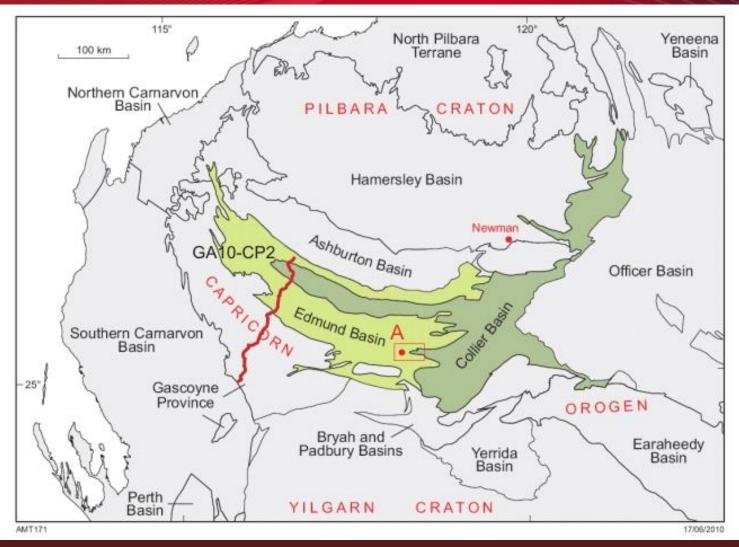
Geology of the Edmund and Collier Groups

HN Cutten, AM Thorne, SP Johnson

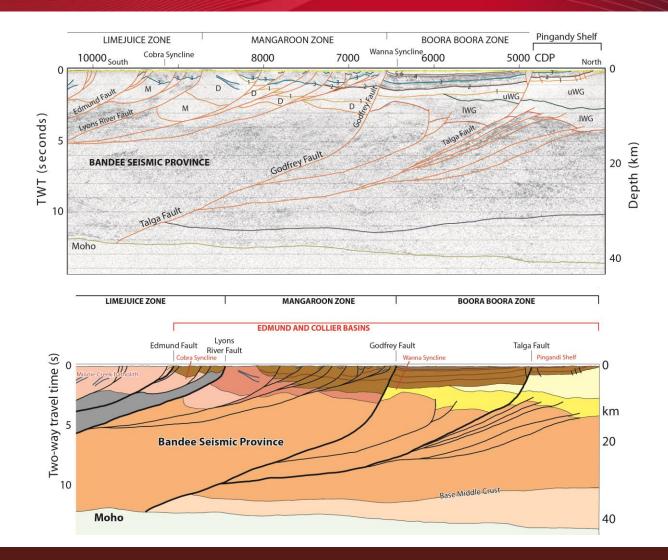
Edmund and Collier Basins





GA10-CP2





Stratigraphy of the Edmund & Collier Basins



Kulkatharra Dolerite c. 1070 Ma

Narimbunna Dolerite c. 1465 Ma Volcaniclastics c. 1465 Ma

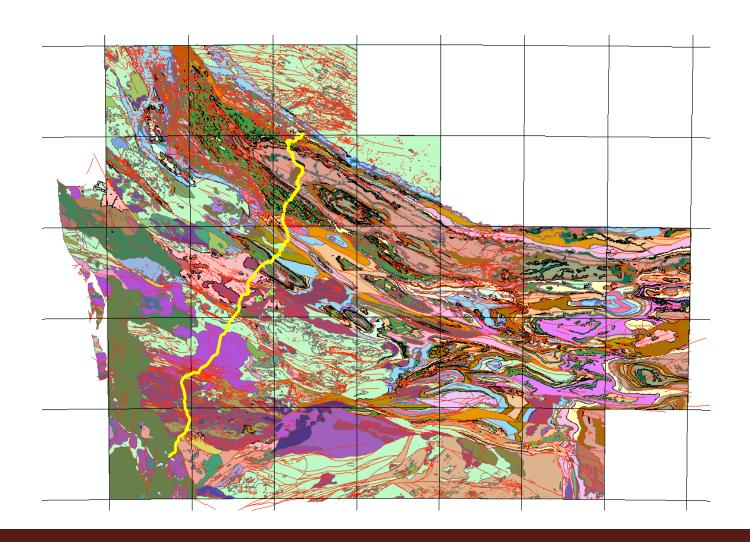
Durlacher Supersuite 1620 Ma



	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	llgarari Fm	6		
	Calyie Fm	#i	COLLIER	
	Backdoor Fm	5	GROUP	Bangemall
-/	Coodardoo Fm			ᆲ
	Ullawarra Fm	4		all
	Devil Creek Fm	i i		
	Discovery Fm			
rotornárou sámo tra	Muntharra Fm	3		S
	Kiangi Creek Fm	3	EDMUND	ᇢ
	Cheyne Springs Fm		-"	Supergroup
<u> </u>	Blue Billy Fm	2	GROUP	[일]
	Gooragoora Fm		· GROOP	р
	Irregully Fm	1		
Service Control	Yilgatherra Fm			
Palaeoprotero Basement				

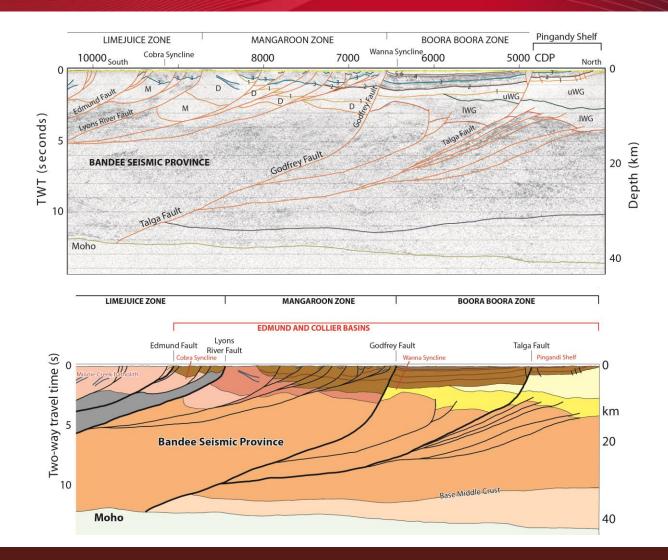
Folding and faulting





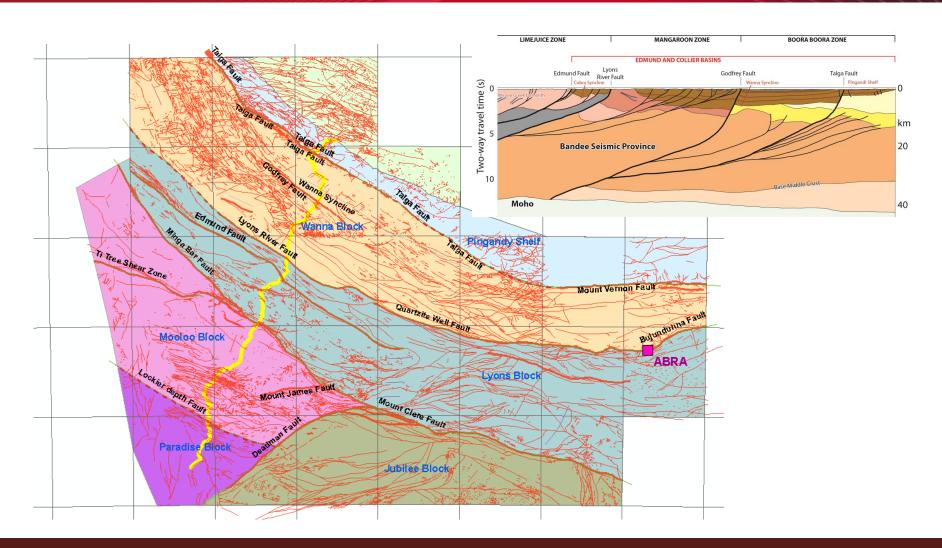
GA10-CP2





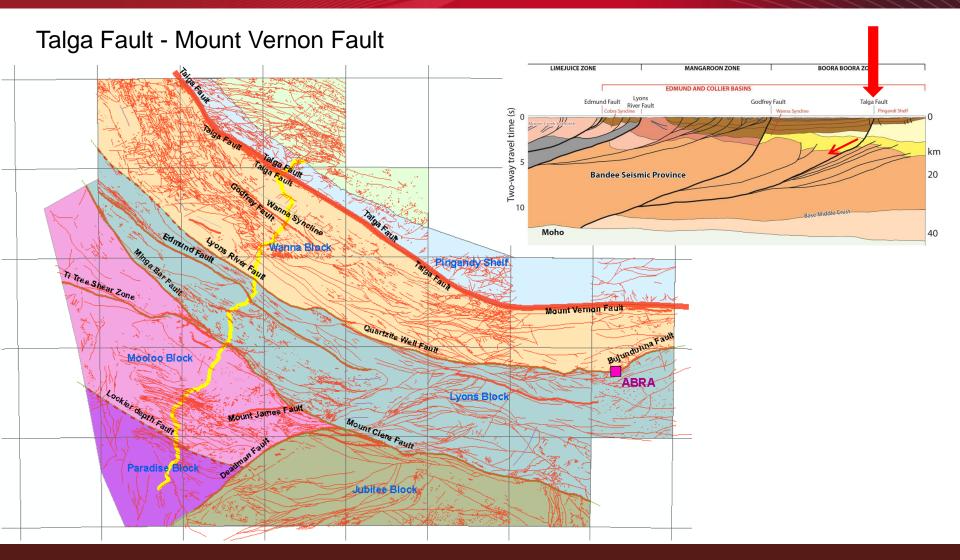
Fault blocks





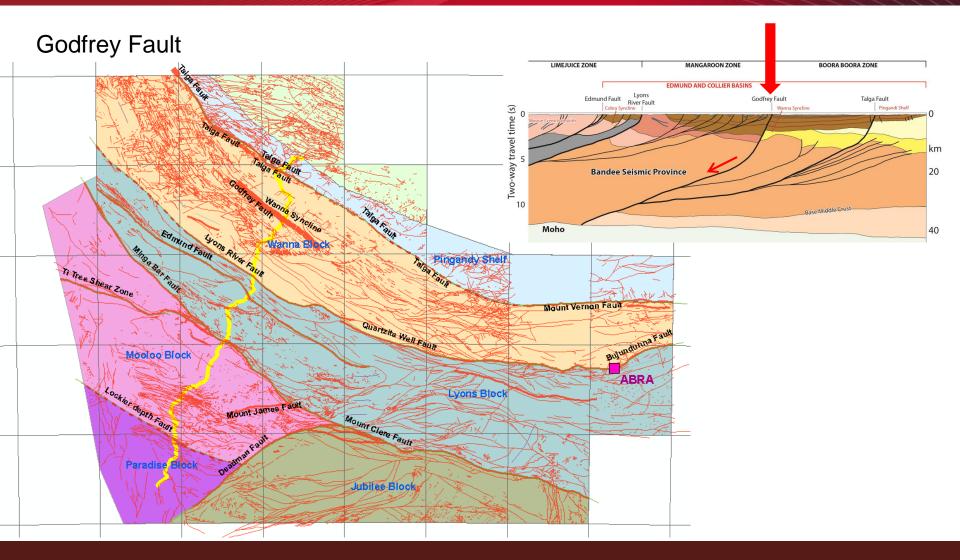
Major Faults





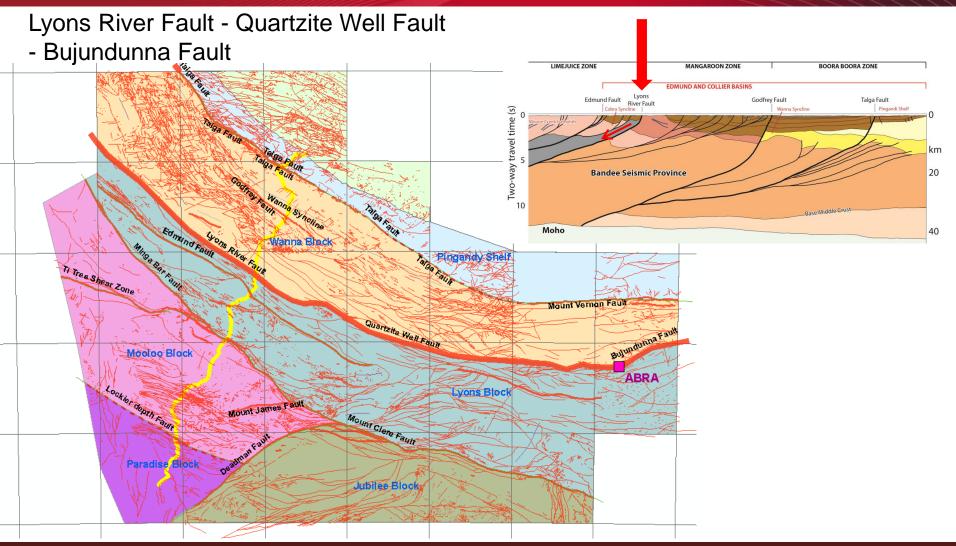
Major Faults





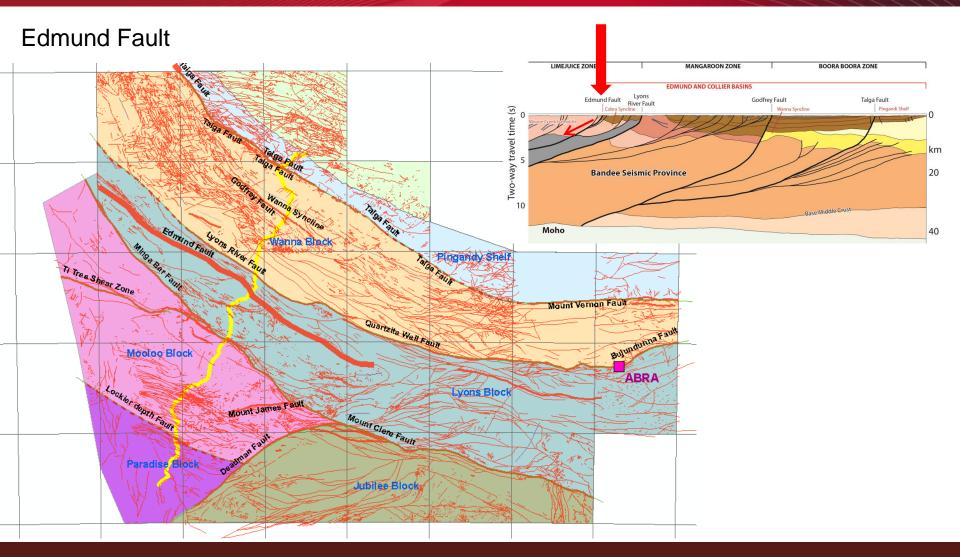
Major faults





Major Faults

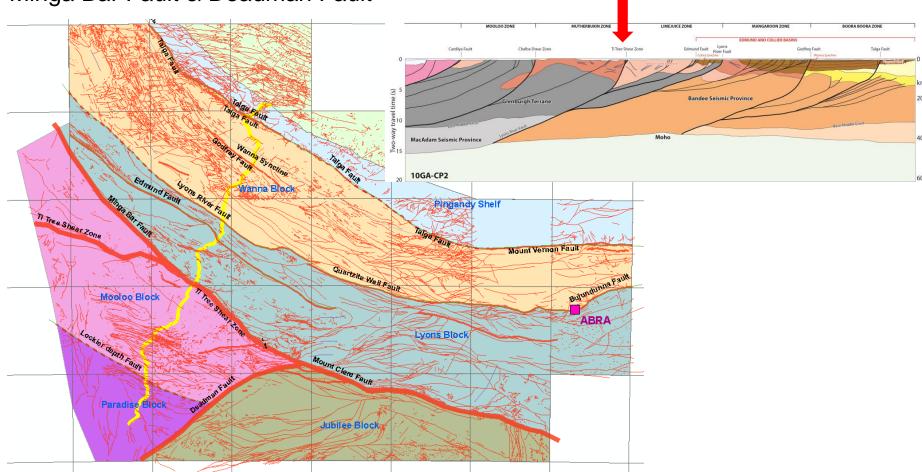




Major faults



Ti Tree Shear Zone – Mount Clere Fault Minga Bar Fault & Deadman Fault



Package 1:



	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	Ilgarari Fm	6		
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
-/ 4888000000	Coodardoo Fm			1 3
	Ullawarra Fm	4		all
1,1,1,1,1	Devil Creek Fm			
	Discovery Fm			
oneso co con con con con con con con con con	Muntharra Fm	3		SL
ANGRASIE (MARIA)	Kiangi Creek Fm	3	EDMUND	듛
F1,17	Cheyne Springs Fm			ğ
	Blue Billy Fm	2	GROUP	Supergroup
h , ,	Gooragoora Fm	_		
	Irregully Fm	1		
on the state of the state of	Yilgatherra Fm			
Palaeoprotero				_
Basement	2010	•		

Yilgatherra Formation

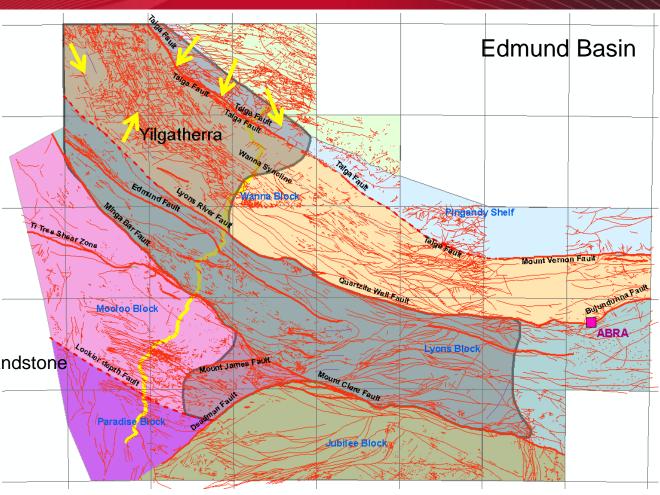
Pingandy Self

30 m fluvial to shallow marine sandstone fluvial to peritidal environment

Basin

350 m basal conglomerate quartz sandstone & siltstone

fluvial to shallow-marine environment



Package 1:



E	garari Fm Calyie Fm Backdoor Fm Coodardoo Fm	5	COLLIER	Bangemall
F (Backdoor Fm			Bangemall
⇒ C	Coodardoo Fm		GROUP	Bangemall
u u				emall
	Illawarra Fm			a
		4		
, , , , , , , , , , , , , , , ,	evil Creek Fm			
	iscovery Fm			
A CONTRACTOR OF THE PARTY OF TH	Muntharra Fm	3		S
P	(iangi Creek Fm	3	EDMUND	be
17/1/ C	heyne Springs Fm			Supergroup
, E	Blue Billy Fm	2	anoun.	2
	Gooragoora Fm		GROUP	ᅙ
	rregully Fm	—		
1	'ilgatherra Fm			
Palaeoproterozoic Basement	-			

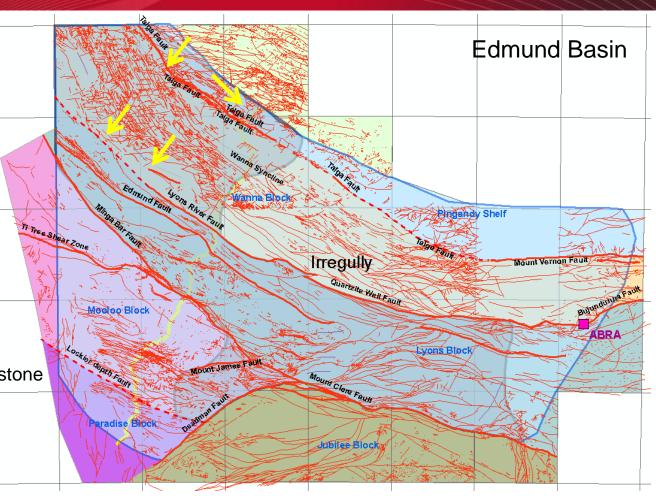
Irregully Formation

Pingandy Self

350 m basal conglomerate and sandstone and stromatolitic dolostone Peritidal carbonate platform

<u>Basin</u>

3 km slope breccias, dolomitic sandstone & siltstone Fulvial to subtidal environment





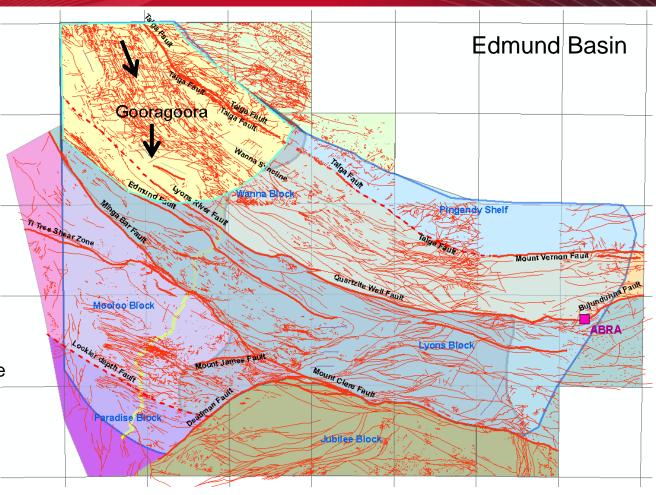
	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	llgarari Fm	6		
	Calyie Fm		COLLIER	
1	Backdoor Fm	5	GROUP	Bangemal
	Coodardoo Fm			m
	Ullawarra Fm	4		ıall
1,1,1,1,1	Devil Creek Fm			
	Discovery Fm			
iocerana ana ana an	Muntharra Fm	3		S
001001000000000000000000000000000000000	Kiangi Creek Fm	3	EDMUND	pe
6111	Cheyne Springs Fm	4		Supergroup
/	Blue Billy Fm	2	GROUP	OC.
	Gooragoora Fm		GROUP	ē
	Irregully Fm	1		
DESCRIPTION OF THE PERSON OF T	Yilgatherra Fm			
Palaeoprotero Basement				

Gooragoora Formation

Prograding delta

Fine to coarse -grained sandstone and some interbedded carbonate.

10m on Pingandy Shelf
150m south of Talga Fault



Package 2:



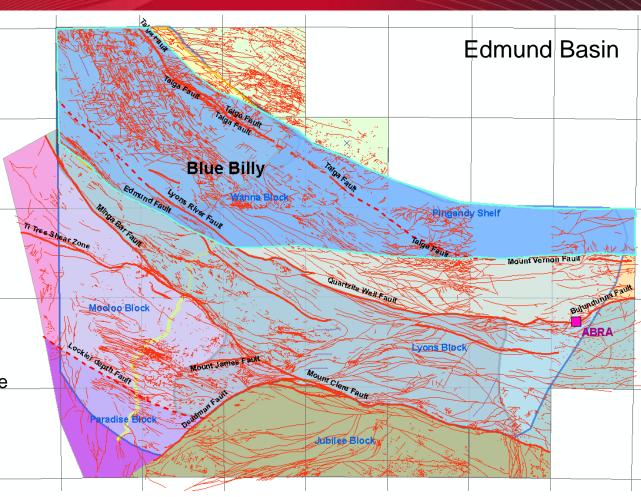
	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	Ilgarari Fm	6		
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
	Coodardoo Fm			3
	Ullawarra Fm	4		all
1,1,1,1,1	Devil Creek Fm			
	Discovery Fm			
DESCRIPTION OF DESCRIPTION OF THE PROPERTY OF	Muntharra Fm	3		Su
000000000000000000000000000000000000000	Kiangi Creek Fm	3	EDMUND	듛
6111	Cheyne Springs Fm			Supergroup
<i> </i>	Blue Billy Fm			2
<i>f</i>	Gooragoora Fm		GROUP	Þ
	Irregully Fm	1		
TOTAL BOOK STATE OF	Yilgatherra Fm			
Palaeoprotero				_
Basement				

Blue Billy Formation

Rise in sea level

30-500 m of pyritic carbonaceous siltstone and turbidite sandstone

Deep-water anoxic shelf environment





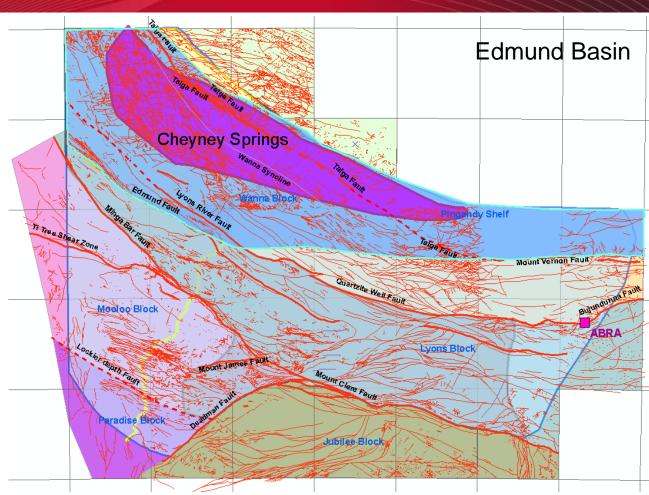
	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	Ilgarari Fm	6		
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
AND THE RESERVE	Coodardoo Fm			e a
	Ullawarra Fm	4		all
1,1,1,1,1	Devil Creek Fm			
	Discovery Fm			
nonunuannon	Muntharra Fm	4 3		uS
000000000000000000000000000000000000000	Kiangi Creek Fm	,	EDMUND	pe
6111	Cheyne Springs Fm			Supergroup
/	Blue Billy Fm	2	GROUP	2
<i></i>	Gooragoora Fm		GROUP	Þ
	Irregully Fm	1		
DEREST OF THE PARTY OF	Yilgatherra Fm			
Palaeoprotero				
Basement				

Cheyne Springs Formation

Basin infill

50-300 m of dolomitic siltstone and quartz sandstone

Distal sub-tidal carbonate shelf environment





	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	Ilgarari Fm	6		
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
	Coodardoo Fm			a l
	Ullawarra Fm	4		ıall
1,1,1,1	Devil Creek Fm			
	Discovery Fm			
HOLD DO	Muntharra Fm			SL
100000000000000000000000000000000000000	Kiangi Creek Fm		EDMUND	ಠ
61,11	Cheyne Springs Fm			Supergroup
F	Blue Billy Fm	` 2		0
1	Gooragoora Fm		GROUP	늉
	Irregully Fm	1		
STATE OF THE PARTY	Yilgatherra Fm			
Palaeoprotero				
Basement				

Kiangi Creek Formation

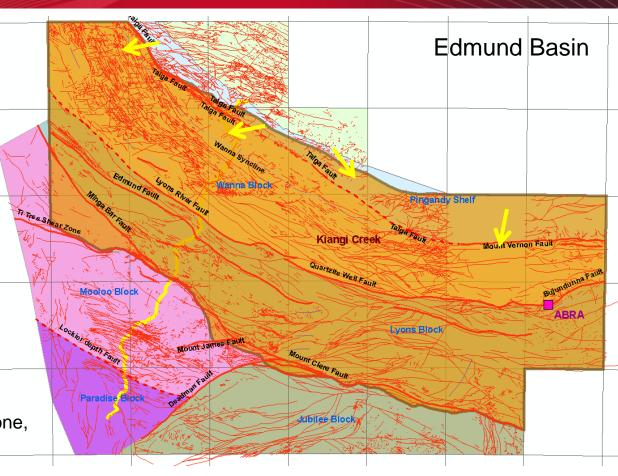
• 50 m to 2.6 km

Eastern region

- Upper: fan delta environment sandstone and siltstone
- Erosional marine flooding surface
- Lower: alluvial fan environment congomerate and coarse sandstone,

Western region

- Deep shelf environment
- siltstone, turbiditic sandstone, mass flow quartz sandstone, carbonaceous siltstone



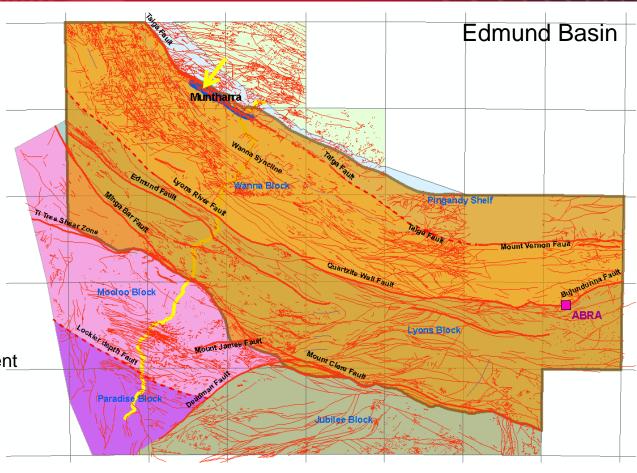


	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	Ilgarari Fm	6		
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
	Coodardoo Fm			a l
	Ullawarra Fm	4		ıall
1,1,1,1,1	Devil Creek Fm			
	Discovery Fm	4		
ACCOMPANION OF THE PARTY.	Muntharra Fm			S
9012888889189299	Kiangi Creek Fm		EDMUND	호
64	Cheyne Springs Fm			Supergroup
1	Blue Billy Fm	2		0
	Gooragoora Fm	_	GROUP	ե
	Irregully Fm	1		
DELL'ADORE (SERVICE)	Yilgatherra Fm			
Palaeoprotero				
Basement				

Muntharra Formation

Pingandy Shelf

- 30-50 m of dolostone
- Shelf edge carbonate environment





	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	Ilgarari Fm	6		
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
	Coodardoo Fm			1 3
	Ullawarra Fm	. 4		all
1,1,1,1,1	Devil Creek Fm			
	Discovery Fm			
IOCENIDIOS OF INCH	Muntharra Fm	3		S
10000861160000	Kiangi Creek Fm	. 3	EDMUND	듛
6777	Cheyne Springs Fm			Supergroup
f=====================================	Blue Billy Fm	2		0
1 7 7 7	Gooragoora Fm		GROUP	15
	Irregully Fm	1		
DELL'AND DE	Yilgatherra Fm			
Palaeoprotero				_
Basement				

Package 4

Ongoing movement on Talga Fault

Downdrop of Wanna and Lyons Blocks

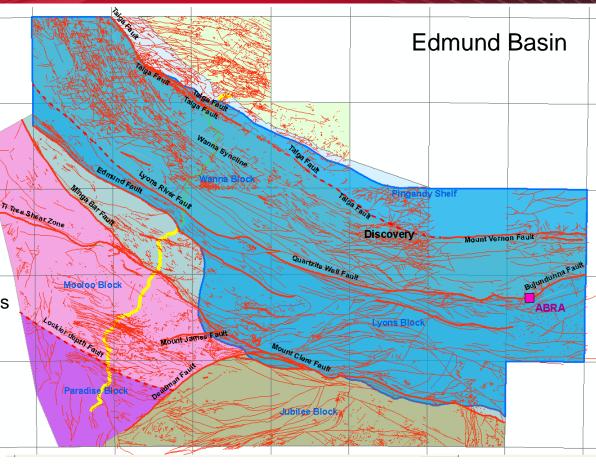
Discovery Formation

Regional marker unit

 50-365 m of silicified, pyritic siltstone and black chert

 anoxic environment below storm wave base

• deposited following a marine transgression

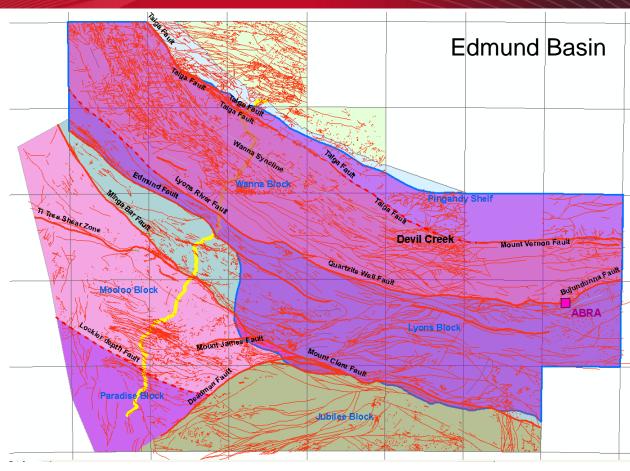




	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	llgarari Fm	6		
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
	Coodardoo Fm			3
	Ullawarra Fm	4		all
1,1,1,1,1	Devil Creek Fm			
	Discovery Fm			
iocerana ana ana an	Muntharra Fm	3		Su
000000000000000000000000000000000000000	Kiangi Creek Fm	3	EDMUND	듛
67/1/	Cheyne Springs Fm			Supergroup
	Blue Billy Fm	2		2
F-7-7-7	Gooragoora Fm		GROUP	Þ
	Irregully Fm	1		
DELL'AND DE	Yilgatherra Fm			
Palaeoprotero Basement				_

Devil Creek Formation

- 80-450 m dolograinstone and dolomudstone
- Sub-tidal slope to basinal environment

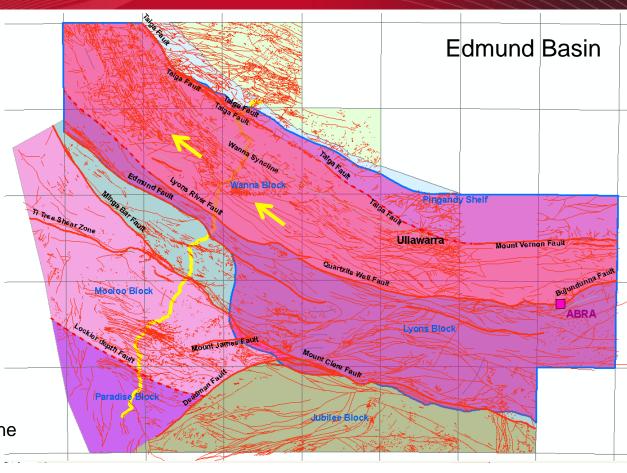




	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	Ilgarari Fm	6		
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
ASSESSION	Coodardoo Fm			31
	Ullawarra Fm			all
, , , , , , , , , , , ,	Devil Creek Fm	•		
	Discovery Fm			ا ا
ionniono amonni	Muntharra Fm	3		l S l
2003030000000000	Kiangi Creek Fm	3	EDMUND	ᄝ
61,11	Cheyne Springs Fm			Supergroup
<i> </i>	_ Blue Billy Fm	2		일
	Gooragoora Fm		GROUP	히
	Irregully Fm	1		
DESCRIPTION OF THE PERSON	Yilgatherra Fm			
Palaeoprotero				
Basement				
	_			

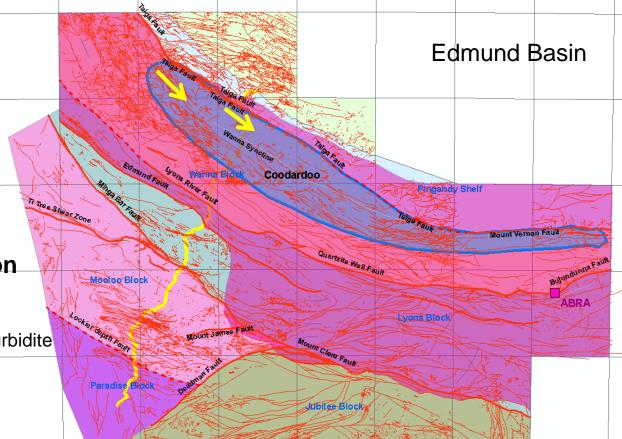
Ullawarra Formation

- 100 600 m of laminated siltstone mudstone and sandstone
- Sub-tidal slope to basinal environment
- Volcaniclastics dated c. 1465 Ma
- Curran Member, turbiditic sandstone and parallel-planar siltstone





	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	Ilgarari Fm	6		
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
	Coodardoo Fm			3
	Ullawarra Fm	4		all
1111111	Devil Creek Fm			
	Discovery Fm			
HONEN CHOCKER CONTRACT	Muntharra Fm	3		SL
ACCEPTAGE PRACTICAL	Kiangi Creek Fm	3	EDMUND	be
677	Cheyne Springs Fm			Supergroup
<i> </i>	Blue Billy Fm	2		ro
F	Gooragoora Fm		GROUP	ㅎ
	Irregully Fm	1		
- Constant of the last	Yilgatherra Fm			
Palaeoprotero				
Basement				



Coodardoo Formation

 ~ 200 m of thick-bedded turbidite and mass flow sandstone.

 Sub-tidal slope to basinal environment

Hiatus: 1465 Ma – ?



	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	llgarari Fm	6		
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
	Coodardoo Fm			em
	Ullawarra Fm	4		all
1111111	Devil Creek Fm			
	Discovery Fm			Track to
	Muntharra Fm	3		Su
	Kiangi Creek Fm	3	EDMUND	pe
(1)	Cheyne Springs Fm			g
	Blue Billy Fm	2		Supergroup
7 7 7	Gooragoora Fm		GROUP	b
	Irregully Fm	1		
Service (Yilgatherra Fm			
Palaeoprotero				_
Basement				

395 m.y.?

Mutherbukin Tectonic Event

- c.1465 Ma Top Edmund Group
- Ullawarra volcaniclastics
- Narimbunna Dolerite
- c. 1070 Ma Top Collier Group
- Kulkatharra dolerite
- Peperite texture (Backdoor Fm)





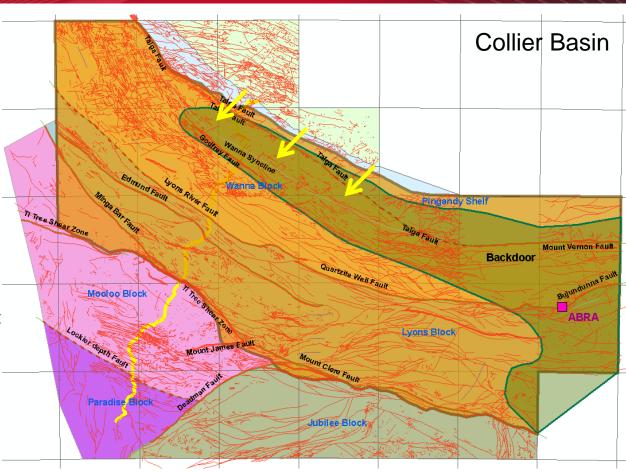
	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	Ilgarari Fm	6		
	Calvie Fm		COLLIER	
	Backdoor Fm	—	GROUP	Bangemal
/ ///////////////////////////////////	Coodardoo Fm	4		1 3
	Ullawarra Fm			all
1111111	Devil Creek Fm			
	Discovery Fm			
HONENO/CORONNONIO	Muntharra Fm	3		Su
200000000000000000000000000000000000000	Kiangi Creek Fm		GROUP	Supergroup
6777	Cheyne Springs Fm			
<i> </i>	Blue Billy Fm			
f	Gooragoora Fm			
	Irregully Fm	1		
OTHER DESIGNATION OF THE PERSON OF THE PERSO	Yilgatherra Fm			
Palaeoprotero Basement				

Package 5

- Narrowing of basin in the west
- Widening of the basin in the east

Backdoor Formation

- ~ 1500 m of laminated siltstone sandstone and dolomudstone
- Coarsening upward succession
- · Increase in sandstone
- Marginal delta-front environment
- Sediment supply from the NE.

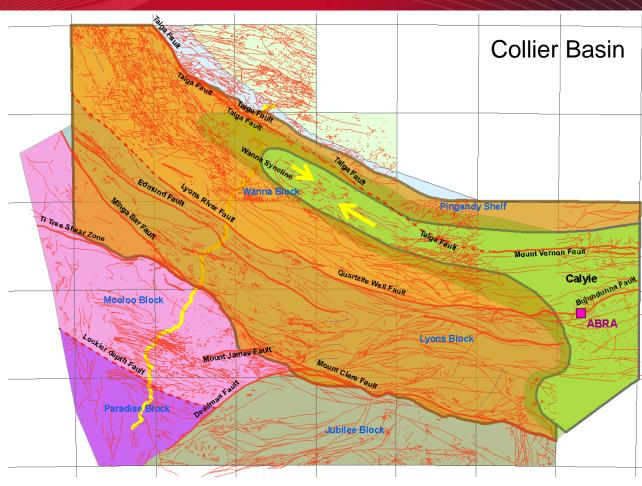




	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	Ilgarari Fm	6		
	Calyie Fm	[COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
/ 1888	Coodardoo Fm	4		8
	Ullawarra Fm			all
,1',1',1',1	Devil Creek Fm			
	Discovery Fm			
onevocacenone.	Muntharra Fm	2	EDMUND GROUP	Supergroup
anasanan maan	Kiangi Creek Fm			
6111	Cheyne Springs Fm			
/	Blue Billy Fm			
	Gooragoora Fm			
	Irregully Fm	1		
OTHER DESIGNATION OF THE PERSON OF THE PERSO	Yilgatherra Fm			
Palaeoprotero	ozoic			
Basement				

Calyie Formation

- ~ 200 m sandstone and siltstone
- Delta-top to delta-front environment
- Sediment supply along the basin axis





	FORMATION	DEPOSITIONAL PACKAGE	GROUP	
	llgarari Fm			
	Calyie Fm		COLLIER	
	Backdoor Fm	5	GROUP	Bangemal
	Coodardoo Fm			ä
	Ullawarra Fm	4		a
,,,,,,,,	Devil Creek Fm			
	Discovery Fm			
iosanasanasa	Muntharra Fm	2		nS
000000000000000000000000000000000000000	Kiangi Creek Fm		EDMUND	90
644	Cheyne Springs Fm		i i	Supergroup
/	Blue Billy Fm		GROUP	
<i></i>	Gooragoora Fm		GROUP	ō
	Irregully Fm	1		
DESCRIPTION OF THE PERSONS ASSESSMENT	Yilgatherra Fm			
Palaeoprotero				
Basement				

Package 6

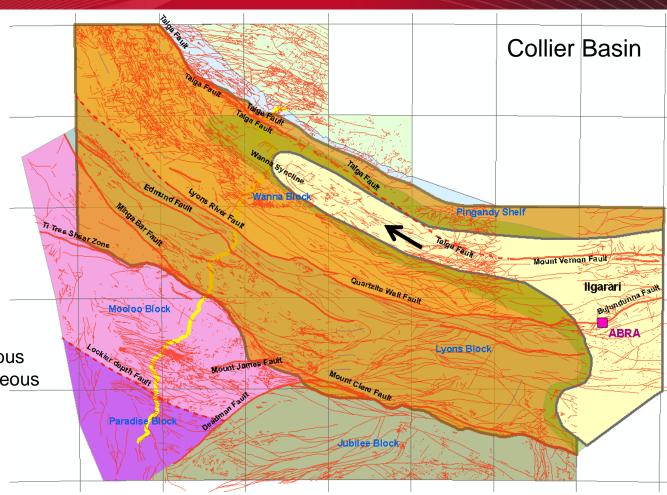
Marine transgression

Ilgarari Formation

- 700 m pyritic and carbonaceous siltstone, sandstone, calcareous siltstone and chert
- · Marine shelf environment
- · Sediment supply from SE

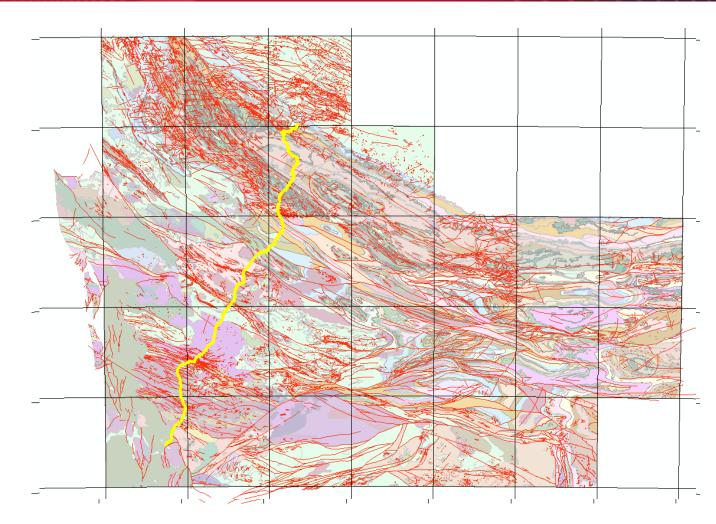
Kulkatharra Dolerite

• c. 1070 Ma



Deformation events





Fault offset



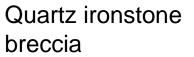


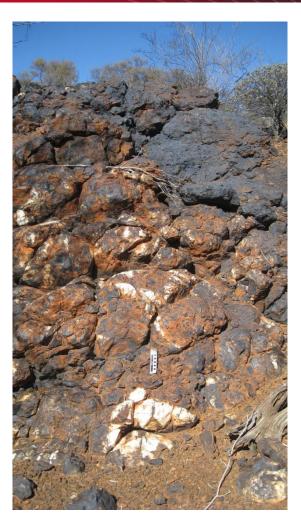
Deformation





Slickensides





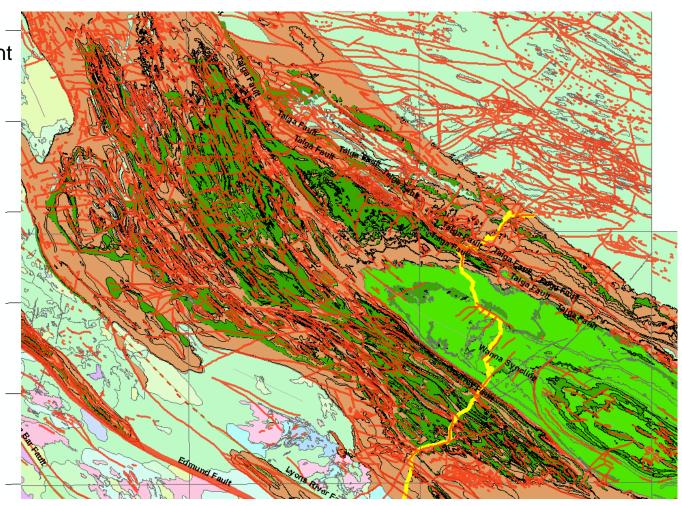
Deformation events



Mutherbukin Tectonic Event (1385–1200 Ma)

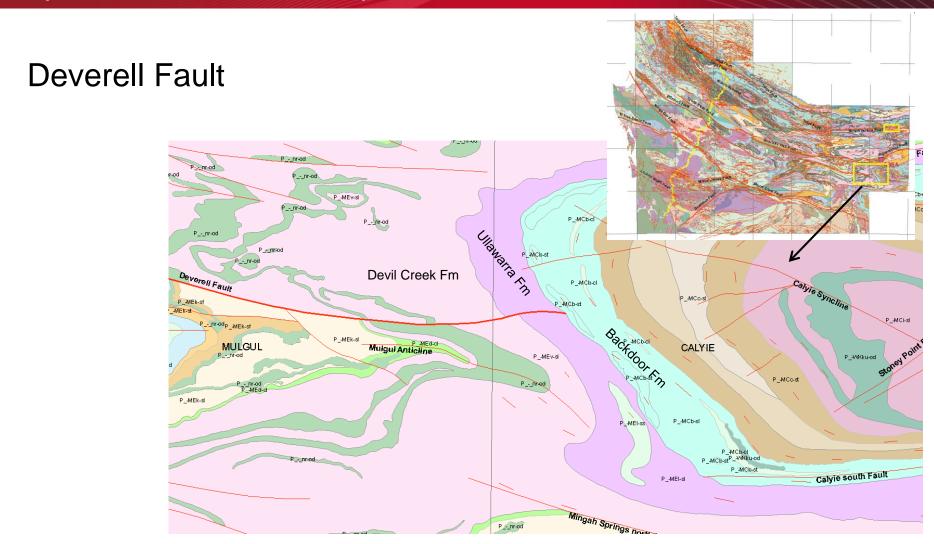
Edmundian Orogeny (1030–955 Ma)

Mulka Tectonic Event (c. 570 Ma)



Mutherbukin Tectonic Event (1385-1200 Ma)



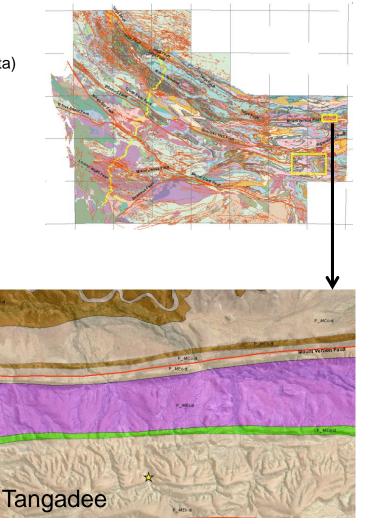


Mutherbukin Tectonic Event (1385-1200 Ma)



Unnamed fault: K-Ar 1171 ± 25 Ma (GSWA unpublished data)





Mutherbukin Tectonic Event (1385-1200 Ma)



Hydrothermal monazite and xenotime (1385–1300 Ma)(Rasmussen et al., 2010)

Pyrite – Re/Os (c. 1265 Ma)(GSWA, unpublished data)

Edmundian Orogeny (1030-955 Ma)

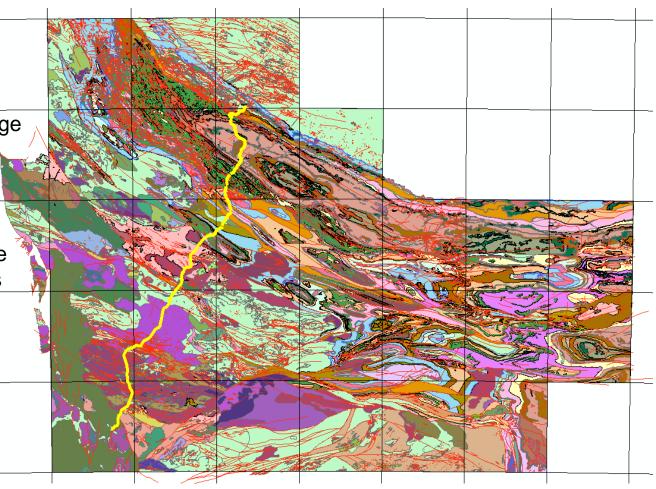


D_{1e}

- Reverse faulting and transpressive folding.
- Local axial planar cleavage
- NE-SW compression

D_{2e}

 Curvilinear bending of the axial traces of F1e folds



Mulka Tectonic Event (c. 570 Ma)

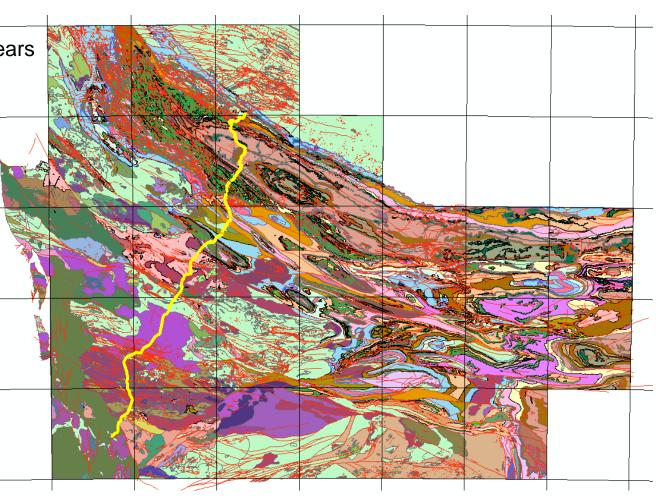


Brittle-ductile faults and shears

Dextral strike-slip shear indicators.

Dextral offset of c. 755 Ma
 Mundine Well dolerite ___
 dykes

 Dated c. 570 Ma from ⁴⁰Ar/³⁹Ar muscovite in a dextral shear zone

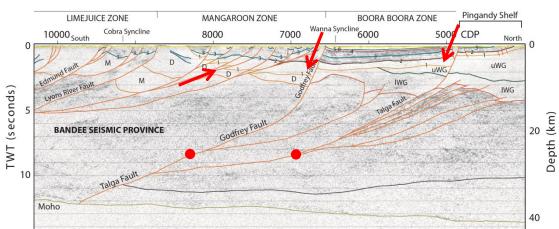


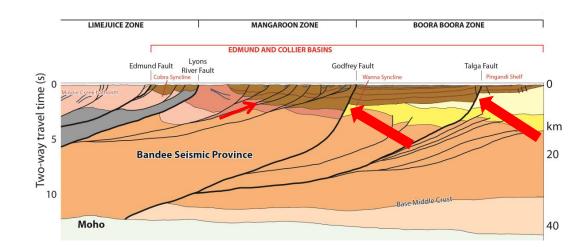
GA10-CP2:

CONCLUSION



- Listric normal faults facilitated deposition
- Reactivated basement structures
- Depth and thickness of depositional packages
- Edmund and Collier Basins a series of half-grabens
- Basin inversion by reverse transpression





Edmund and Collier Basins



