



Unlocking the shale gas of the Beetaloo Sub-basin

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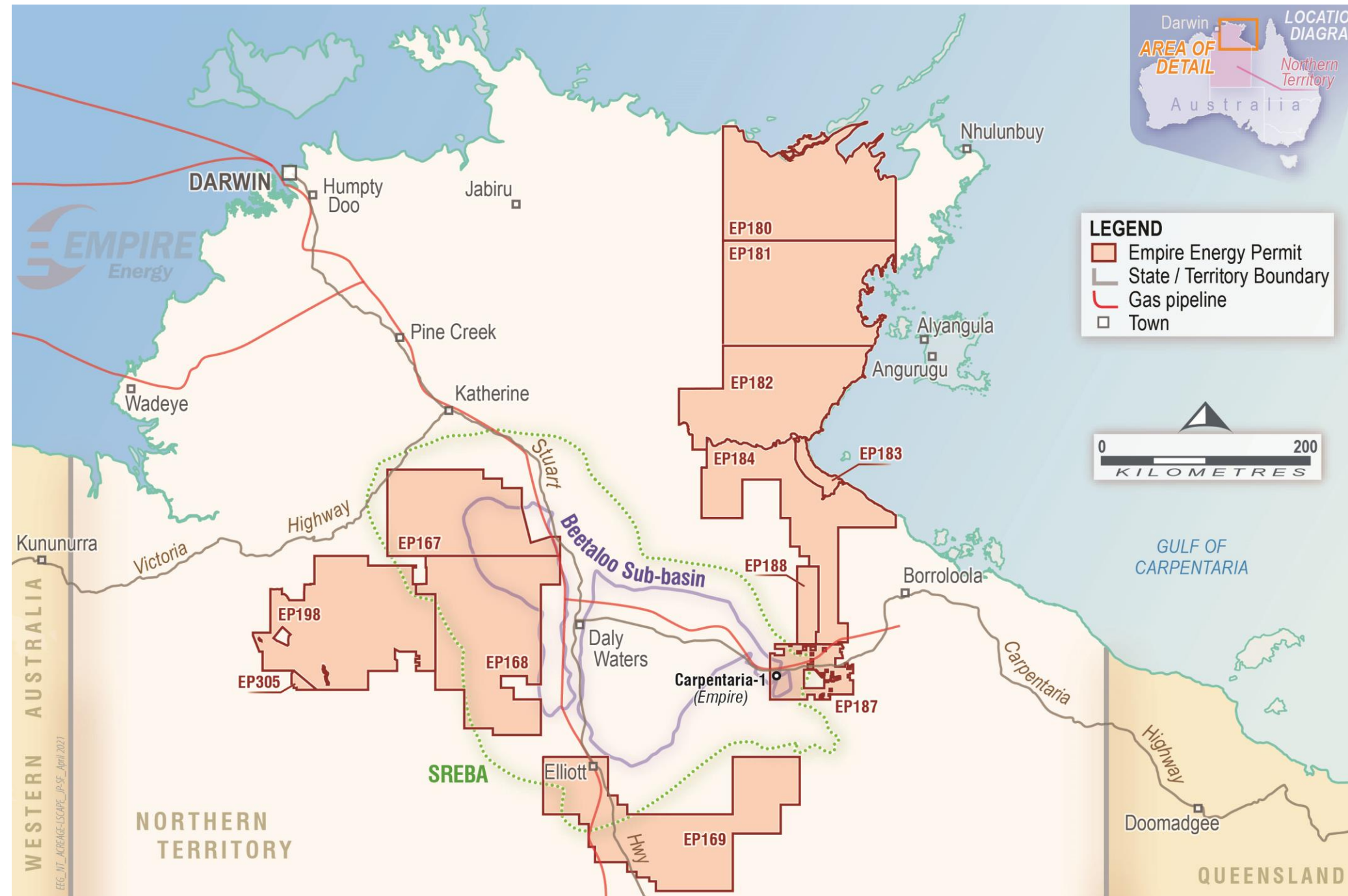
- Largest independent operator in the Beetaloo Sub-basin
- Listed on the ASX (Code:EEG)
- Operates all its permits

Asset Status: Appraisal



1. Eastern boundary of the Beetaloo Sub-basin shown to extend further east than previously mapped
2. Liquids rich mud gas observed in Carpentaria-1 places more focus on more accurately measuring thermal maturity

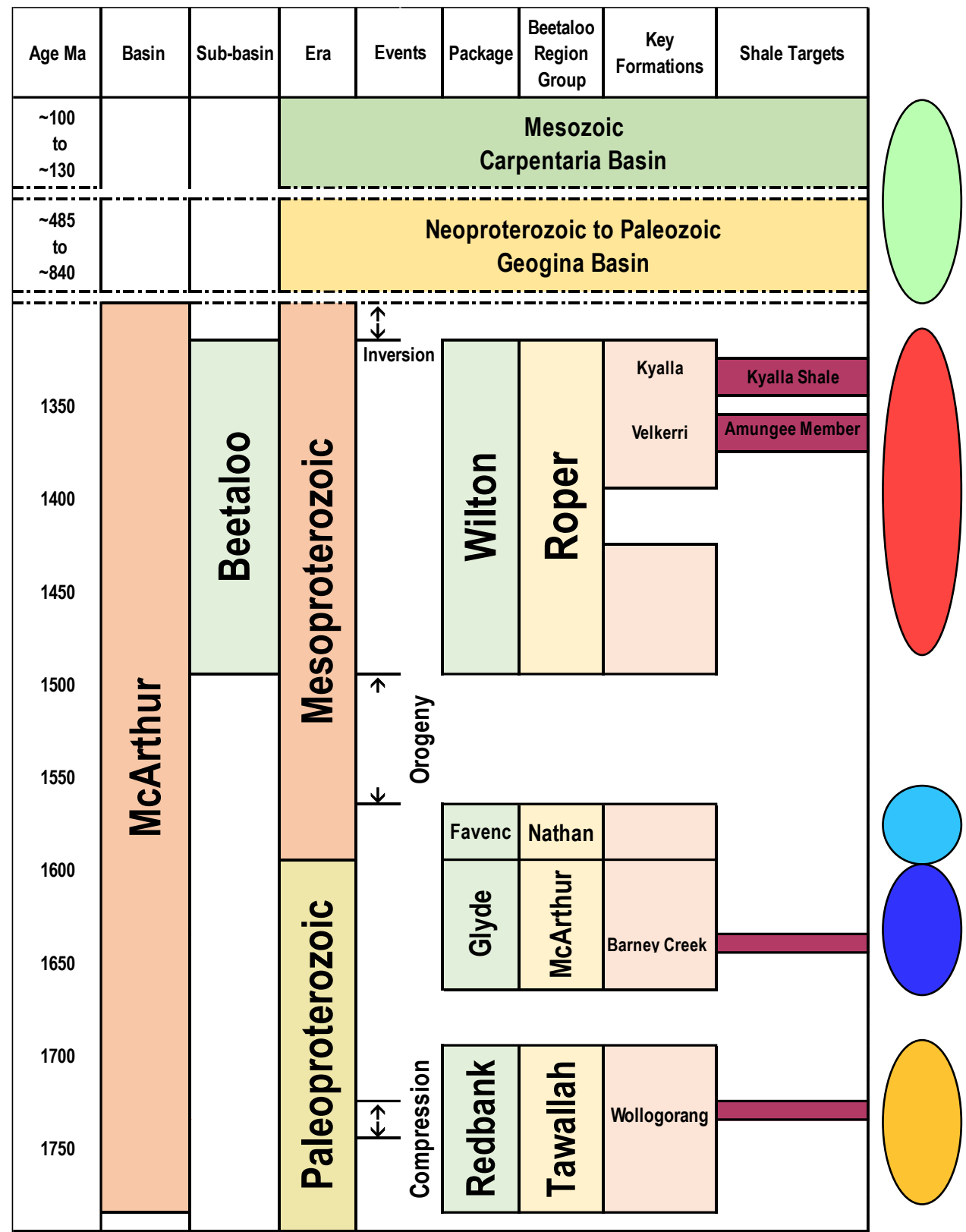
Where the Beetaloo Sub-basin is



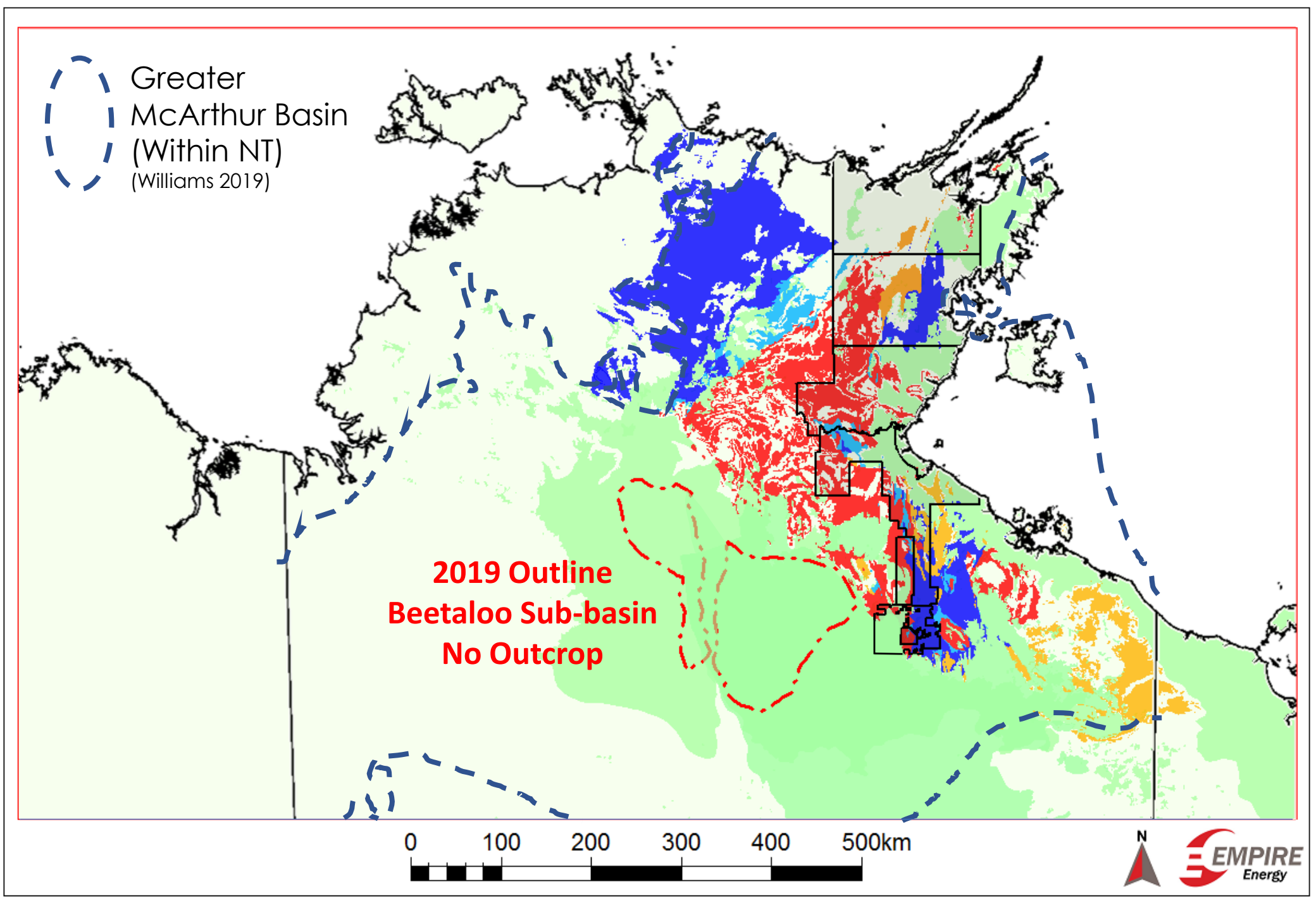
Beetaloo Sub-basin Location



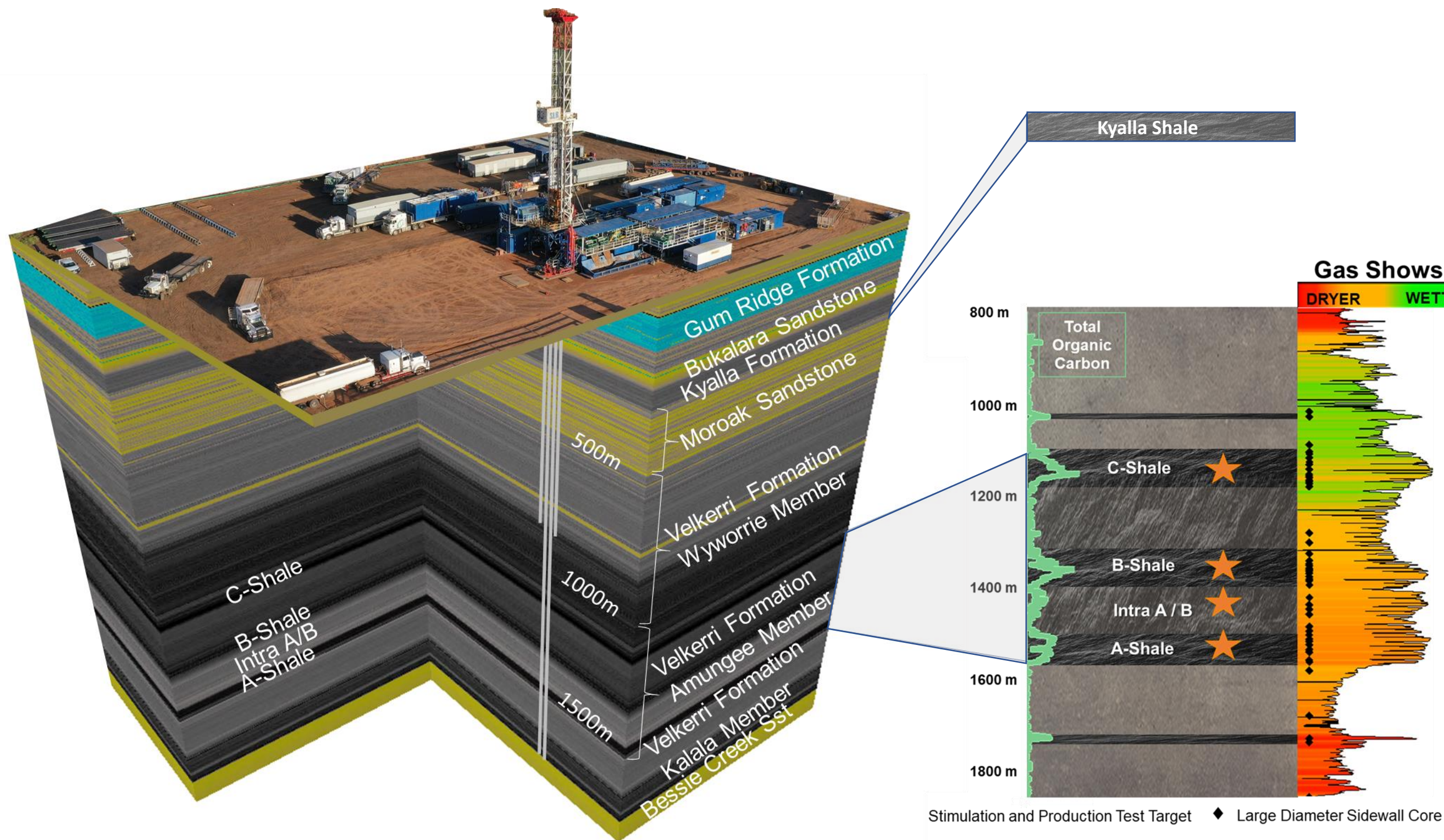
Simplified Stratigraphic column



Outcrop Map colour coded by Package



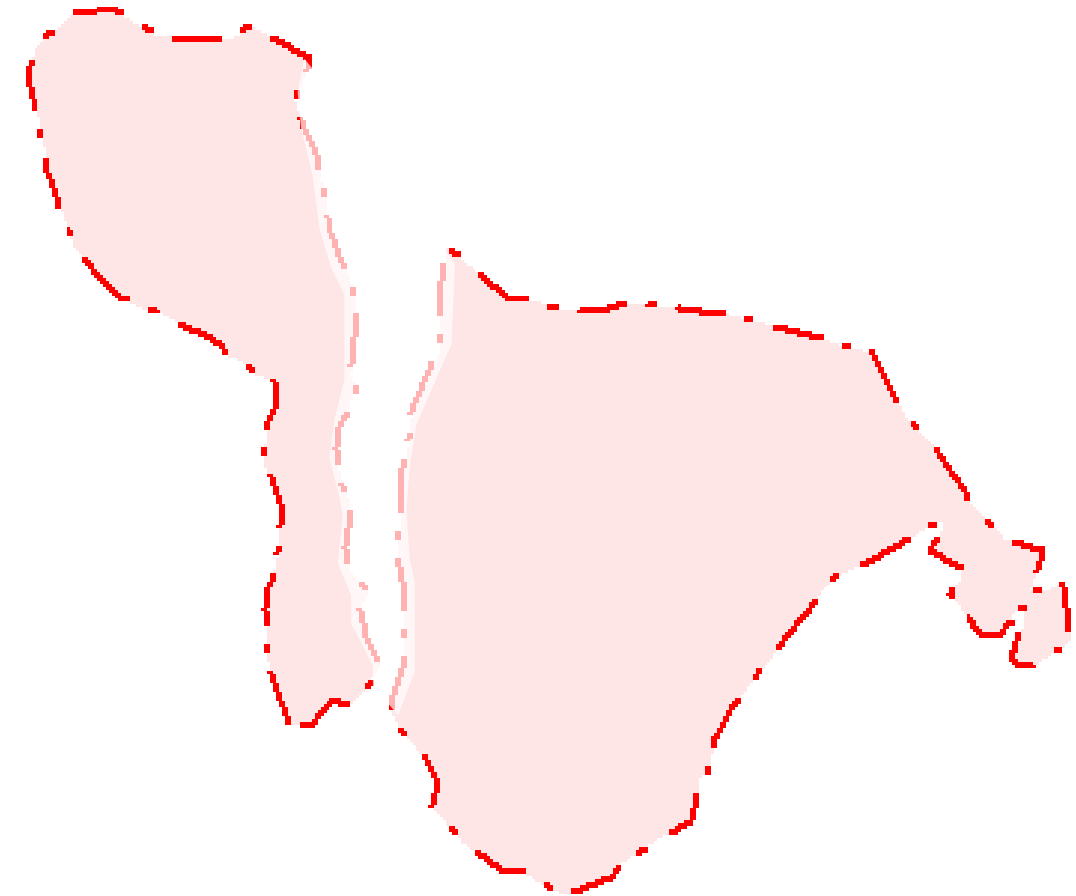
Shale Targets in the Beetaloo Sub-basin



- Shales are the source of the hydrocarbons
- Shales are the reservoir of the hydrocarbons
- As the shales are buried and heated they generate hydrocarbons
- The shales generate oil first, with greater heat gas is generated
- Some escapes to conventional targets, but some is retained in the shale.

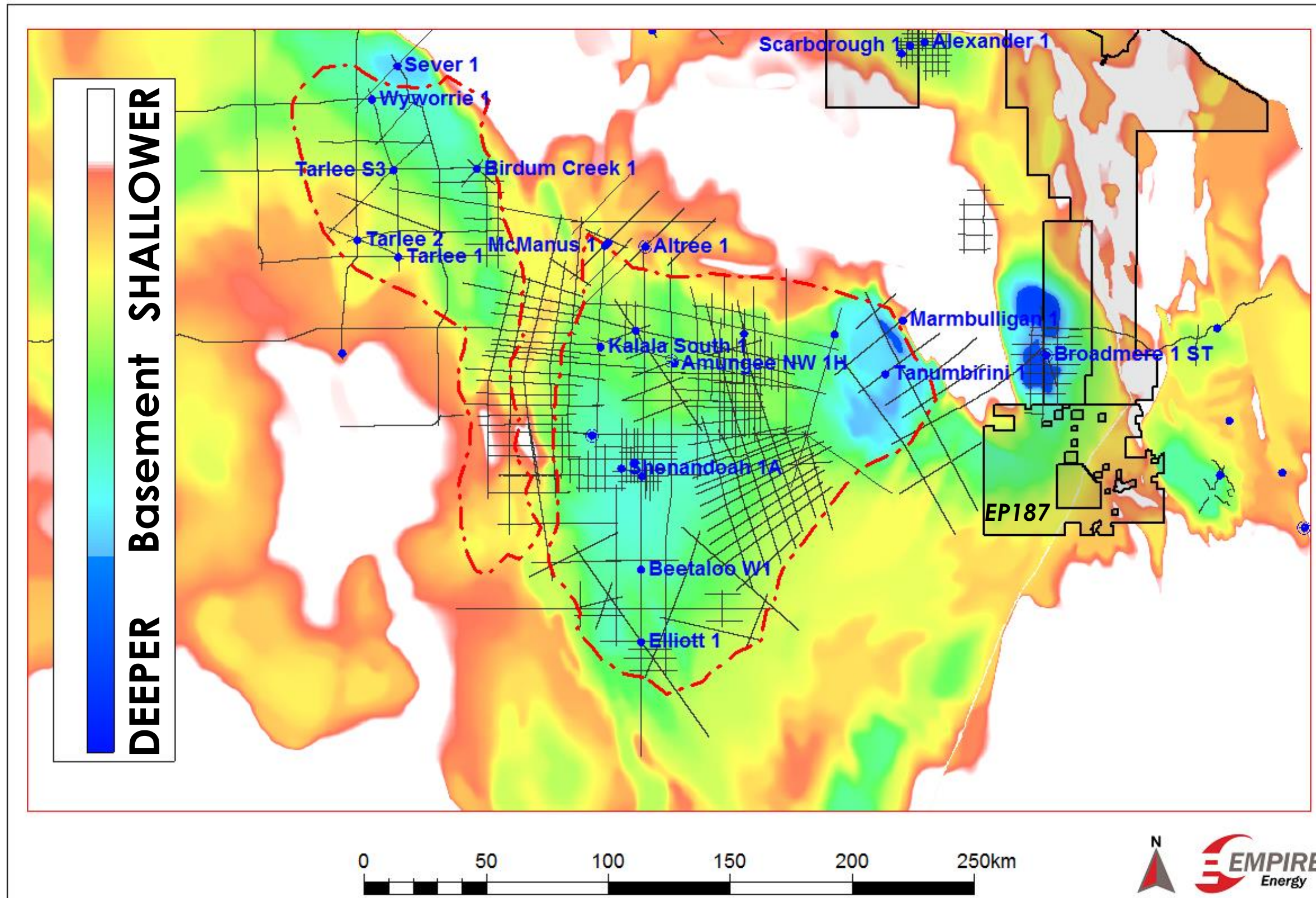


Beetaloo
Sub-basin
Eastern
Extent



2019 Beetaloo Sub-basin Boundary

2019 Beetaloo Sub-basin Boundary over SEEBASE depth to Basement



2019 Criterion

Outline constrained by

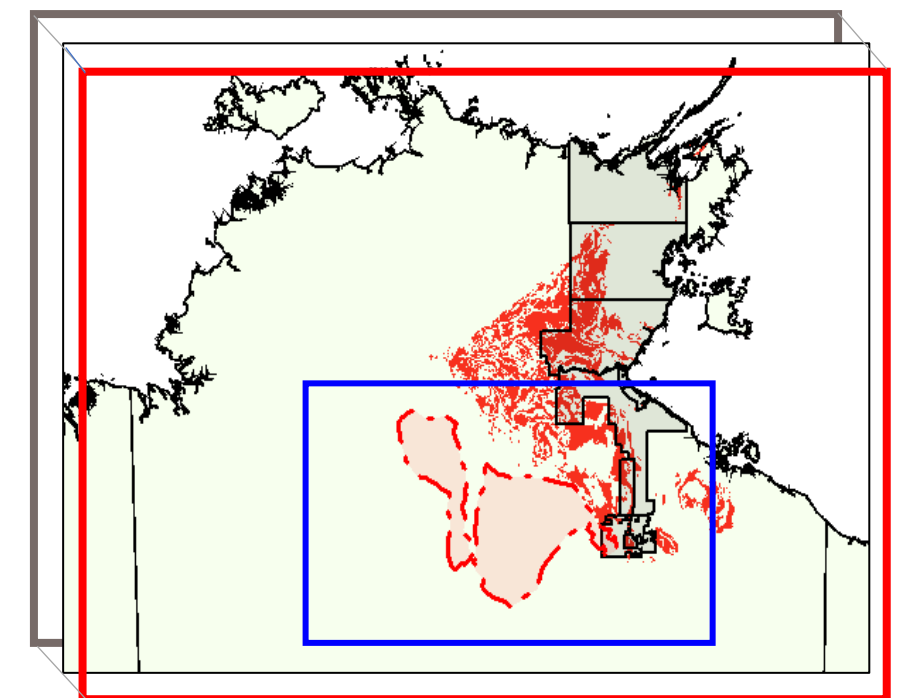
- 26 wells
- 96 seismic lines

Geological Criteria

- Contains Kyalla Formation
- Contains Velkerri formation

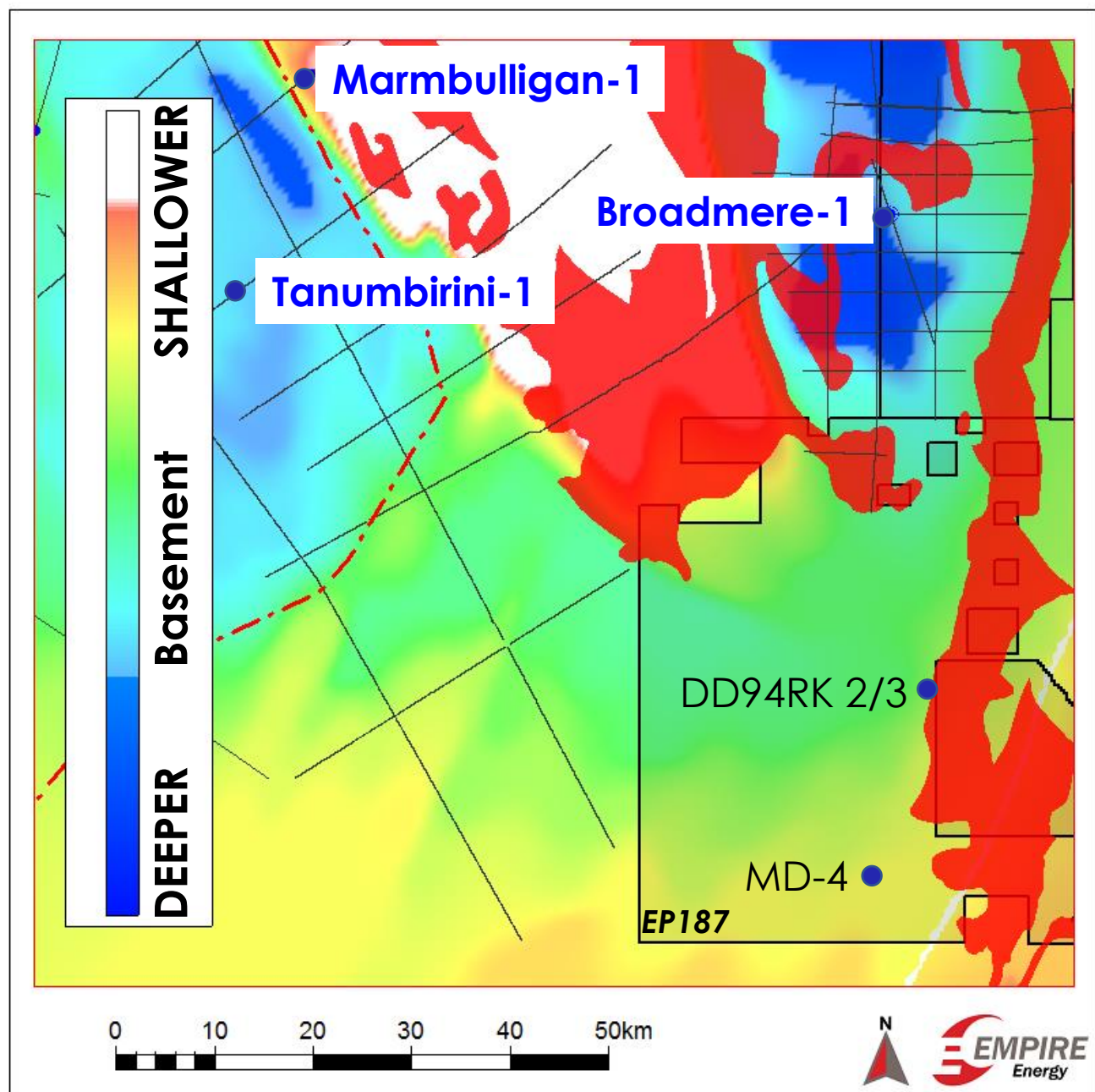
Measurement Resolution Criteria

- Top Kyalla Formation 400 m below surface



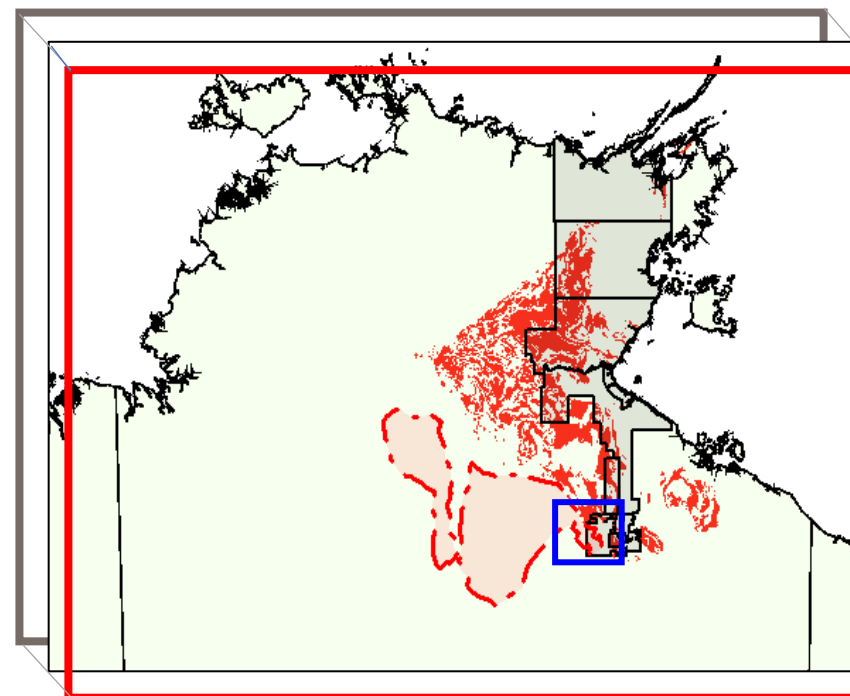
2021 Beetaloo Sub-basin boundary

2019

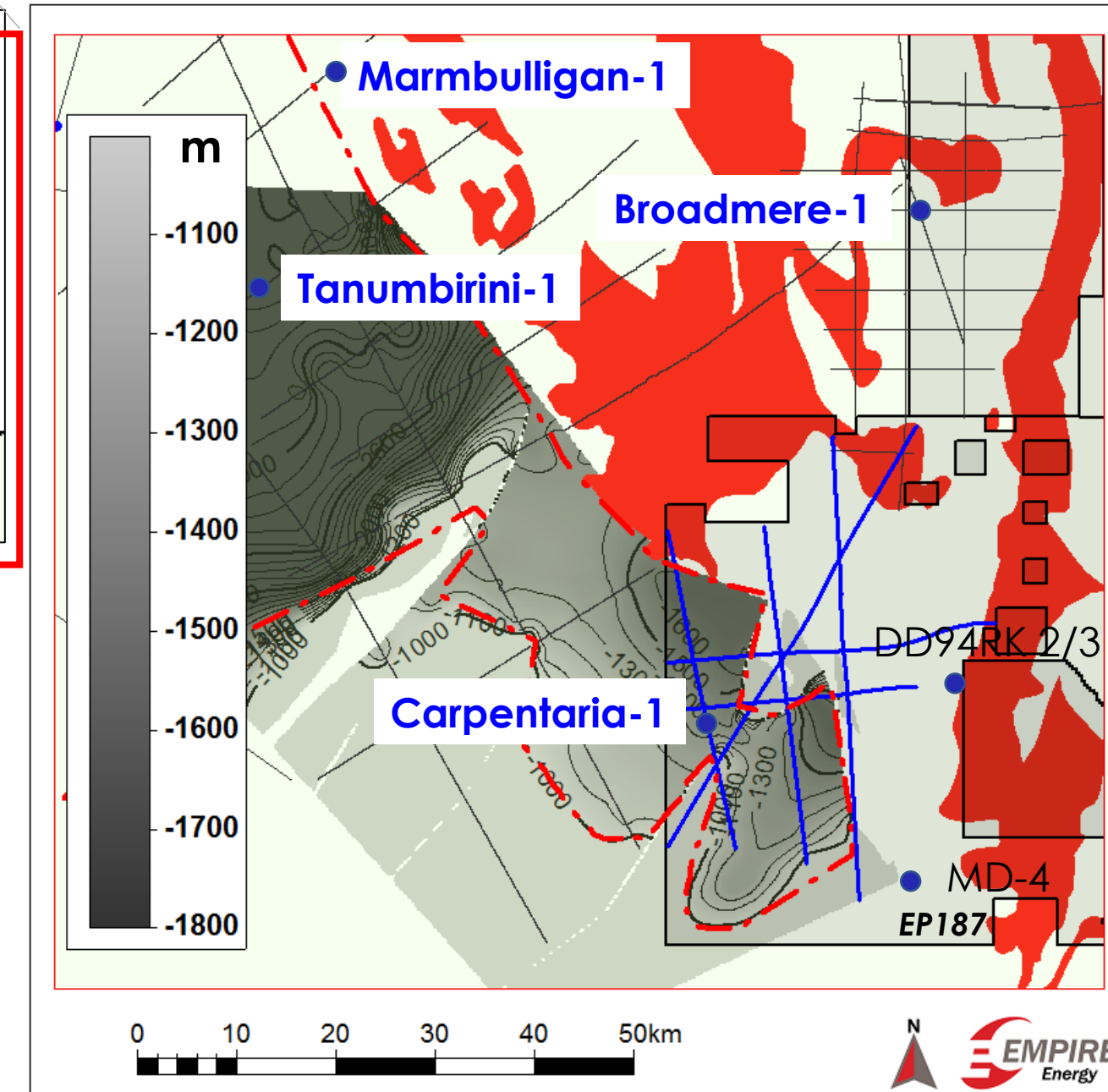


SEEBASE Map

2021



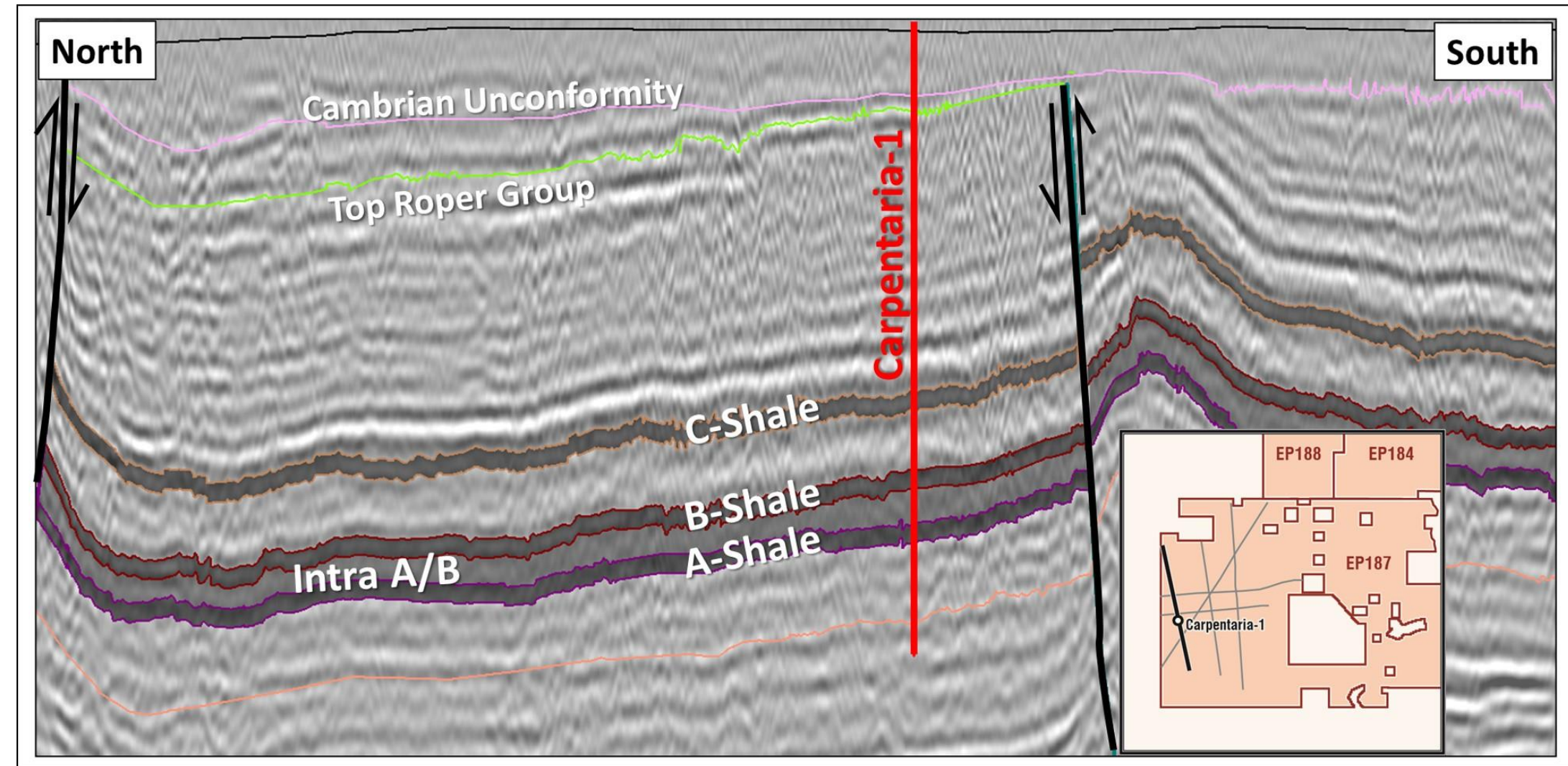
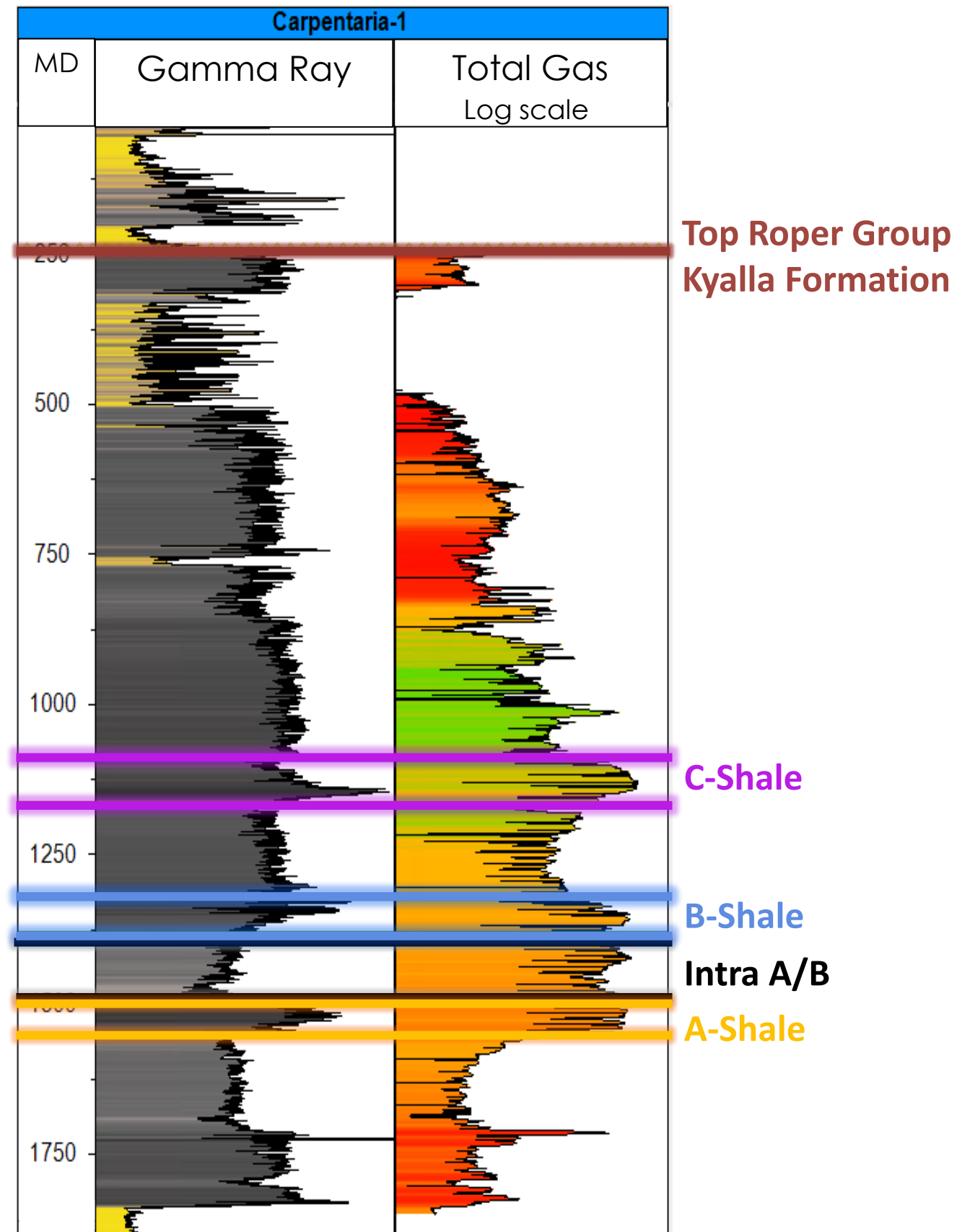
Acquired 2D Seismic
Drilled Carpentaria-1



Depth to Base Velkerri B Shale

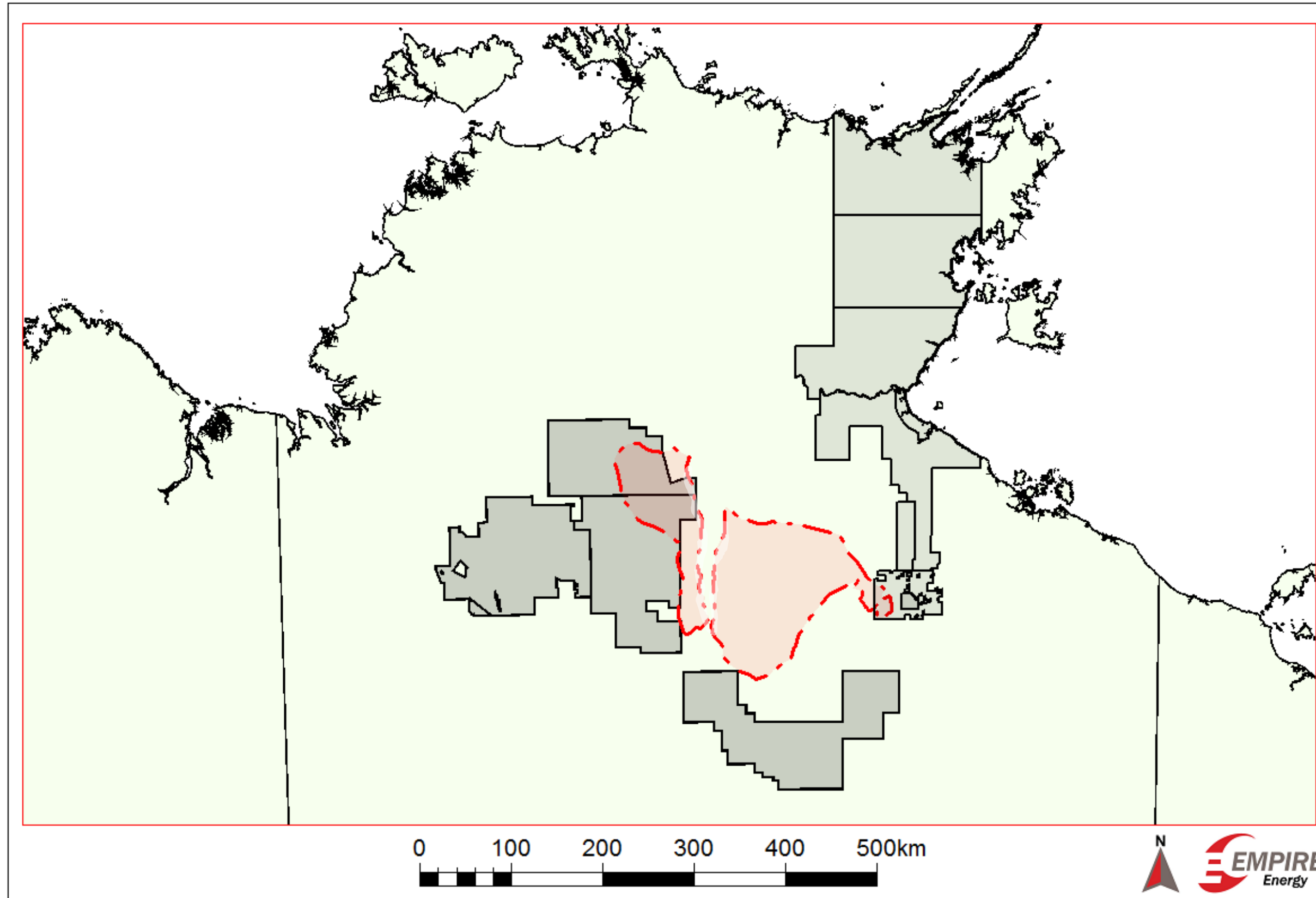
--- Basin Outline  Beetaloo Sub-basin units (Roper) outcrop — Empire 2D Seismic

Beetaloo Sub-basin Eastern Extension



Seismic line 2019-04

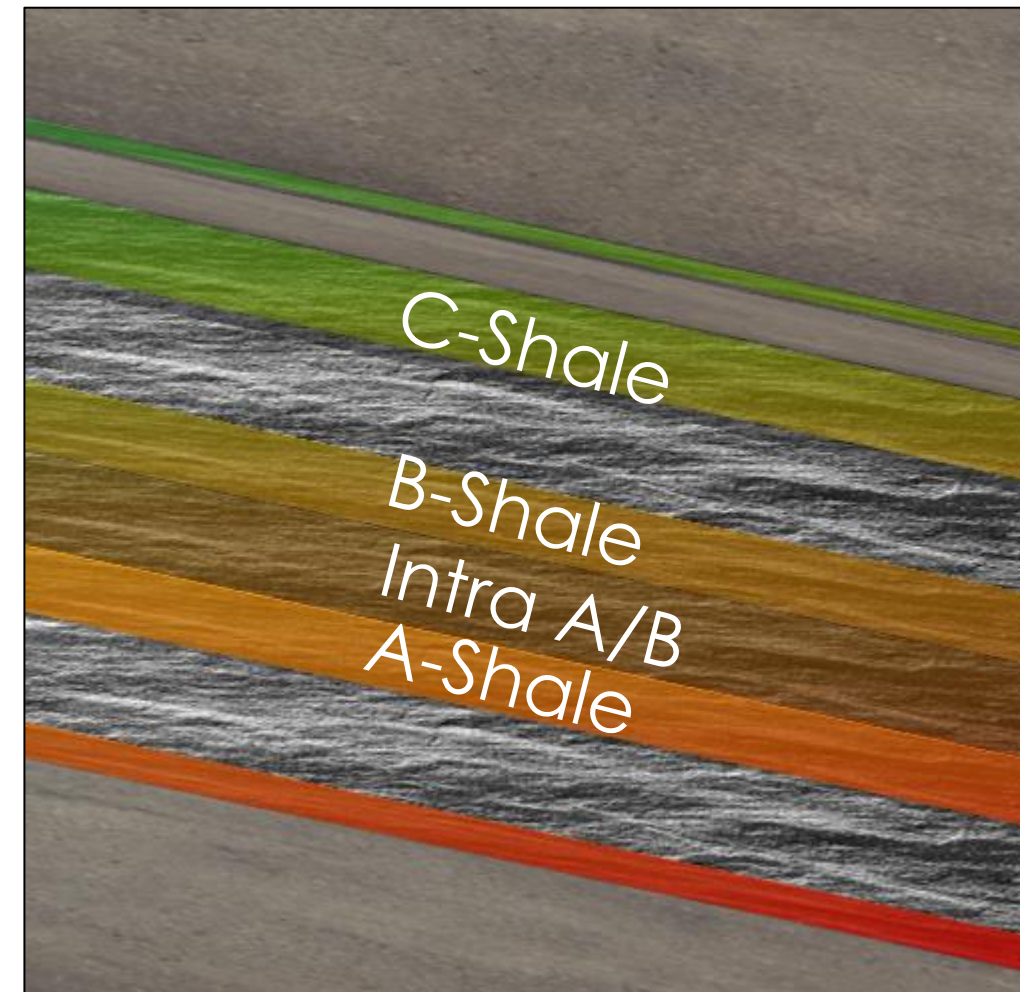
2021 Beetaloo Sub-basin



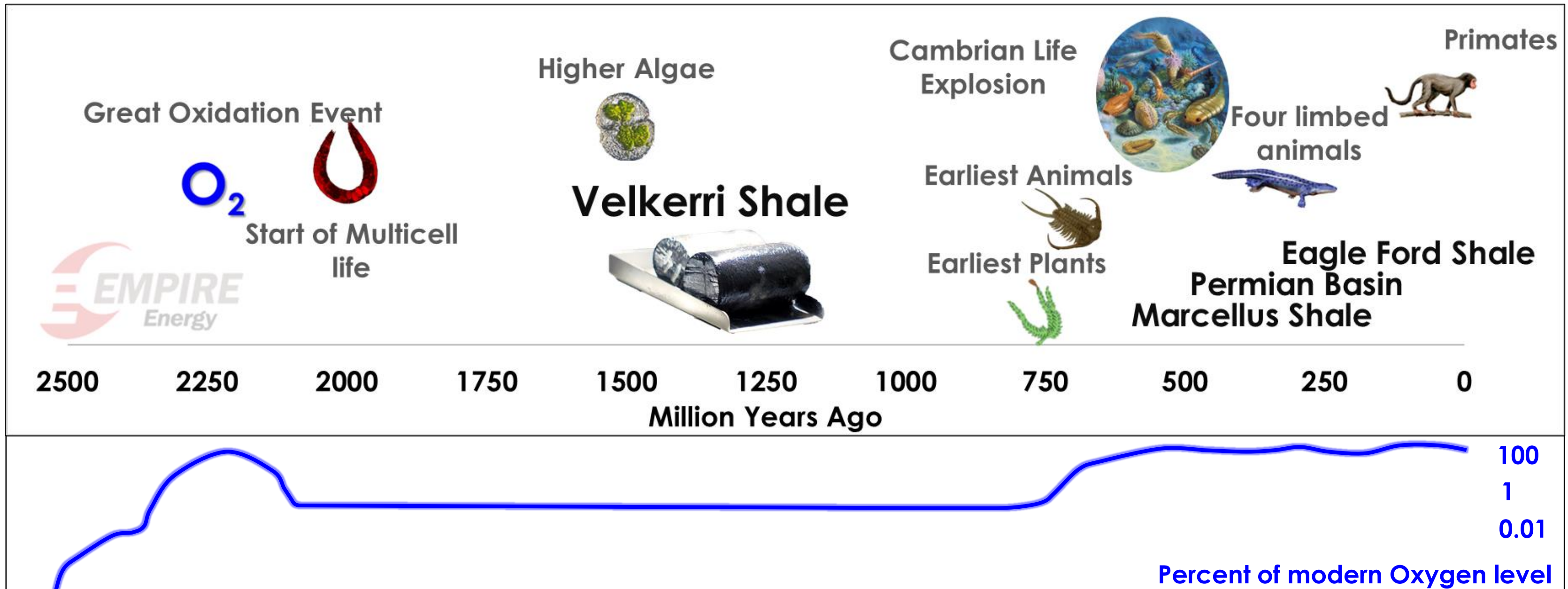
EP198, EP305, EP167, EP168 and EP169 will be acquired through acquisition of Pangaea Resources Northern Territory assets



Thermal
Maturity
Gas or Liquid
Hydrocarbons
or both



Age of the source Rocks



- Velkerri Shales much older than United States Analogues
 - Both productive USA and Velkerri shales are marine origin
- More simple organic material in the Velkerri shale source rocks due to age
- Velkerri Shales are well persevered due to lower oxygen levels at the time

Thermal Maturity And Tomatoes



Burial ↓ Heating

Generating Liquid Hydrocarbons
difficult to produce in tight shales

Burial ↓ Heating

Generating lighter Liquid Hydrocarbons

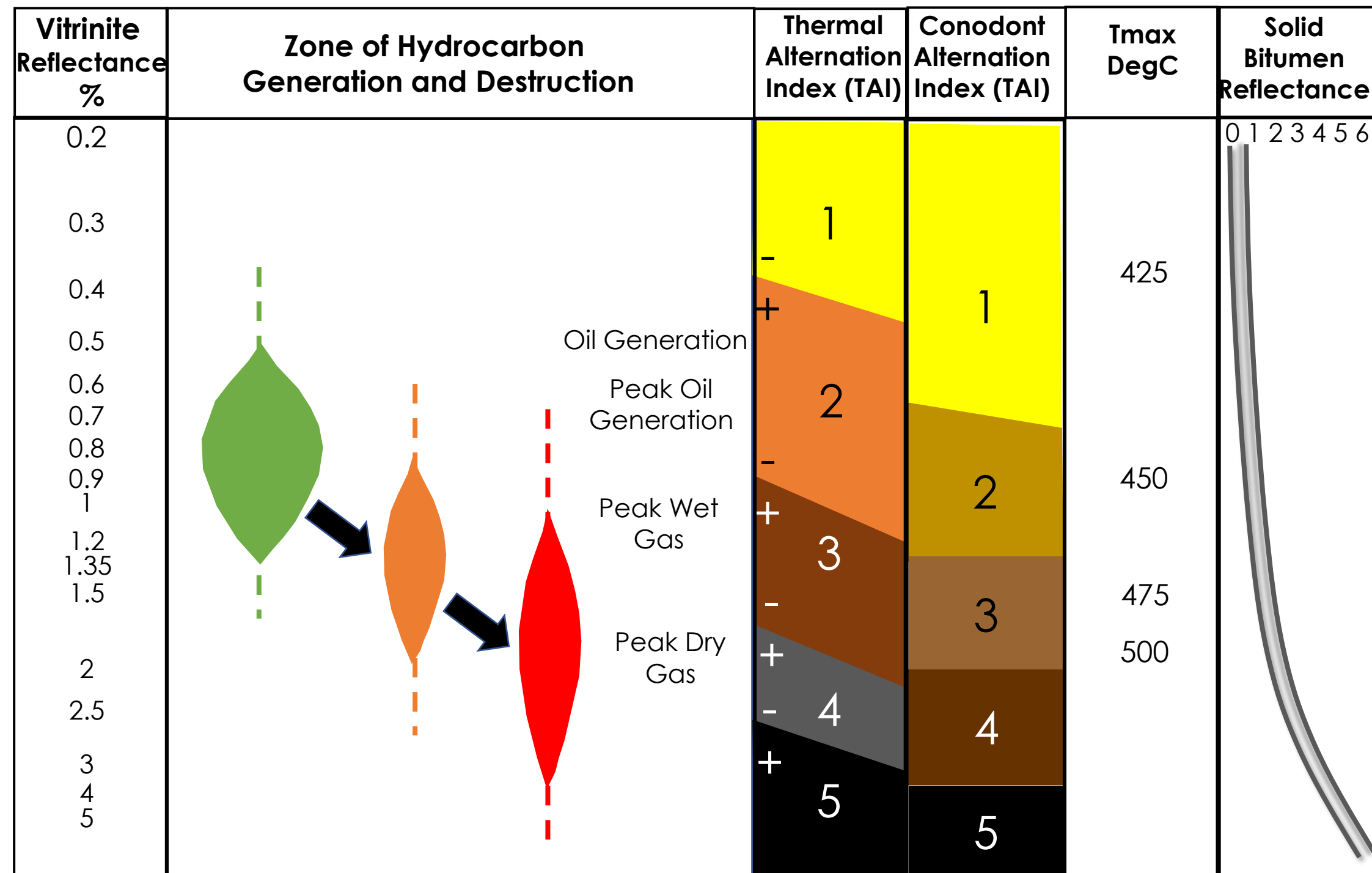
Burial ↓ Heating

Generating mix of gas and liquid Hydrocarbons
Gas aids production with liquids improving economics
Focus is to determine the optimum ratio of gas and liquids

Burial ↓ Heating

Generating and converting liquids to dry gas

Measure of Thermal Maturity - shale



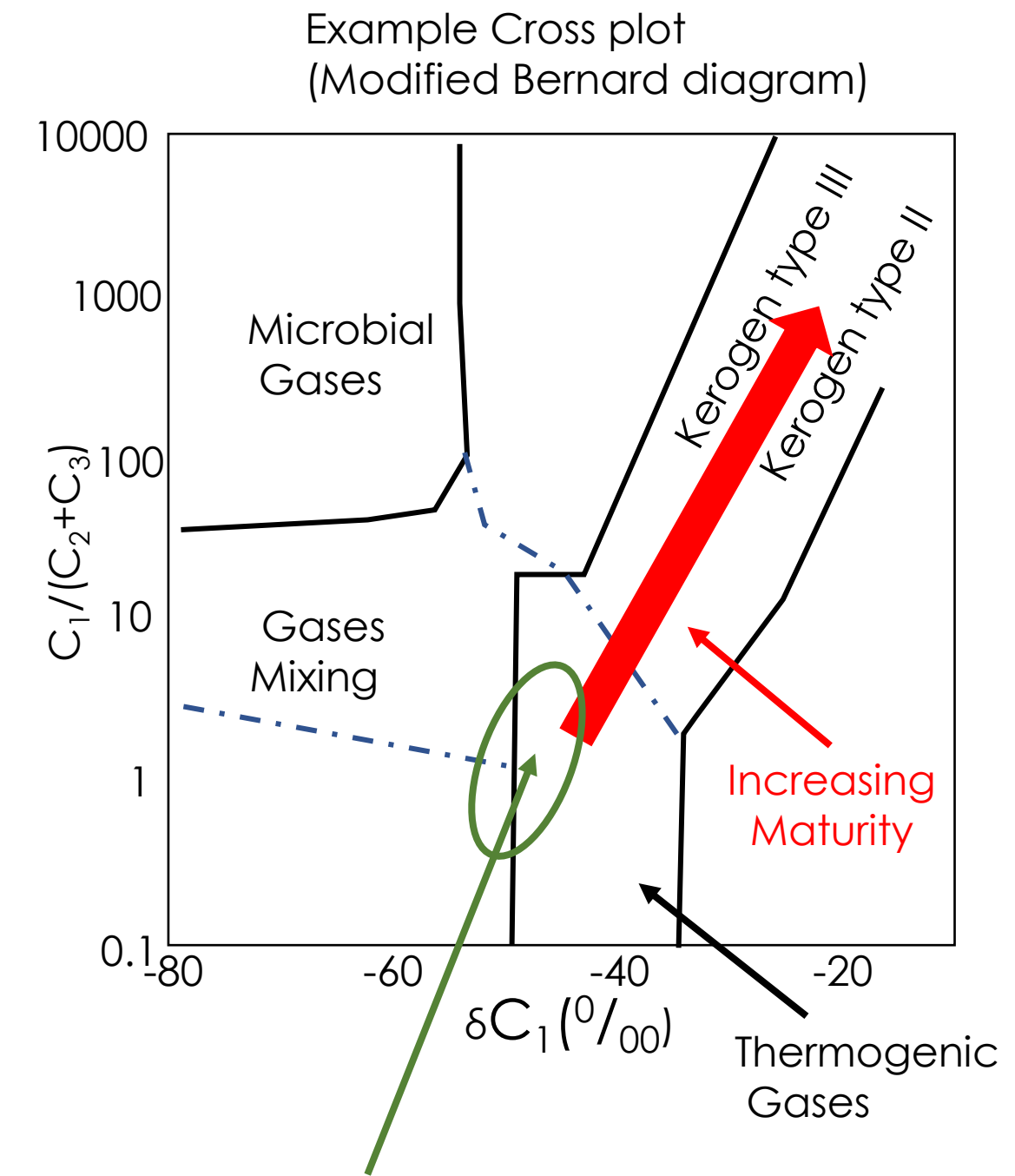
- Measures the rocks directly
- Methods proxy to Vitrinite Reflectance
 - plant based source rock
- Calibrated on limited datasets 1 billion years younger than the Beetaloo Sub-basin



Measure of Thermal Maturity - gas



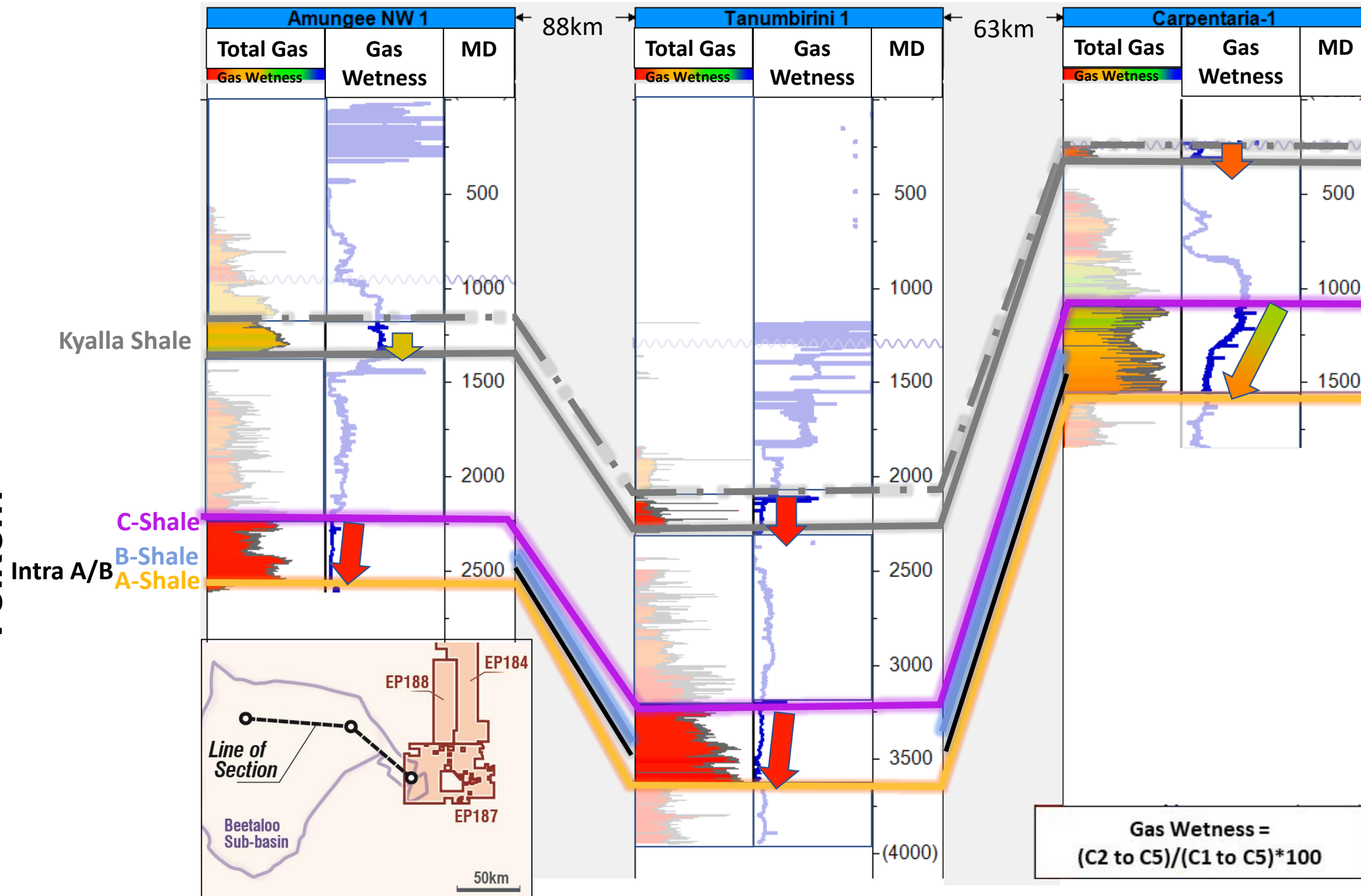
- Method measures the gas directly for thermal maturity
- Captures mudgas samples whilst drilling over regular depth intervals
- Analysis of carbon isotopes provides a proxy for thermal maturity
- Tied back to direct rock measurements
- Calibrated on limited datasets 1 billion years younger than the Beetaloo Sub-basin



Carpentaria-1 well data plotting in this area

Liquids Rich Gas at Shallower Depths

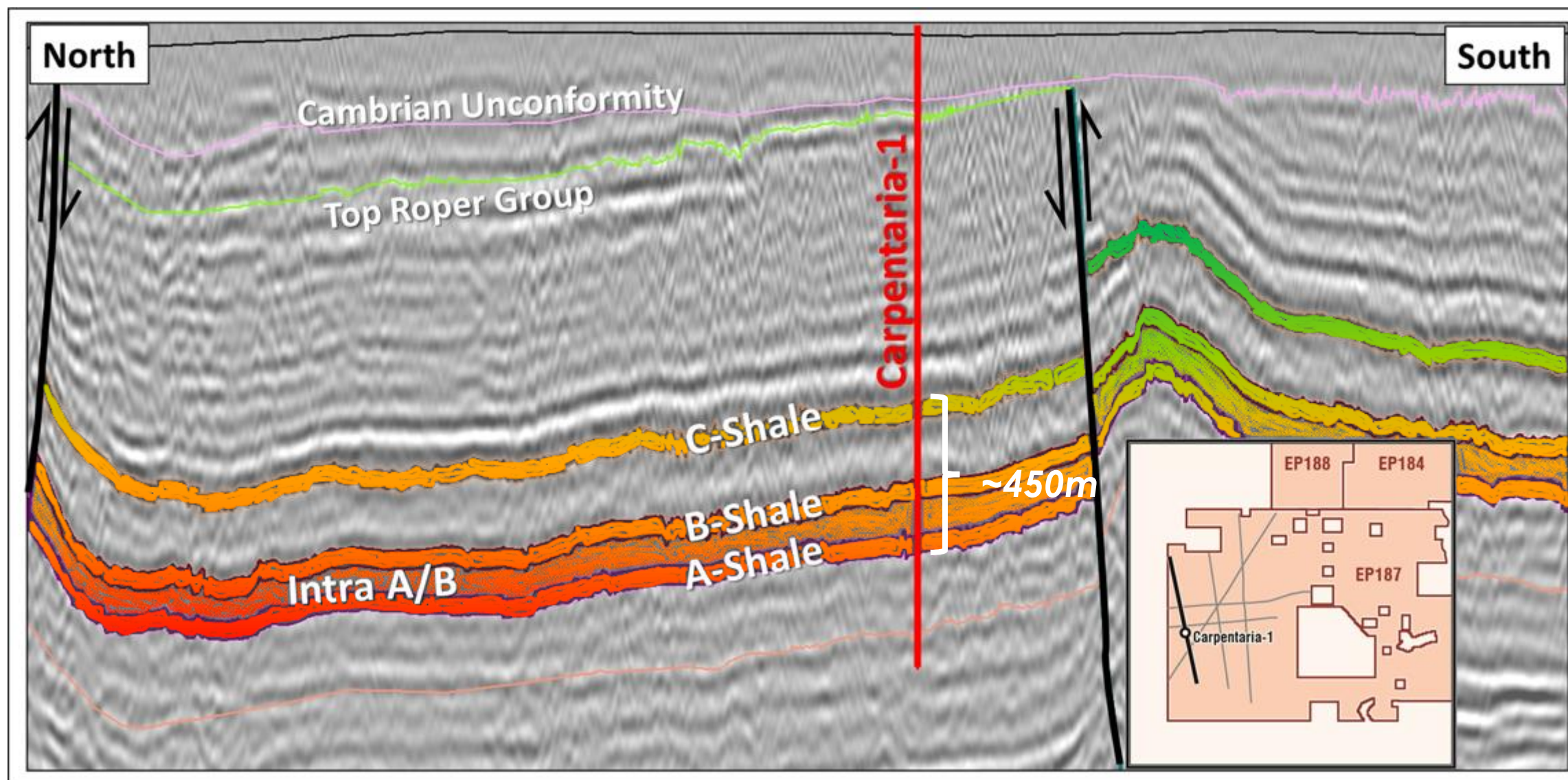
Velkerri



- Mudgas wetness ratios displayed
- Future production testing required to calibrate the interpretation
- With depth and thermal maturity gas becomes dryer with depth
- Liquids to gas gradient is observed in the Carpentaria-1 well
- This gradient likely changes spatially with different burial histories and temperature

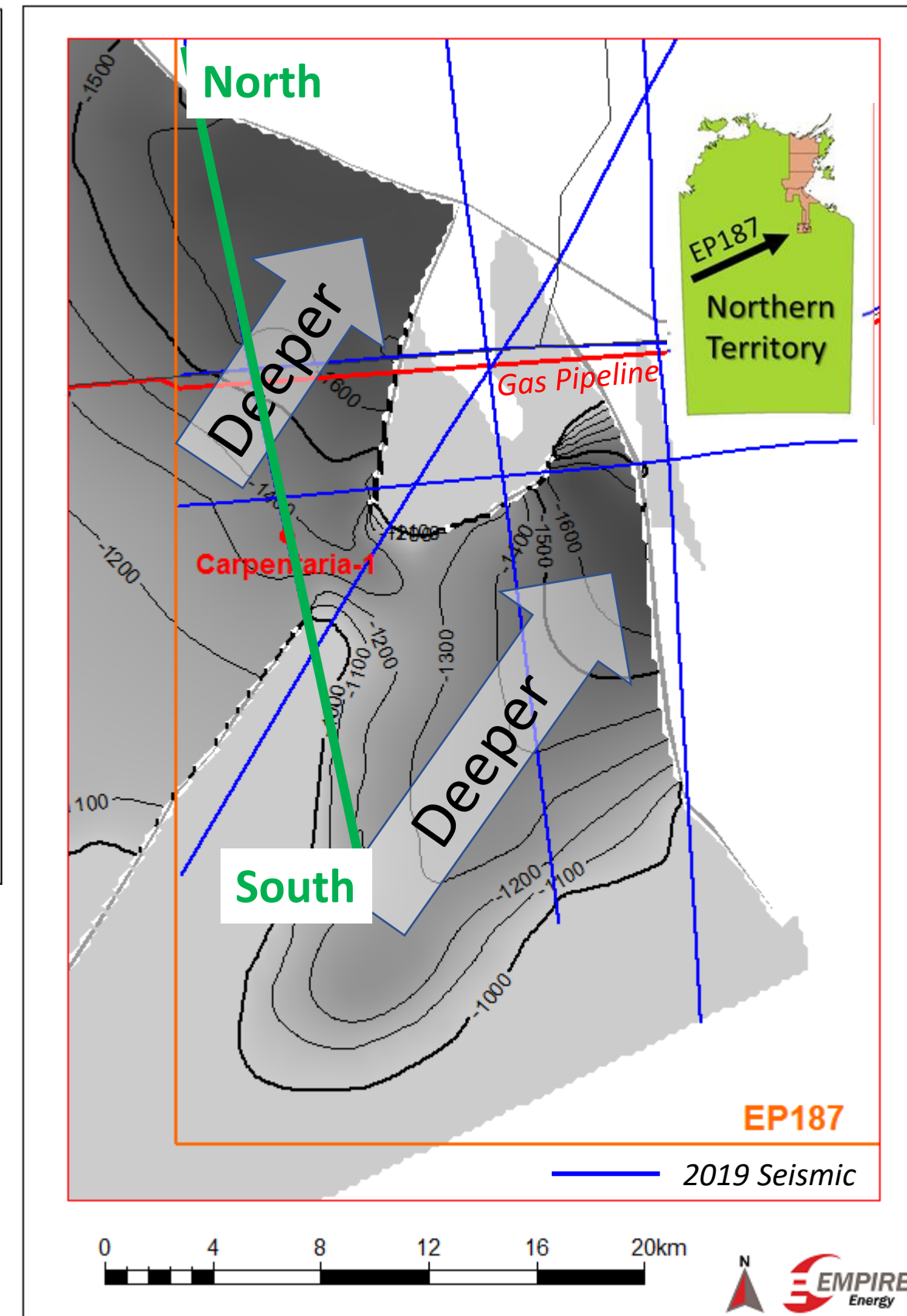
Colour scale of gas wetness, although based on actual gas ratios, is illustrative only.

Why we want to know thermal maturity?



DRYER ⇐ Hydrocarbons ⇒ **LIQUIDS**

- Velkerri stacked Shale play
- We need to come up with a method of predicting gas and liquids ratios away from well control
- Shopping list of liquids rich gas targets



1. Eastern boundary of the Beetaloo Sub-basin shown to extend to the east
2. Liquids rich mud gas observed in the stacked Velkerri shale at Carpentaria-1 provides multiple target options



Exploring the Future
in the Territory Today

ASX: EEG