

ARCHITECTURE OF THE AMADEUS AND GEORGINA BASINS, NORTHERN TERRITORY, BASED ON DEEP SEISMIC REFLECTION LINE 09GA-GA1



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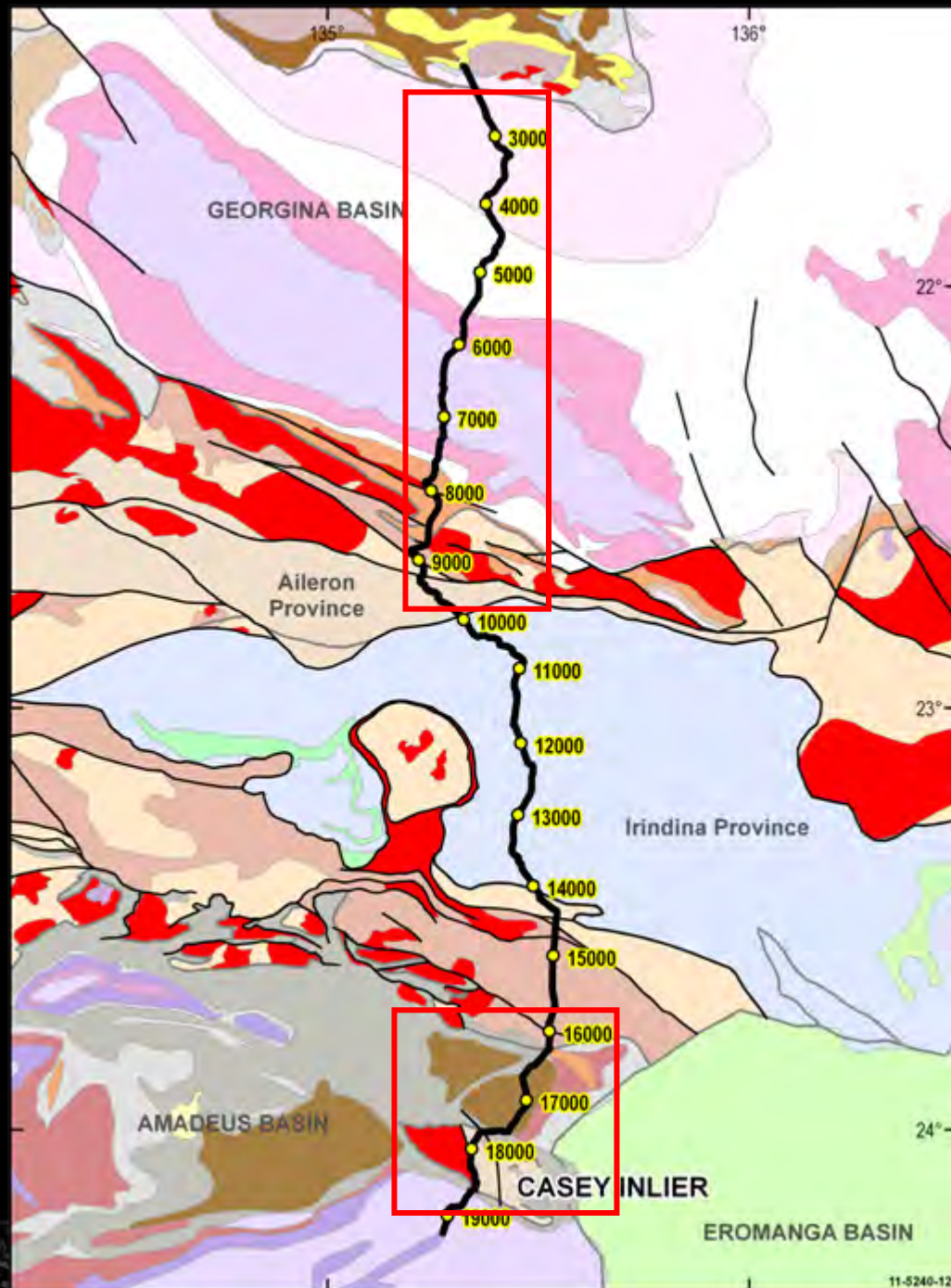
Outline

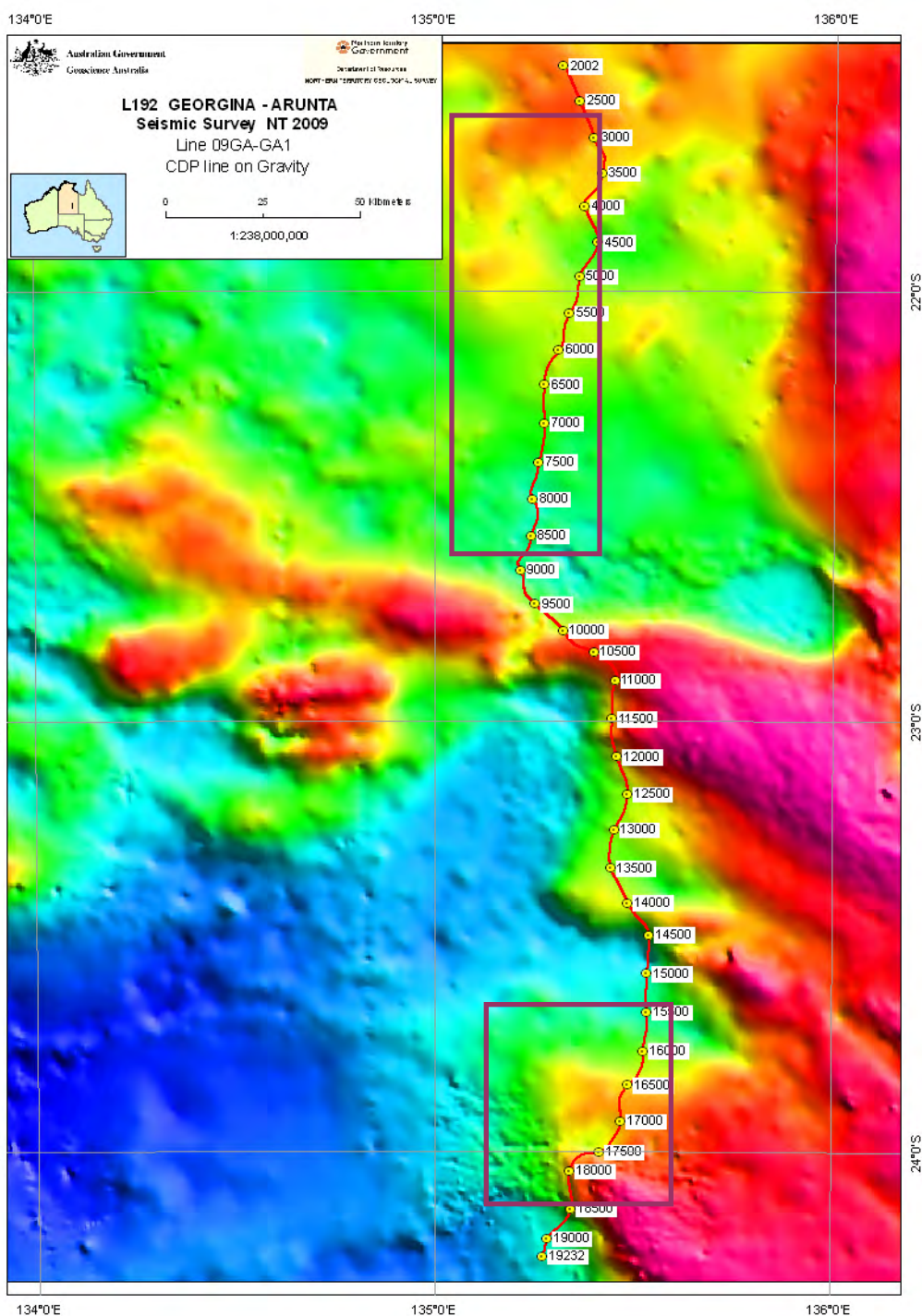
- Seismic line 09GA-GA1
- Georgina Basin
- Amadeus Basin
 - Georgina-Arunta seismic line
 - GOMA seismic line



Seismic line 09GA-GA1

- Subsurface imagery greatly improves understanding of basin successions and geological structures





Georgina-Arunta Gravity

- Amadeus and Georgina Basins
- Contemporaneous basin deposition – Centralian Superbasin

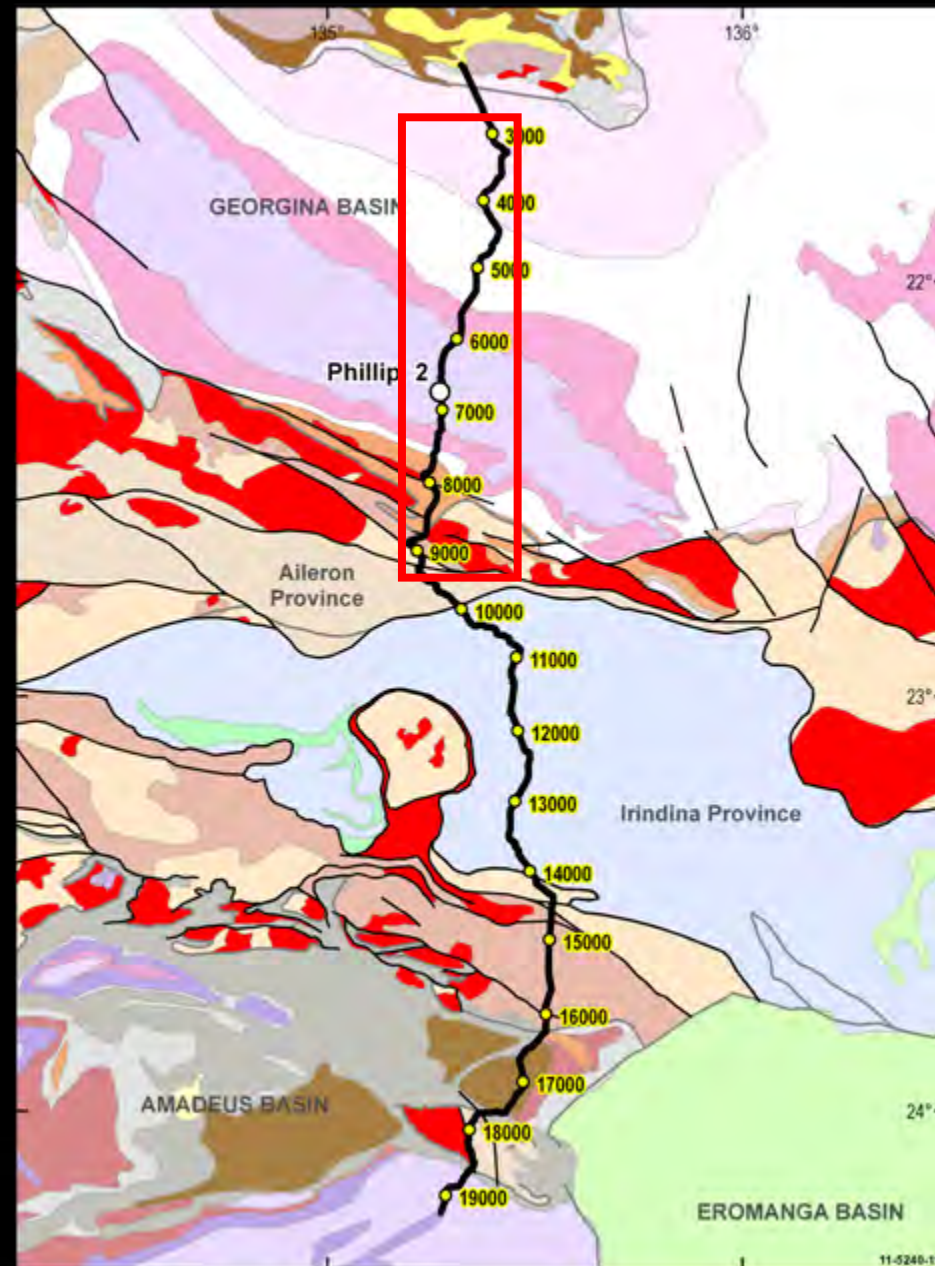
Georgina Basin

- Neoproterozoic to Devonian basin
- Poorly exposed in vicinity of seismic line
- Exploration from 1950s
- Ammaroo 1 and 2
- Phillip 1 and 2
- Cambrian and Ordovician hydrocarbon systems



Georgina Basin

- Shown in three sections - south to north
- Phillip 2 well located on seismic line



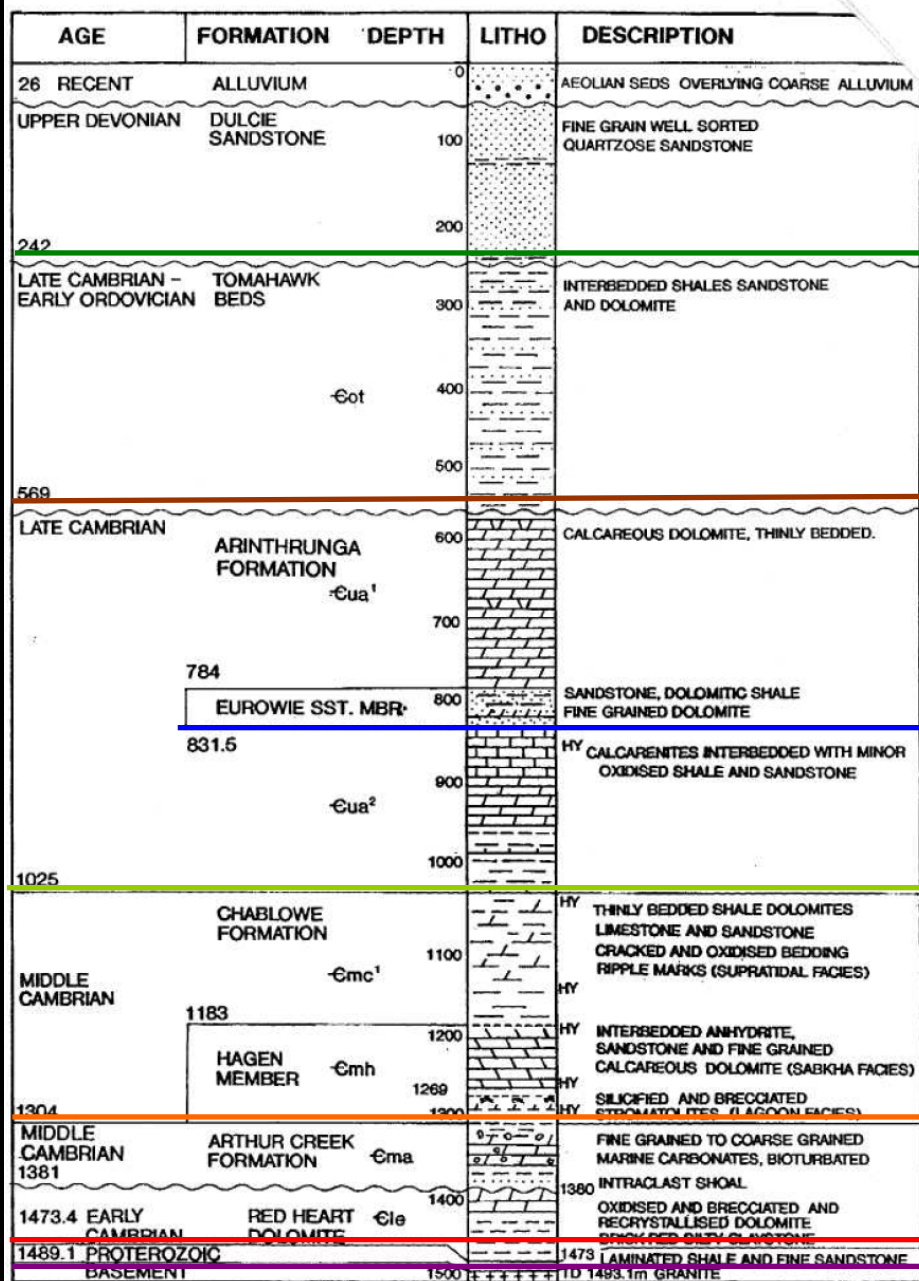


FIG 5

Pacific Oil & Gas Pty Limited			
PHILLIP NO. 2			
ACTUAL SECTION			
Author	G.W.K.	Date	April 1989
		Plan No.	PetNTcw 3047

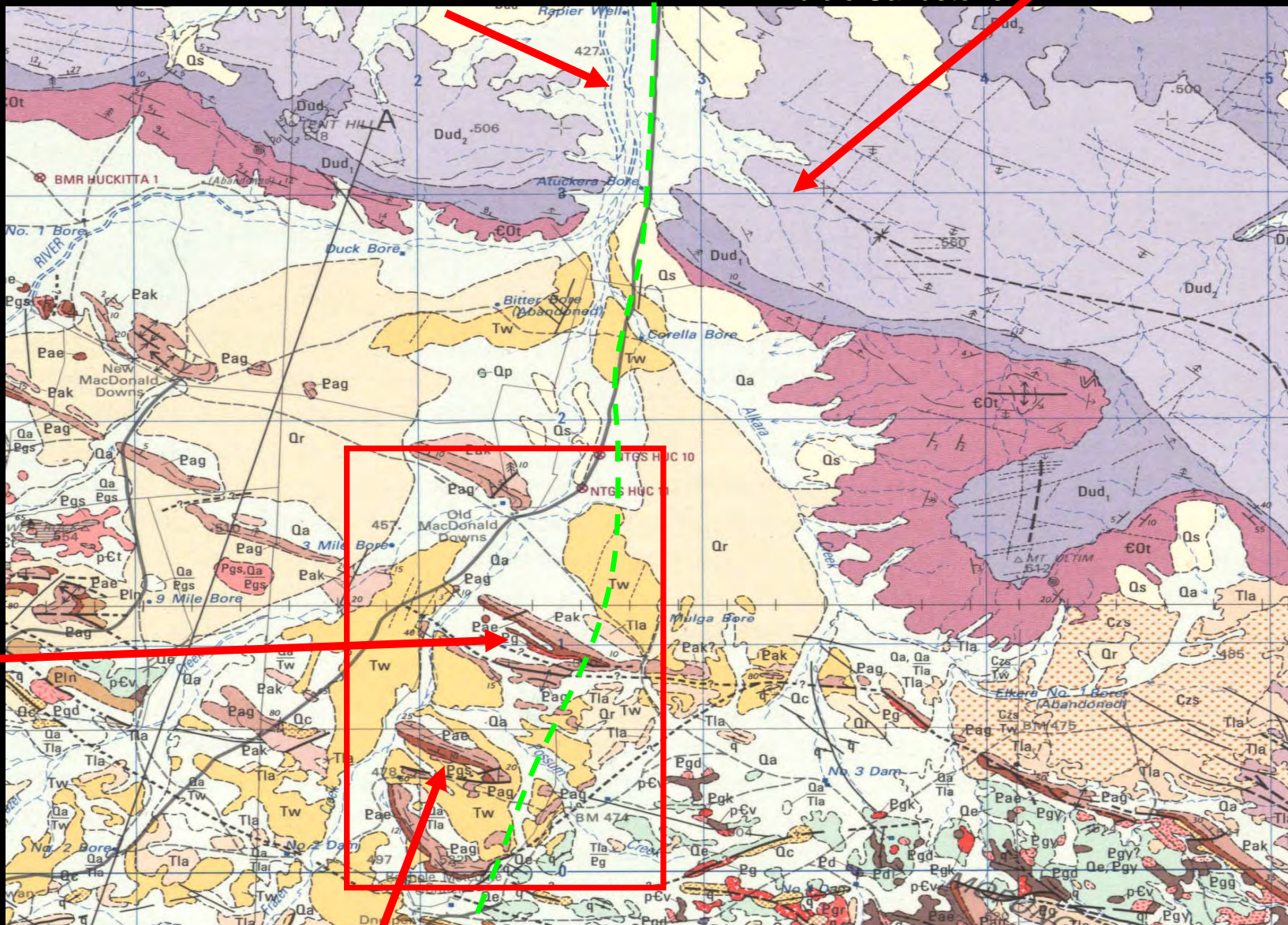
Phillip 2

- Used to control stratigraphy in interpretation of seismic
 - 1489 m to basement (granite)
 - 1802 ± 6 Ma
- (Kositcin et al., in prep.)
U-Pb zircon SHRIMP age

Route of Seismic line 09GA-GA1

Dulcie Syncline: Tomahawk Fm and
Dulcie Sandstone

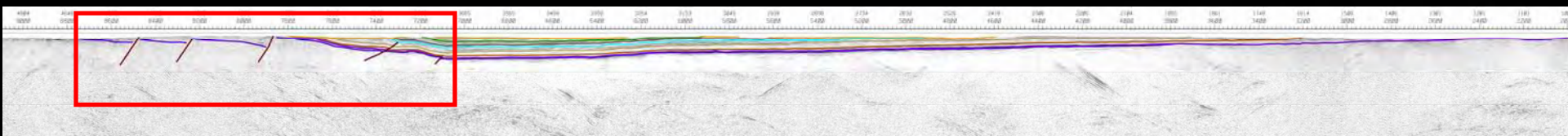
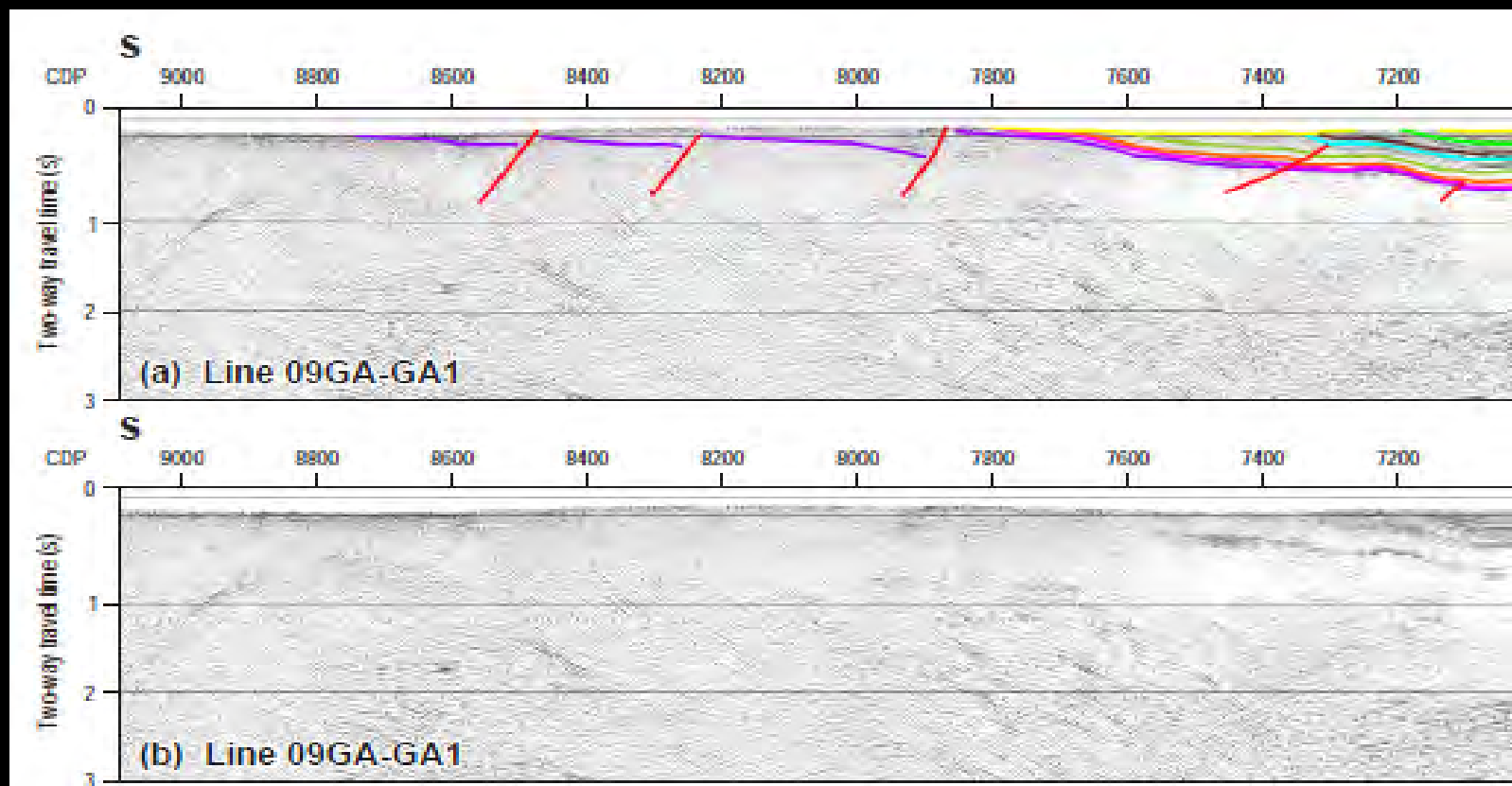
Granite
outcrop



Neoproterozoic half graben outcrop

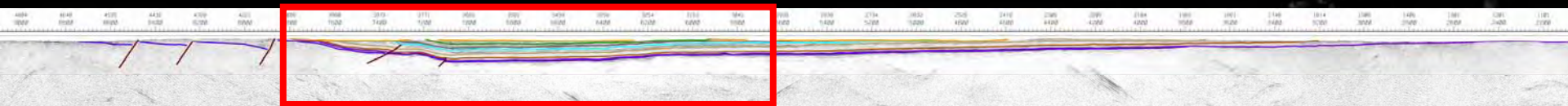
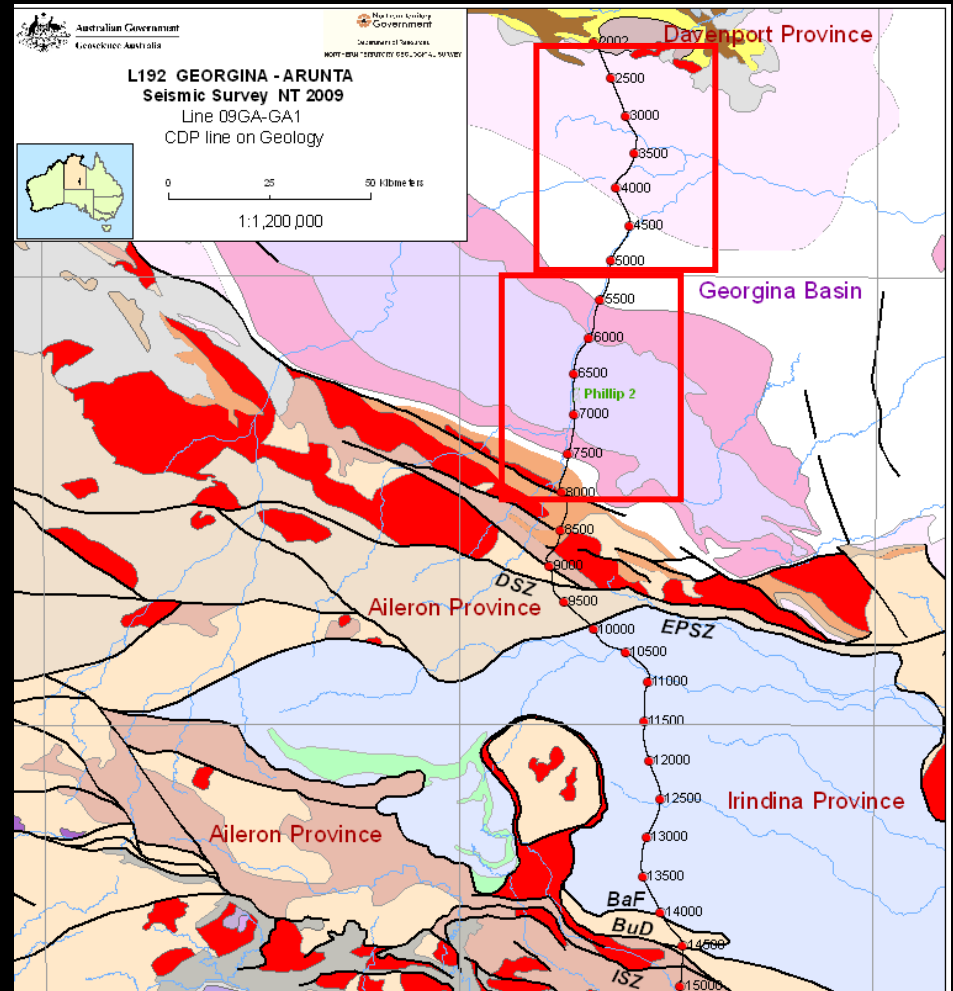
Huckitta 1:250K map sheet

Neoproterozoic Half Graben

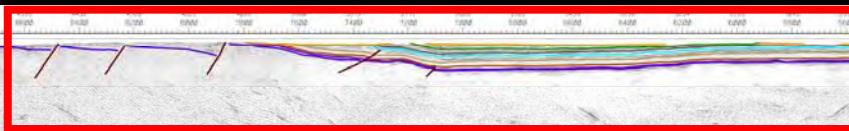
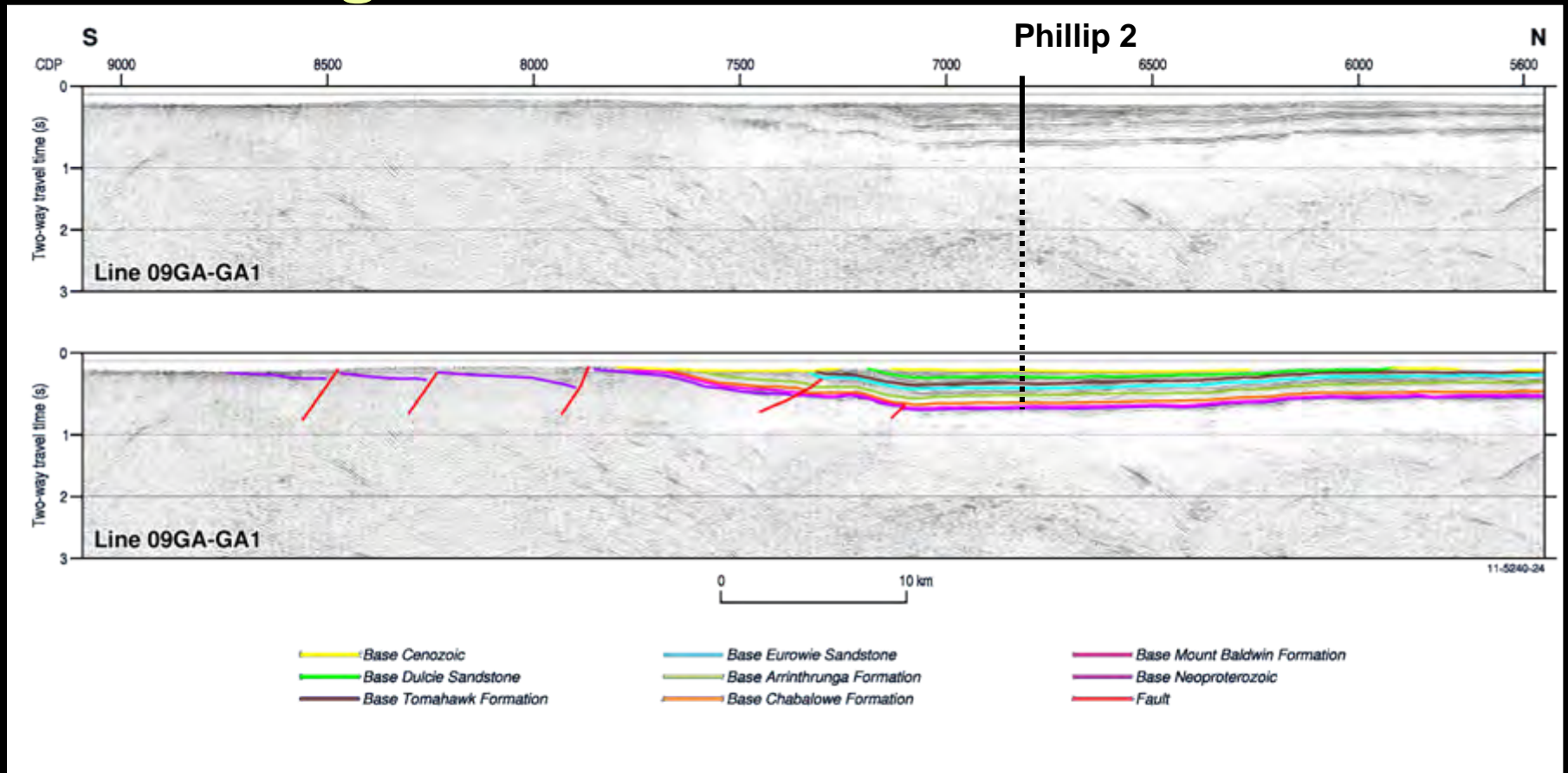


Seismic Line 09GA-GA1

- Predominantly Paleozoic succession to north of half graben
- Shown in two sections

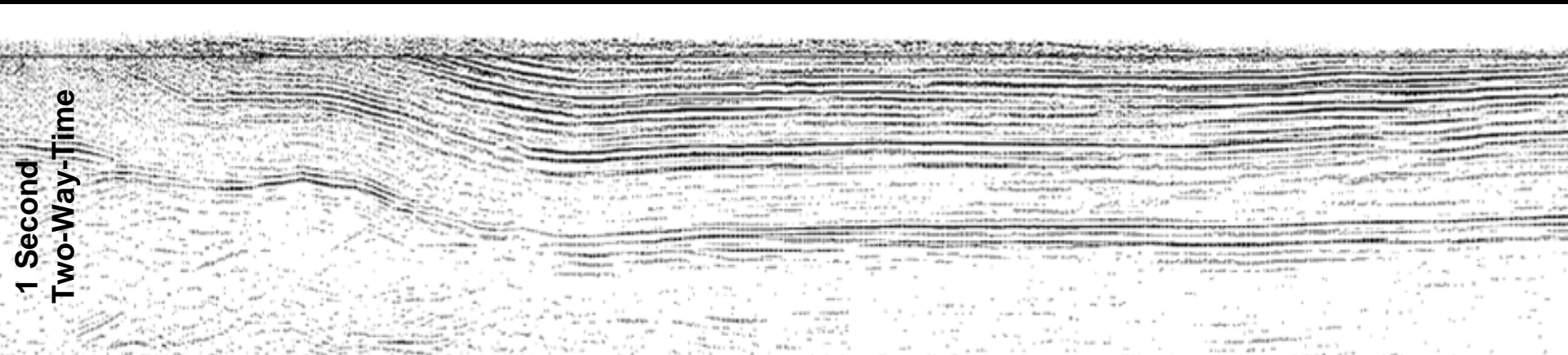


Georgina Basin - Southern Section

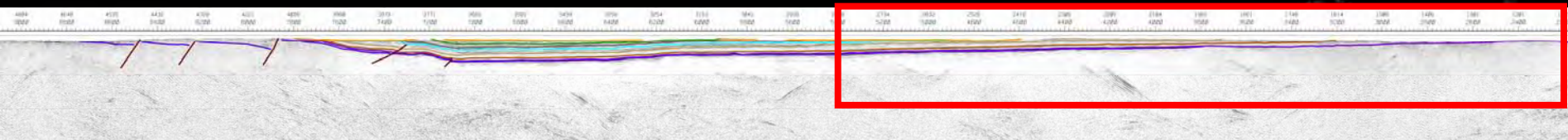
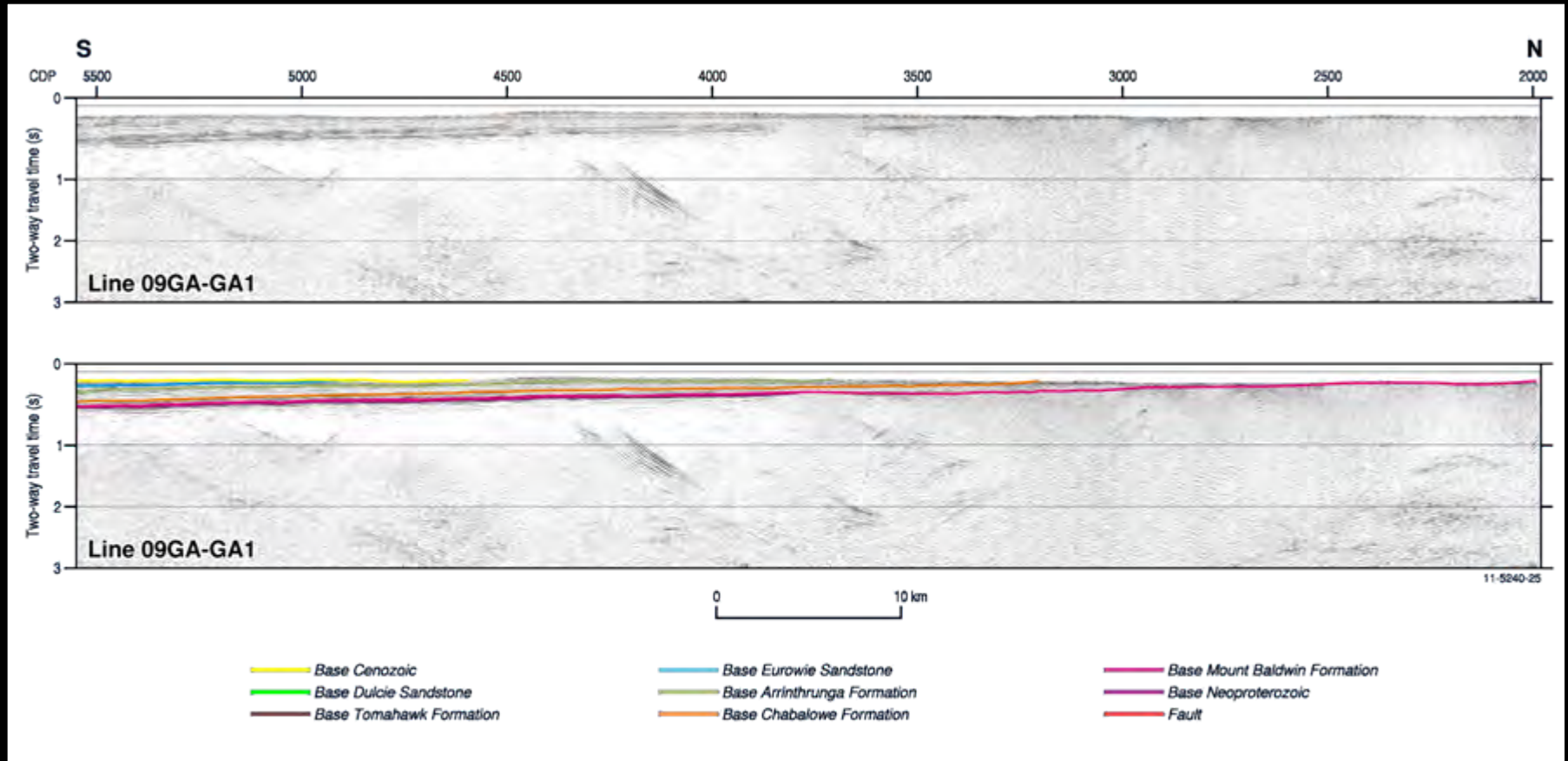


Georgina Basin – Dulcie Syncline

Phillip 2



Georgina Basin - Northern Section



Georgina Basin - Outcrop Photos



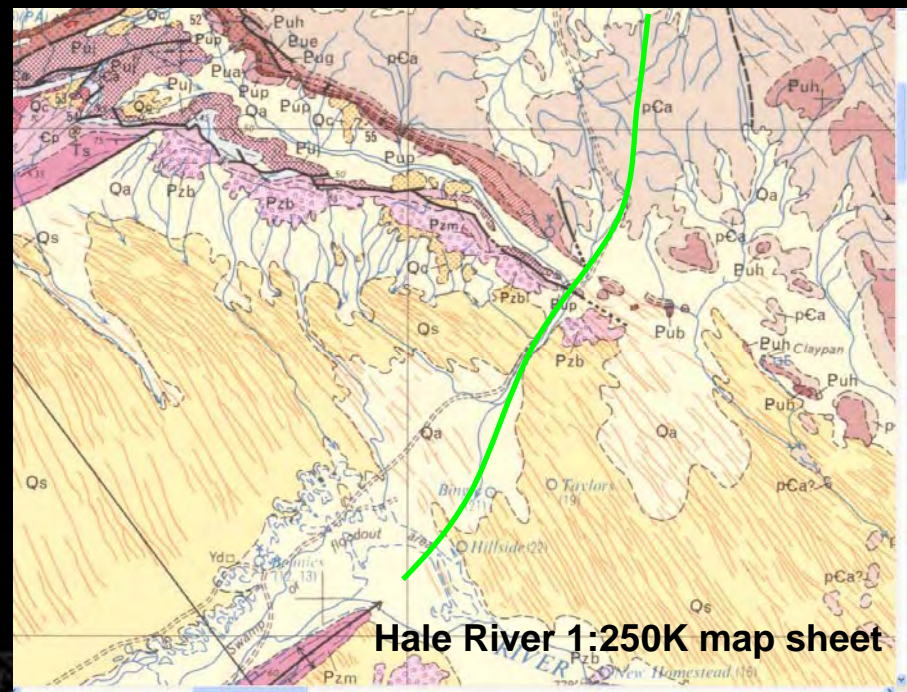
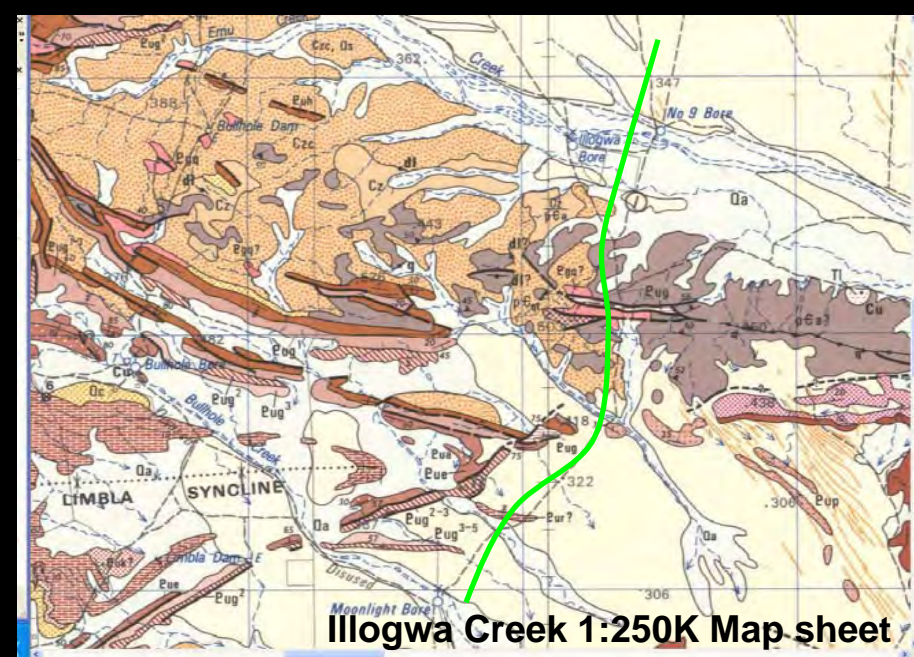
Amadeus Basin

- Neoproterozoic to Devonian
- Basin surrounds Casey Inlier
- Oil and gas producing basin
- Exploration from 1950s
- Neoproterozoic, Cambrian and Ordovician hydrocarbon systems

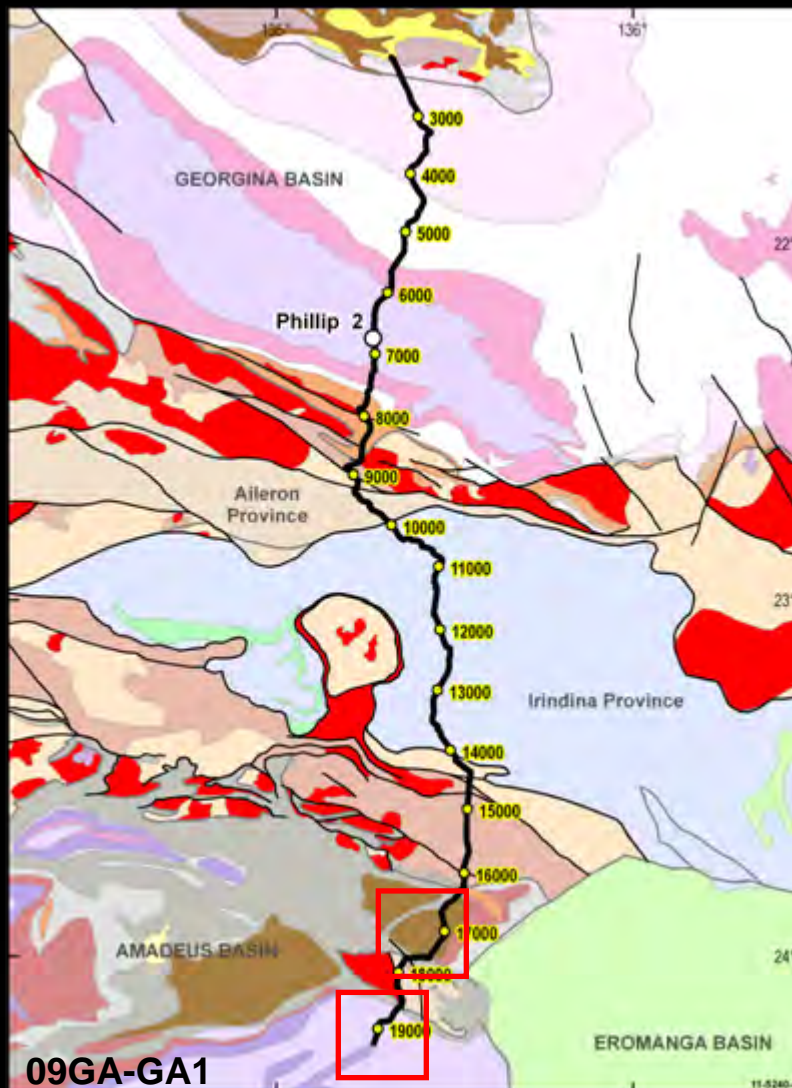


Limited Surface Control

- No wells in the Amadeus Basin in vicinity of seismic line 09GA-GA1
- Surface geology maps used for stratigraphic control

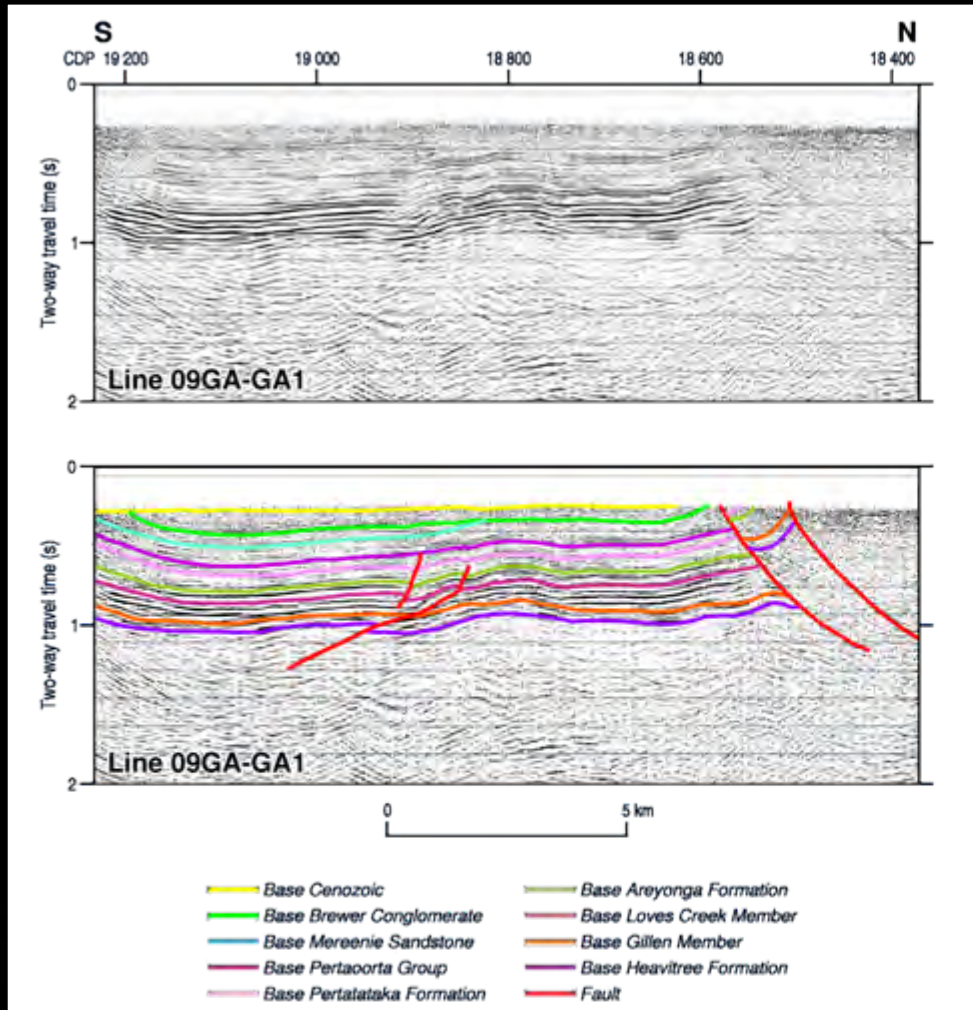


Amadeus Basin and the Casey Inlier



- Shown in two sections, south of Casey Inlier and north of Casey Inlier

Amadeus Basin - South of Casey Inlier



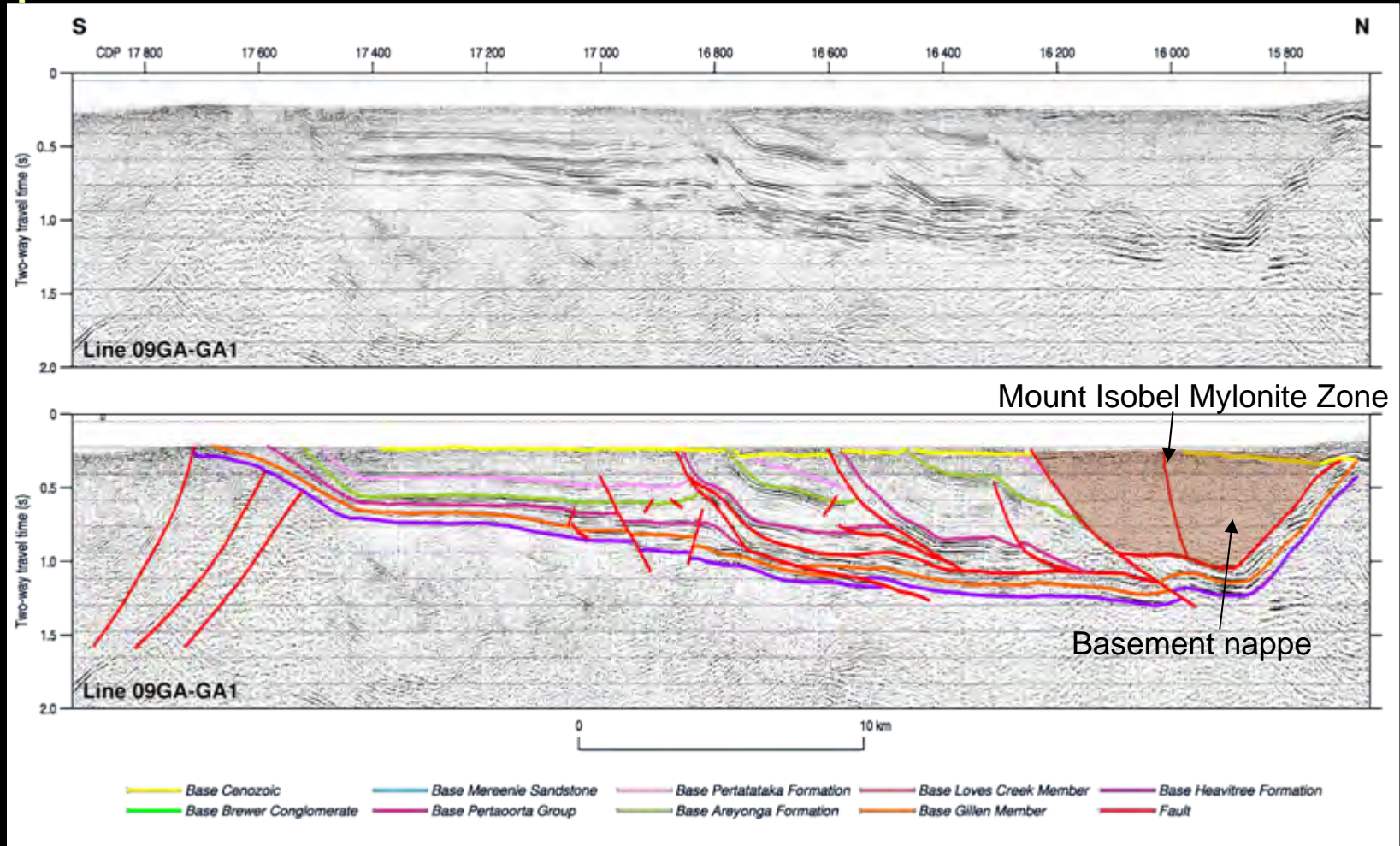
- Flat lying sediments with no growth – strike section

- Northern margin is overthrust by Casey Inlier

- Neoproterozoic to Devonian succession preserved

Amadeus Basin - North of Casey Inlier

- Northeastern margin of the basin
- Only Neoproterozoic succession preserved
- South directed shortening
- Basement-cored nappe



Mount Isobel Mylonite Zone

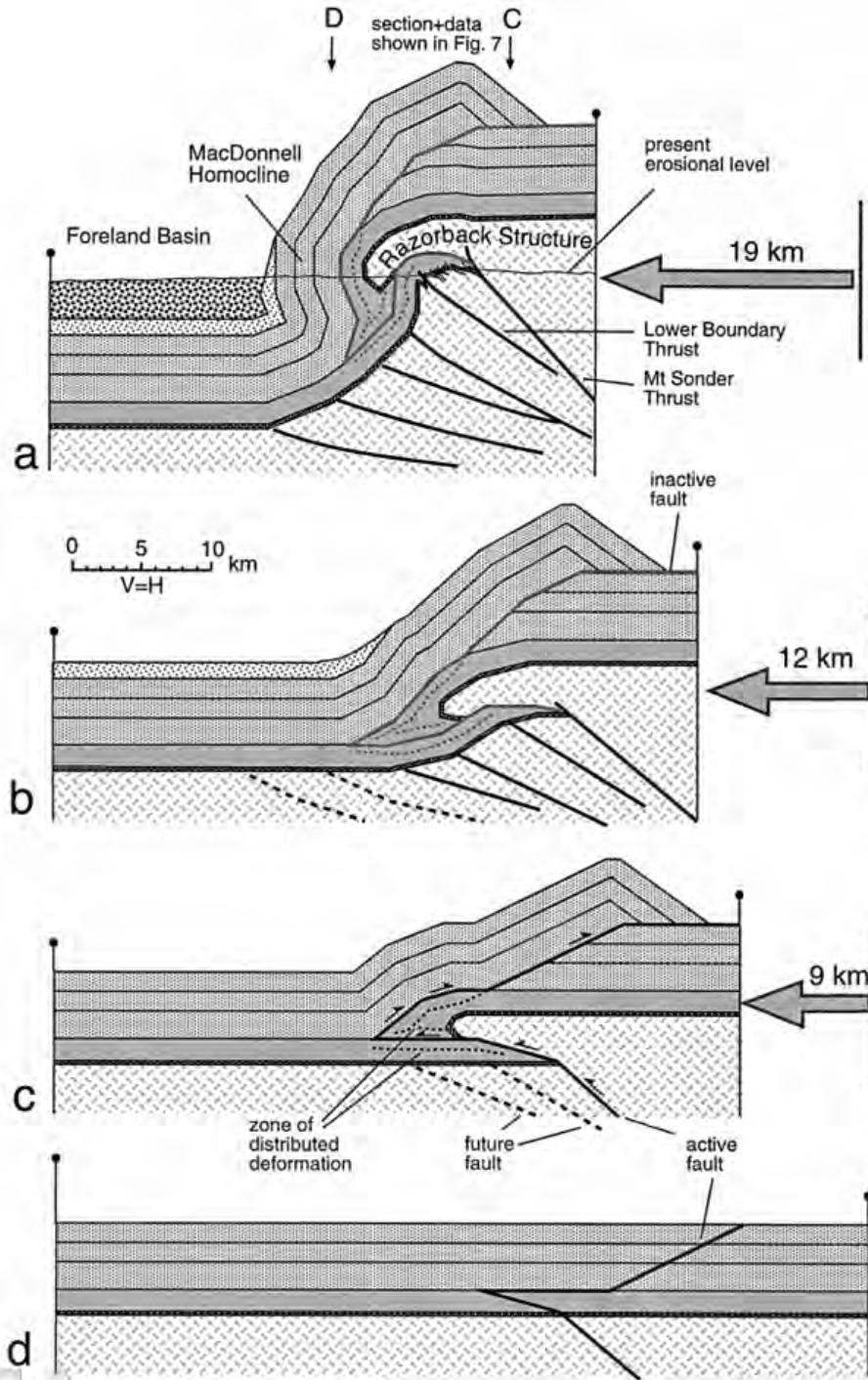
New SHRIMP age:
protolith zircon crystallisation
 1748 ± 4 Ma
(Kositcin et al., in prep.)

Photo: Gordon Webb



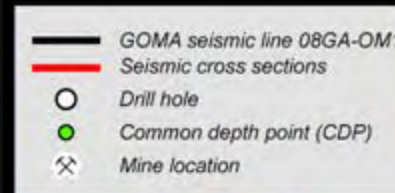
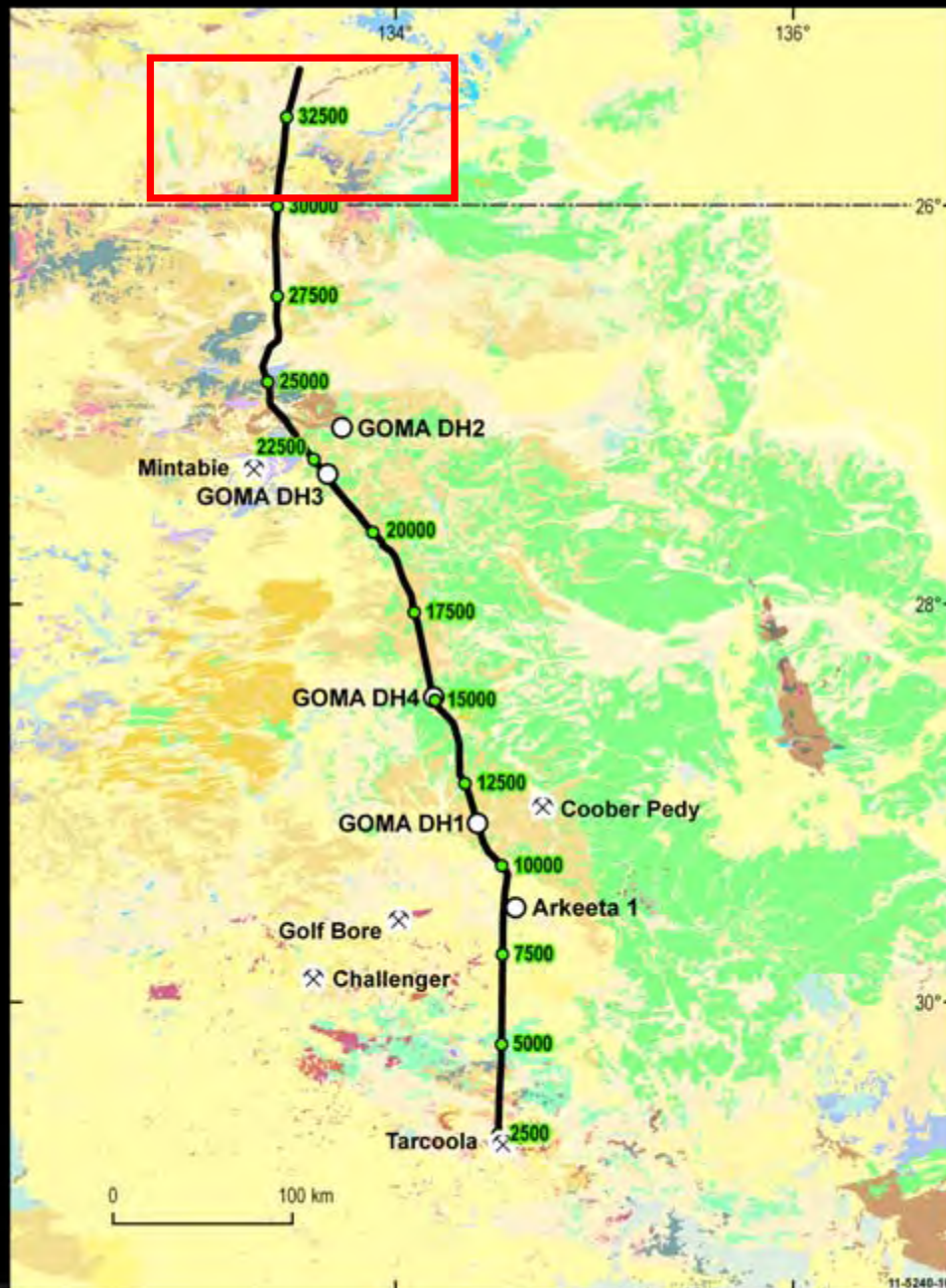
Structural Model for Basement Nappe

(Flöttmann & Hand, 1999, JSG, 21, 399-412)

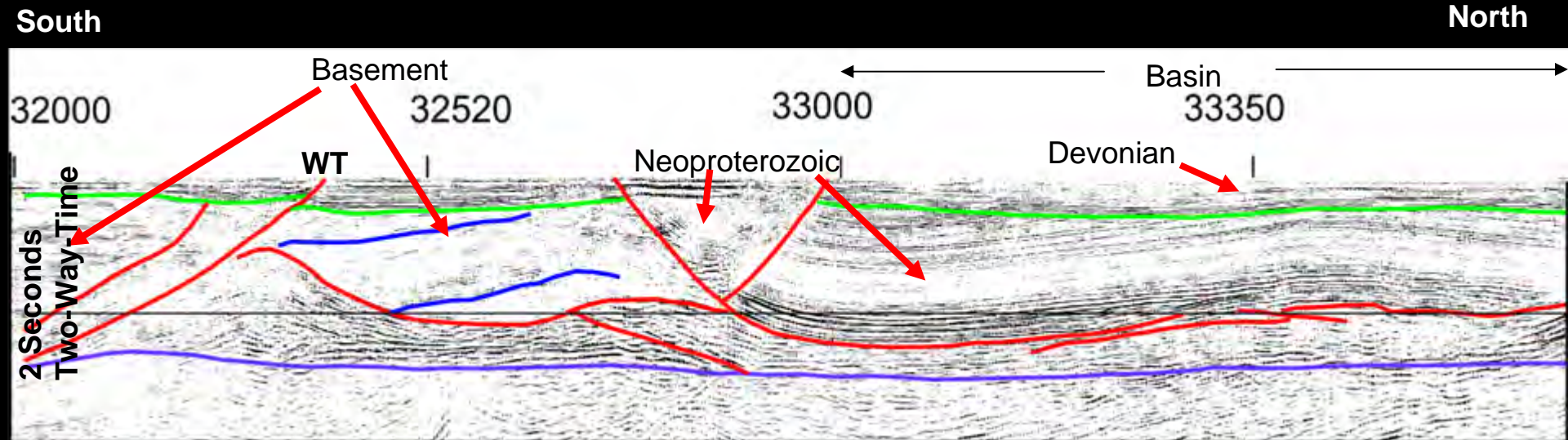


GOMA Seismic Line (08GA-OM1)

- Sparse outcrop
- Mostly Cenozoic and Mesozoic cover
- Geological control poor

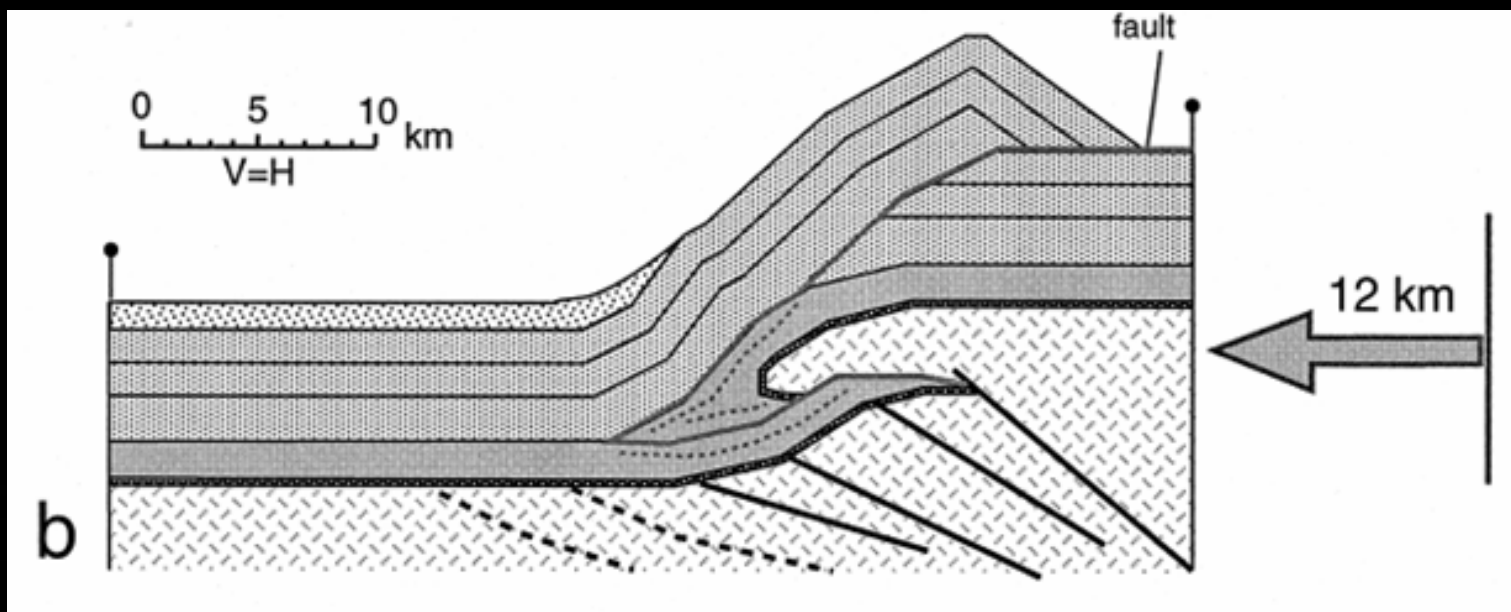
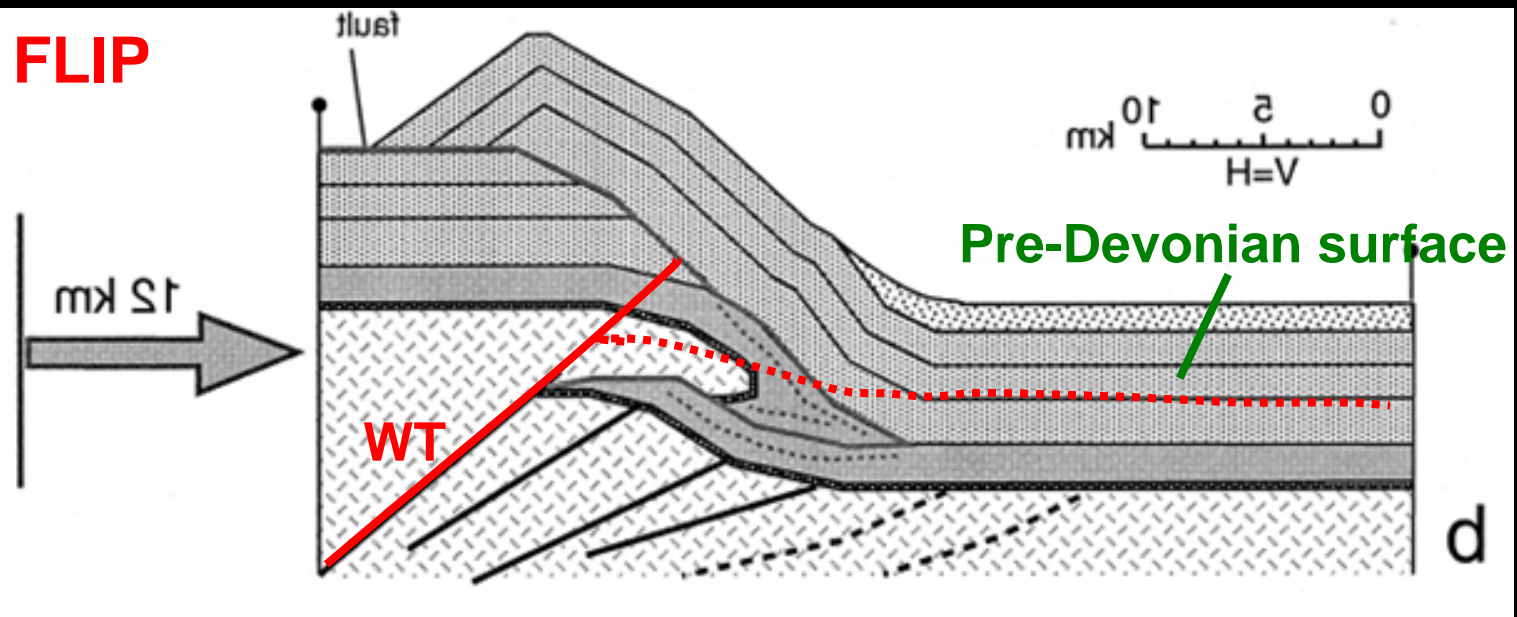


Amadeus Basin – GOMA 08GA-OM1



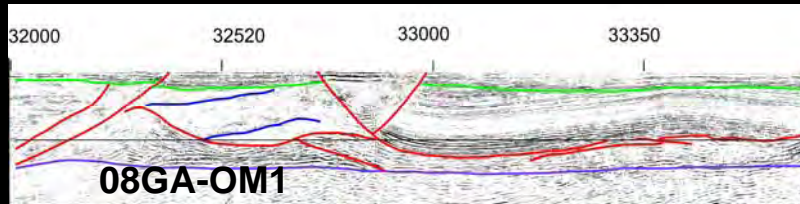
- Shows basins southern margin
- GOMA data available from GA web page - Record 2010/39

FLIP

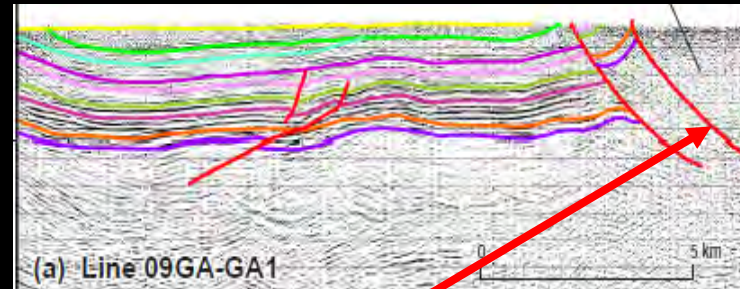


Amadeus Basin in three sections

Southern Margin



Northeast



Casey Inlier



Northeastern Margin

Amadeus Basin Photos



Conclusions

- Georgina Basin undergone only gentle folding to produce a broad syncline
- Amadeus Basin, by contrast, has been subject to significant deformation, with the northern seismic section showing a south-directed, thin-skinned fold-thrust belt, with a basement-cored nappe in the north
- Amadeus basin, southern margin, opposite polarity with north directed basement nappe

