

# Larus Energy Limited

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ANNUAL GENERAL MEETING, 7TH JUNE, 2018  
COMPANY UPDATE

DR MICHAEL SWIFT , EXPLORATION MANAGER

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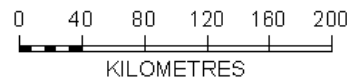
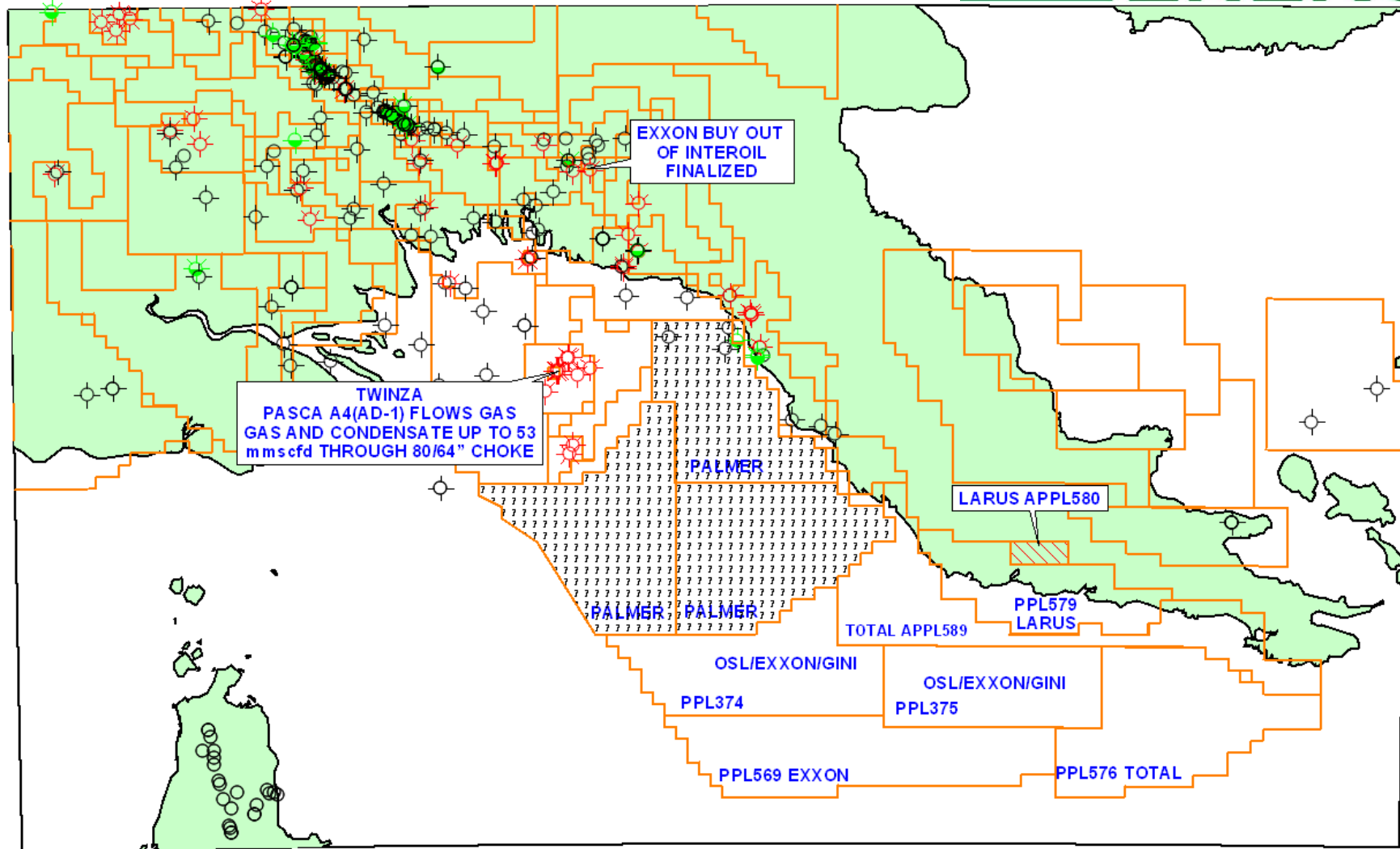
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# Exploration – what others are doing in the region



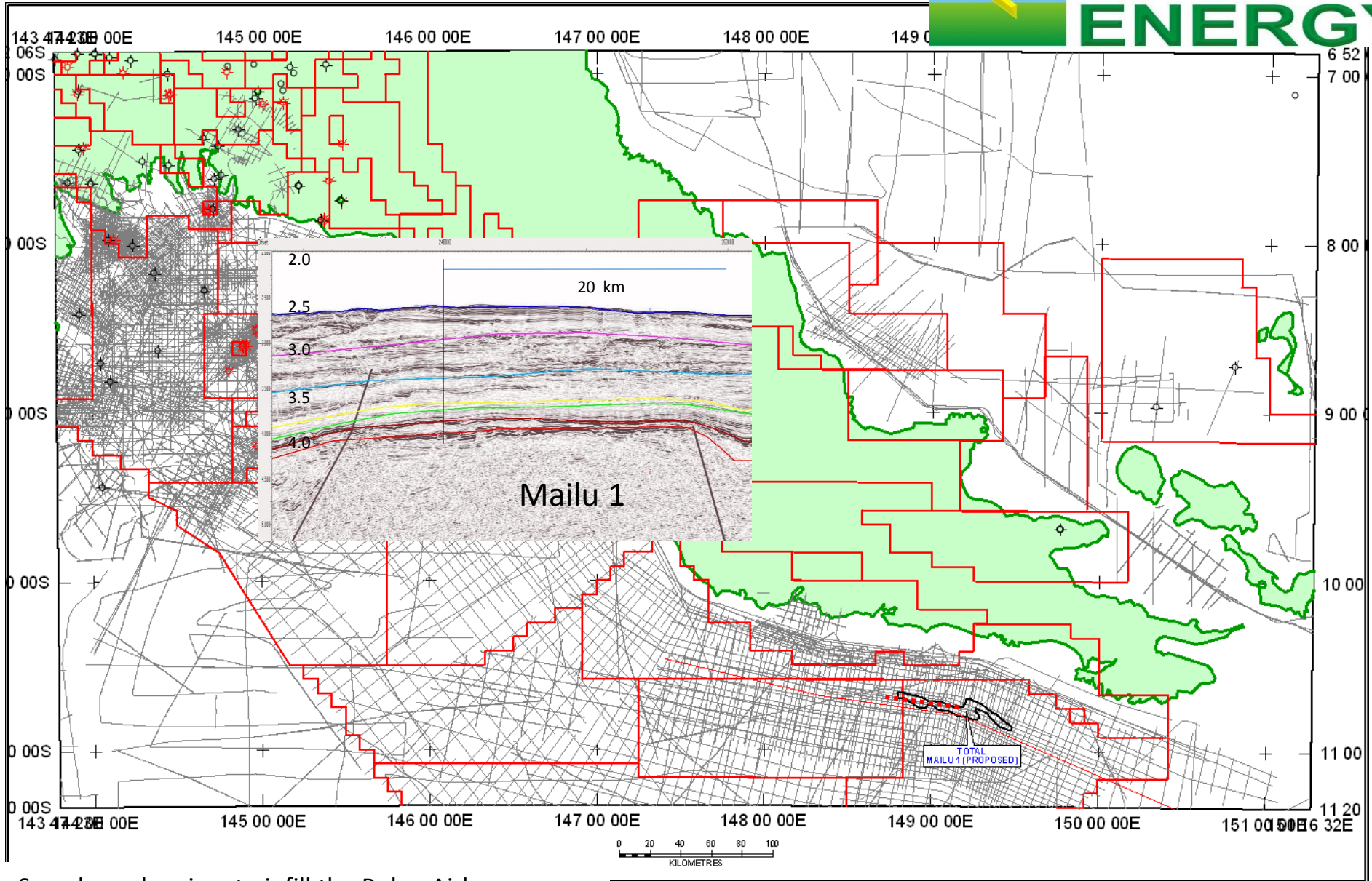
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Mapfile: what others are doing. dbm

Map Sheet: PNG\_BASE003

G&G – what others are doing in the region.  
There is a massive amount of offshore 2D seismic  
being acquired in SE PNG.



Searcher planning to infill the Roho Airborne  
Survey, a multi-client airborne gravity gradiometry  
and magnetics survey.

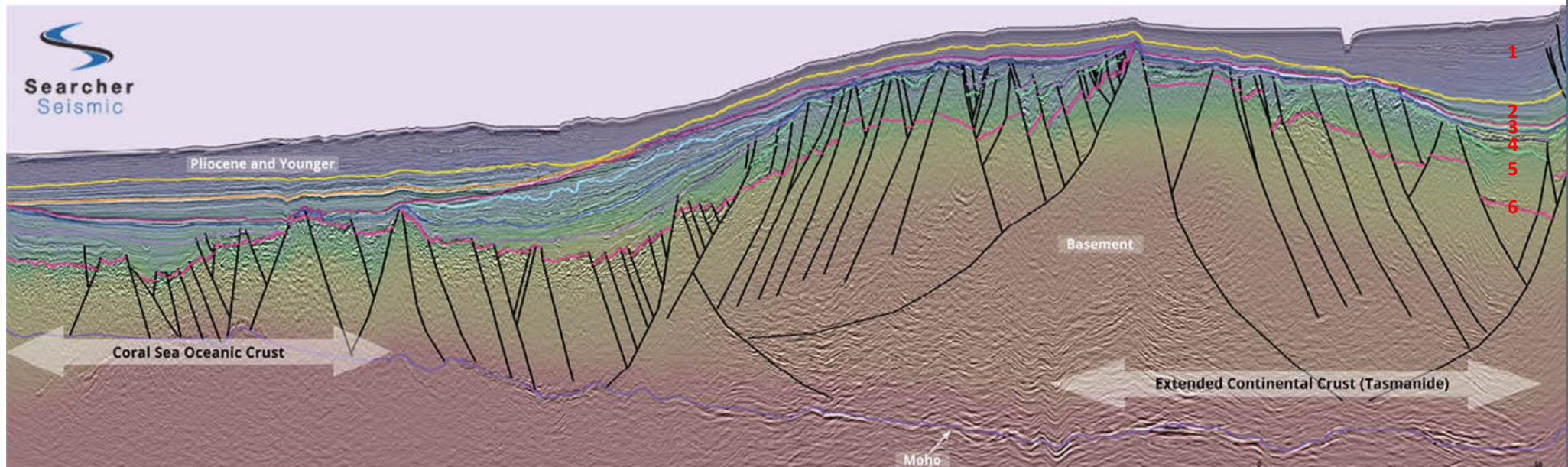
Mailu 1 is a drape anticline and well south  
of the frontal thrust.

# Regional Line



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N

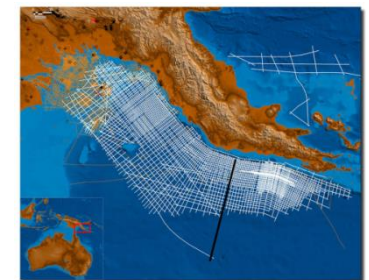


### UNCONFORMITIES

1. Recent to Pliocene basins defined between the present-day sea floor and Woodlark Basin break-up unconformity.
2. Miocene to Paleocene basins bounded by an unconformity at the top and the Coral Sea break-up unconformity at the base, which corresponds to the C21 magnetic anomaly (5.2 Ma to 60 Ma).  
Eocene foreland and frontal bulge unconformity?
3. Upper Cretaceous basins defined between the Coral Sea and Tasman Sea break-up unconformities (60 Ma or 79 Ma).
4. Lower Cretaceous to Upper Permian basins with the Middle Triassic and Permo-Carboniferous successions considered analogous to the Bowen and Galilee Basins located onshore Queensland in Australia.
5. Lower Permian to Upper Carboniferous basins are most likely economic basement.
6. Basement to Moho package allowing differentiation between continental, transitional and oceanic crust and consequently refinement of existing plate tectonic models.

### Plays

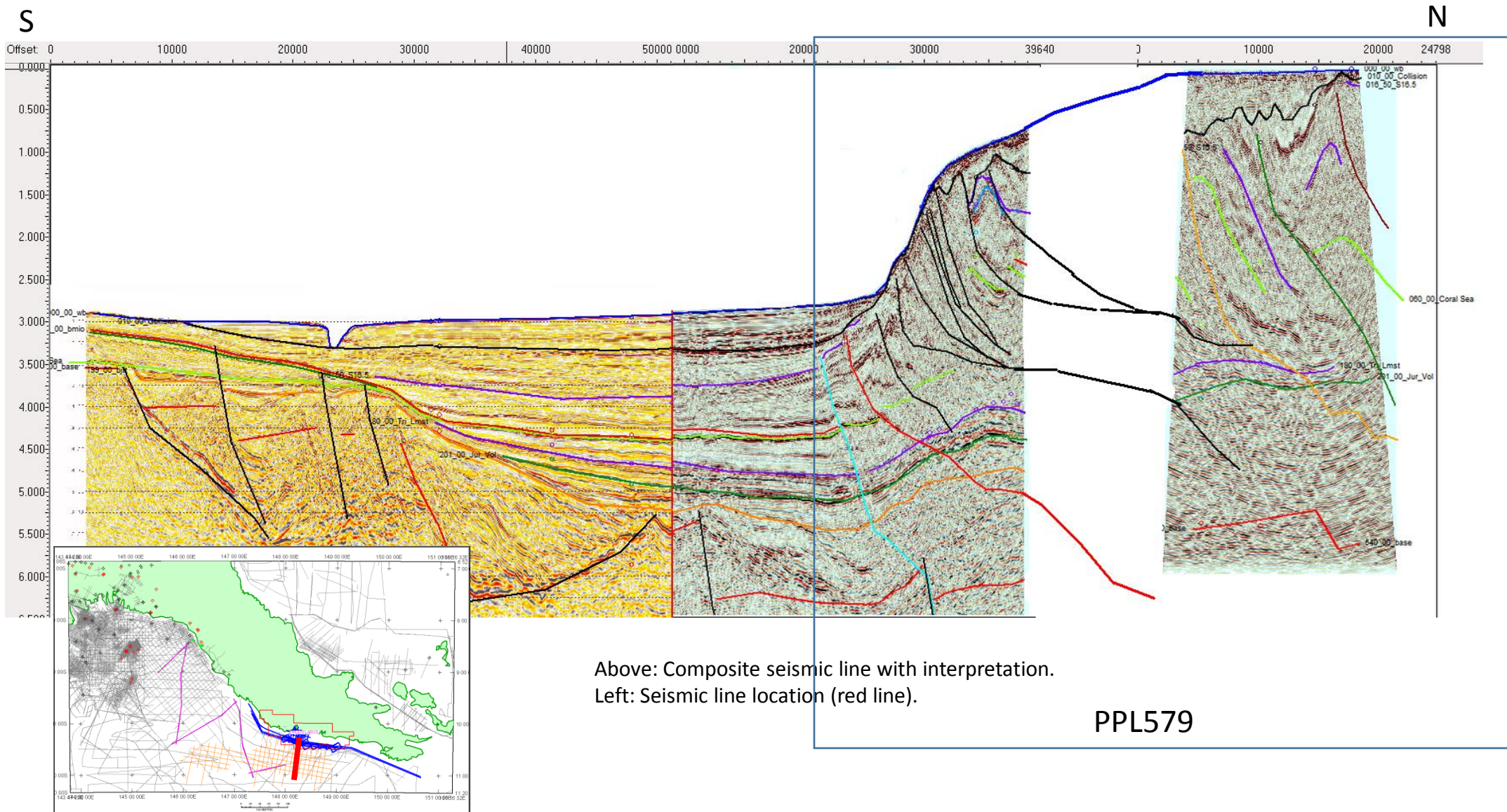
- Compressional fold belt features, some up to 500 km long, not tested in deep water.
- Pliocene detached basin floor fans;
- Miocene pinnacle structures analogous to the Pasca and Pandora gas discoveries;
- (Late Cretaceous) break-up structures of various ages;
- Lower Cretaceous to Upper Triassic reservoir/seal pairs – primary targets in onshore and offshore PNG exploration;
- Middle Triassic to Upper Carboniferous reservoir/seal pairs analogous to the Bowen and Galilee Basins in Queensland;



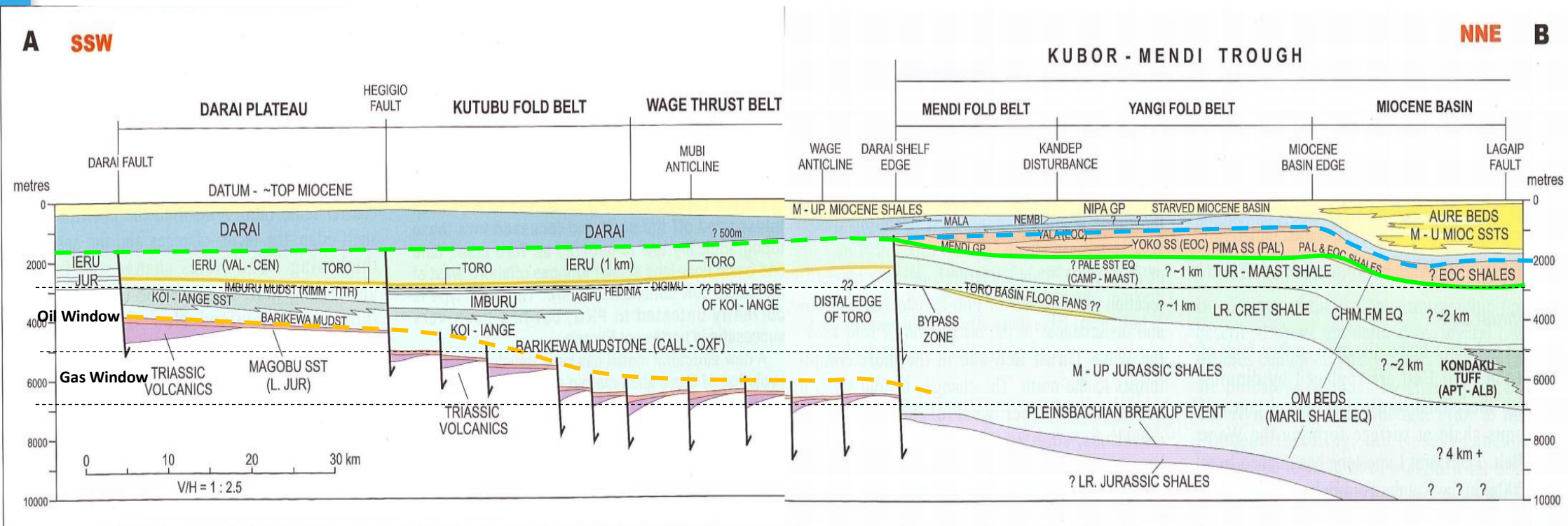
## Zooming in to PPL579.

The 'tweaks' to the interpretation are;

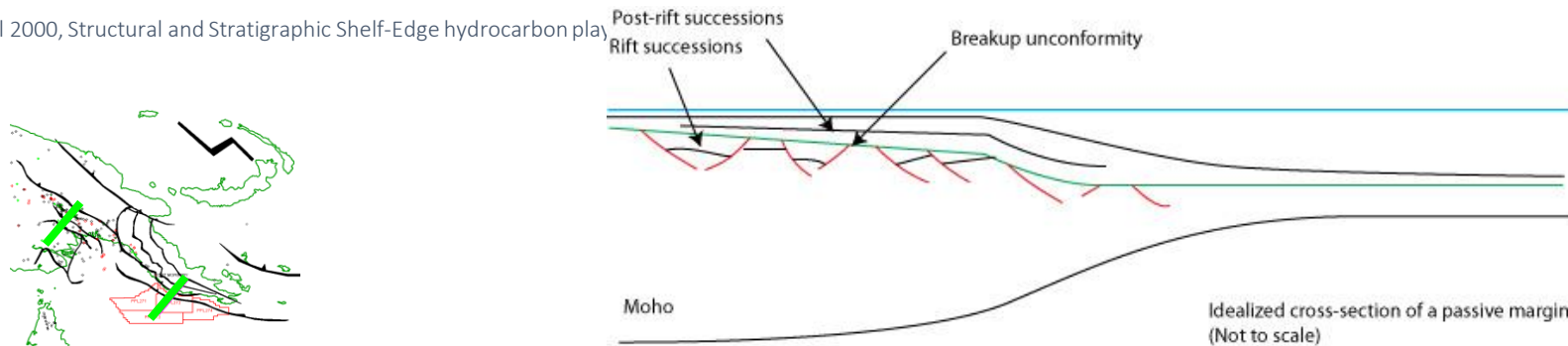
- The Coral Sea Unconformity is cut by the Oligocene Unconformity but Mesozoic still present.
- The southern margin of the Torres Basin is now known
- Increased thickness in seal over Miocene Carbonates



# Papuan Basin Analogue For Source/Reservoir/Seal/Play

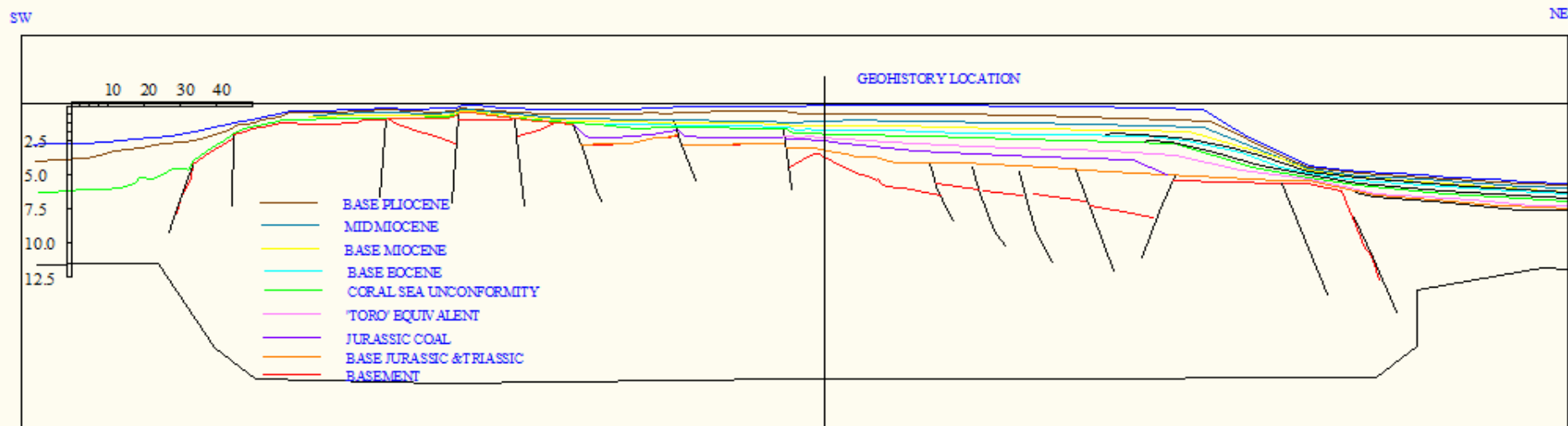


Hill et al 2000, Structural and Stratigraphic Shelf-Edge hydrocarbon play

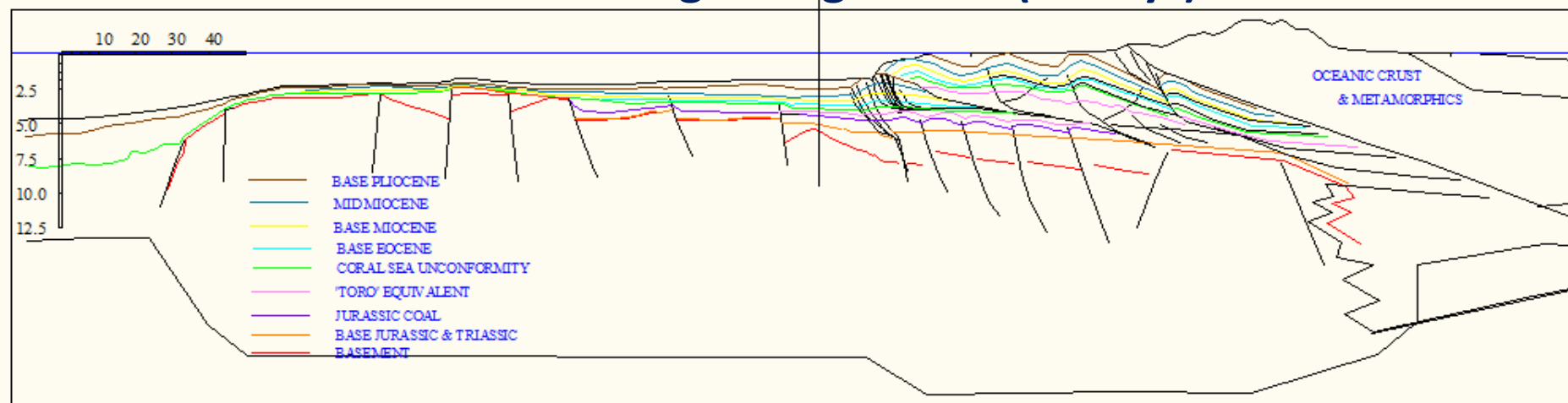


# Structural History of the North PNG Coast

Extension-Extension-Drift-Compression-Foreland-Extension  
 Triassic Cretaceous Cretaceous Miocene Pliocene Recent



**Starting configuration (15 Myr)**



**End configuration (Today)**

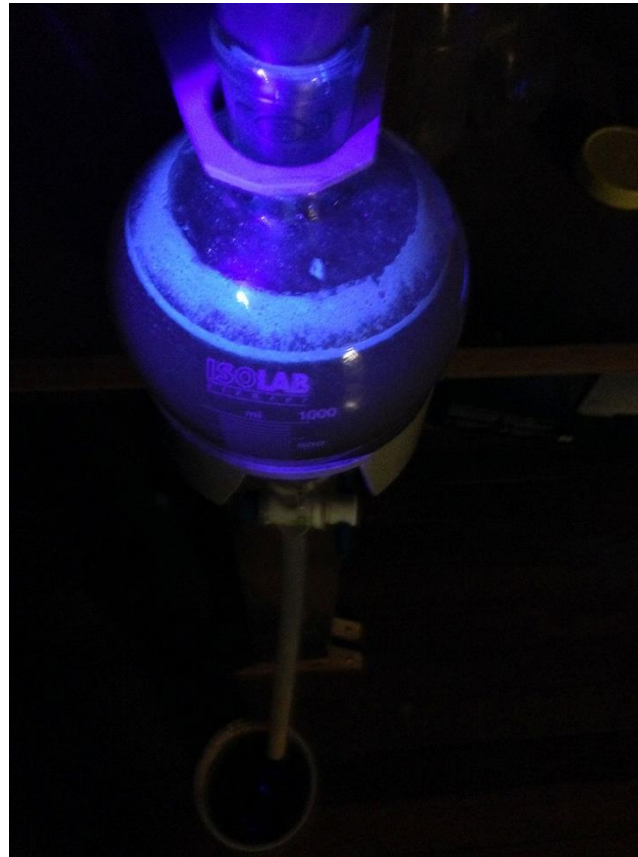




Panorama looking west along the foothills to the north of PPL579. The flat coastal plain is seen in the distance. A major thrust fault system is under the hills and comes to the surface at the foot of the hills. The seep is down the gully to the right of the vehicle.



Oil sample under normal light.

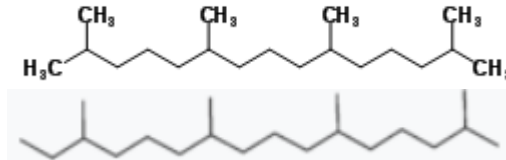


Oil sample under UV light.



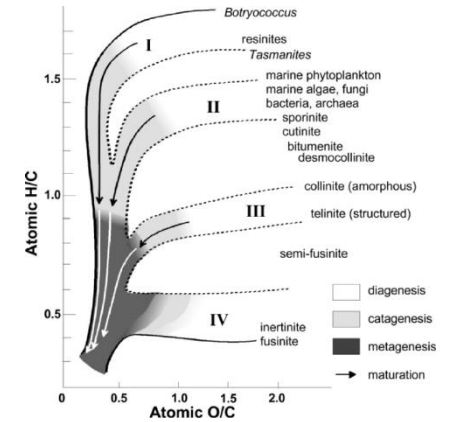
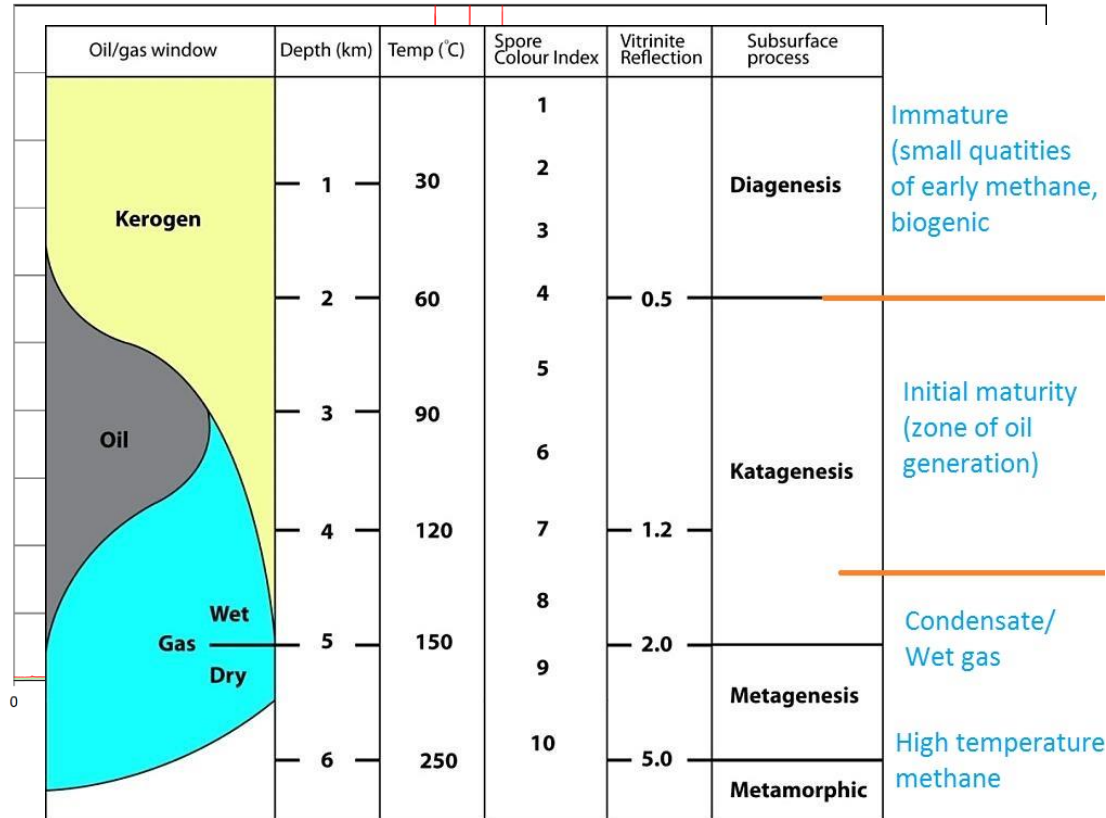
Sample on water and pure light crude oil.

# 2017 Oil Seep – Analysis - Recapping



Oil seep samples 103718, 103720, 103721

- n*-Hexane nC<sub>10</sub>
- 2,4-DMP nC<sub>11</sub>
- Benzene nC<sub>12</sub>
- Cyclohexane nC<sub>13</sub>
- 2-Mhexane nC<sub>14</sub>
- 2,3-DMP nC<sub>15</sub>
- 1,1-DMP nC<sub>16</sub>
- 3-Mhexane nC<sub>17</sub>
- 1-c-3-DMCP nC<sub>18</sub>
- Phytane ph
- 1-t-2-DMCP nC<sub>19</sub>
- 2,2,4-TMP nC<sub>20</sub>
- n*-Heptane nC<sub>21</sub>
- MecycloHexa nC<sub>22</sub>
- 2,5DMHexa nC<sub>23</sub>
- 2,3,4-TMP nC<sub>24</sub>
- Toluene nC<sub>25</sub>
- 3-Mheptane nC<sub>26</sub>
- 2,2,5-TMP nC<sub>27</sub>
- Cycloheptane nC<sub>28</sub>
- n*-Octane nC<sub>29</sub>
- Ethylbenzene nC<sub>30</sub>
- m*-Xyle/pXyl nC<sub>21</sub>
- o*-Xylene nC<sub>32</sub>
- n*-Nonane nC<sub>33</sub>



Environment	Kerogen Type	Kerogen Form	Origin	HC Potential
Aquatic	I	Alginite	Algal bodies	Oil
		Amorphous Kerogen	Structureless debris of algal origin	
Terrestrial	II	Exinite	Structureless planktonic material, primarily of marine origin	Gas, some oil
			Skins of spores and pollen, cuticle of leaves and herbaceous plants	
	III	Vitrinite	Fibrous and woody plant fragments and structureless, colloidal humic matter	Mainly gas
	IV	Inertinite	Oxidized, recycled woody debris	None

## Gas chromatography

The science is: Pr/Ph 3.9-4.0 in refined oils but here at the seep Pr/Ph is 4.9 There are different patterns of intra-paraffin peaks between refined oil and the seep sample. Very high Pr/Ph ratios (more than 3) are associated with terrestrial sediments, fluvio-marine and coastal swamp environments. High values (4 to 10) are related to peat swamp depositional environments (oxidizing conditions).

# Farmout Effort and Conferences



The farmout effort has now be ramped up following the seismic program results and the oil seep discovery.

### Papua New Guinea PPL 579

- Larus Energy Limited (Larus) is seeking a partner to earn an interest in PPL 579 in the Torres Basin, PNG
- Permit was revised in January 2017
- First two years of work program are seismic and 6&G studies
- Exploration well required in 2019-2020
- Hydrocarbon potential of basin highlighted by recent licence applications (APPLs) made by ExxonMobil and Total contiguous to PPL579
- Undrilled Torres Basin on trend with Mesozoic and Tertiary production in the northwest Papuan Basin
- Miocene and Mesozoic reservoirs with seals identified
- Jurassic Source (Rx) buried into Oil/Gas Window
- Seismic demonstrates structural style, burial depth similar to producing Papuan trend

**Opportunity Summary**

- An opportunity to earn a significant equity stake with oil and gas prospective resources in a high-impact frontier licence, new sub basin
- The area is largely unexplored and includes exploration opportunities in two different petroleum systems
- 12 Mesozoic and 22 Tertiary strong leads have been mapped with clastic and carbonate targets
- Initial exploration effort will focus on two high-graded offshore prospects, potential in excess of 13 TCF
- Commercialization Infrastructure coming to the area with InterOil/Total's multi-train LNG development at Elk-Antelope

Larus holds a 100% WI through its wholly owned subsidiary Larus Energy (PNG) Limited in the licence

- Completed work includes the 2011 Baranata Deep Water 2D seismic survey (1,000km), 2012 Abau Offshore 2D seismic survey (300km), and the 2015 Paluma 2D seismic survey (810km)

Moyes & Co., Upstream Technical & Transaction Advisors April 2017  
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### Geological Setting

PPL 579 is situated within the frontier eastern part of the Eastern Papuan Basin, and straddles an on/offshore area between Port Moresby and the south-eastern tip of the Papuan Peninsula, south of the Owen Stanley Ranges

- Similar setting to other discoveries and fields in PNG with complex tectonic history
- The licence covers the Mesozoic Torres Basin which encompasses the regions of the Eastern Papua Plateau and the Papuan Plateau
- The deepwater Moresby Trough separates the Papuan and Eastern Plateaus from the Papuan Peninsula
- The Papuan Peninsula immediately north of PPL 579 is largely occupied by the New Guinea Orogen

### Basin Stratigraphy

- Without well control the stratigraphic framework of the Torres Basin is poorly defined
- Stacked overthrust Tertiary systems overlie a Mesozoic succession, Jurassic coals, continuous from the foreland and through the sub-thrust
- Similarities with the tectonic development of Papuan Basin suggest a comparable stratigraphy exists in the deep section as well as similar stratigraphy to the Eastern Papuan Basin in the shallow section
- Seismic evidence advocates a preserved section of Mesozoic exerts in the PPL 579 area
- The development of this deeper section would be related to syn-rift/post-rift deposition following Panga opening of the Tethys Ocean breakup in the Early Jurassic. The shallow Tertiary extension is comparable to the Miocene Carbonate plays of the Aure Trough

### Play Types, Leads & Prospects

- Source rocks in the Torres Basin are represented by the Early to Middle Jurassic Marl Shale and Mio-Pliocene Aure Beds shales
- Several reservoirs could be present including the Middle Jurassic to Early Cretaceous Toro Sandstone Equivalent and Pale Sandstone; Tertiary sandstones of the Talama and Laxao; and Miocene Puri Limestone Equivalent
- The Mio-Pliocene Orubadi Shale and intraformational shales will provide seals to hydrocarbon migration
- To date Larus has mapped 12 Mesozoic and 22 Tertiary leads within PPL579. Sweet spot to be extended both onshore and offshore
- High-graded leads include:
  - Vekwala, a Jurassic target in 42m of water, PTD of 3,600m. Estimated unrisked resource of 13 TCFG and 180 MMBO
  - Sunday, a Cretaceous target in 600m of water, PTD of 3,000m. Estimated unrisked resource of 13.5 TCFG and 160 MMBO

### History of Exploration in the Area

- Regional PNG has not been a focus for hydrocarbons until Larus acquired the licence
- Data includes the regional seismic data acquired by the German BGR in 1981 known as the "1981 Sonne data" and the semi-regional seismic data in and around PPL 579 from Fugro's regional offshore seismic acquisition programme undertaken in 2006 and 2007
- This data shows the two known plays in the Papuan Basin - the Miocene reef development similar to InterOil/Total's Elk and Antelope fields and the Mesozoic Highlands oil fields are potentially developed in PPL 579
- As a follow up, Larus has acquired three new sets of 2D seismic data covering 2,100km which has allowed maturing drillable prospects in the licence

### Larus Energy

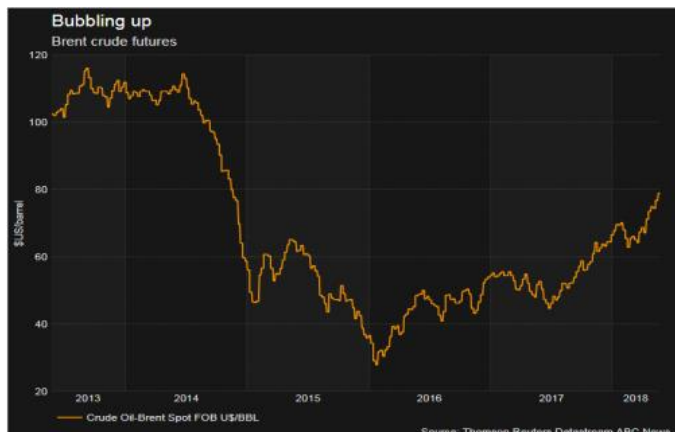
- Larus was incorporated in New South Wales, Australia in November 2009 and has positioned itself to participate in the forecast growth of PNG's oil and gas sector
- Its head office is in Perth and is an unlisted public company

Additional information for this project is available upon request electronically. The access to qualified companies will be granted after execution of a Confidentiality Agreement (CA). For more information and to request the CA, please contact:

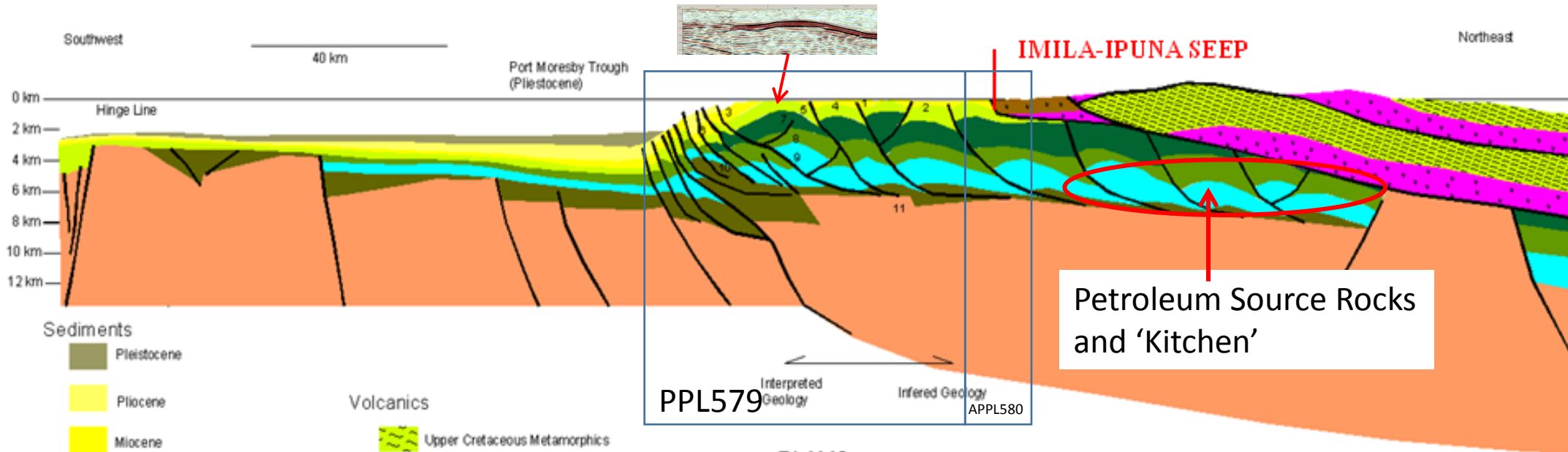
Chris Moyes President cmoyes@moysesco.com +1 214 623 6700	Ian Cross Managing Director icross@moysesco.com +65 6653 4106	Andy Melvin Managing Director amelvin@moysesco.com +44(0)1702 855895
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# Torres Basin Plays and Petroleum Systems



## Sediments

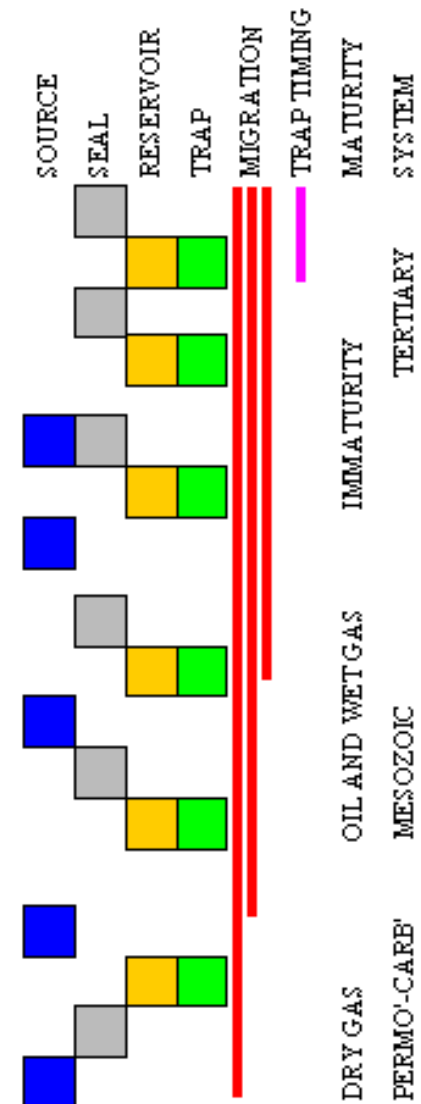
- Pleistocene
- Pliocene
- Miocene
- Paleocene-Eocene-Oligocene
- Upper Cretaceous
- E Cretaceous
- Jurassic
- Triassic
- Basement

## Volcanics

- Upper Cretaceous Metamorphics
- Jurassic Oceanic Crust
- > Mesozoic Ultramafics

## PLAYS

1. Karst Miocene Limestone
2. Miocene Sst thrust anticline
3. Miocene Reefs
4. Miocene fractured limestones thrust anticline
5. Miocene fractured limestones sub-thrust anticline
6. Mid-Miocene fans thrust anticline
7. Late Cretaceous Sst thrust anticline
8. Early Cretaceous Sst thrust anticline
9. Jurassic, fluvio-lacustrine thrust anticline
10. Triassic, fluvio-lacustrine thrust anticline
11. Permian Basin rotated fault block.



# Summary

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- PPL579 work program favourable within the current exploration climate. Meeting Years 1 & 2 commitment.
- Seismic database improvements consolidate Larus geological model
- PPL579 over the Torres Basin holds analogous plays and petroleum systems of those proven in the Papuan and East Papuan Basins
- The first oil seep discovery in the Torres Basin greatly reduces the exploration risk. Ongoing analysis will further reduce risk.
- Farmout efforts are targeted and on going.