The Southern Lamu basin, offshore Kenya: evolution; structure; and hydrocarbon plays.

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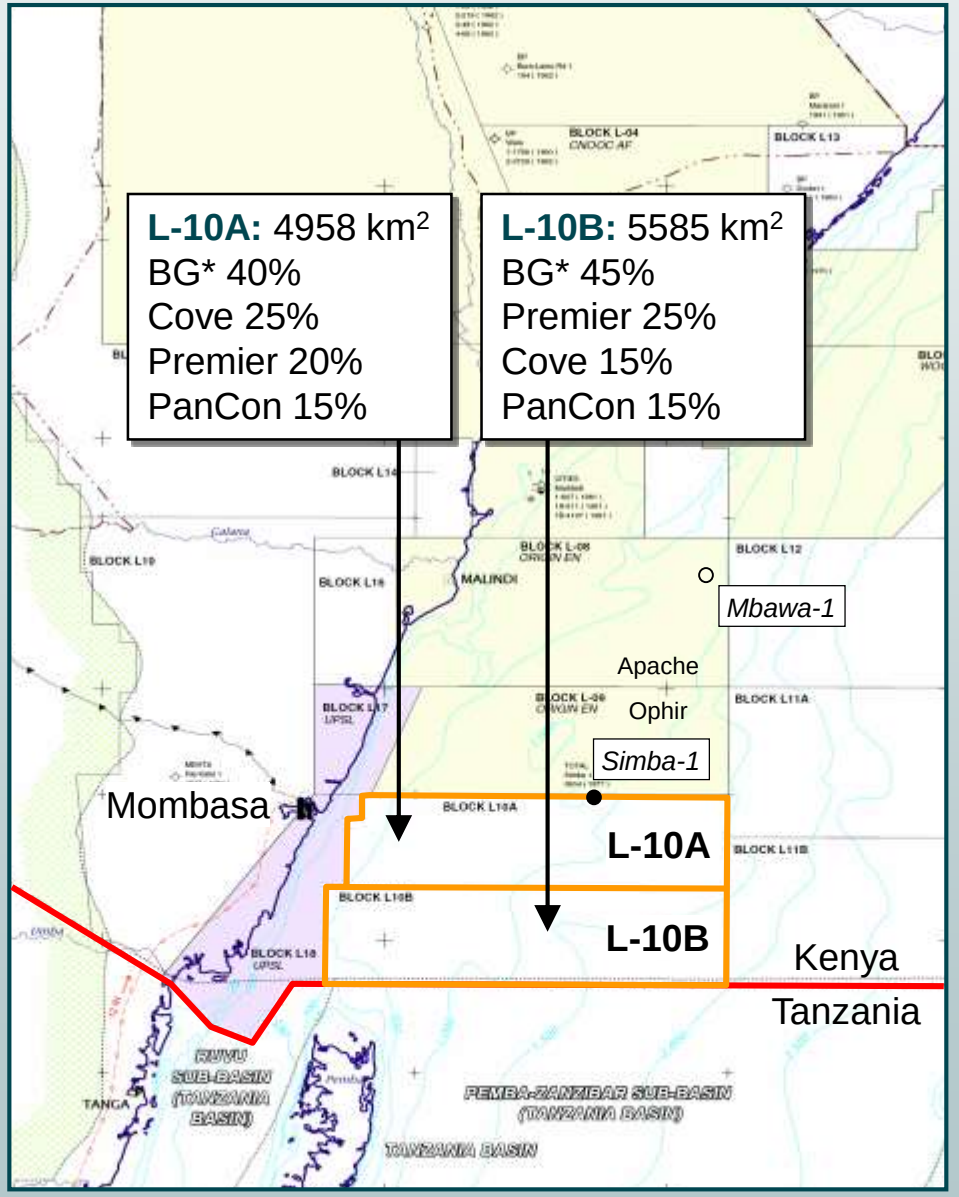
Presentation agenda

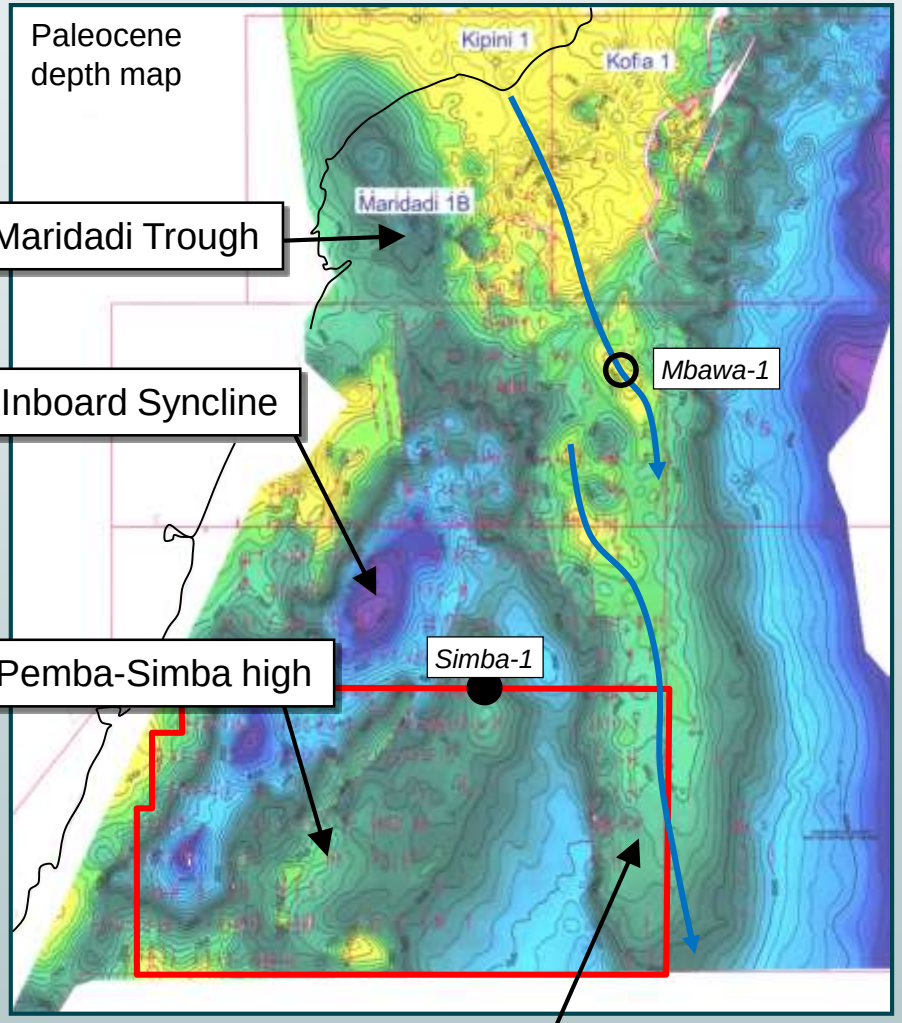
- Structural setting and tectonic evolution
- Stratigraphy and HC systems
- Post-drill analysis
- L-10 plays: initial ideas
- L-10 plays: as seen on new seismic

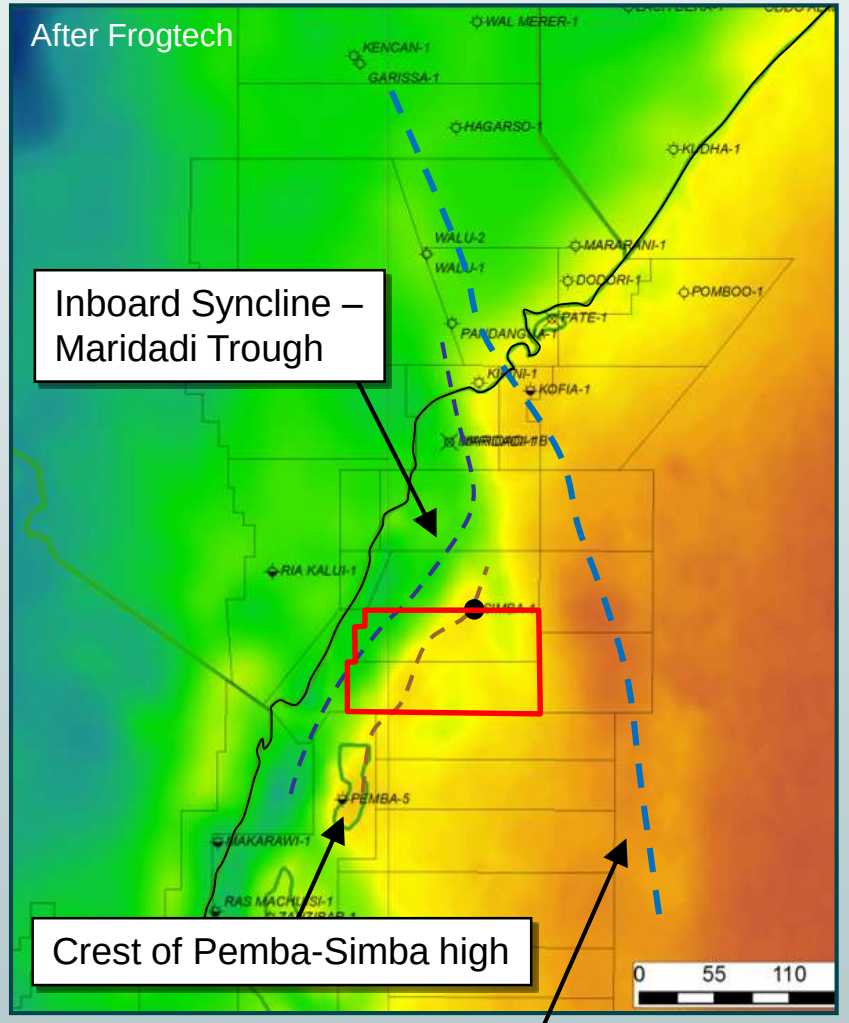
L-10 A+B summary

- Effective date 15th August 2011
- Water depths ~350 – 2000m
- ~ 10,300 km^2
- Previously licensed to Woodside, who recorded 2D seismic (~12 x 8 km grid) across entire area
- Relinquished in 2005 (Woodside retained northern area and drilled Pomboo-1)
- Simba-1 well drilled on L-09, L-10 border in 1978 by Total
  - P&A dry, with weak gas shows
  - Found Palaeogene and Cretaceous turbidite sand reservoirs



Bouguer gravity map vs seismic depth map





Regional seismic line: L-10 (A+B) play fairways

Plays

1 Mi reef trend

2 Pemba-Simba high: KL rift shoulder

3 Ku-Pg turbidite play on W flank of DWR

4 Ju-KL reef

Block L-10

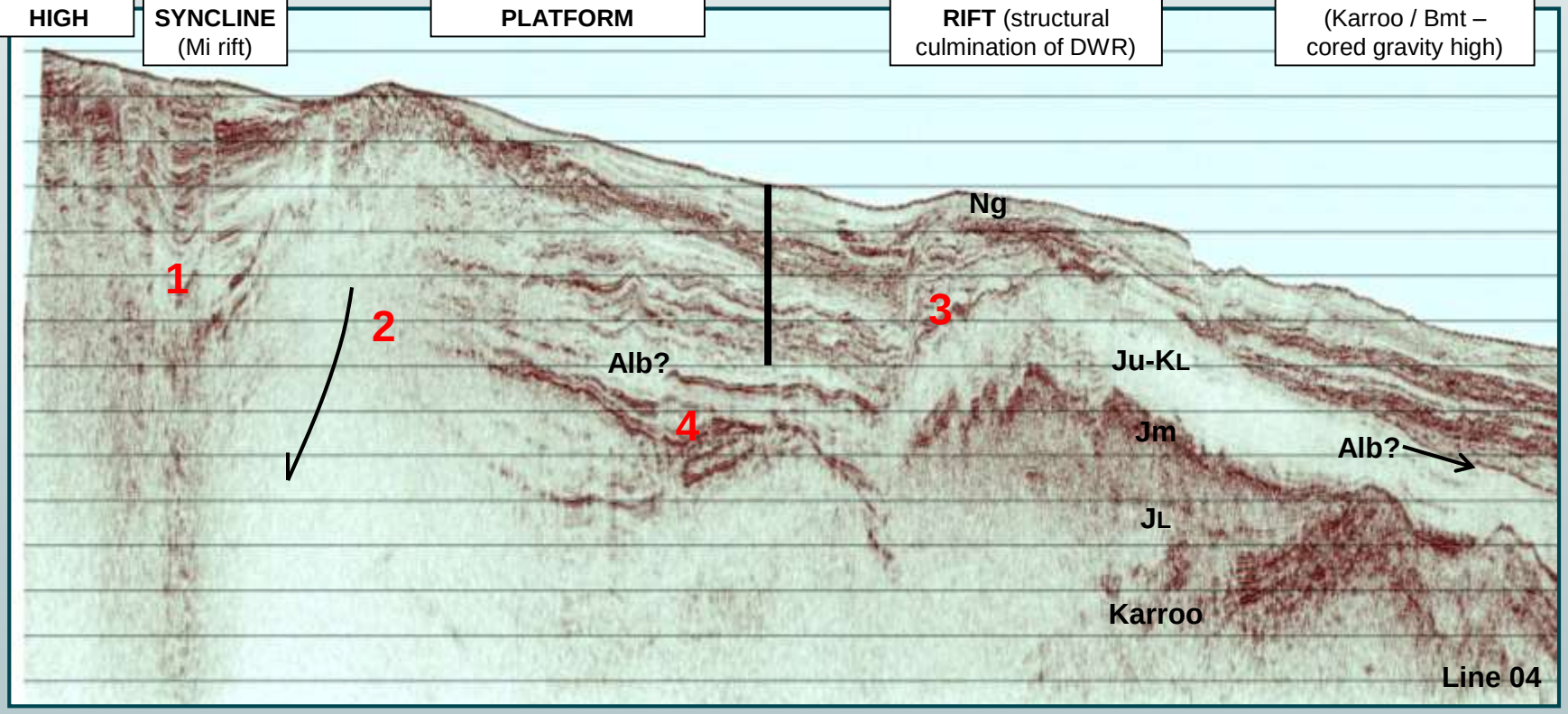
MOMBASA HIGH

INBOARD SYNCLINE (Mi rift)

W-DIPPING CENTRAL PLATFORM

INVERTED JURASSIC RIFT (structural culmination of DWR)

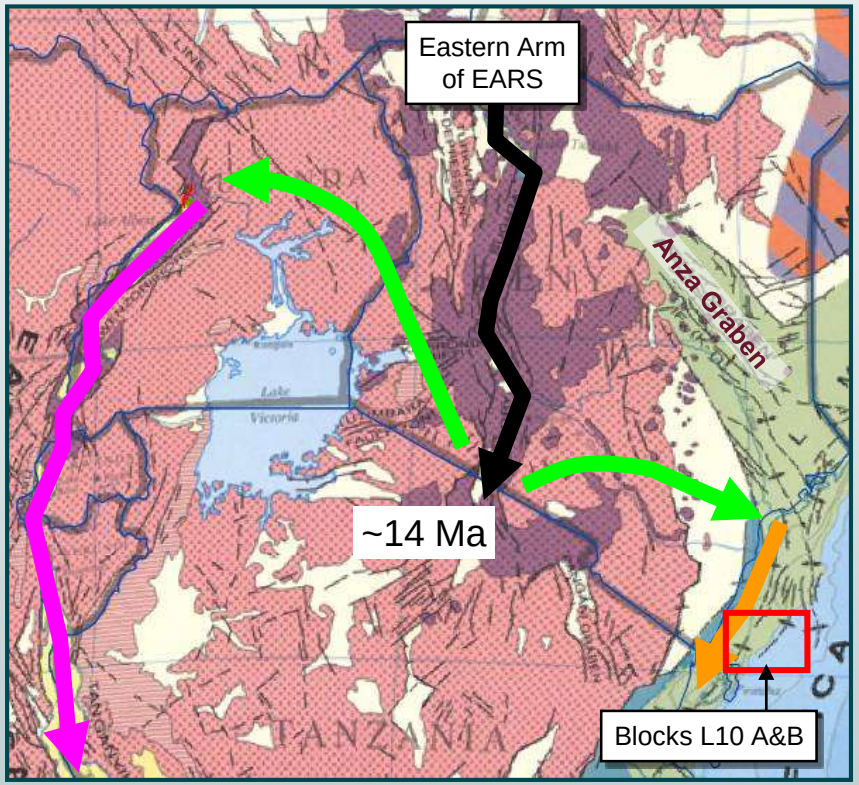
DAVY-WALU RIDGE (Karroo / Bmt – cored gravity high)



= Sequence drilled by Simba-1 (TD in Camp.)

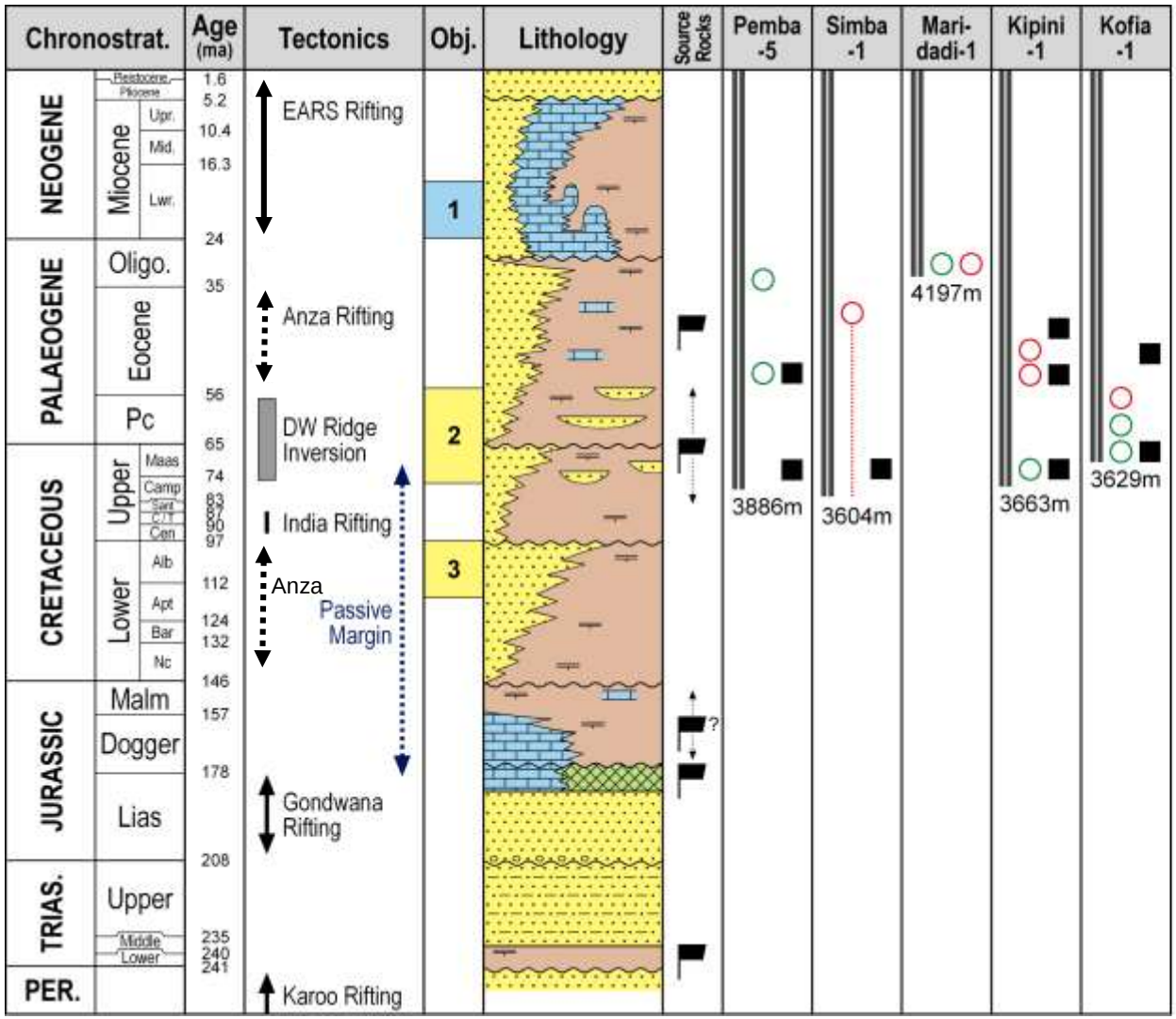
Regional tectonic setting

- Earliest rifting is Karroo (Carb - PL)
  - post rift (TrL) source rocks
- Kenya margin results from Jurassic rifting and the oblique drifting of Madagascar/India
  - syn-rift (JL) and post-rift (JM-JU) source rocks deposited
- KL and Pg Anza Basin rifting
  - does it extend south into L-10 area?
- Upper Cretaceous - Palaeogene uplift / inversion of the Davie Ridge: created a restricted depo-centre inboard
  - potential deposition of Ku-Pg source rock



- Neogene East African Rift
  - Rifting commenced in East African Rift System (EARS) in Oligocene (~36 Ma)
  - Gregory Rift propagated (north and) south, until the edge of the Tanzanian Archaean craton was encountered at ~14 Ma. Effective rifting terminated in Gregory Rift (Calais et al, 2006; Le Gall et al, 2004)
  - rifting jumped W, initiating the Albert rift and, slightly earlier (Olig - MiL we claim) also jumped E, causing rifting in offshore coastal Kenya / Tanzania
- Development of pinnacle reef fairway, and subsidence of Inboard Syncline.

Stratigraphic summary – Offshore Kenya



Objective 1

Miocene carbonate platform, with reef development along outboard margin, sealed by deep-water shales (main objective)

Palaeogene source rocks

Objective 2

Pg-Ku turbidite sands (Simba-1)

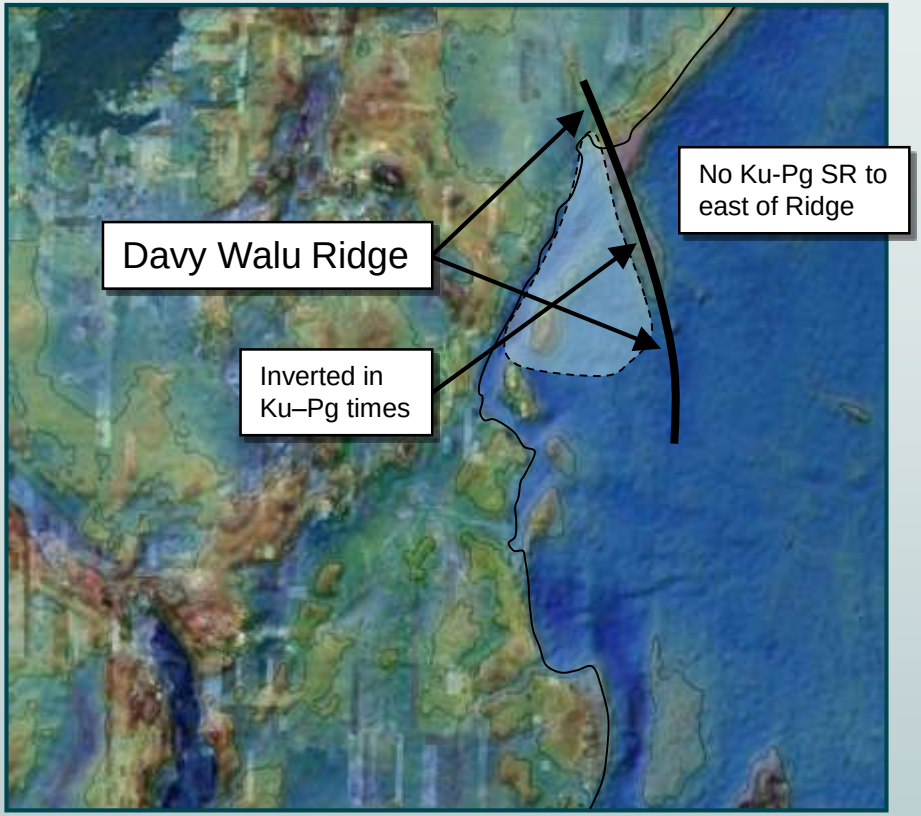
Objective 3

Albo-Aptian sands (Songo-Songo reservoir)

Jurassic source rocks (predicted in this area)

○ Weak oil show
○ Weak gas show
■ Source rocks

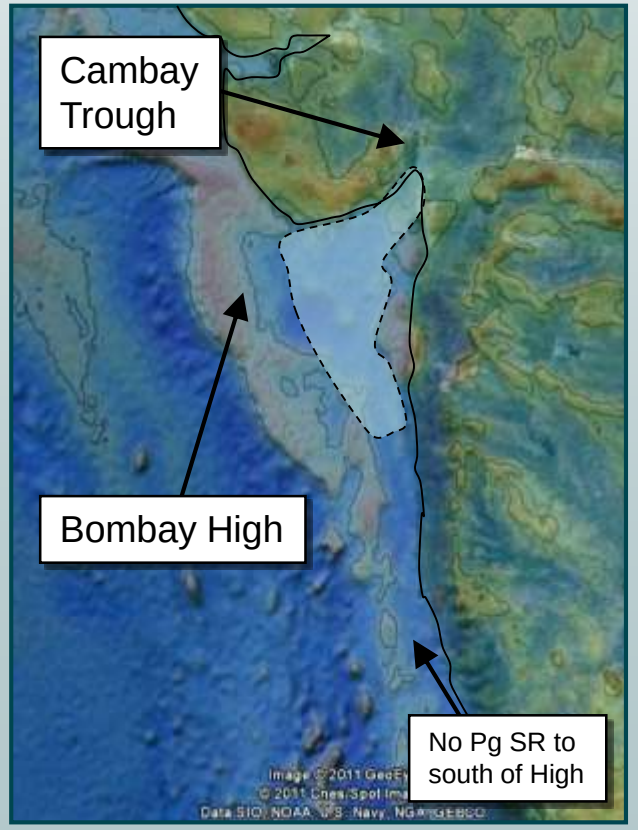
Analogue for possible Ku-Pg SR distribution in offshore Lamu Basin



Kenya:
Ku – Pg inversion of Davy Walu Ridge created area of restricted circulation to the west of it, in which Ku-Pg source rocks could be deposited. Inversion of the Ridge onshore probably diverted drainage away to the east, so the TOC was less diluted by clastic influx.

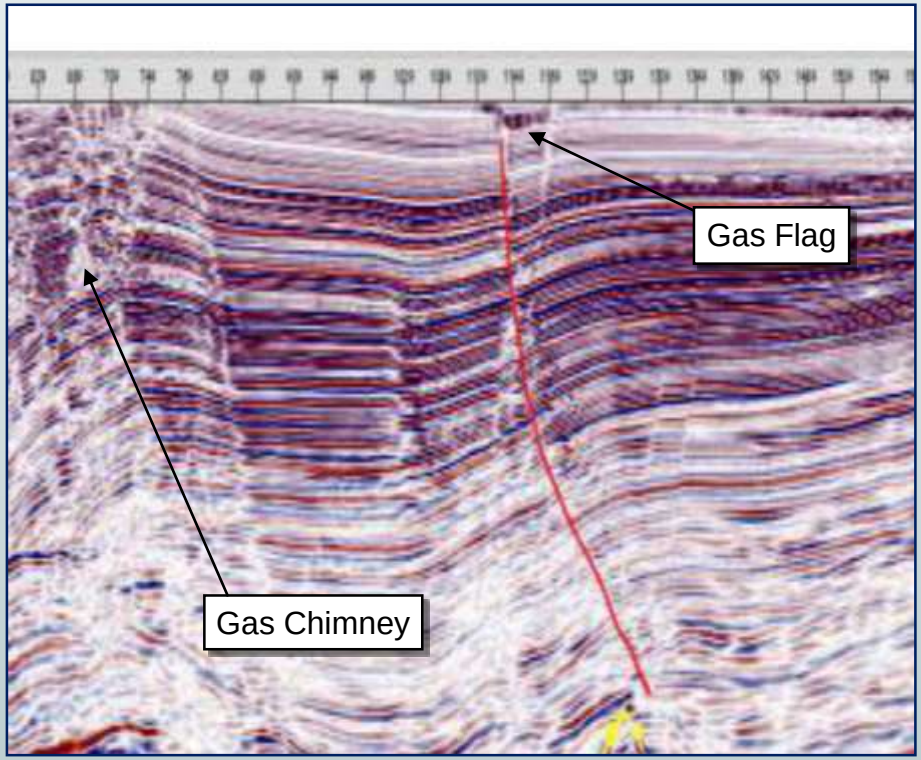
Note: Scale of both maps the same.

India:
Ku growth of Bombay High created restricted conditions behind it and rich Pc-Eo source rocks deposited, which charged BH and Cambay fields. To the south of the High, no Pg source rocks found.



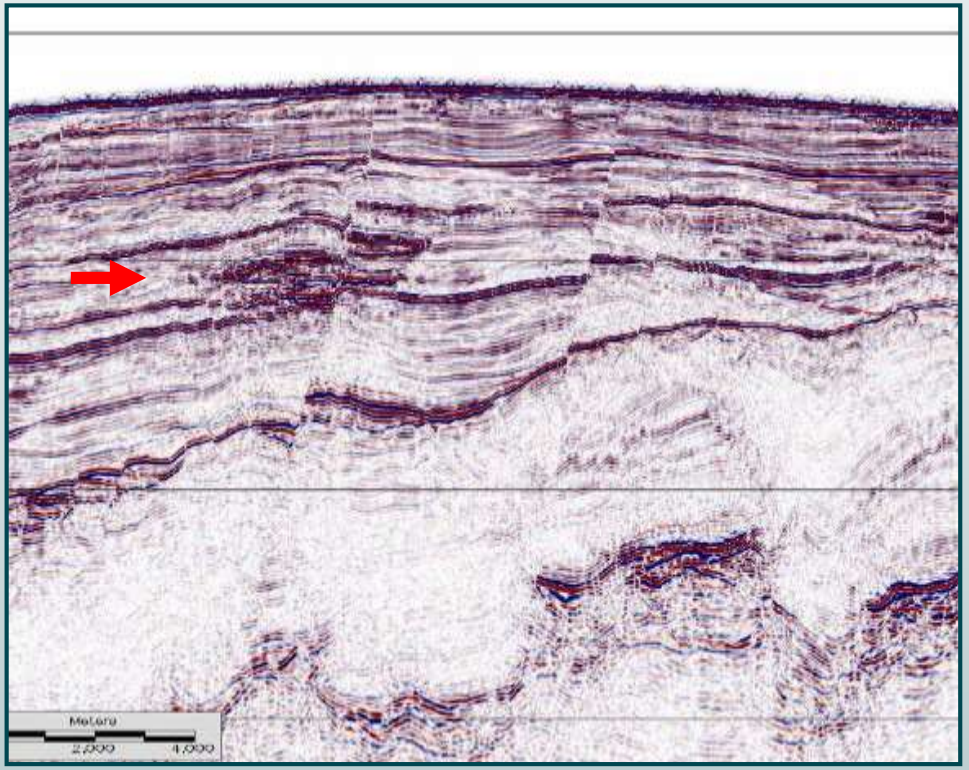
L-10: Possible evidence of HC charge

A. Inboard Syncline



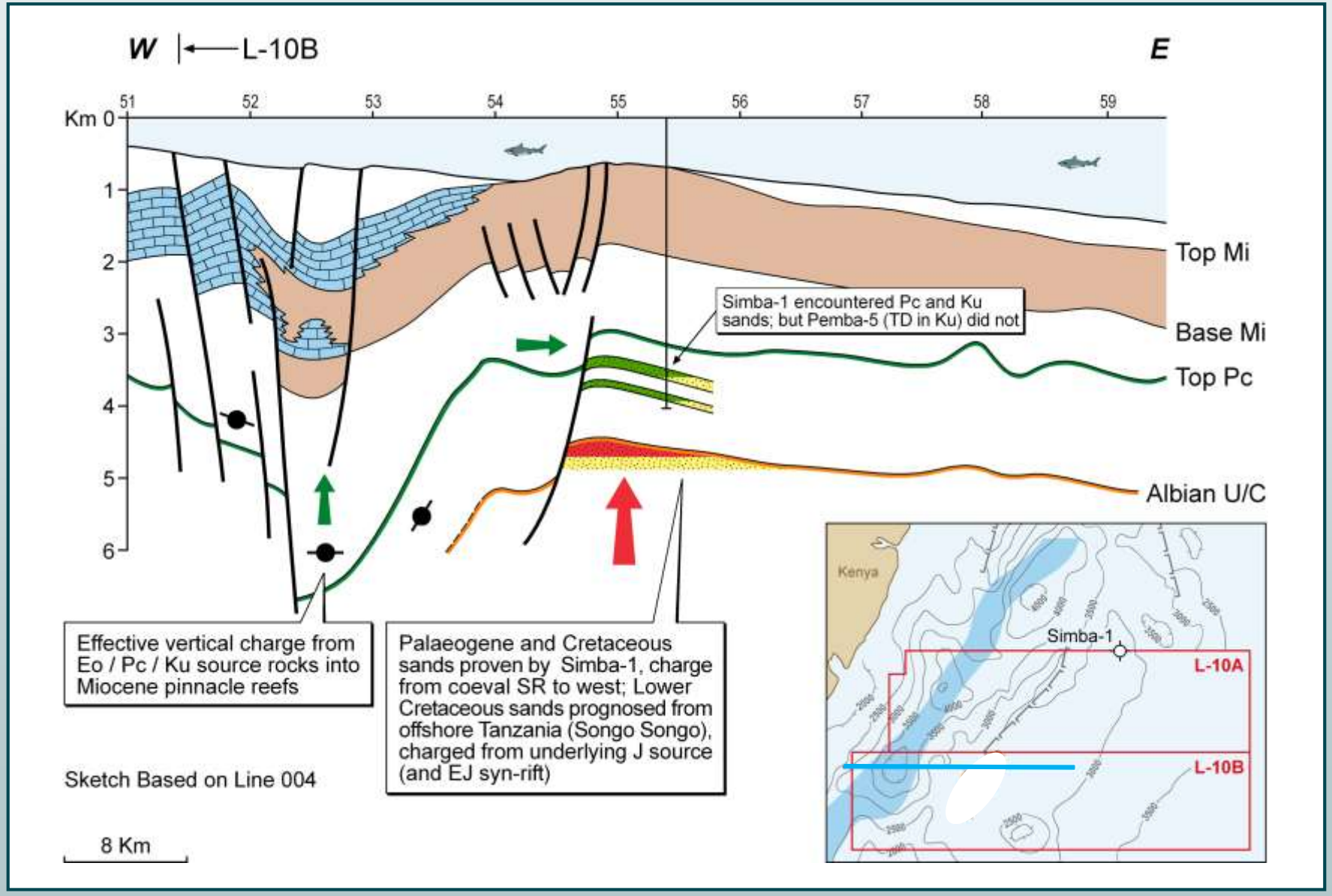
Gas chimney, and gas flag on downthrown side of fault, close to seabed.

B. Davy-Walu Ridge



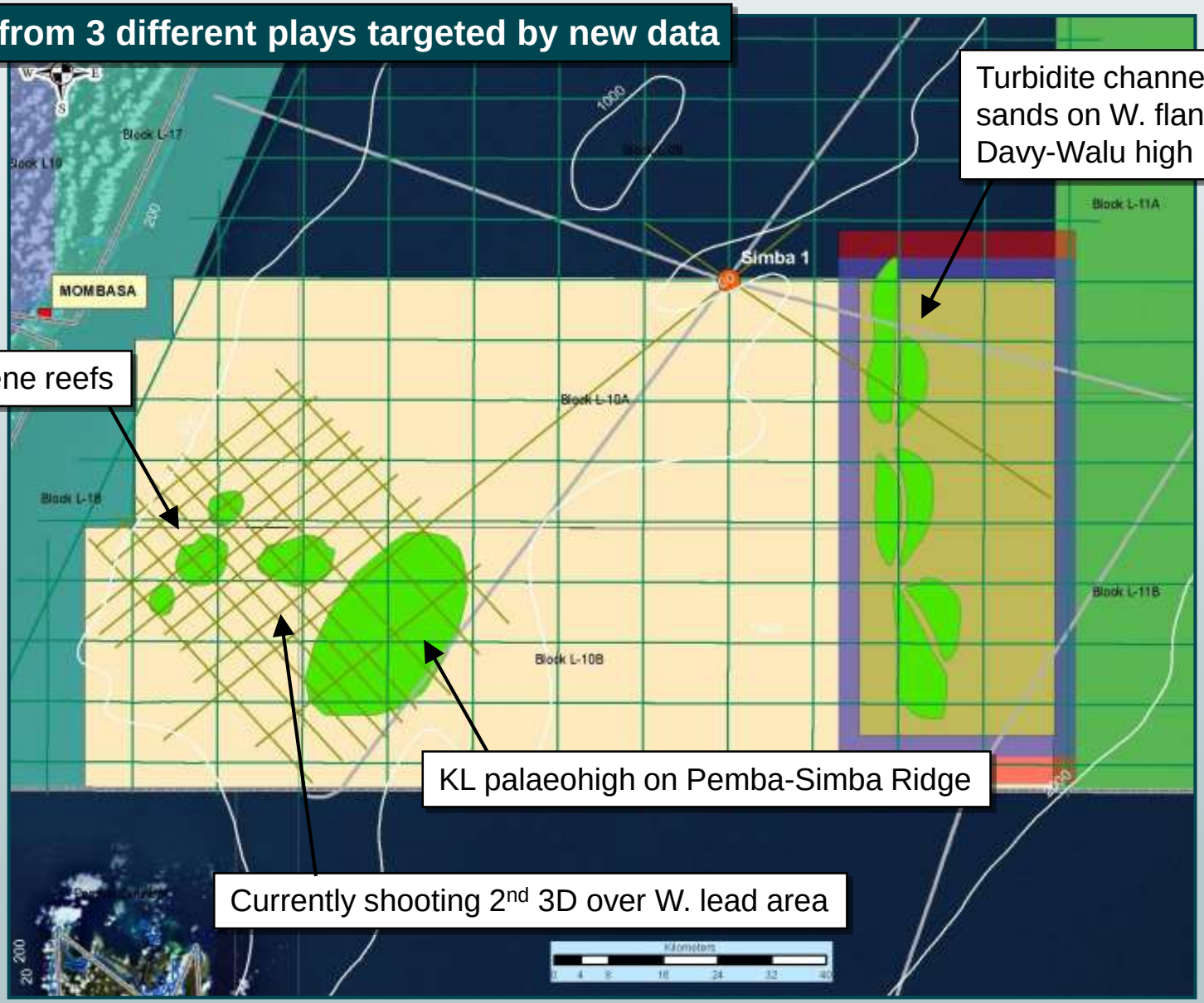
Gas flags on up- and down-thrown sides of deep rooting fault, and possible GWC.

Sketch cross-section 2:
Miocene reef play and rift shoulder lead



Kenya L-10A, L-10B: 2011-12 seismic programme

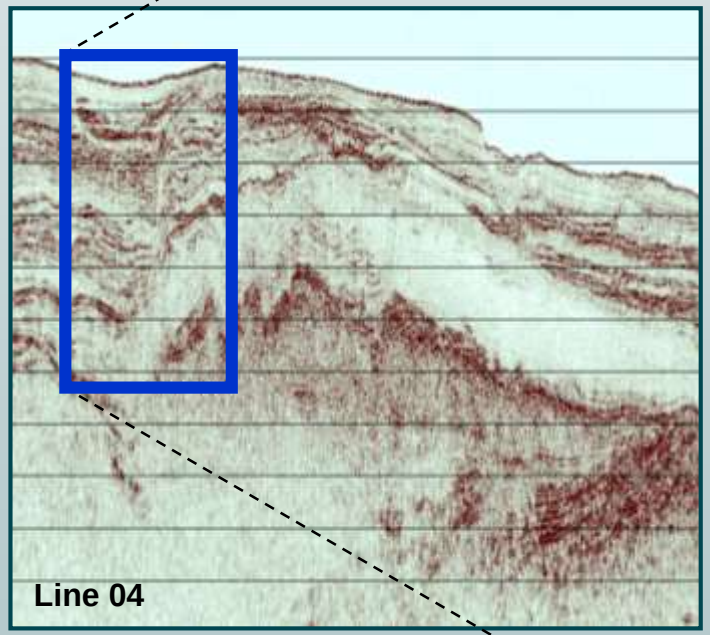
Leads from 3 different plays targeted by new data

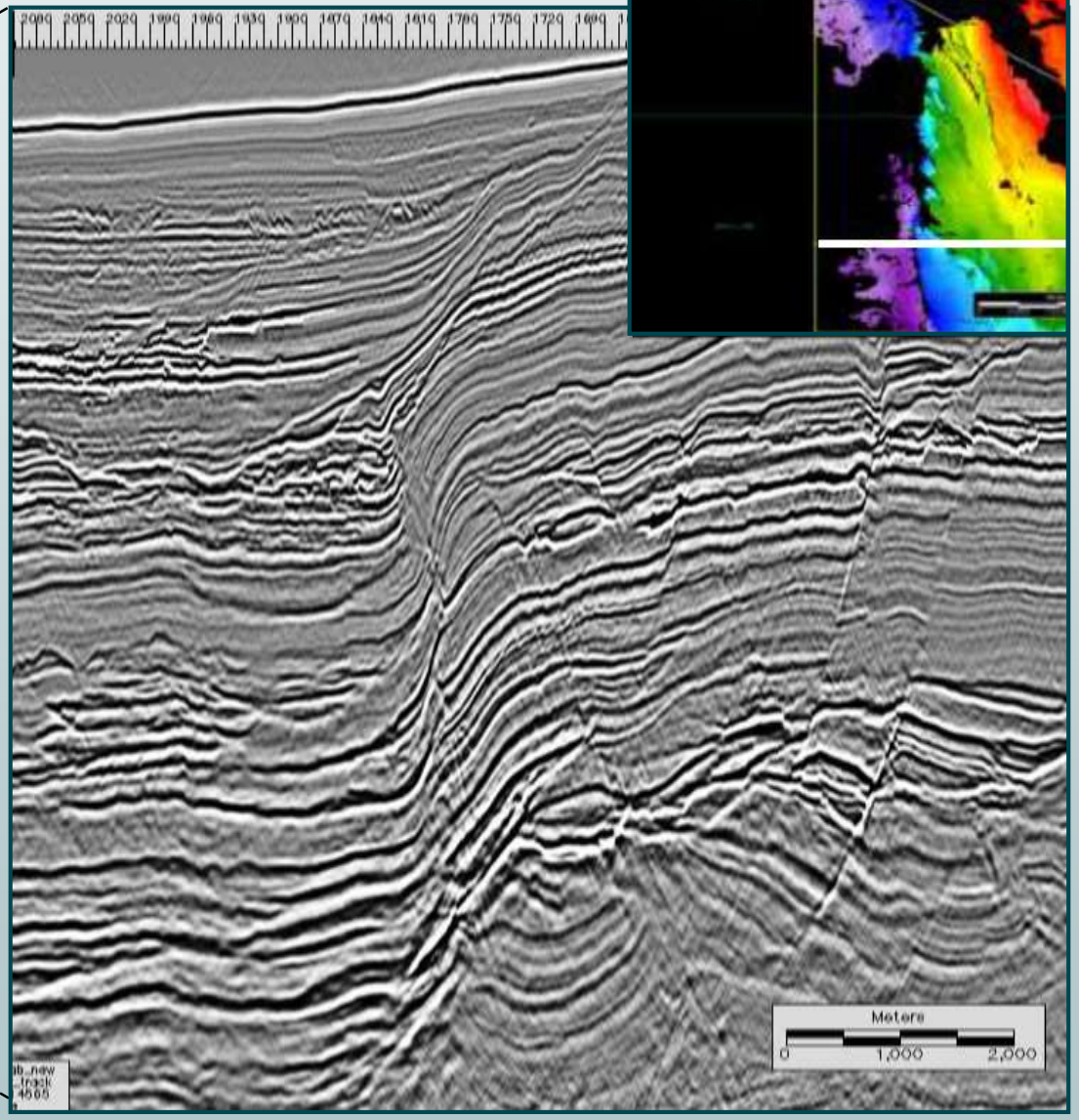


L-10: Ku-Pg listric faults, rollovers, and channels on western flank of DWR

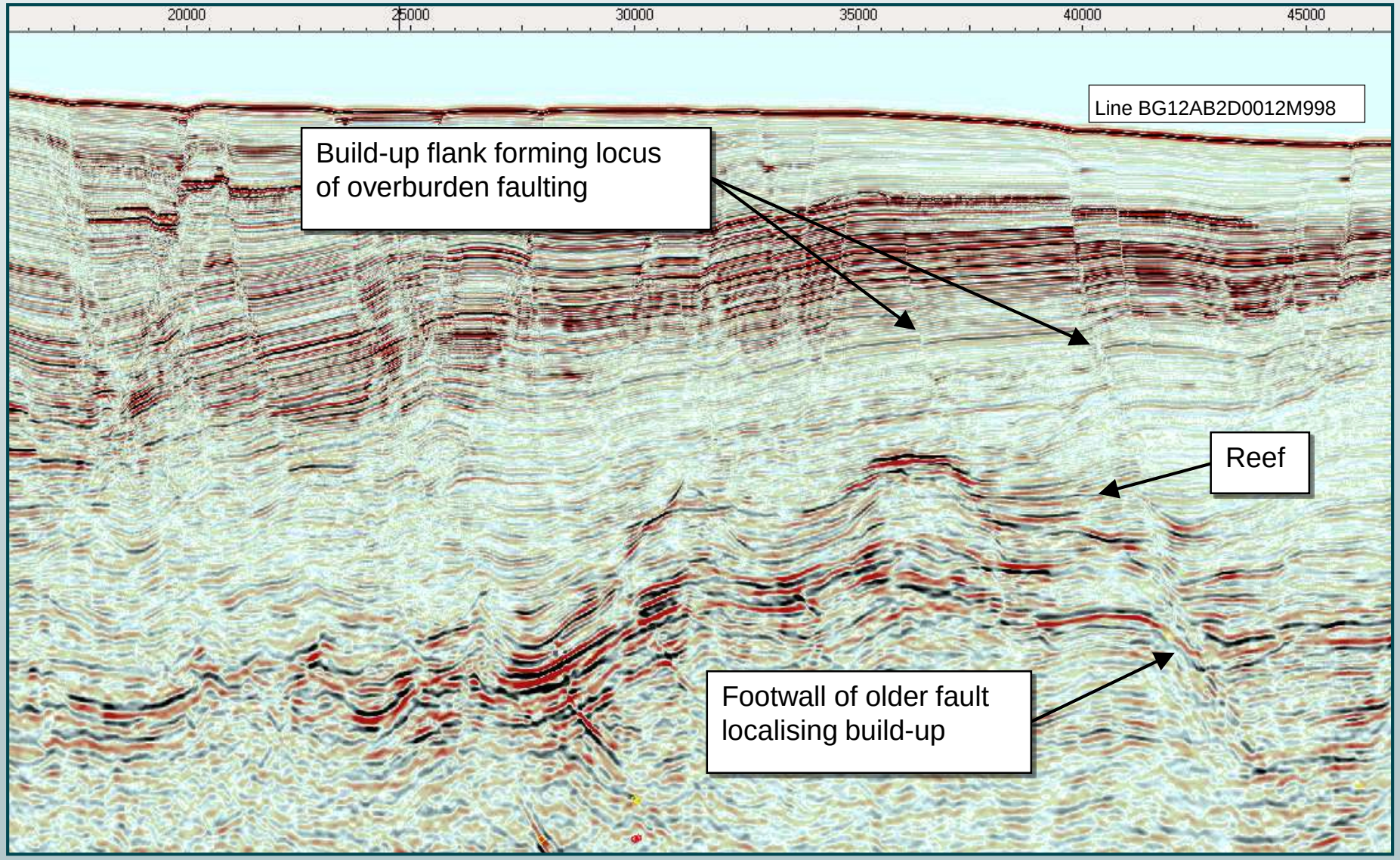
Crest of DWR has high charge risk: JJ-KK source rocks frozen by Ku-Pg inversion.

But L-10 western flank play has direct access to continuously subsiding KL-Ng trough.

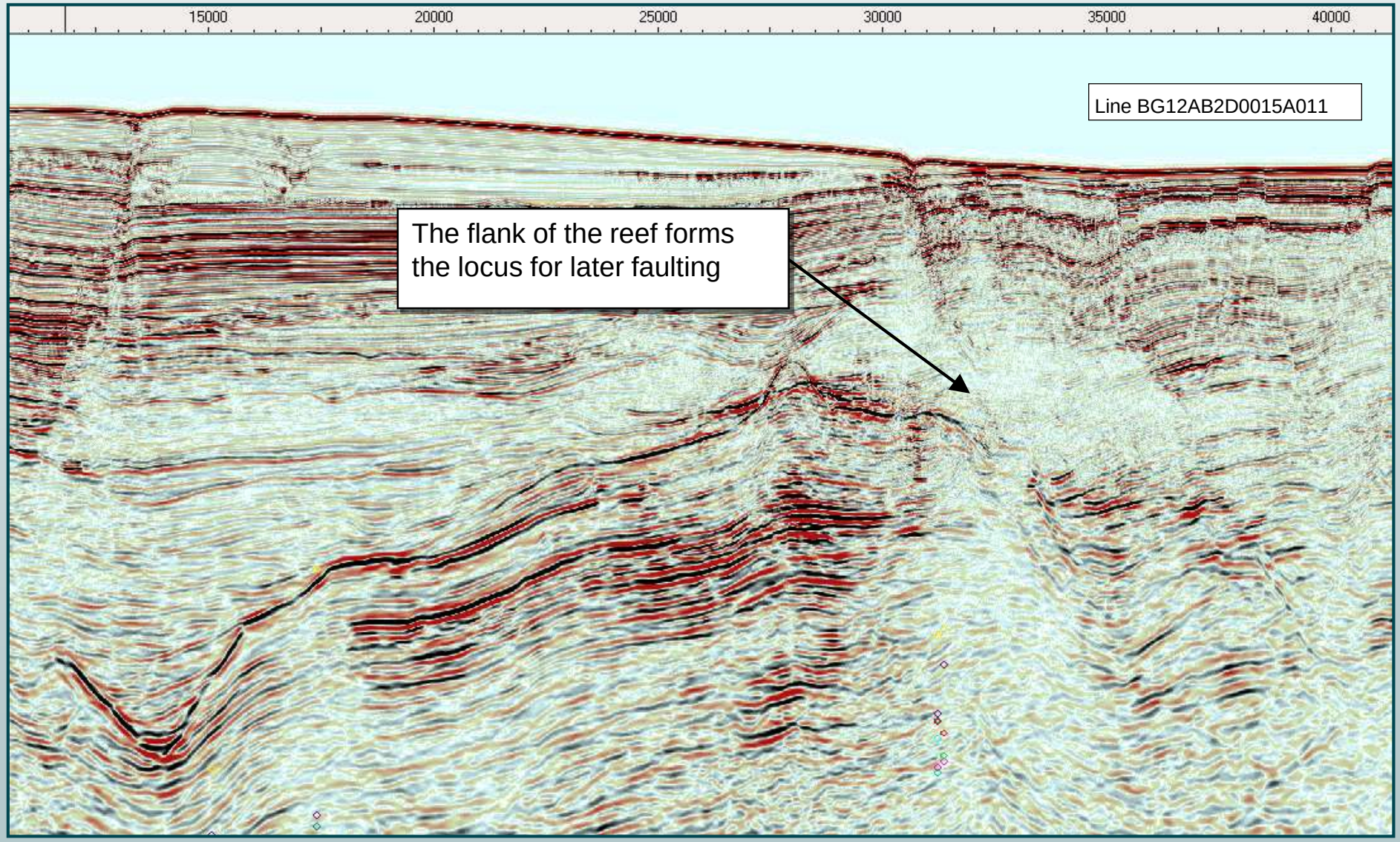




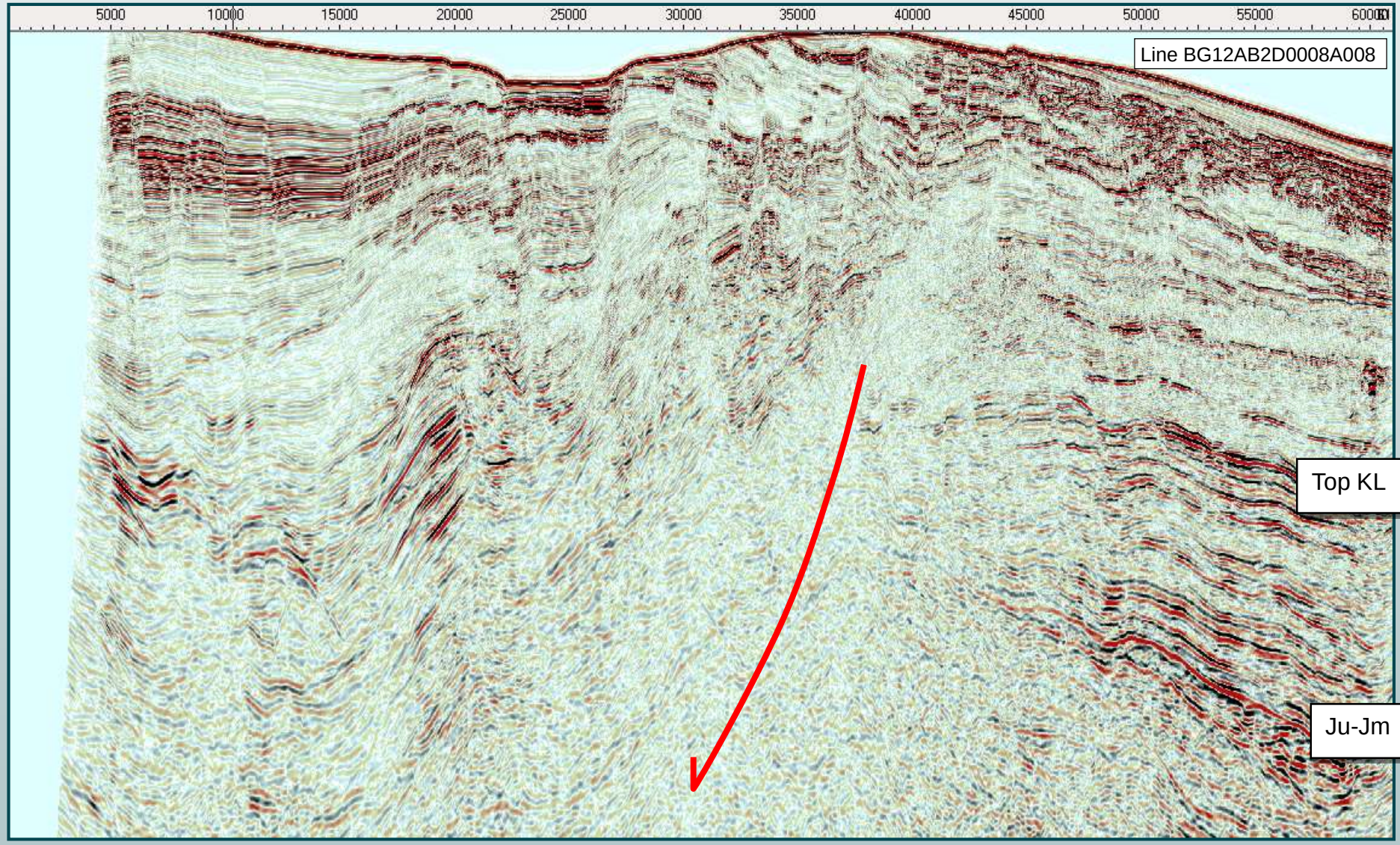
L-10: Miocene reef play (1)



L-10: Miocene reef play (2)



L-10: Lower Cretaceous - Jurassic fault-dip closure



THANK YOU