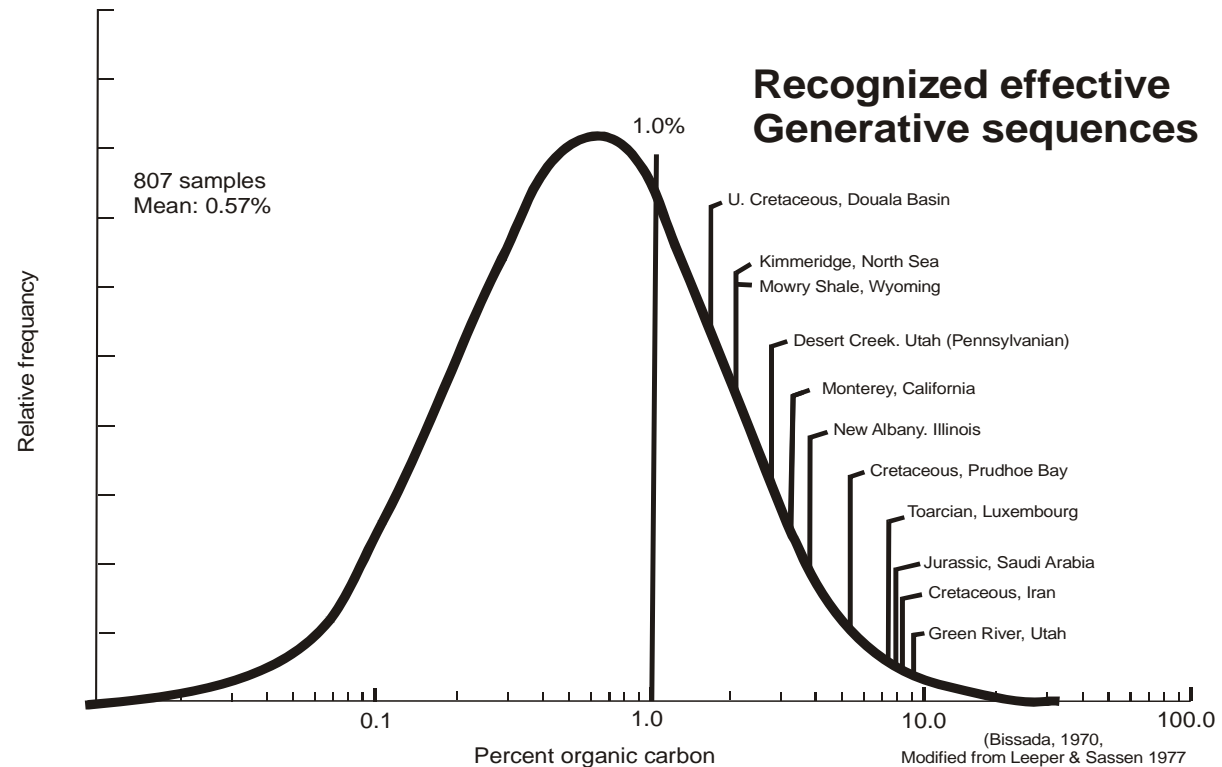
3572 - 3582:

SLTST a/a and LST intercalations.

LST lt brn gy, micxln, ang, v slty, occ sndy, mod - wl ind.

# For a potent source rock system the following ingredients are essential

- High TOC
- High hydrogen content
- Material volume of source rock
- Optimal maturity
- (primary

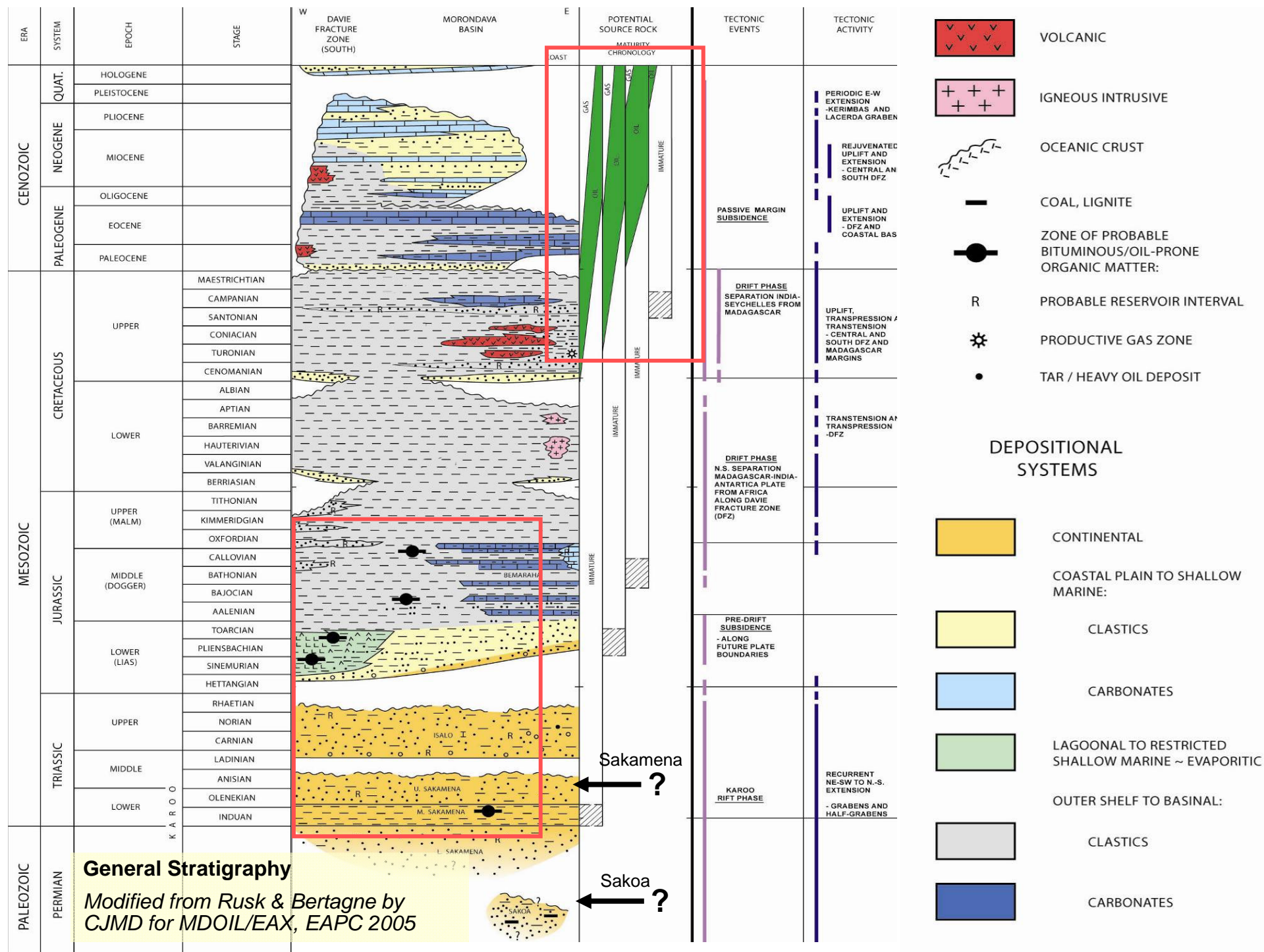


Relative organic carbon  
Enrichment

Expected percentage  
of sampled rock  
in each class

| Significantly below average | Below average | Average | Above average | Significantly above average |
|-----------------------------|---------------|---------|---------------|-----------------------------|
| 6.4%                        | 22.2%         | 40.0%   | 24.2%         | 6.7%                        |

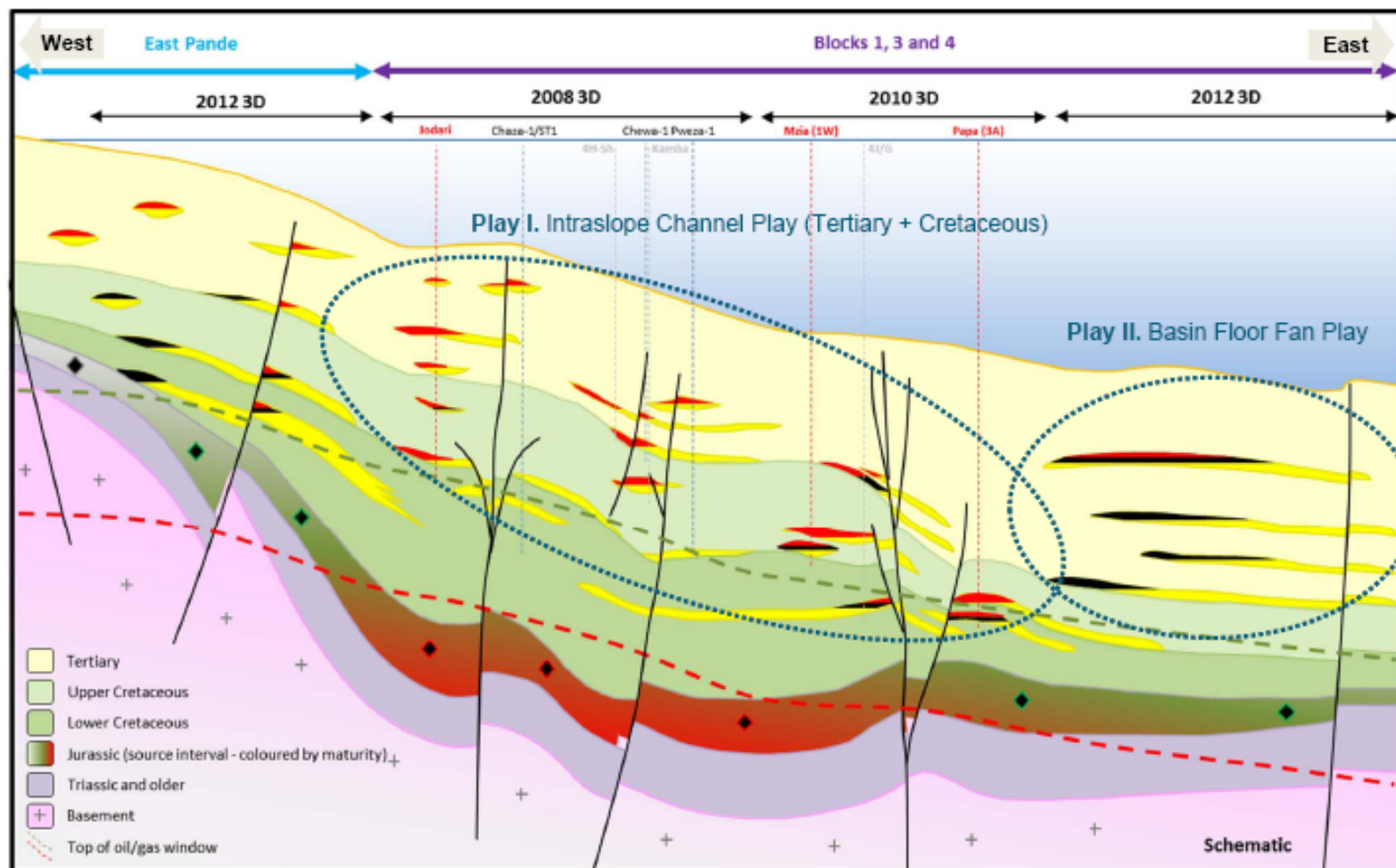
Adapted from Bissada, Leeper & Saasen by CJMD for EAPC 2005





# Tanzania: Schematic Basin Section

+7 TCF recoverable resources discovered to date



Based on internal Ophir Energy estimates of primary targets only as of March 2012