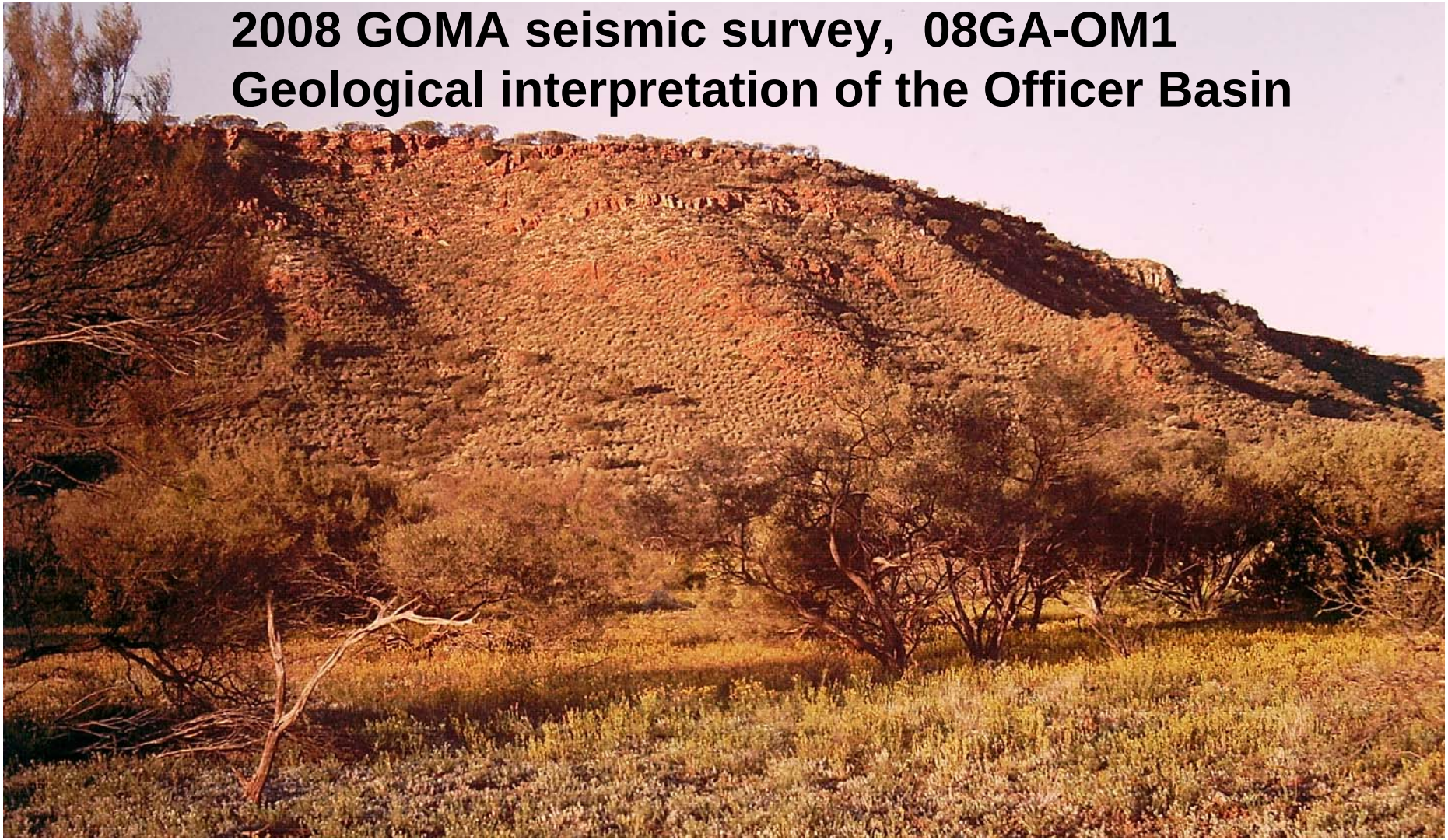
2008 GOMA seismic survey, 08GA-OM1
Geological interpretation of the Officer Basin



Wolfgang V. Preiss, Russell J. Korsch and Lidena K. Carr

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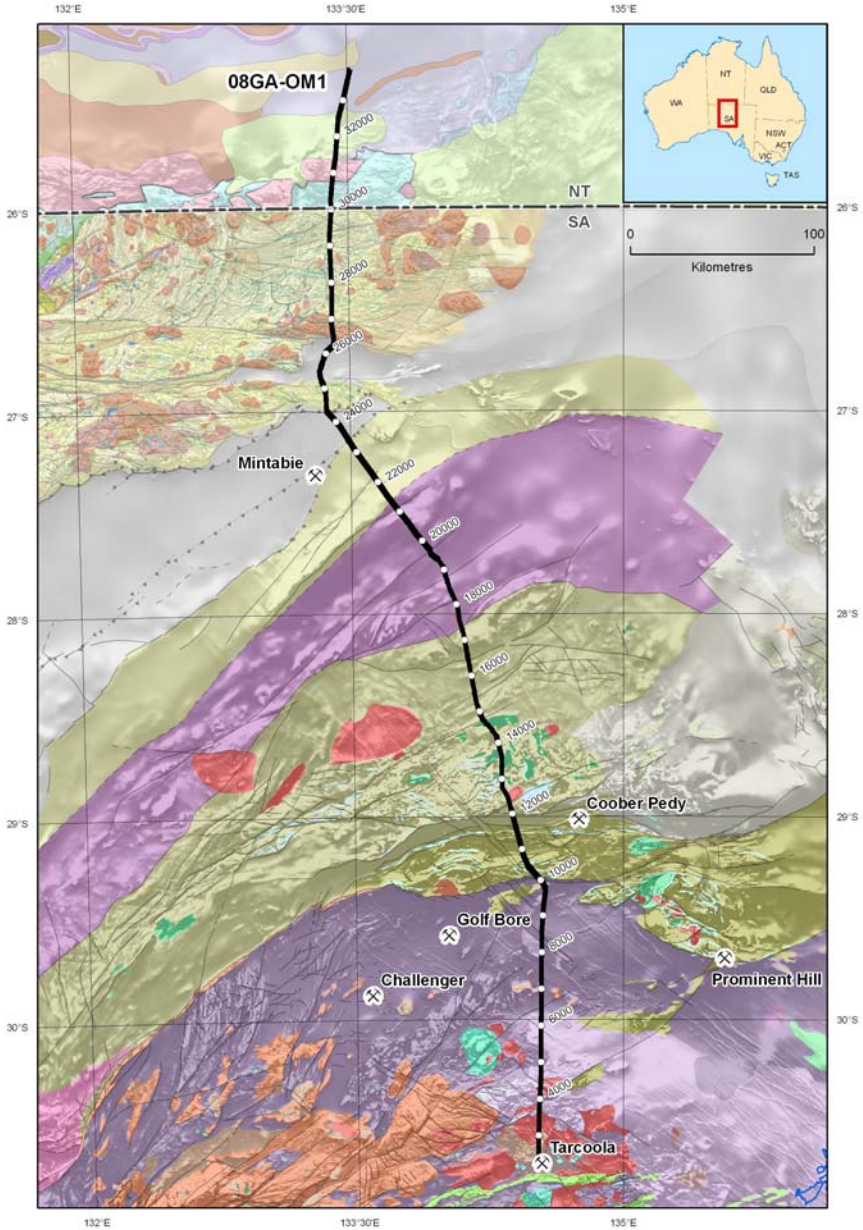
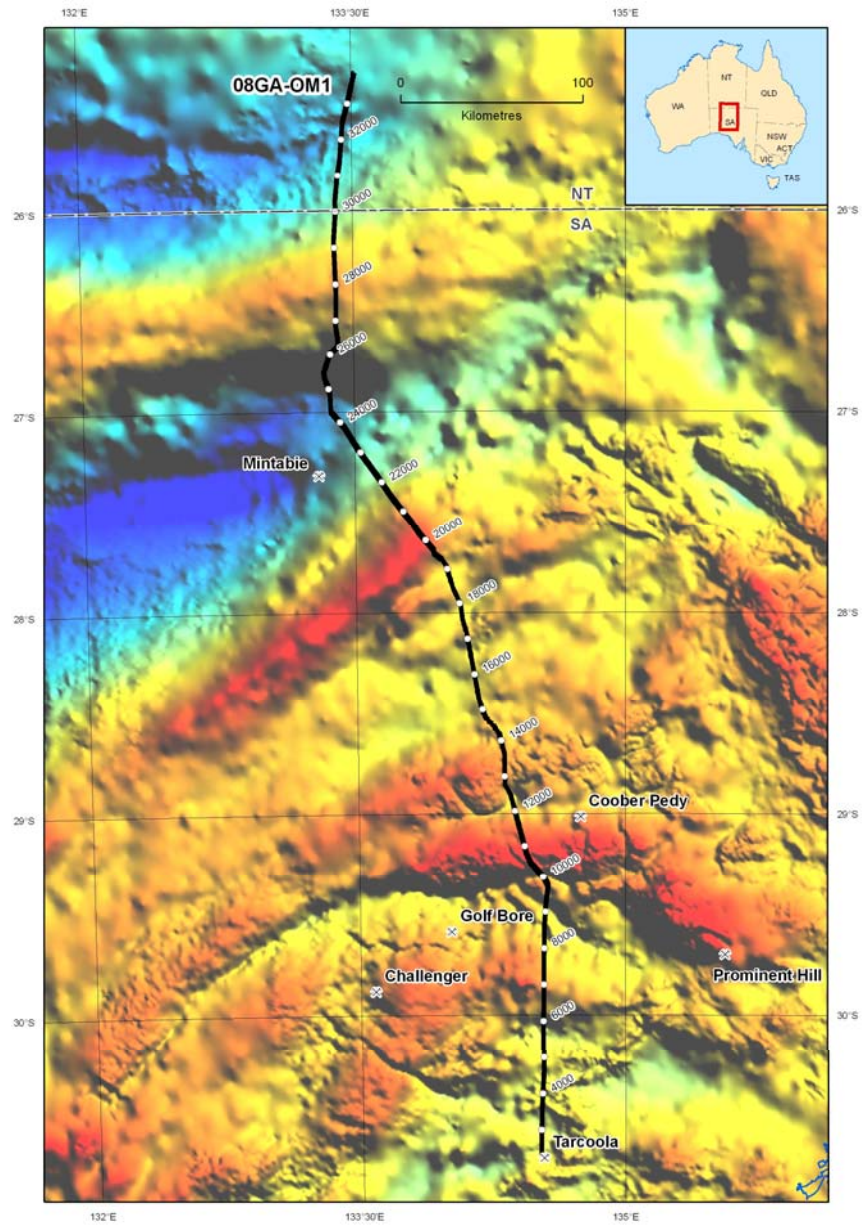


Solid Geology over 1VD



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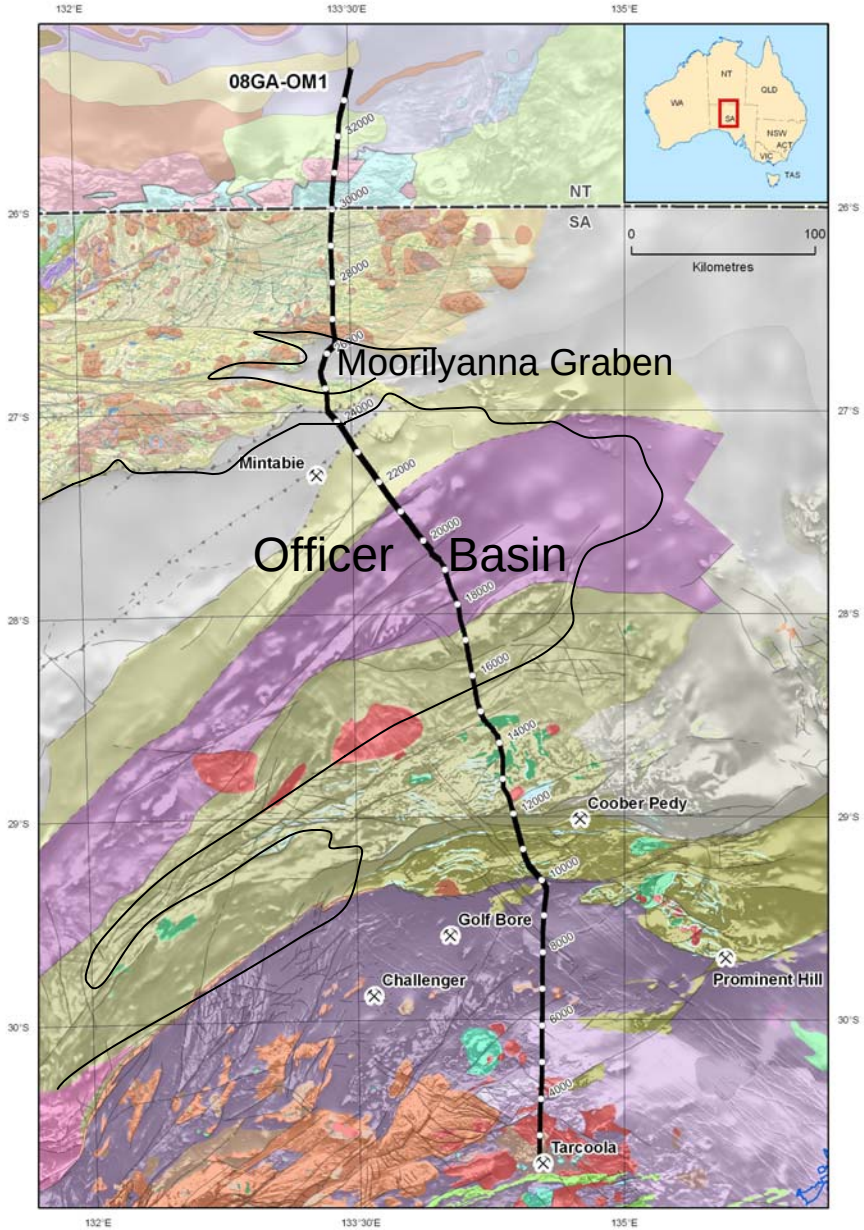

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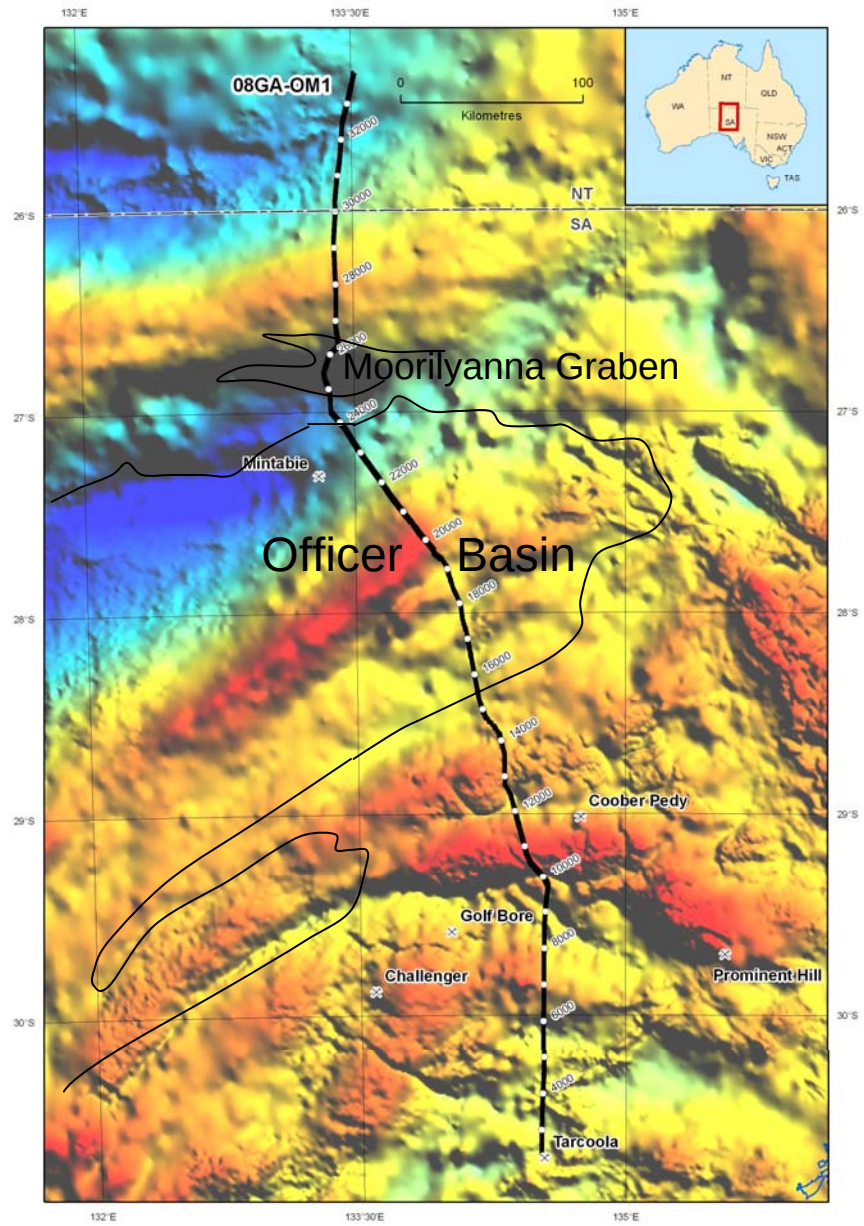

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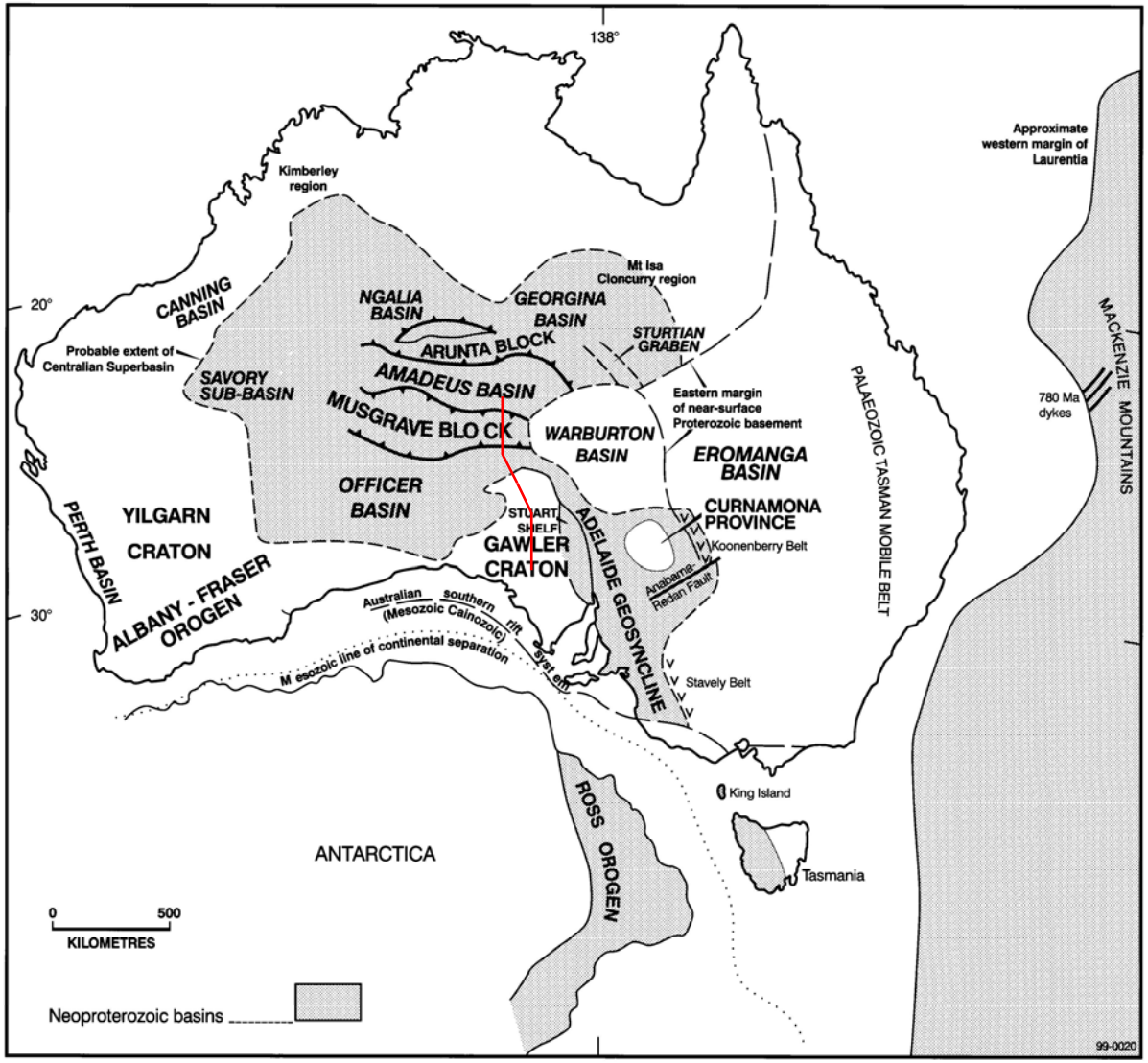

Officer Basin – part of Centralian Superbasin with links to the Adelaide Geosyncline

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OFFICER BASIN STRATIGRAPHY

Age	Statigraphic unit		Description	Adelaide Geosyncline equivalents
Devonian		Mimili Formation	arkosic sandstone, green-grey siltstone	
Ordovician	MUNDA GROUP	Blue Hills Sandstone	quartz sandstone, feldspathic sand	
		Indulkana Shale	soft shale	
		Mount Chandler Sandstone	clean sandstone with Scolithus	
Cambrian				*Delamerian Orogeny*
	MARLA GROUP	Trainor Hill Sandstone	well-sorted white sandstone	LAKE FROME GROUP
		Apamurra Formation	calcareous sandstone, siltstone	
		Mt Johns Conglomerate Member	red-brown conglomerate, sandstone	UNGROUPED
		Arcoellina Sandstone	red-brown fine-medium sandstone	Wirrealpa Limestone
		Observatory Hill Formation	red-brown micaceous siltstone,	Billy Creek Formation
		Parakeelya Alkali Member		
		Wallatinna Member	granule arkose, conglomerate	
		Ouldburra Formation	limestone, dolomite, sandstone, evaps	HAWKER GROUP
		Relief Sandstone	fine to medium-grained sand	carbonate, sandstone, siltstone
Marinoan/ Ediacaran		*Petermann Orogeny*		
		Punkerri Sandstone ?	red and white sandstone	POUND SUBGROUP
	UNGOOLYA GROUP =Rodda beds	Narana Formation		Wonoka Formation
		Mena Mudstone Member	grey-green mudstone	
		Munta Limestone Member	limestone	
		Munyarai Formation	calc-siltstone and limestone	
		Tanana Formation	limestone, calc-siltstone	
		Karlaya Limestone	micritic limestone	
		Dey Dey Mudstone	red-brown mudstone; ejecta layer	Bunyeroo Formation
	LAKE MAURICE GROUP	Murnaroo Sandstone	well-rounded bimodal sand	ABC Range Quartzite
		Meramangye Formation	red-brown and grey-green silt	Brachina Formation
		Tarlina Sandstone	fine-grained sand	Seacliff Sandstone
Marinoan		?		UMBERATANA GROUP
		Wantapella Volcanics	basalt	
Sturtian		?		
		Chambers Bluff Tillite	diamictite, sandstone	Calthorinna Tillite and equivalents
Torrensian				BURRA GROUP
	?MUNDALLIO SUBGROUP	unnamed siltstone, sandstone	thinly interbedded silt and sand	Skillogalee Dolomite
	?EMEROO SUBGROUP	unnamed quartzite	massive quartzite	Mt Margaret Quartzite
Willouran		?		
	?CURDIMURKA SUBGROUP	Alinya Formation	silt, sand, dolomite, evaporites	CURDIMURKA SUBGROUP
		?		
	?ARKAROOLA SUBGROUP	Cadlareena Volcanics equiv.	basalt	ARKAROOLA SUBGROUP
		Coominaree Dolomite equiv.	stromatolitic dolomite	

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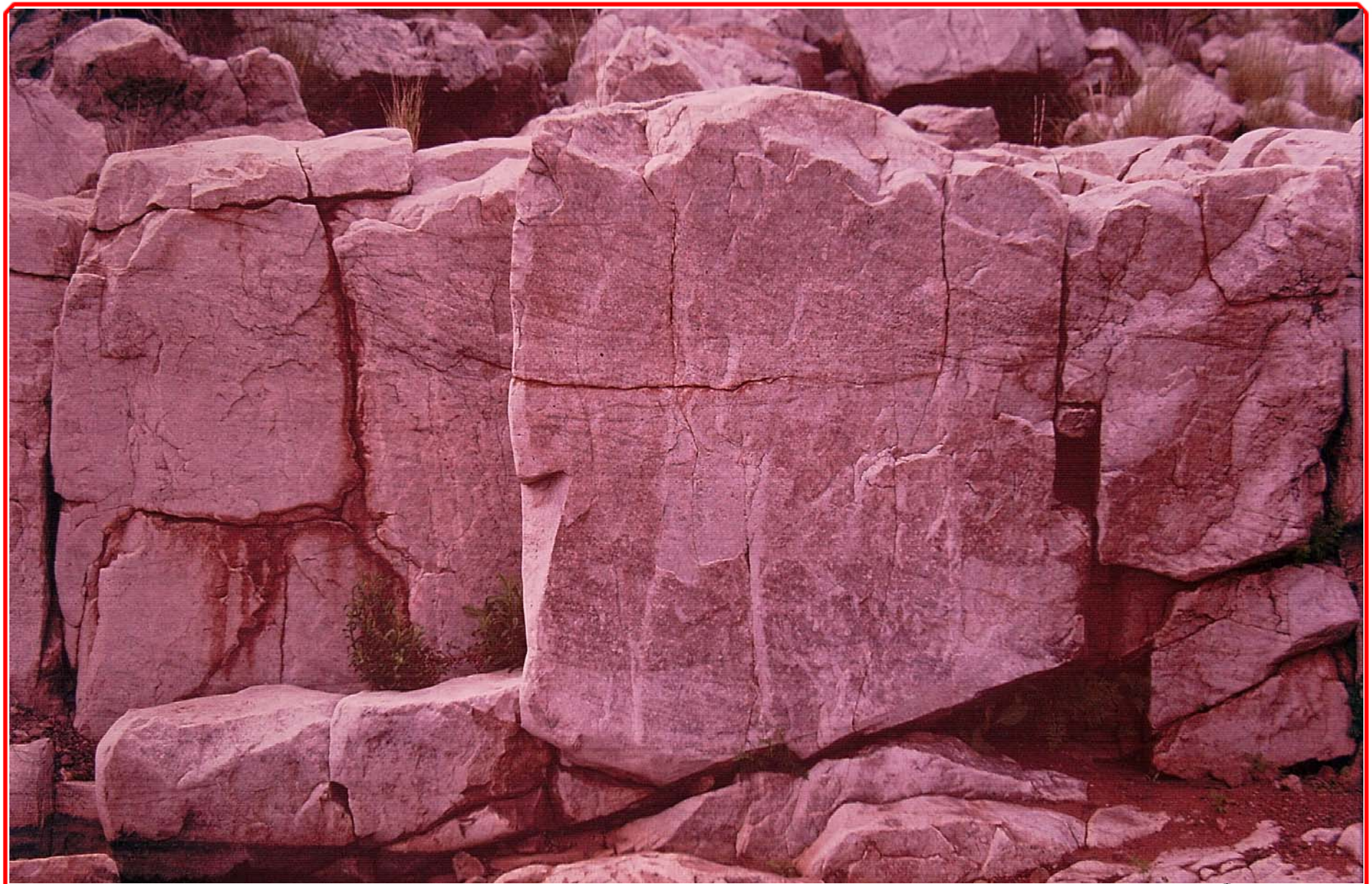

?Emeroo Subgroup – cross-bedded quartzite

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Folds in ?Mundallio Subgroup quartzite, siltstone

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Chambers Bluff Tillite

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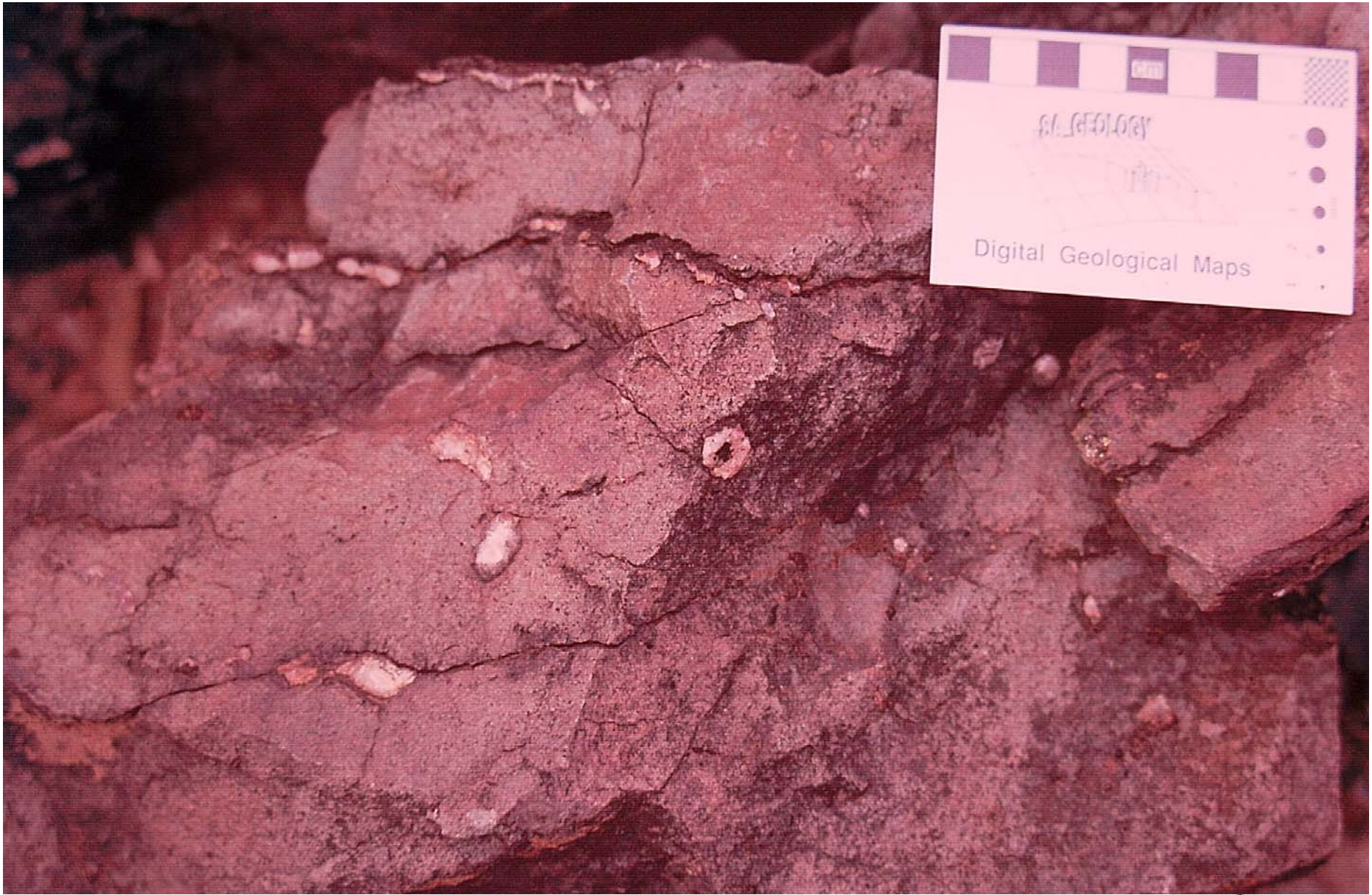

Amygdaloidal basalt, Wantapella Volcanics

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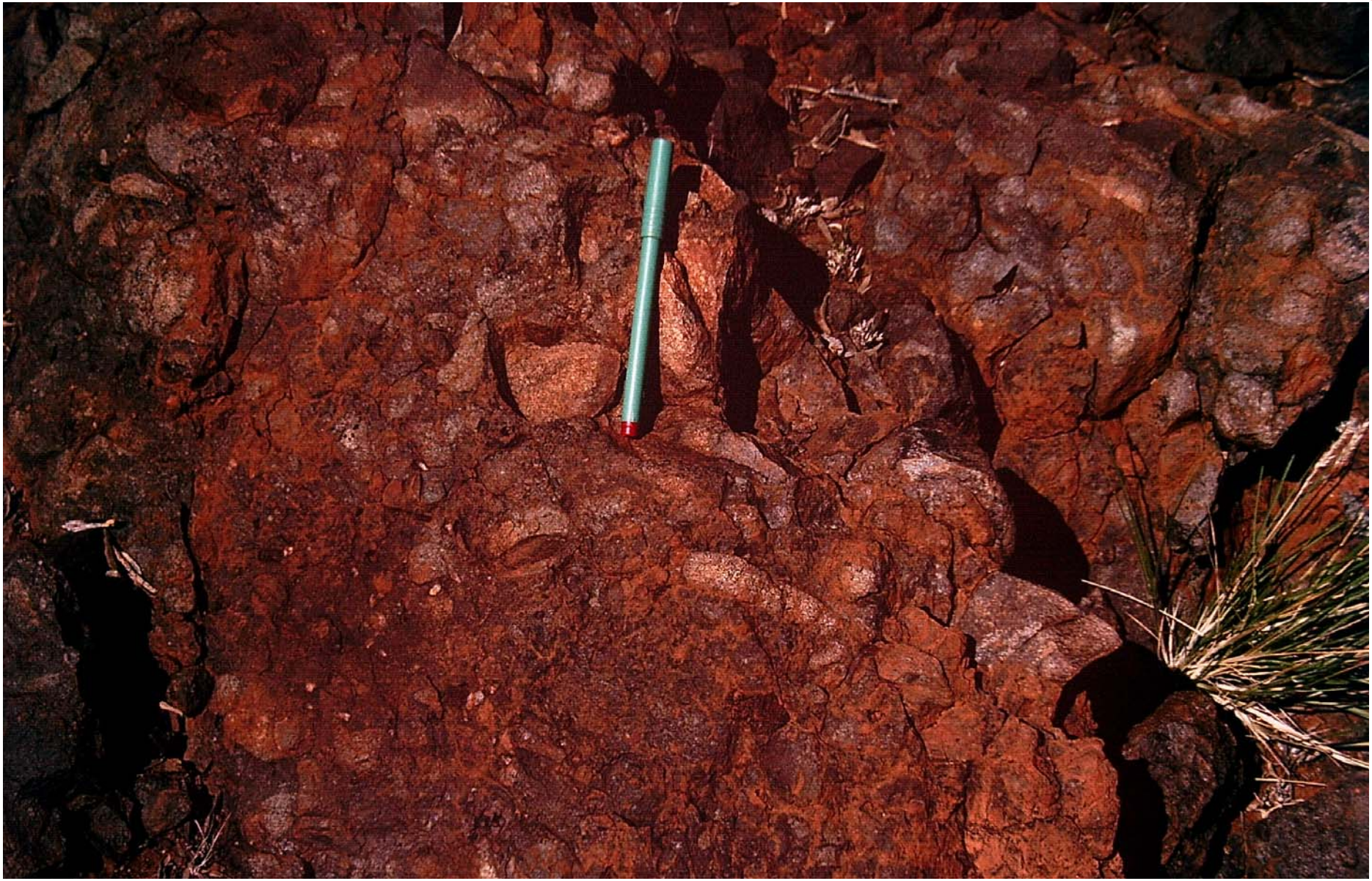
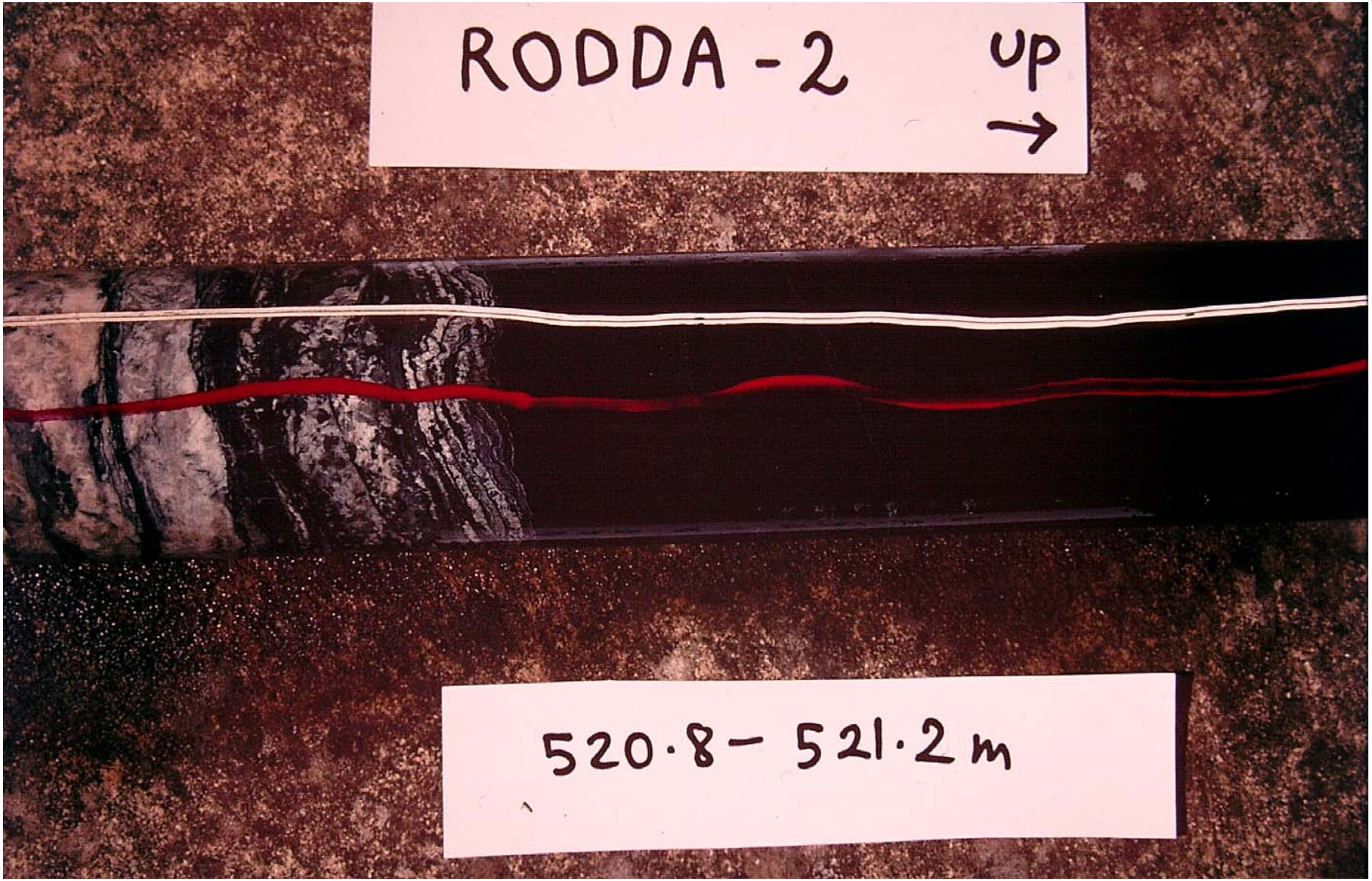


Basalt-pebble conglomerate above Wantapella Volcanics

Slump-folded limestone clast, Rodda beds type section



Rodda beds – calcareous siltstone

Cambrian Trainor Hill Sandstone, Mt Byilkaoora

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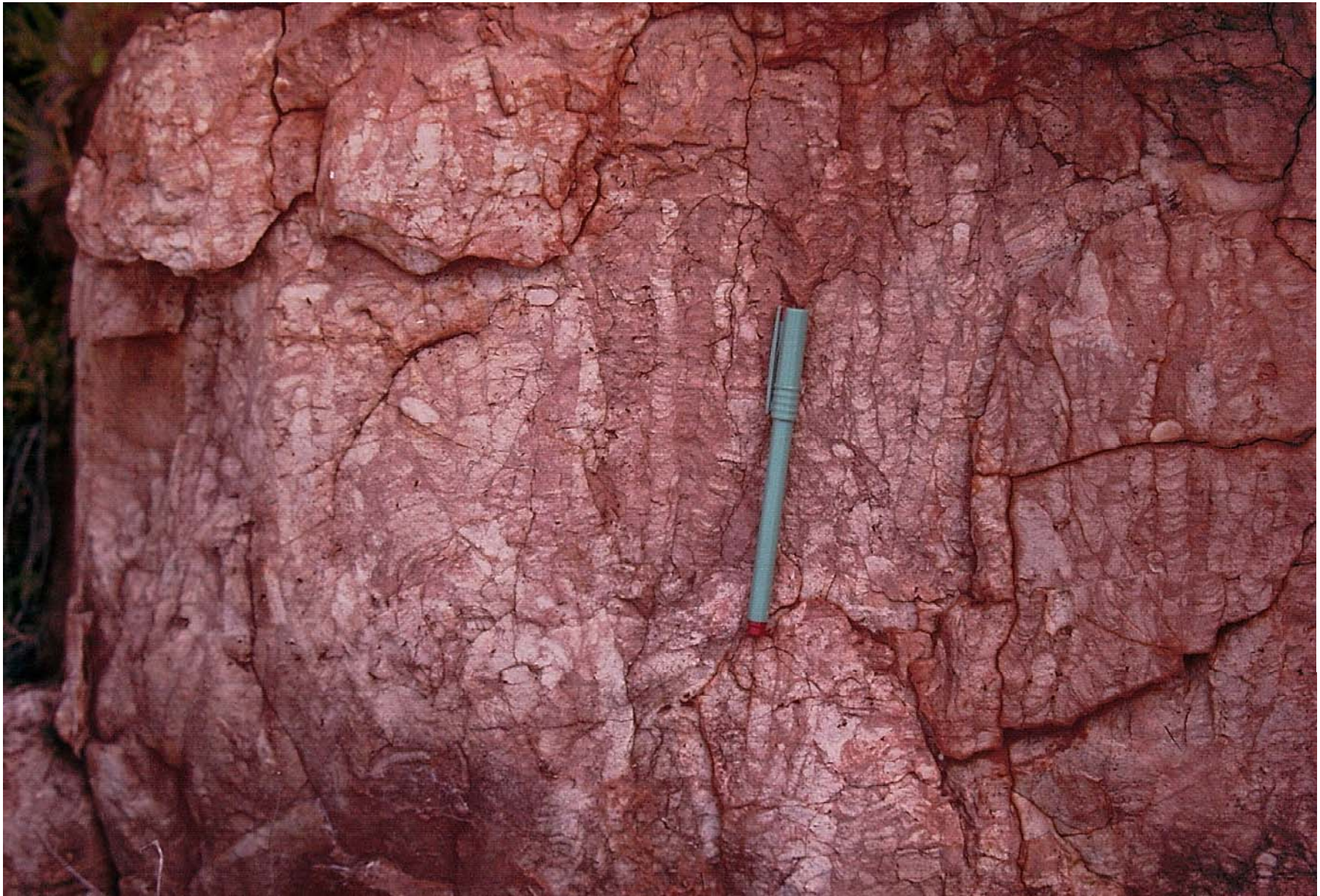
Mt Chandler Sandstone unconformable over dipping ?Emeroo Subgroup quarztite

Cross-bedded Mt Chandler Sandstone



Scolithus burrows in Mount Chandler Sandstone

Cross-bedded sandstone, Mintabie beds - Ordovician or Devonian?

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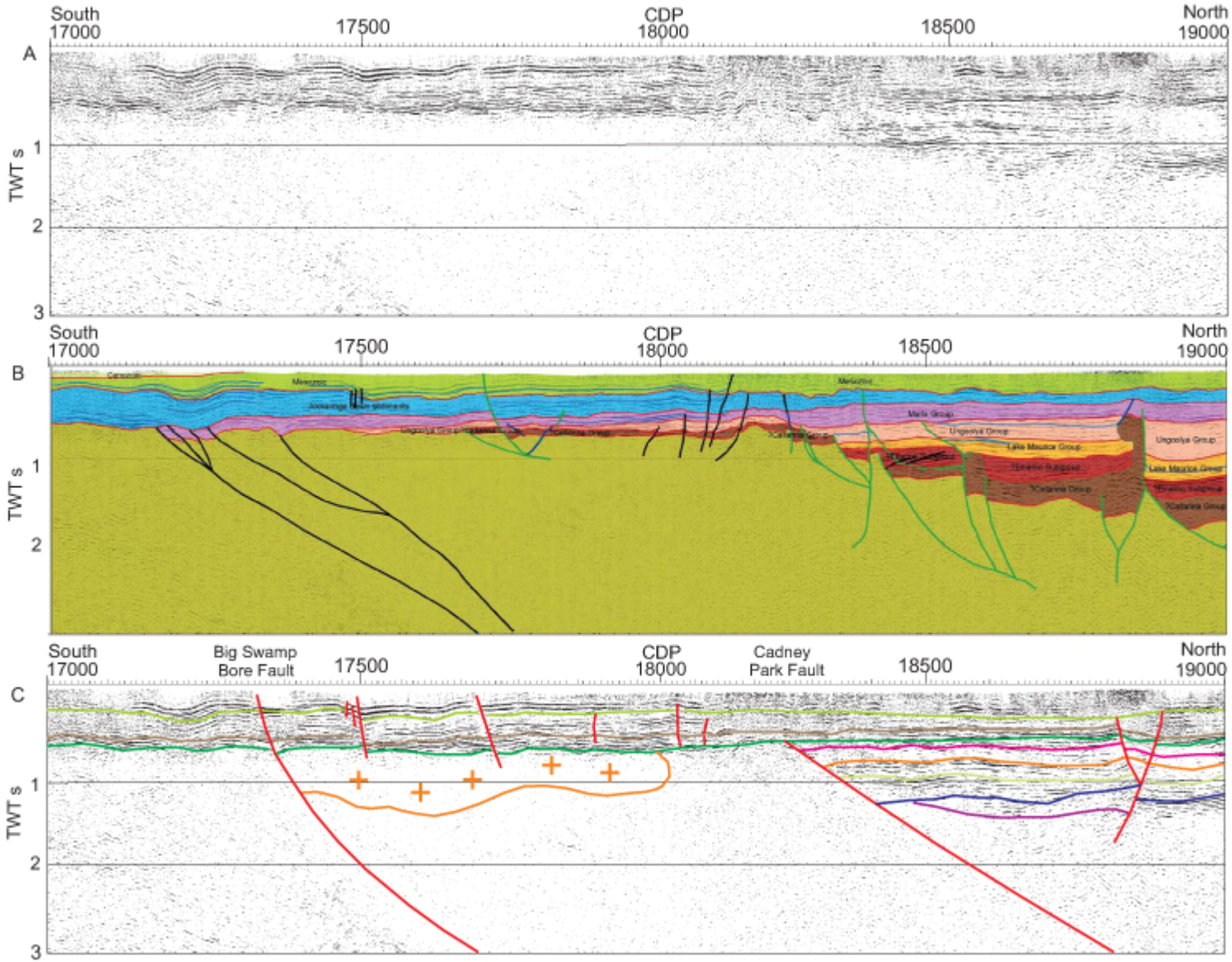

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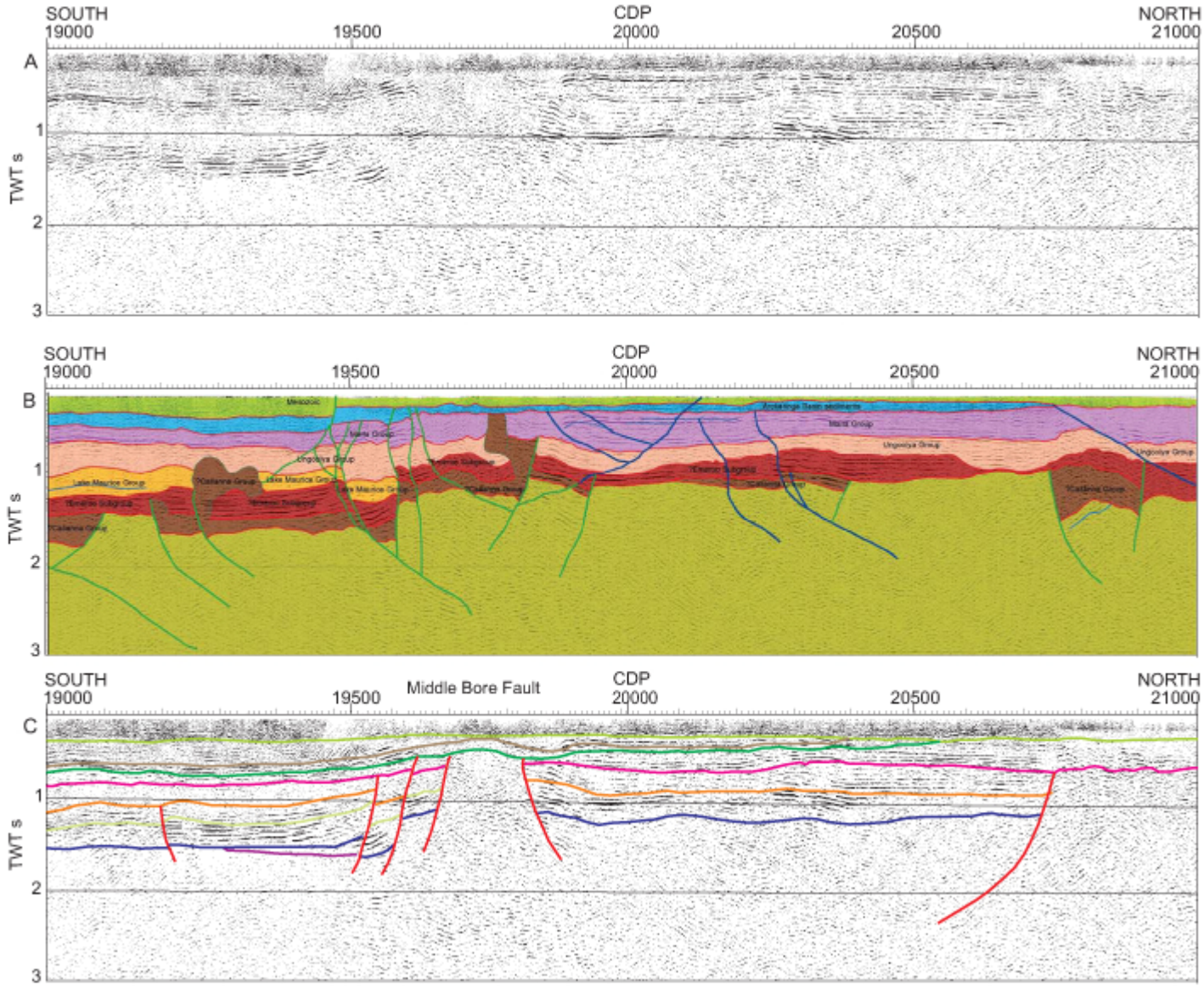

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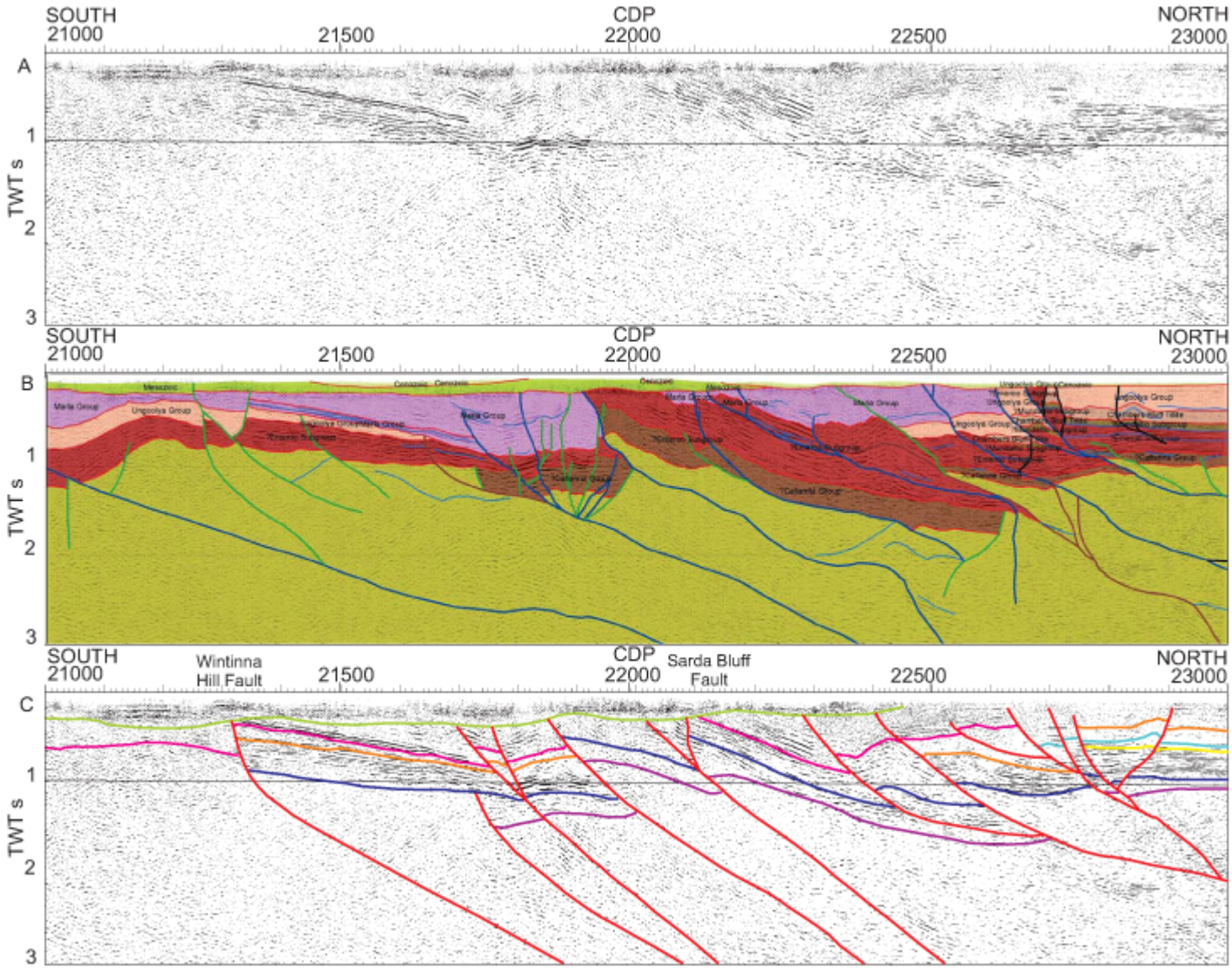

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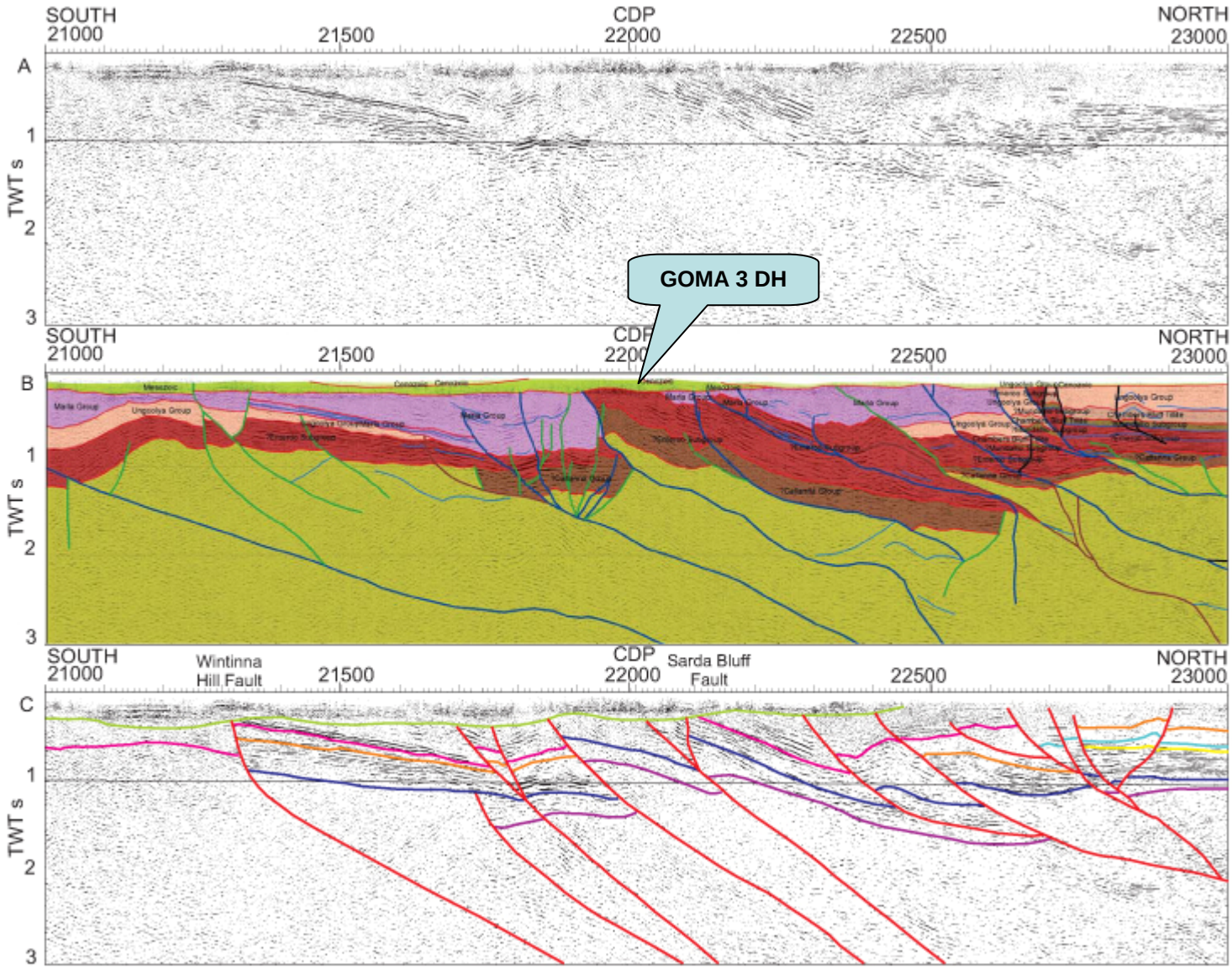

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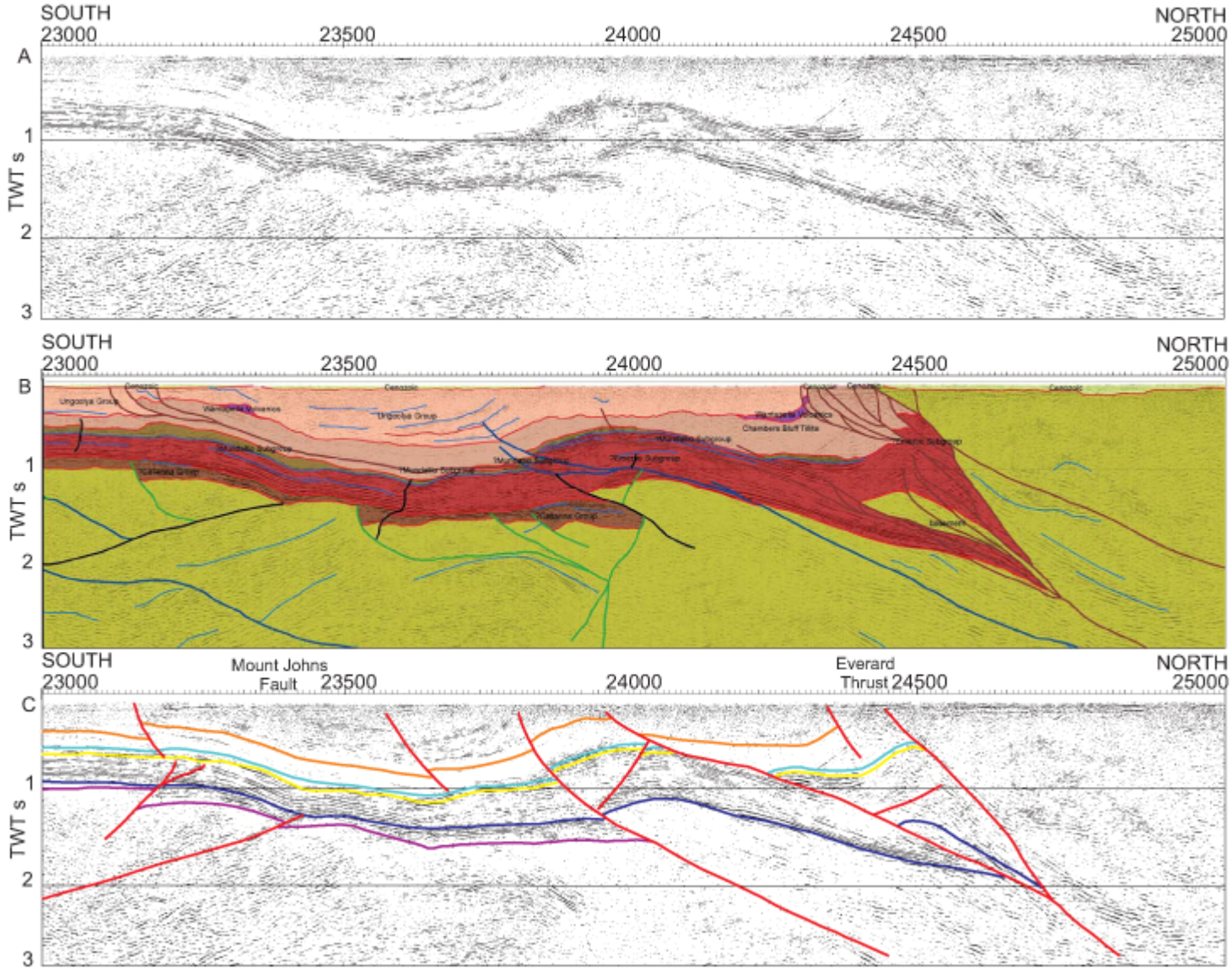

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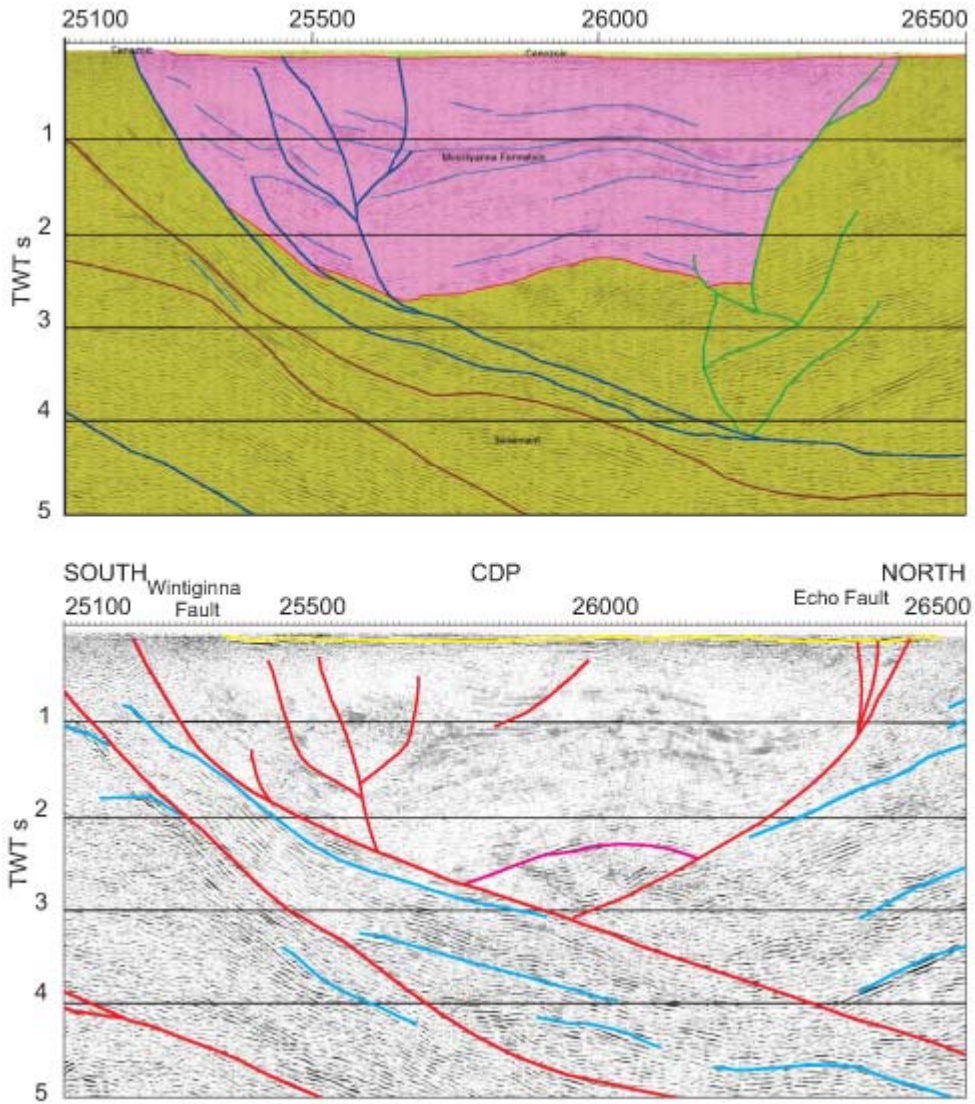

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Sedimentary and Tectonic History of the Officer Basin

Sedimentary and Tectonic History of the Officer Basin

- Rifting of northeast Gawler Craton in Willouran time (~830-800 Ma)

Mafic volcanism in Manya 5 area, possibly more widespread (Arkaroola Subgroup equivalent)

Deposition of evaporitic Alinya Formation (?Curdimurka Subgroup equivalent)

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Deposition of deltaic to shallow marine clean sands and silts (Emeroo and Mundallio Subgroups equivalents) along eastern margin of Officer Basin

- Sturt glaciation (~660 Ma)

Deposition of Chambers Bluff Tillite and equivalents along northern margin of Officer Basin in Sturtian time

Associated fluvioglacial outwash sands

Sedimentary and Tectonic History of the Officer Basin

- Long hiatus in deposition in late Sturtian to early Marinoan time (~650-600 Ma) (equivalent to deposition of Umberatana Group)

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Widespread deposition of Lake Maurice Group – an extension of the lower Wilpena Group of the Adelaide Geosyncline and Stuart Shelf

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• Initiation of intraplate Petermann Orogeny, thrusting Musgrave Province
•basement southward (Everard Thrust) in late Ediacaran time (~570-540 Ma)

• Initiation of a foreland basin, depressing the crust in front of the thrust
Deposition of Ungoolya Group (equivalent to upper Wilpena Group in Adelaide Geosyncline), thickening northward toward the Everard Thrust; deep-water sedimentation, slumping and proximal coarse clastics derived from uplifted basement

Sedimentary and Tectonic History of the Officer Basin

- Erosion of Musgrave Province and parts of the Officer Basin in latest Ediacaran to earliest Cambrian time

Early Cambrian unconformity across whole of Australia

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Deposition of 8 km of upward fining conglomerate, sandstone, siltstone

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• Hiatus in deposition; minor erosion – mid to late Cambrian (?far field effects of Delamerian Orogeny)

Sedimentary and Tectonic History of the Officer Basin

• Marine transgression – Larapinta Seaway
Deposition of Munda Group – shallow water sandstone, shale

• Onset of second intraplate orogeny – Alice Springs Orogeny ~450-350 Ma
Renewed south-vergent thrusting; thrusts dip under Musgrave Province

Devonian Mimili Formation deposited in foreland basin