

Morondava Basin, Offshore Madagascar: A Regional to Basin-Specific Review of Its Hydrocarbon Potential – A Bright Future Awaits*

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Summary

The authors in this poster presentation give an update to their previous papers (Roberts et al. (2013 to 2016[1]) on the petroleum geology and oil and gas potential of the Morondava Basin, Offshore Madagascar. This work is based on the BGP/TGS MAD-13 2D seismic survey ([Figure 1](#)). We examine new pertinent ideas from other parties (e.g., annotated references [2] to [6] below) regarding the geological history and nature of the Davie Ridge, Mozambique Channel, West Somali Basin and Morondava Basin and, in this context, review and illustrate the different plays (e.g., [Figures 2, 3, and 4](#)), and play fairways ([Table 1](#)), in the offshore Morondava Basin - before concluding that this could well be a future petroleum producing province of some note..

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Omnis (Office des Mines Nationales et des Industries Stratégiques, Madagascar): www.omnis.mg.
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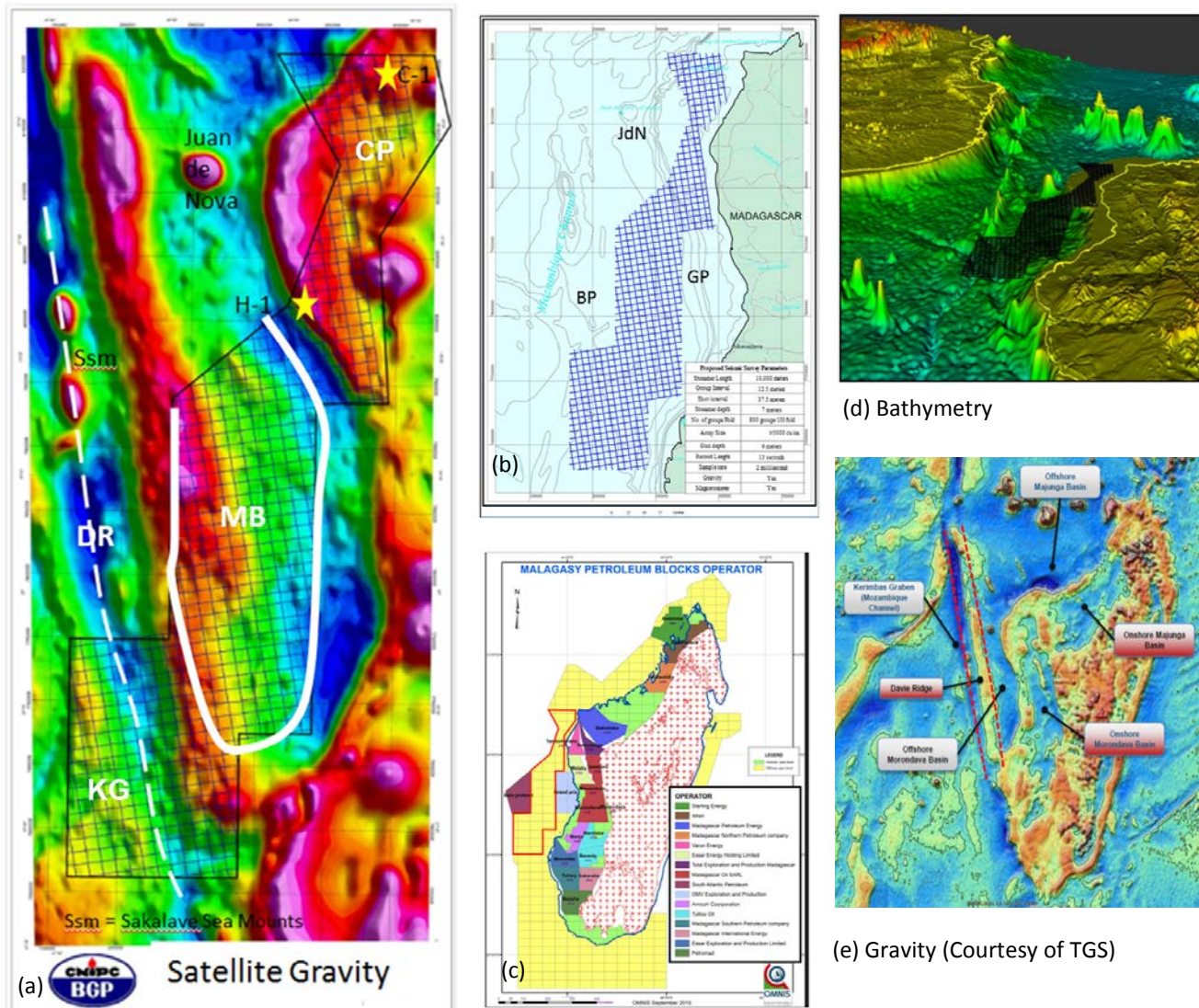


Figure 1a. Satellite Gravity Map showing survey area (10-km grid of seismic lines) and main geological domains (KG = Kerimbias Graben, DR = Davie Ridge, MB = Morondava Basin outlined over survey area, CP = Coastal Platform). C-1 = Chesterfield 1 well, H-1 = Heloise 1 well.
 Figure 1b. MAD-13 Seismic grid and location of adjacent Blocks (GP=Grand Prix, BP=Belo Profond, JdN=Juan de Nova (Fr)).
 Figure 1c. Omnis 2015 Concession map with survey area outlined in red; open blocks in yellow (approx.2000 sq km each).
 Figure 1d. Isometric view showing survey and bathymetry.
 Figure 1e. Satellite Gravity Map (modified from Tyrrell 2014 and courtesy of TGS).

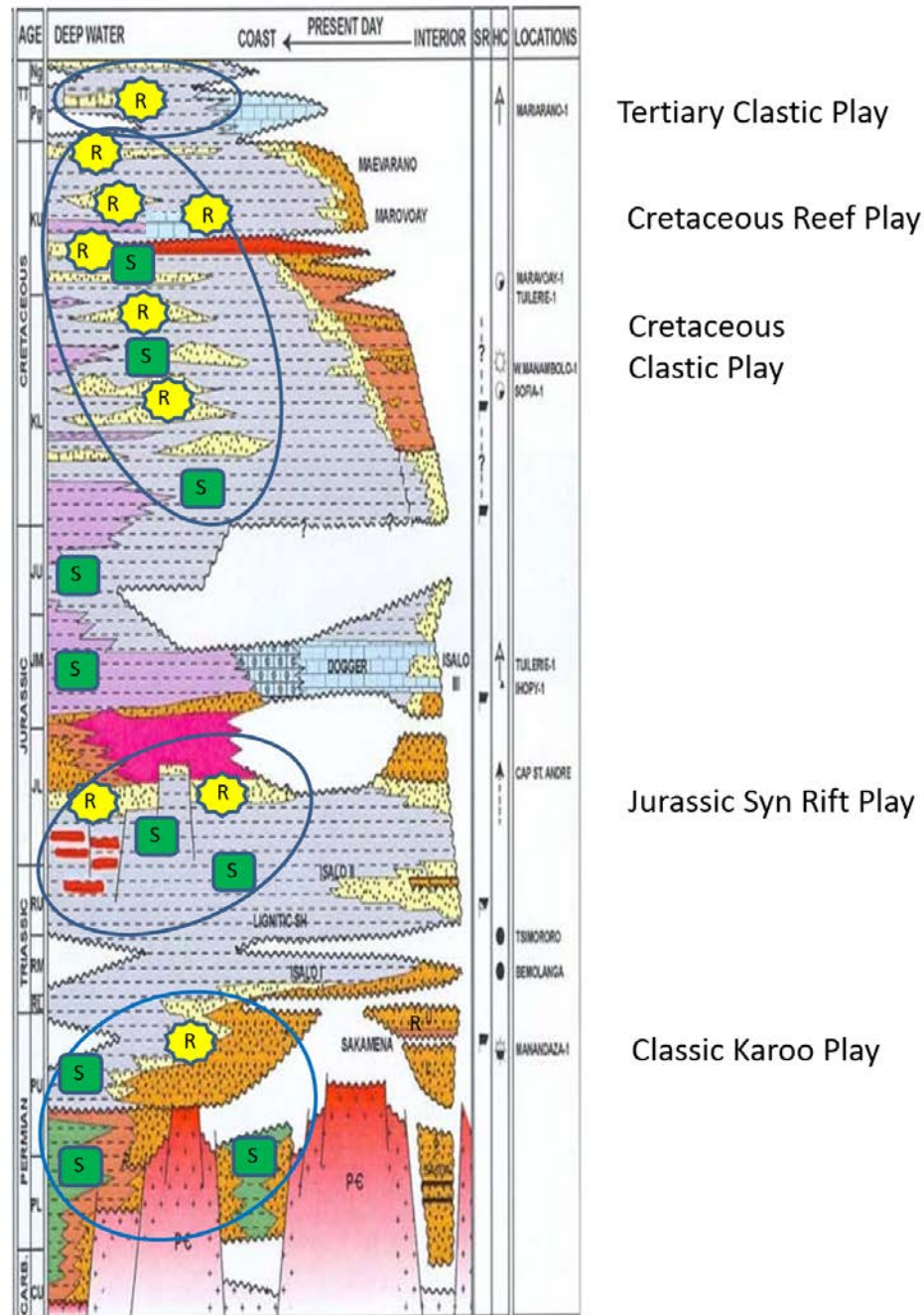
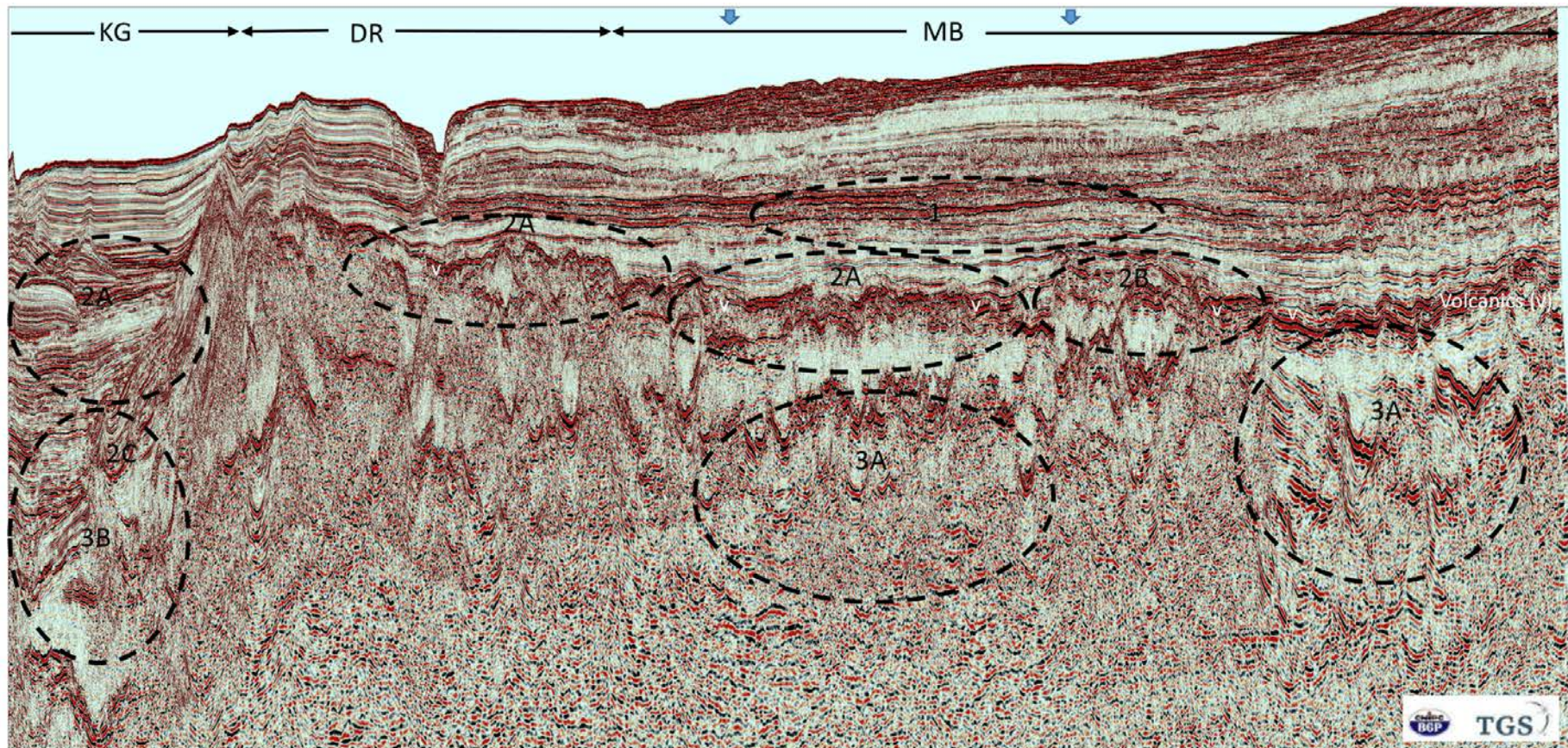


Figure 2. Stratigraphic Column – base source Omnis. Our study area is represented by events on the LHS of the column.



<p>Thick Cretaceous to Tertiary strat traps overlying syn rift and rifted Jurassic and Older Terrain</p>	<p>Cretaceous and Tertiary onlap onto the Davie Ridge.</p> <p>Permo-Triassic and older structures within the Davie Ridge.</p>	<p>Thick Upper Cret (2A) to Tertiary (1) sand bodies. Structural and stratigraphic Traps.</p> <p>Morondava Graben (West*): Large (60 km + wide) and extensive Syn Rift Mid Cretaceous (?) to Jurassic and older Grabens with rotated fault blocks.</p>	<p>Large (30 x 40 km Upper Cretaceous Reef Complex</p> <p><small>* This is not a direct W-E line (the S-N part is indicated by arrows at the top of the fig). However the East/West division of the Graben can be seen on other examples e.g Roberts et al 2015, Fig 8.</small></p>	<p>Morondava Graben (East*) : Large (40 km + wide) and extensive Syn Rift Mid Cretaceous (?) to Jurassic and older Grabens with rotated fault blocks.</p>
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Figure 3. Composite line (PSTM) 220km wide from West-East/South-North/West-East showing the location of some of the major plays. Plays are numbered as per Table 1 column 1. Turonian volcanic level indicated by white Vs.

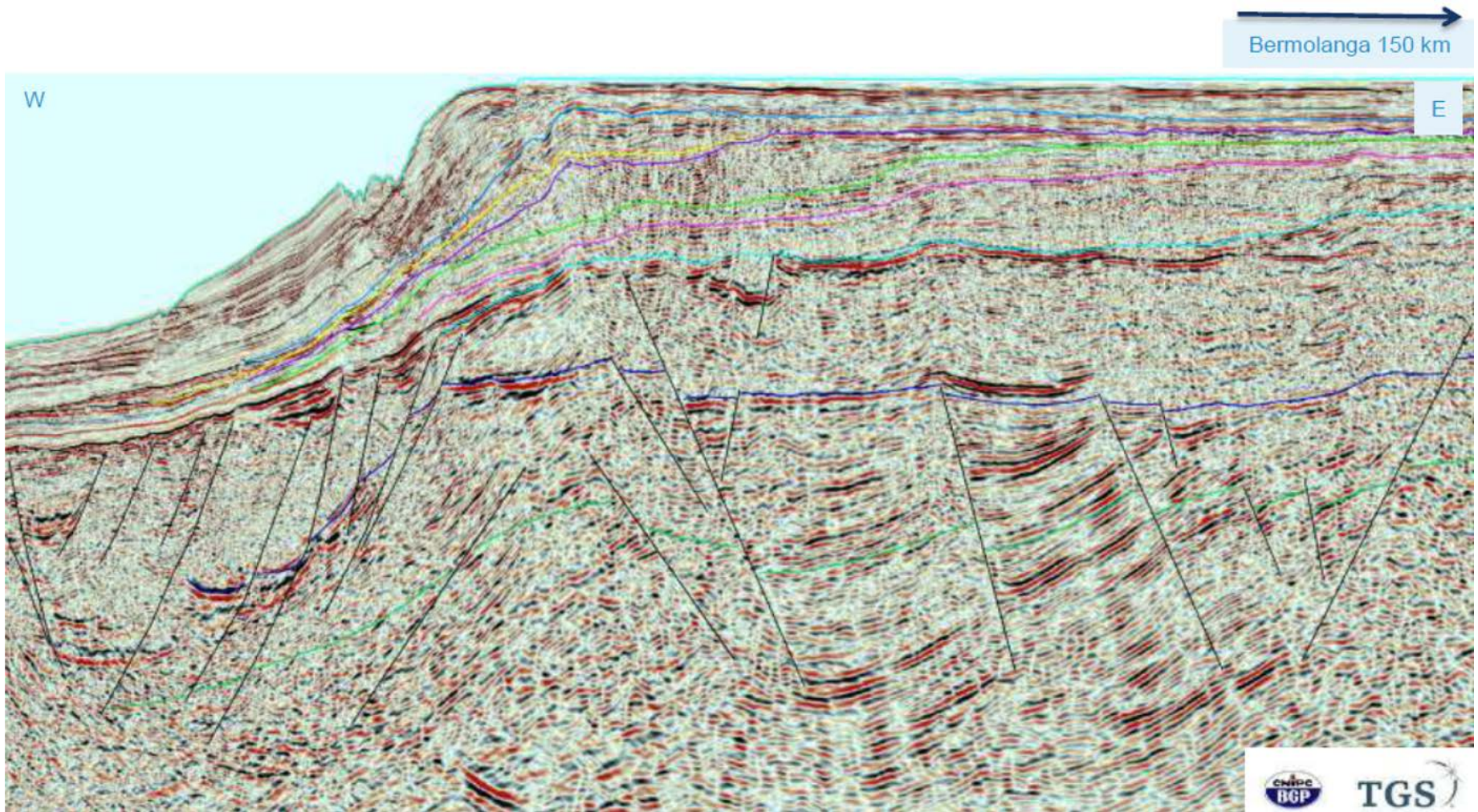


Figure 4. PSTM section illustrating rotated fault blocks (Play fairway 4) on the Coastal Platform. The blocks are expected to be of Karoo age with syn rift Jurassic sediments. Image courtesy of TGS. Section width ~ 40 km.

Madagascar: Morondava Basin Offshore (MAD-13 Survey Area) : Play Fairways - Summary			Location			
			KG	DR	MB	CP
Play Fairways						
1: Tertiary Clastics	Post Rift 2	Basin & Slope floor fans and fluvial channels		Yes (onlap)	Yes	
2A: Late Cret Clastics	Post Rift 1	Basin & Slope floor fans, onlap, drapeover	Yes	Yes (onlap)	Yes	
2B: Late Cret Reefs		Isolated Carbonate Reefs (MB); Platform Margin Reefs (CP)			Yes	Yes
2C: Late Cret Structural		Toe thusts and horsts	Yes			
3A: Late Jur/E-M Cret Clastics	Syn Rift	Clastics in the (newly named) Morondava Graben - Ref 5 fig 7)			Yes	
3B: Late Jur/E-M Cret Structural		Toe thusts (in KG) and horsts	Yes			Yes
4: Karoo Rift	Rift	Horsts, Grabens and Rotated Fault Blocks				Yes
5: Other possible fairways:						
A) Tertiary (Biogenic ? or Thermogenic ?)		Patch reefs or Cold Water Coral Mounds or ?			Yes	
B) Karoo and Older ? (speculative)		? Within weathered/fractured DR - sourced from Late Cret onlap?		?		

Key: KG = Kerimbass Graben, DR = Davie Ridge, MB = Morondava Basin, CP = Coastal Platform

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Table 1. Play fairway table (MAD-13 study area; Roberts et al., 2017).