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The Barkly 2D Deep Crustal Reflection Seismic Survey

Key discoveries and implications for resources

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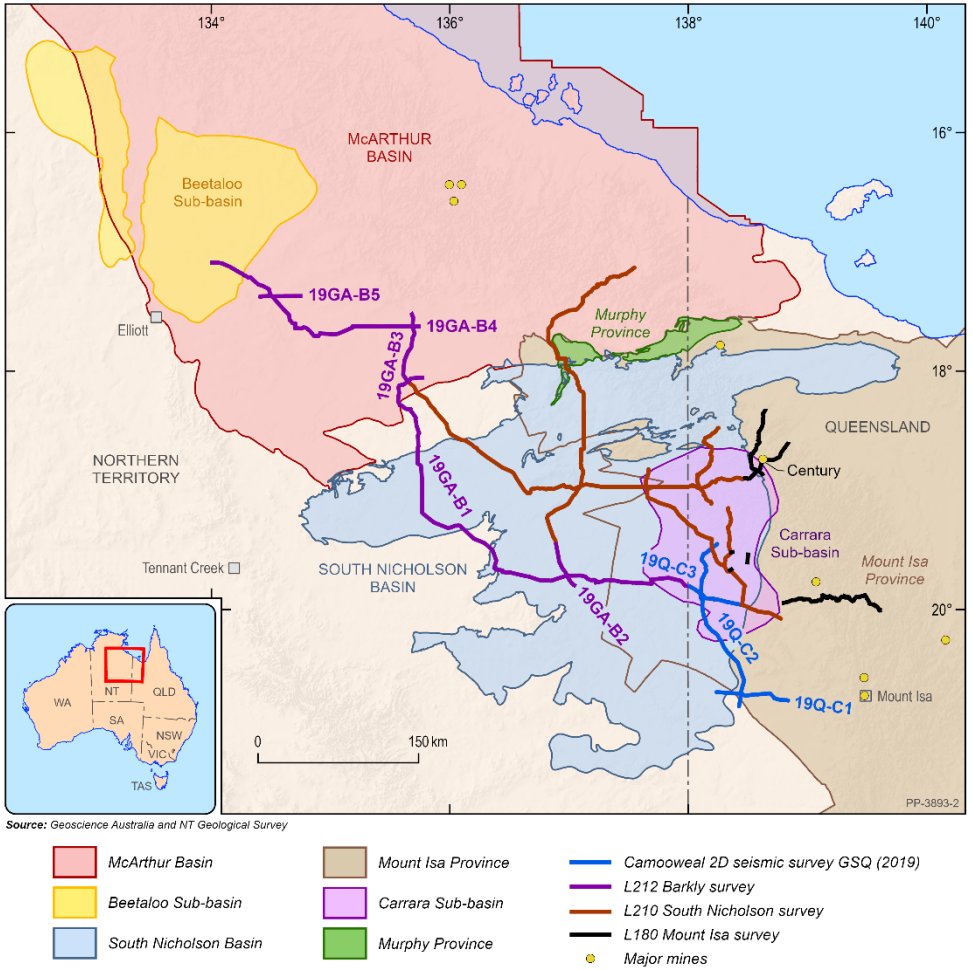
Barkly Seismic Survey (L212)

- Acquired late 2019
- Links highly prospective Beetaloo Sub-basin and the Carrara Sub-basin
- Five lines, total line kms – 812.6 km


Photo credit: Terrex Seismic



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Key points to note

- To facilitate interpretation we used a composite line incorporating lines 19GA-B1, -B3 and -B4
- Composite Line has been sub-divided into three informal domains:
    - ***Carrara domain***
    - ***Brunette Downs rift corridor***
    - ***Beetaloo-McArthur domain***

- NABRE superbasin terminology from east (from *Carrara Sub-basin*)
    - Leichhardt (ca. 1790–1750 Ma), Calvert (ca. 1735–1690 Ma), Isa (ca 1670–1575 Ma) Roper (ca. 1500–1400 Ma)
- Litho-stratigraphic 'Packages' terminology from west (from *Beetaloo Sub-basin*)
    - (e.g. *Redbank, Glyde, Favenc, Wilton e.g.* Rawlings, 1999)

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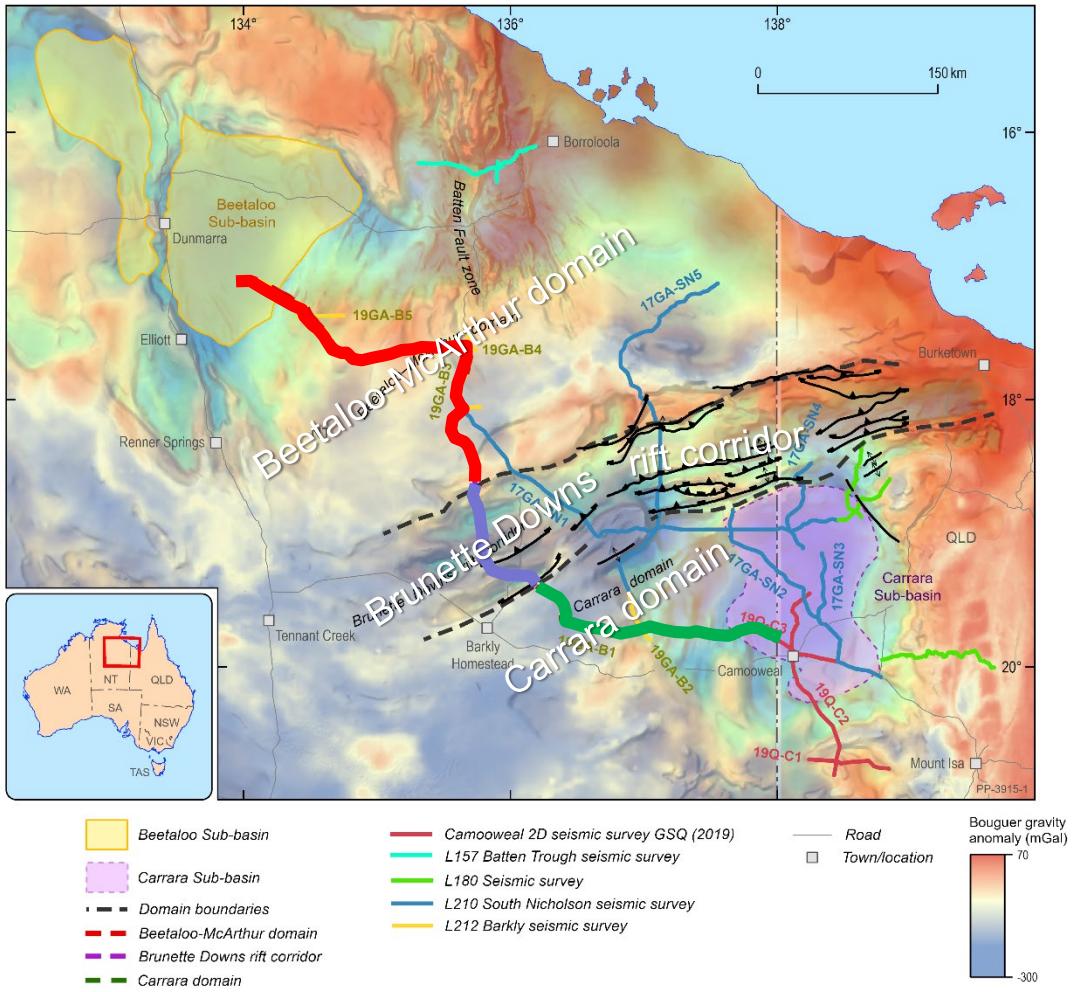
Location of informal seismic domains

- Carrara domain
  - South-western flanks of Carrara Sub-basin
  - Shoulder of basement
- Brunette Downs rift corridor
  - Corridor of northeast trending half-grabens
  - Extends over 400 km strike length
  - Observed in South Nicholson region and Lawn Hill Platform (QLD)
- Beetaloo-McArthur domain
  - Continuous concealed sequence of Proterozoic sediments from Beetaloo Sub-basin



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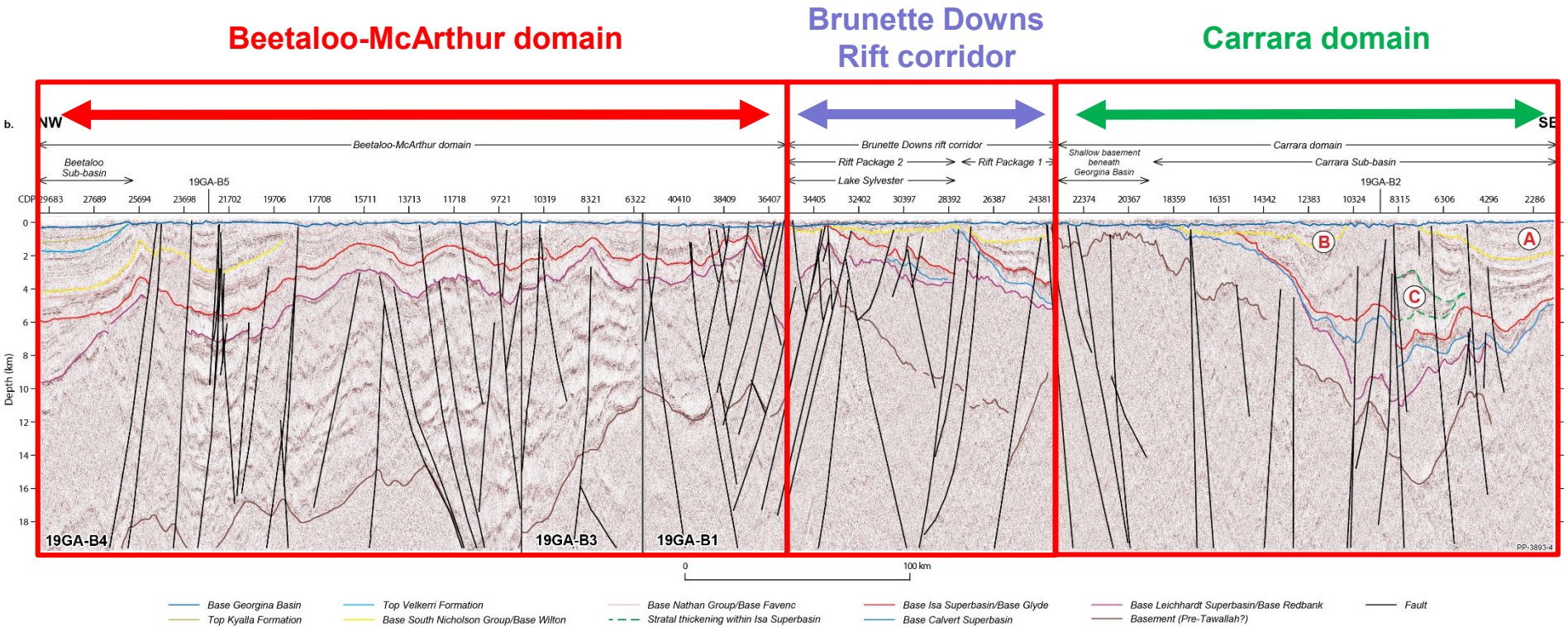
Composite Line B1-B3-B4 and informal domains



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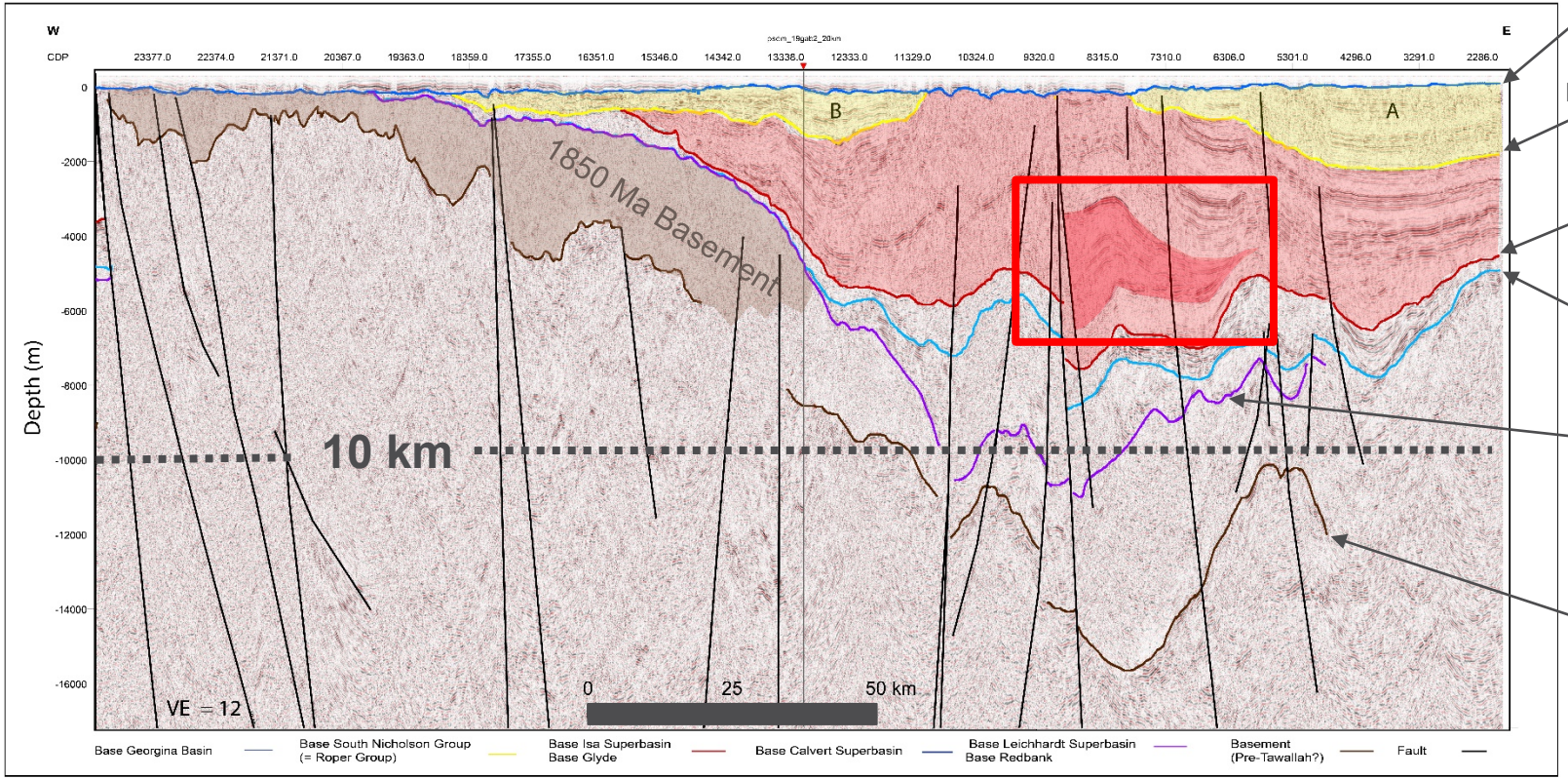
Carrara domain



Base of Georgina

Base of SNG/Roper SB

Base of Isa SB

Base of Calvert SB

Base of Leichhardt SB

Top of crystalline basement (?)

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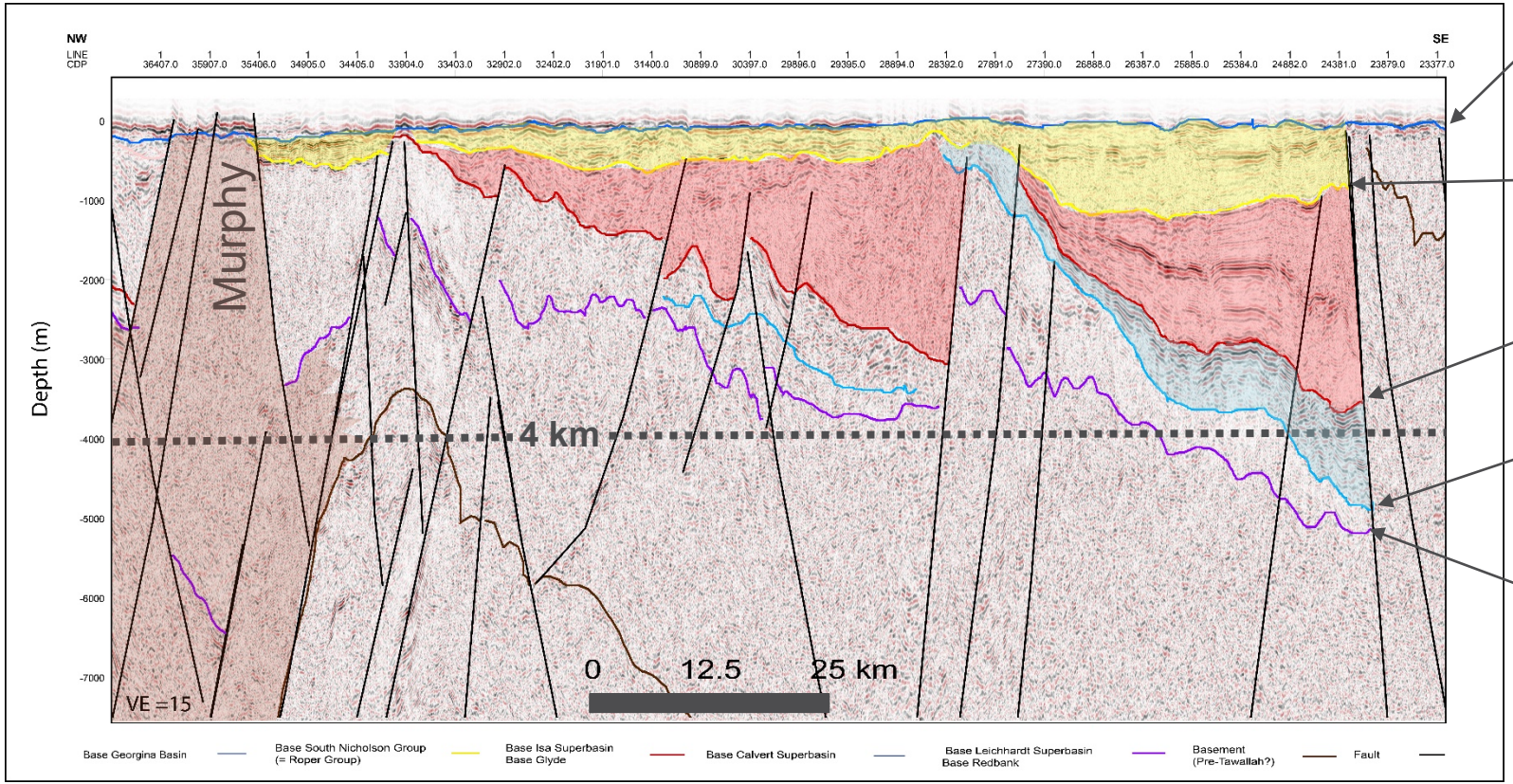
Brunette Downs rift corridor



Base of Georgina

Base of SNG/Roper SB

Base of Isa SB

Base of Calvert SB

Base of Leichhardt SB

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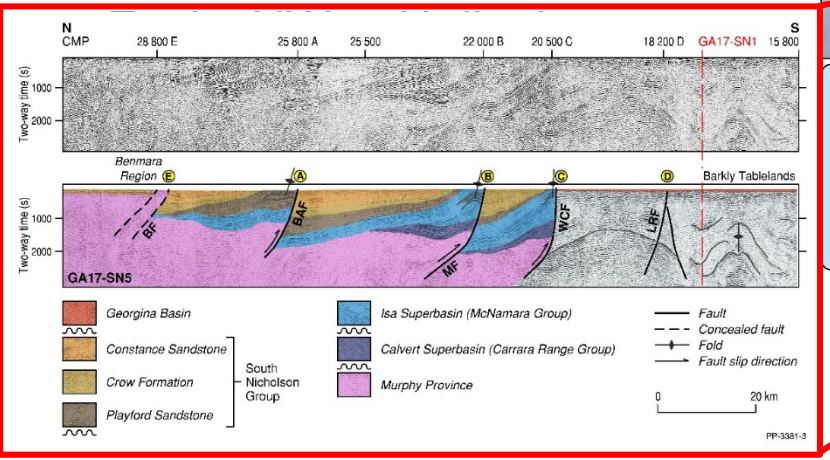
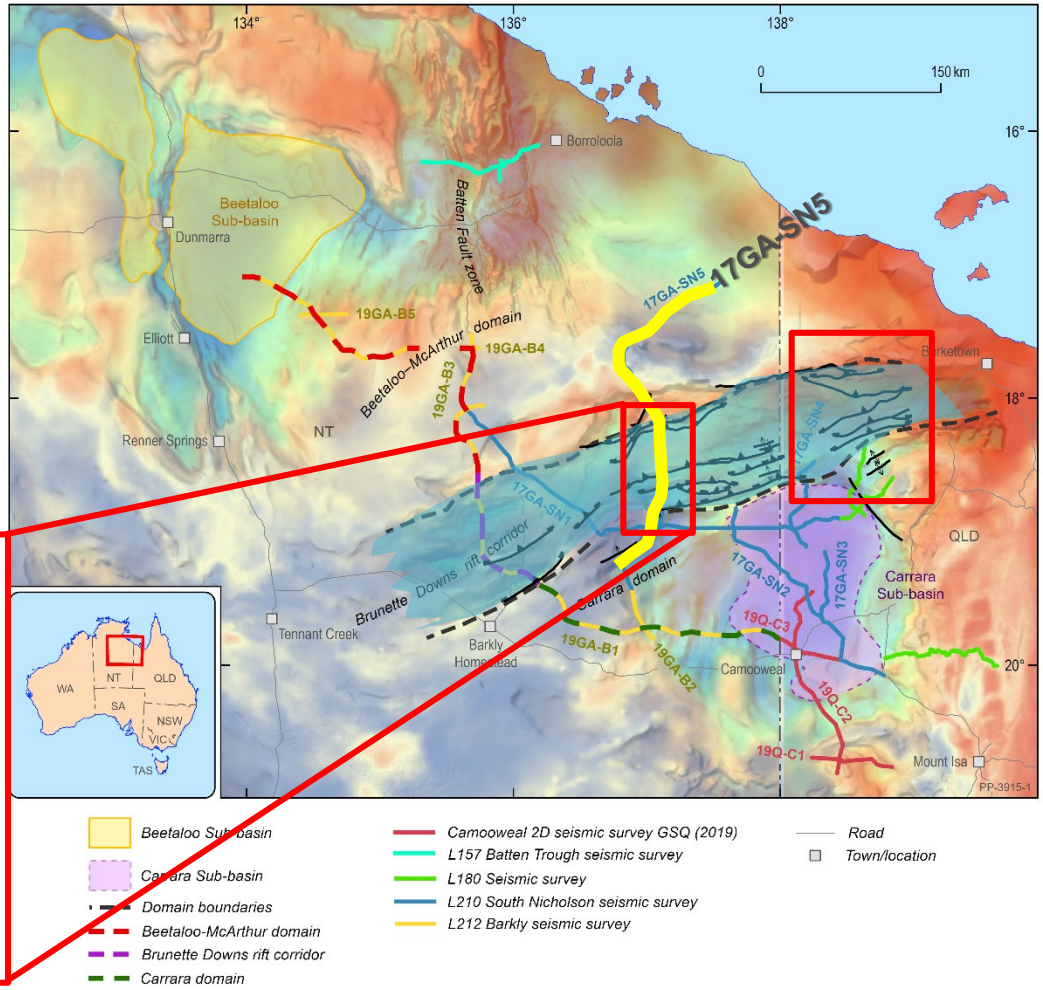
Brunette Downs rift corridor

- Corridor of half-grabens
- Extending from Barkly to Lawn Hill Platform
- Over 400 km length





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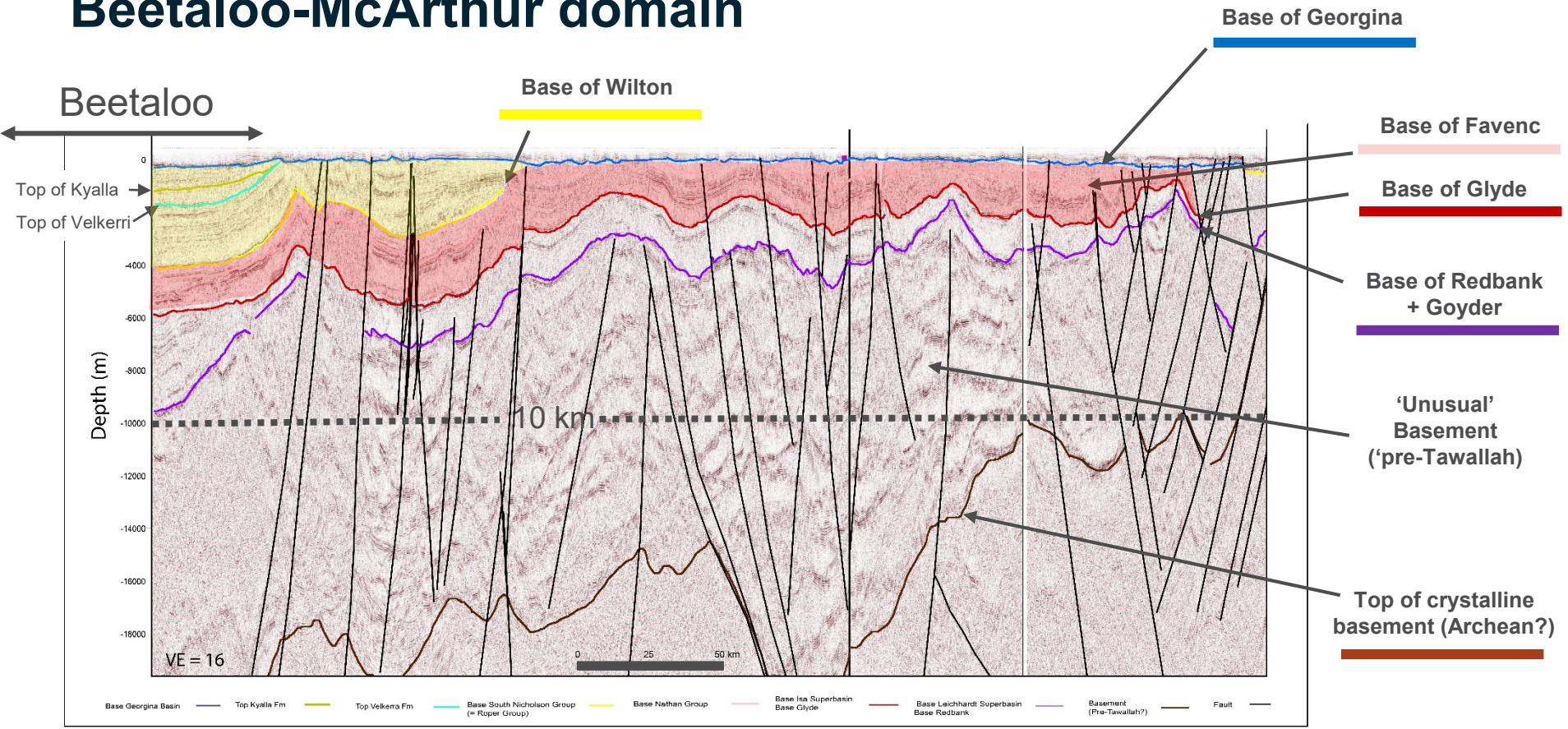
Beetaloo-McArthur domain



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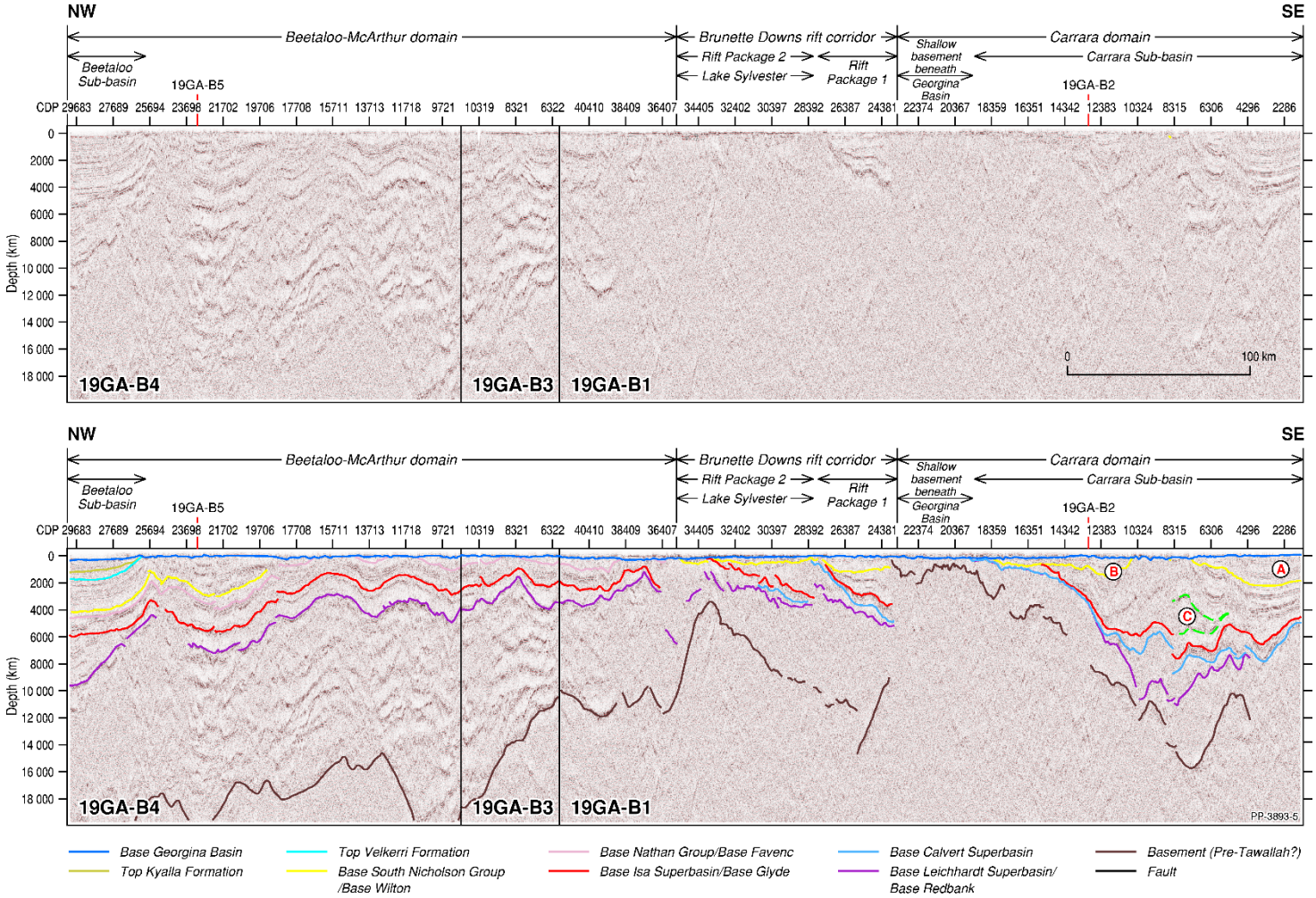

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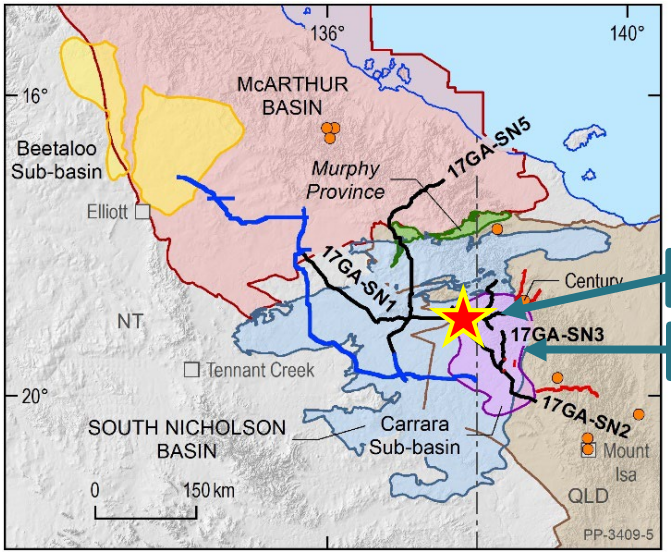
South Nicholson NDI ‘Carrara-1’ deep stratigraphic well



Carrara-1

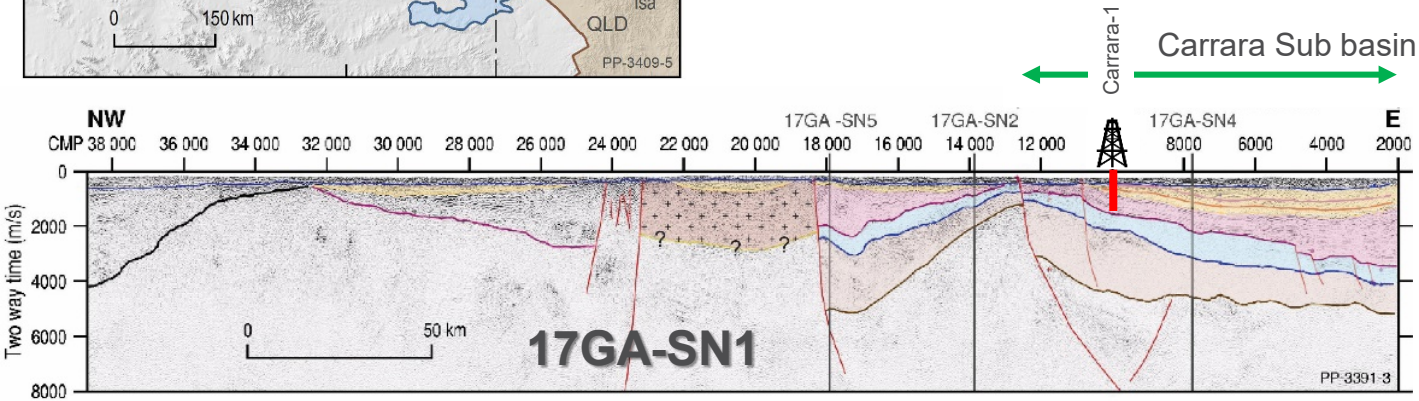
Carrara Sub-basin

Borehole Completion Report now LIVE

https://portal.ga.gov.au/bhcr/minerals/648482

https://portal.ga.gov.au/bhcr/minerals/648482?persona=minexcrc

- 1751 m depth
- Located on western flanks of Carrara Sub-basin on 17GA-SN1



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Conclusions and some thoughts on prospectivity

- Near-continuous sequence of concealed Proterozoic sequences between Beetaloo and Carrara sub-basins
- Identification of a major regional scale rift corridor
  - extension during Calvert SB opening (1725 Ma) and Isa SB (River extension, 1640 Ma) time?
- Deep unusual seismic basement to the north of rift corridor
- Vast area of newly discovered potentially prospective Proterozoic sedimentary sequences across Barkly Tablelands and South Nicholson
  - Rift corridor prospective for McArthur River (Pb-Zn) or Walford Creek (Zn-Pb-Cu-Ag) style mineralisation
  - Large regions of Late Proterozoic Glyde Package and Isa Superbasin, highly prospective for sediment-hosted base metals
  - Early indications from Carrara-1 are positive for energy resources with gas/oil shows
- Is the Carrara Sub-basin another Beetaloo?

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Further information

- Barkly Seismic GA Record (soon to be released)
- **Carrara-1 Borehole Completion Report**
  - https://portal.ga.gov.au/bhcr/minerals/648482 (GA Portal)
  - https://portal.ga.gov.au/bhcr/minerals/648482?persona=minexcrc (MinEx CRC Portal)
- Barkly Processed Data @ https://www.ga.gov.au/eftf/energy/barkly-seismic-survey
- https://portal.ga.gov.au/persona/eftf
- Barkly Seismic on display in exhibition area

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