



Government of Western Australia
Department of Mines and Petroleum

Yilgarn – Narryer transition YU1 & SC1

Romano, SS, Ivanic, TJ, Korsch, RJ, Wyche, S, van
Kranendonk, MJ, Jones, LEA, Zibra, I, Blewett, RS, Jones, T,
Milligan, P, Costelloe, RD, Doublier, MP, Pawley, MJ,
Gessner, K, Hall, CE, Patison, N, Kennett, BLN and Chen, SF

27/02/2013



Australian Government
Geoscience Australia



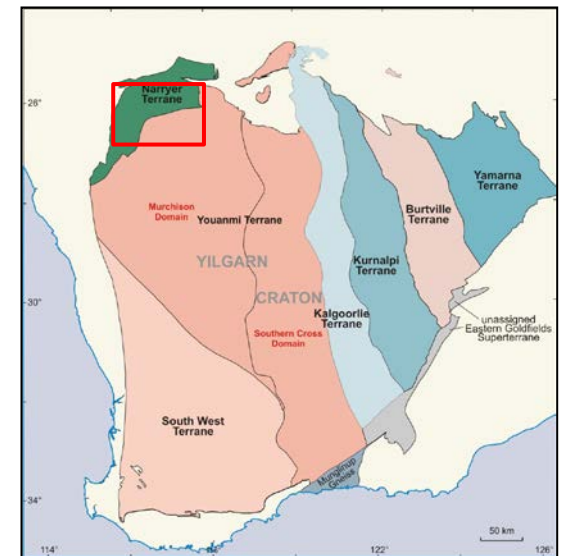
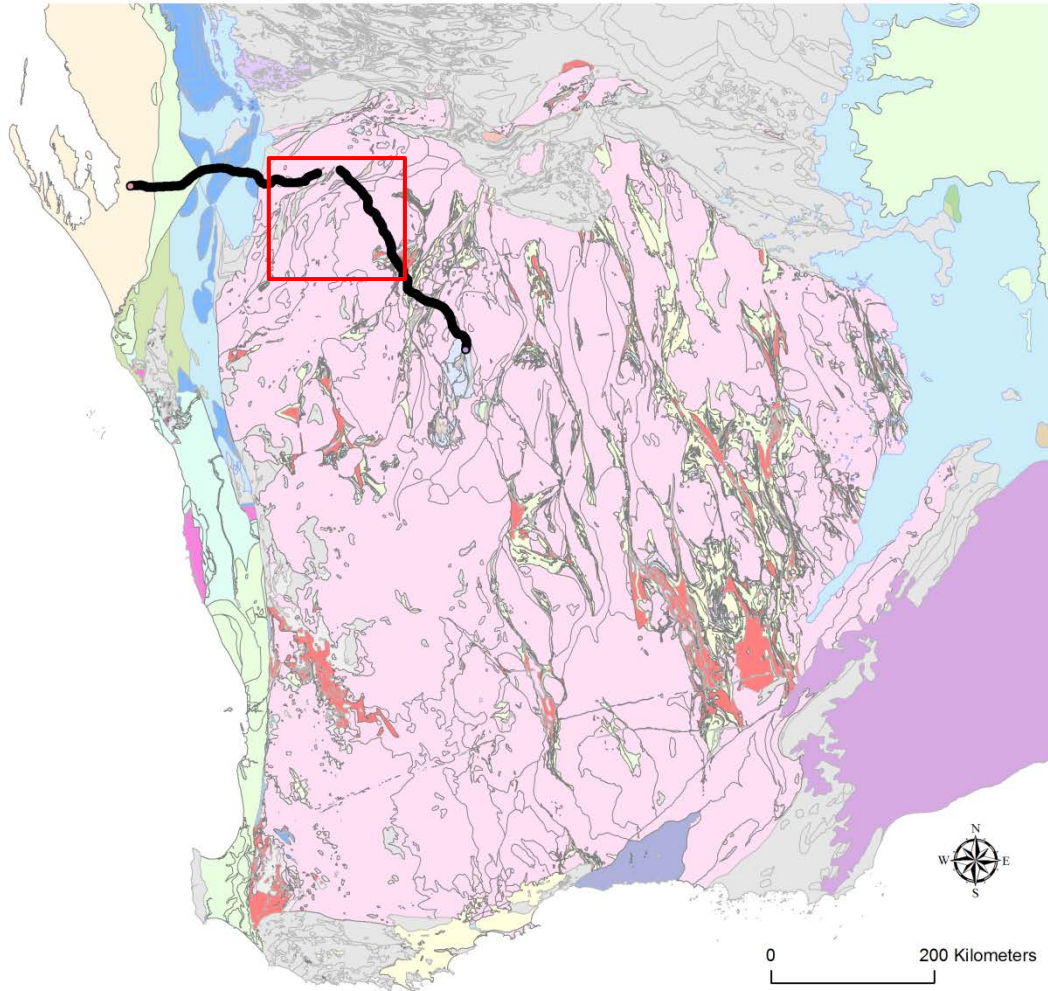
ROYALTIES
FOR REGIONS



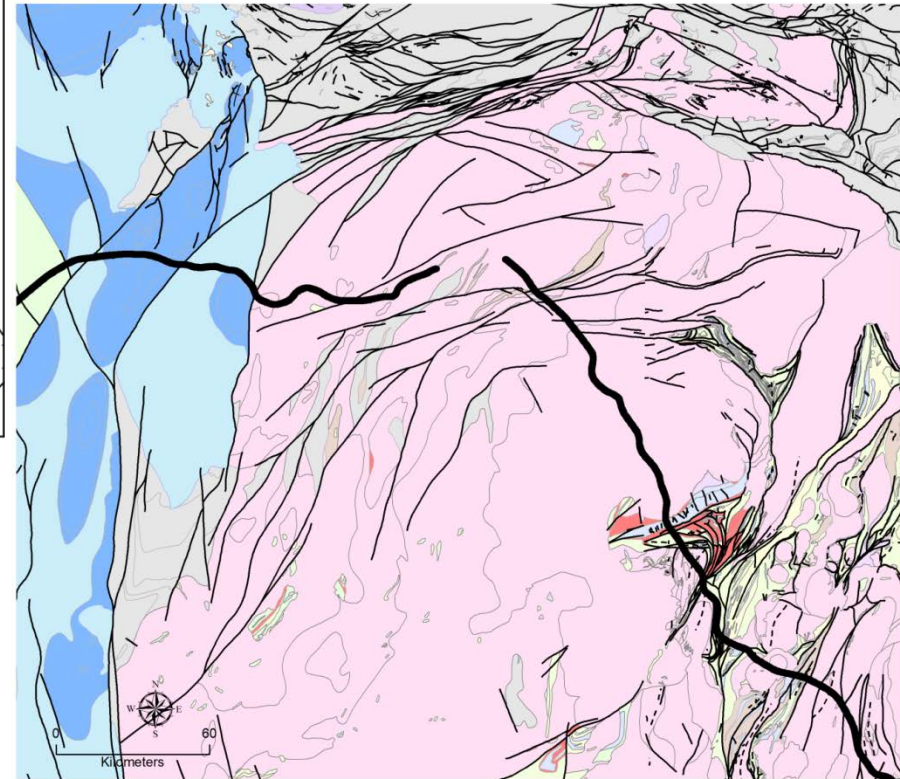
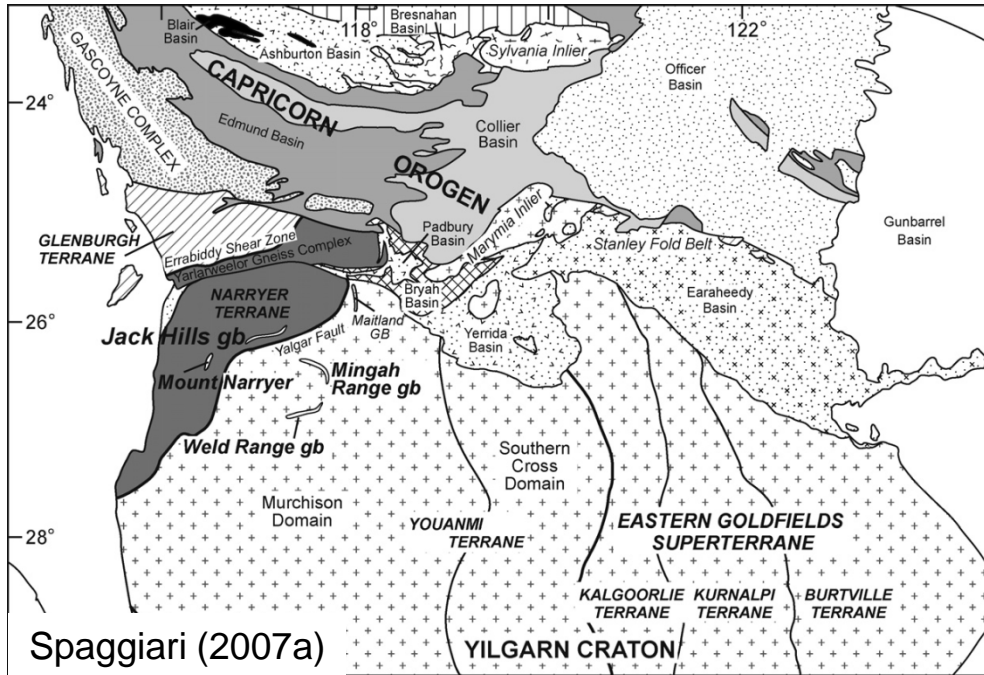
Geological Survey of
Western Australia

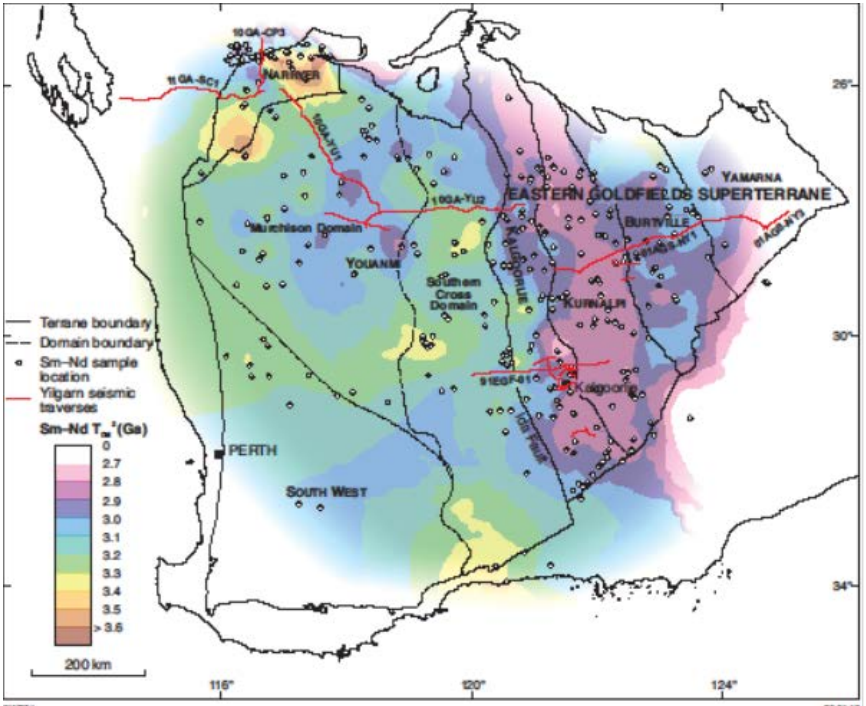
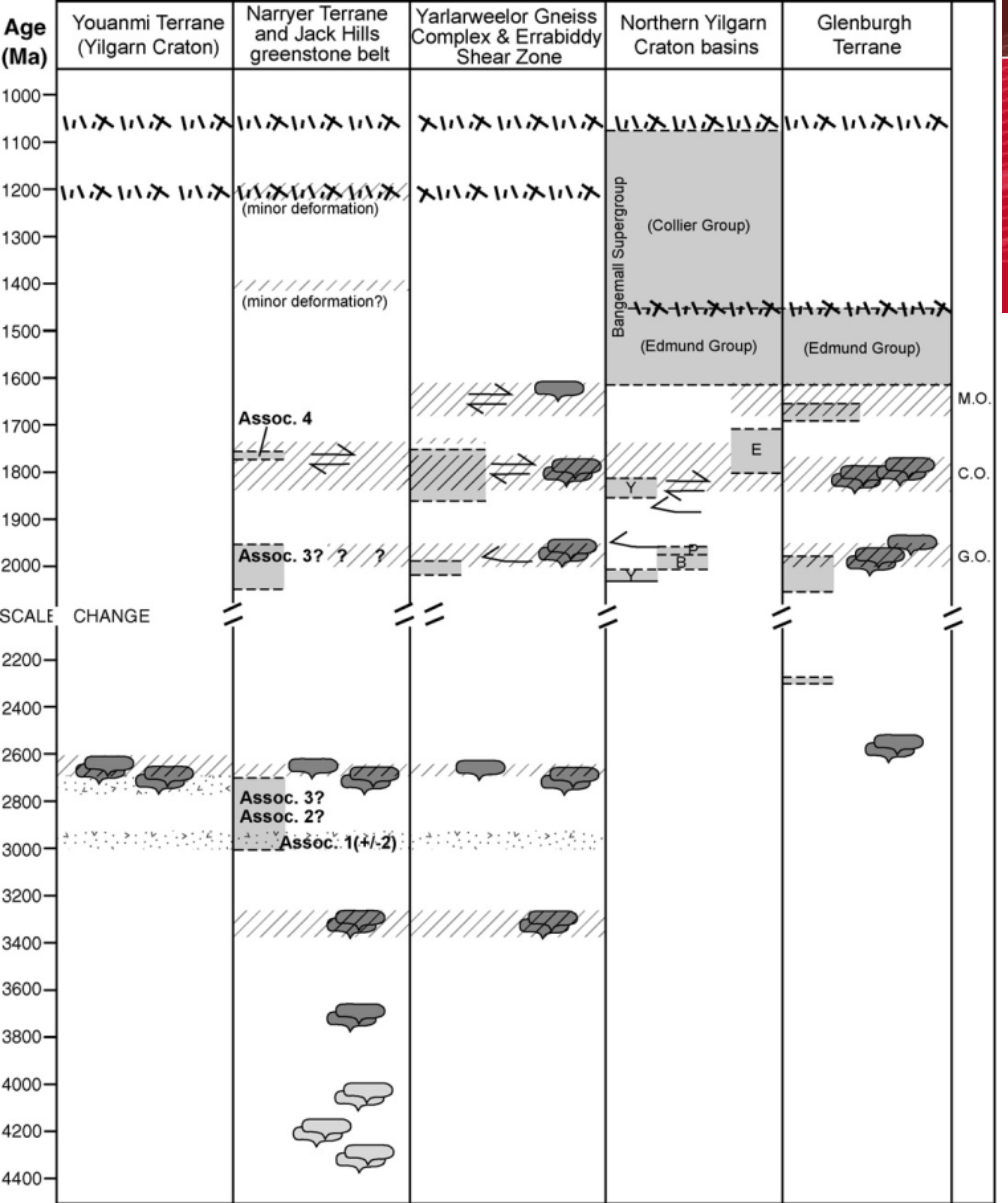
Photo: C.Spaggiari

Geological Overview NW-Yilgarn



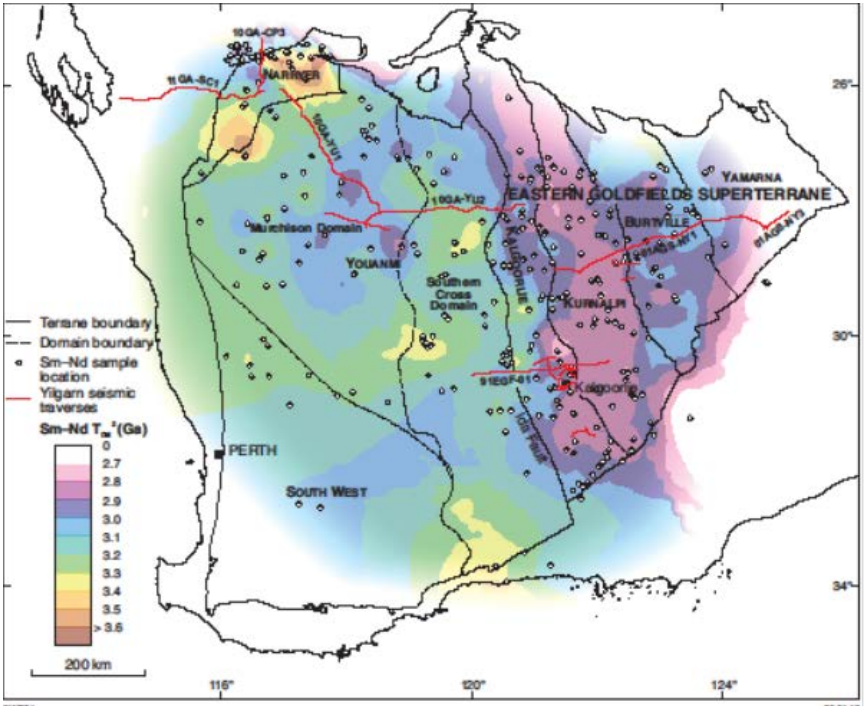
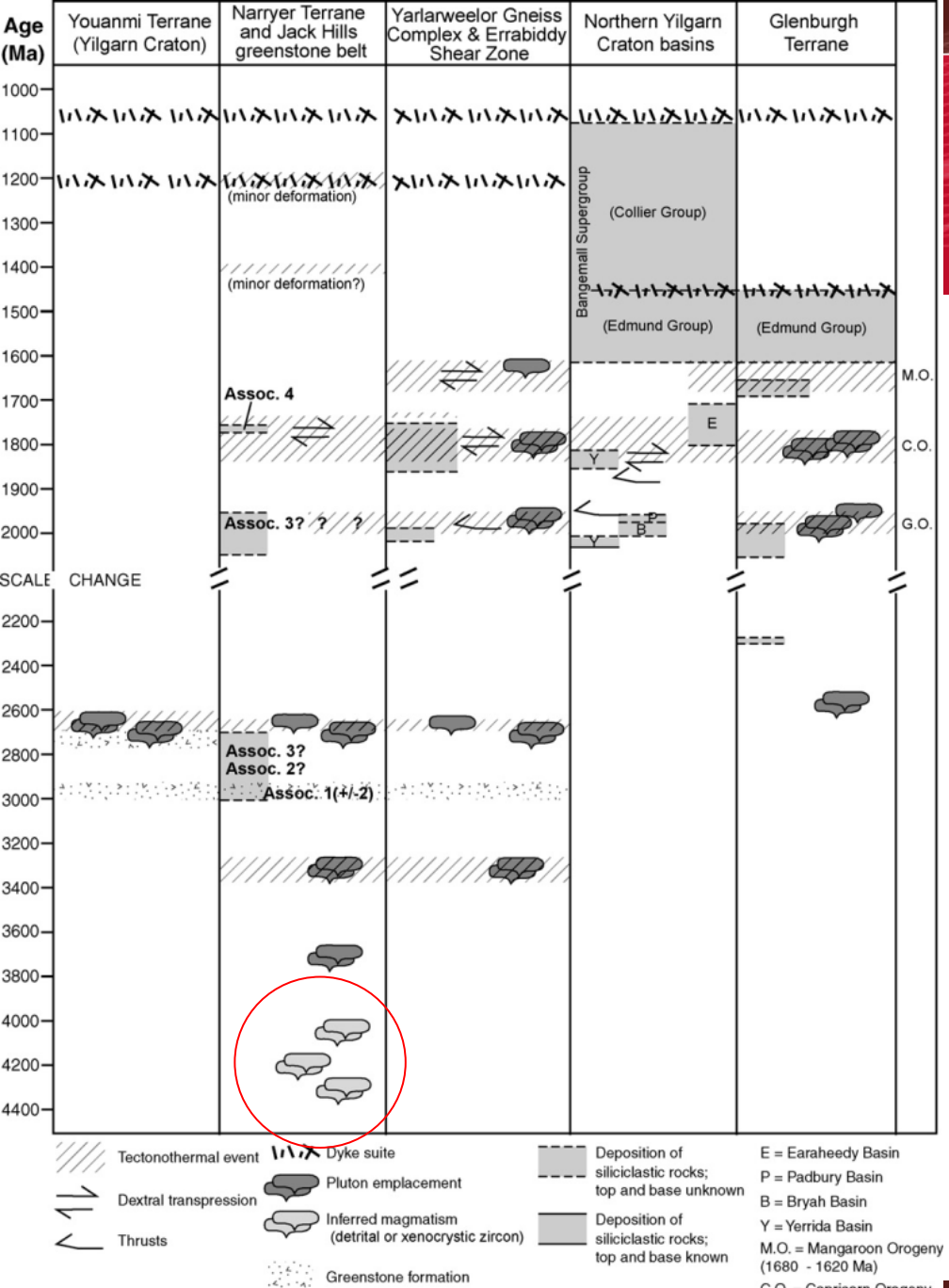
Geological Overview NW-Yilgarn



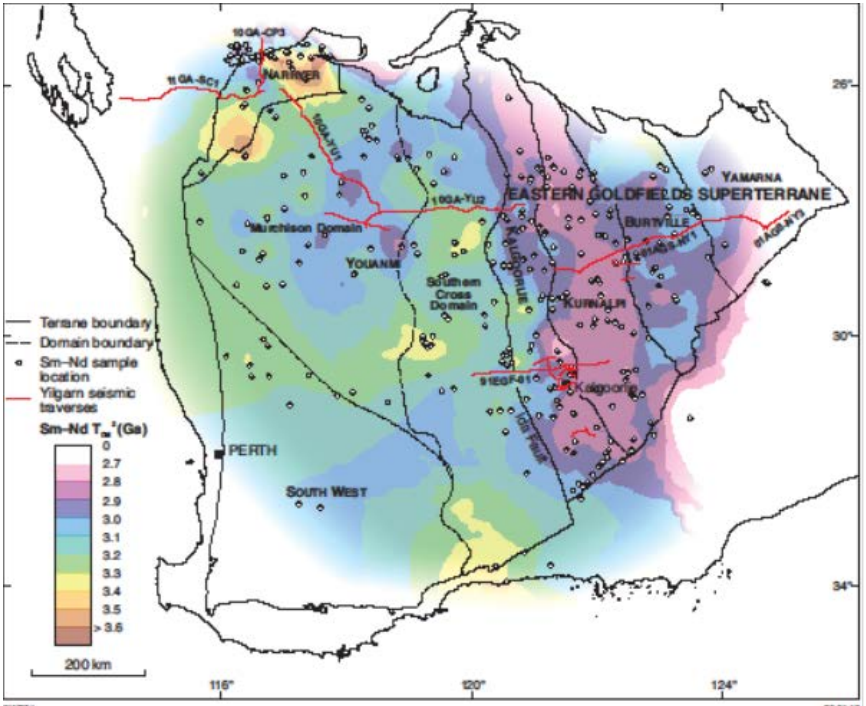
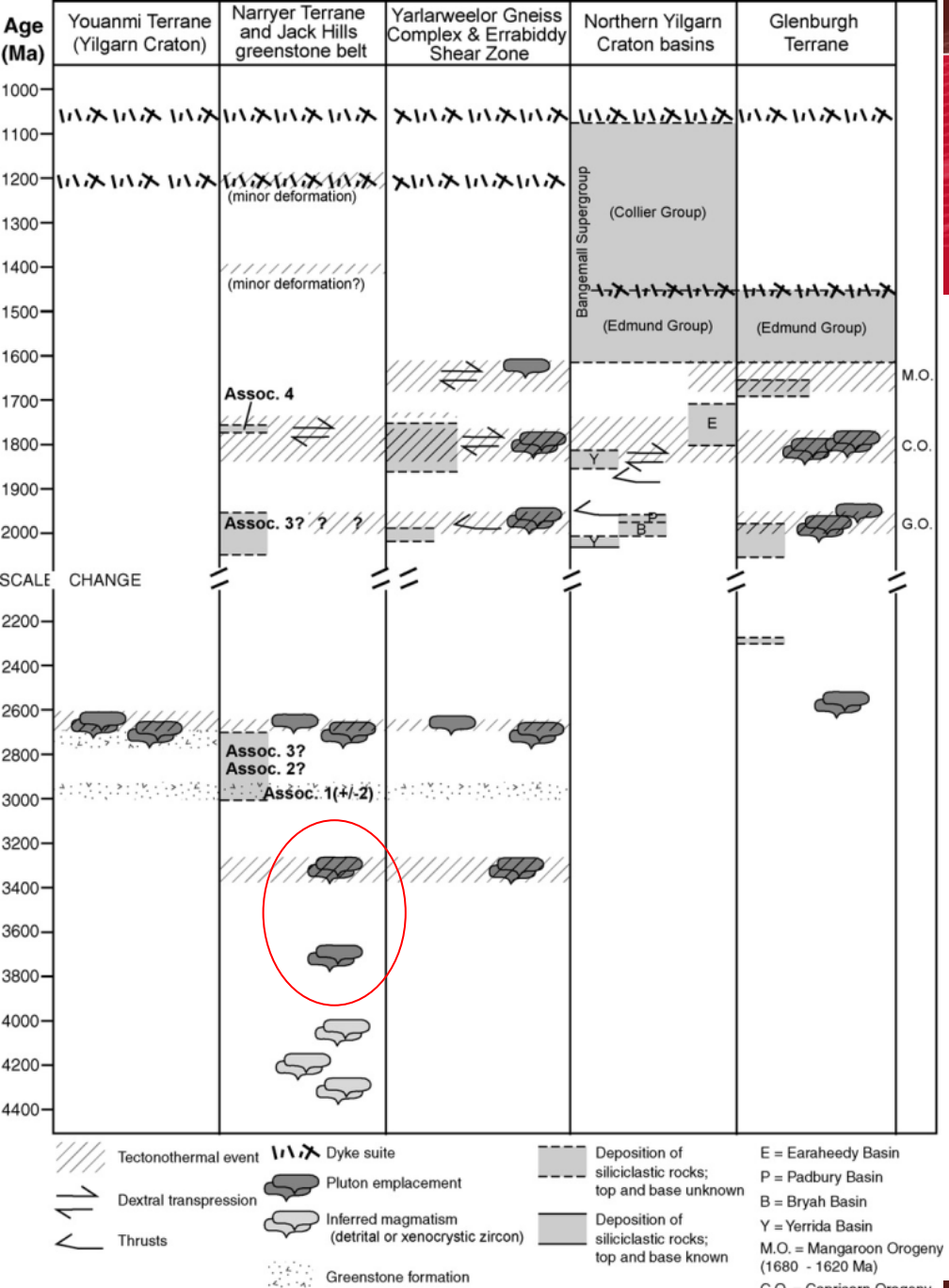


- Tectonothermal event
- Deposition of siliciclastic rocks; top and base unknown
- Greenstone formation
- Dextral transpression
- Pluton emplacement
- Inferred magmatism (detrital or xenocrystic zircon)
- Thrusts
- Deposition of siliciclastic rocks; top and base known

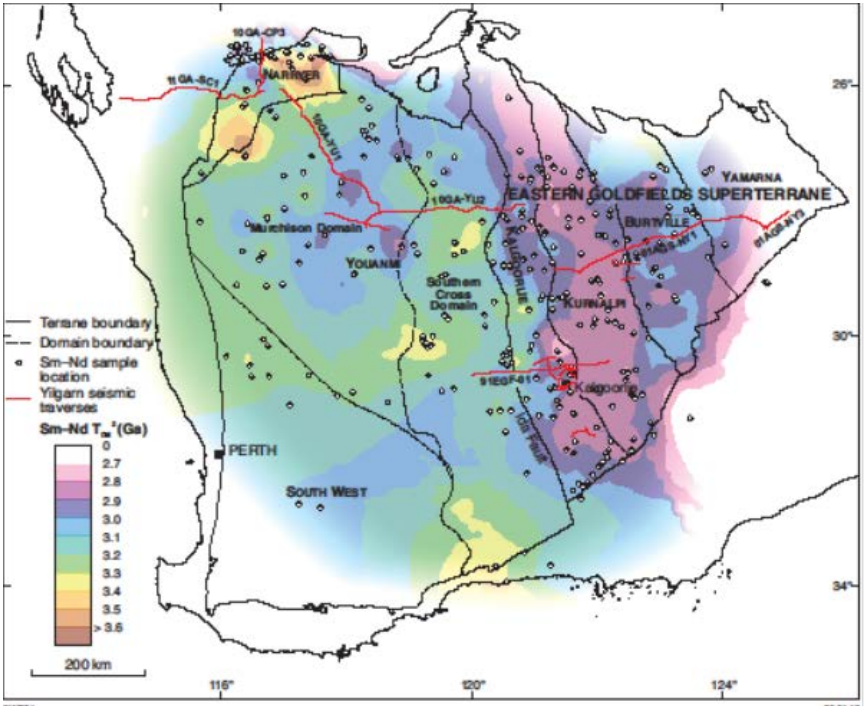
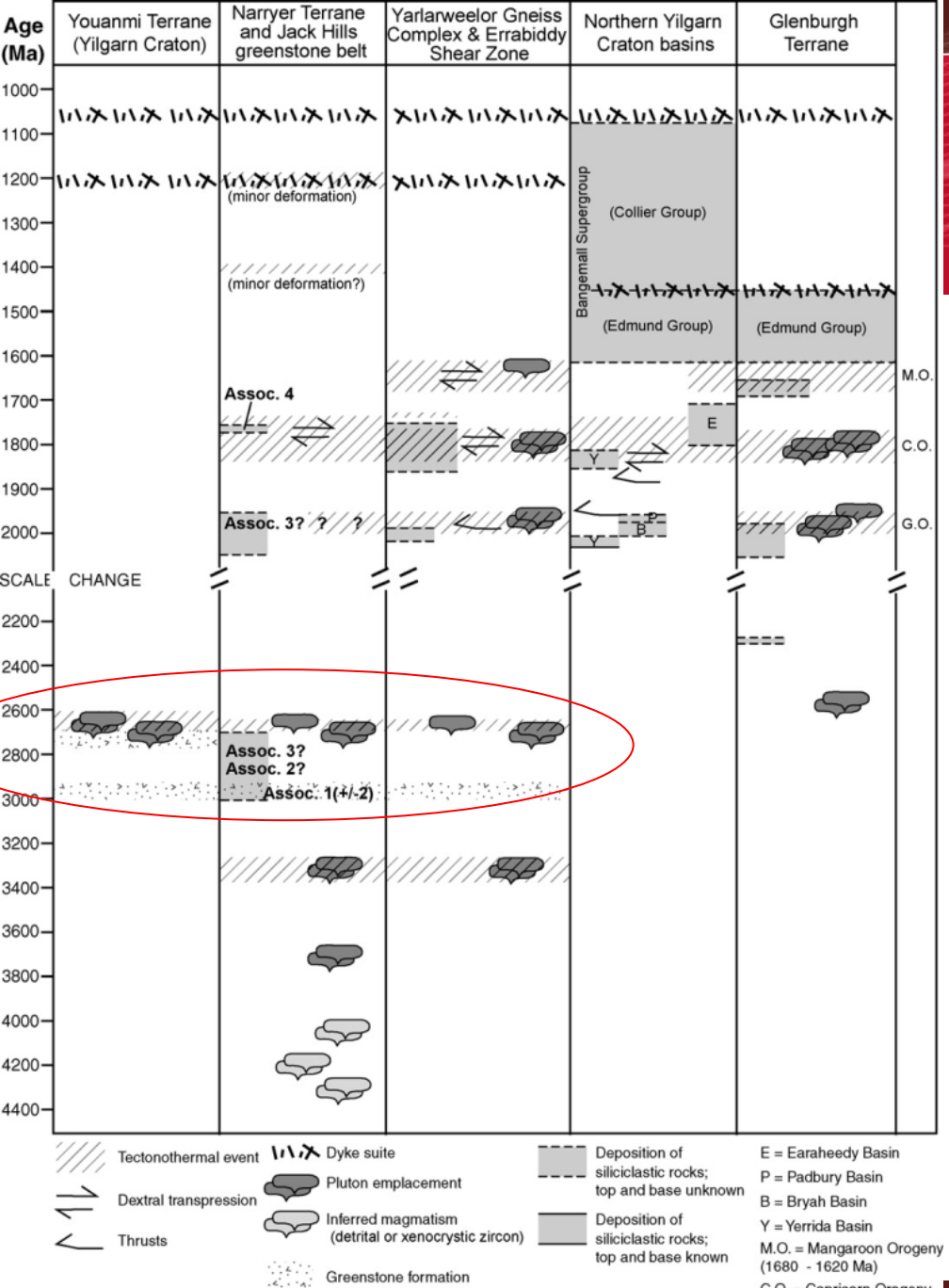
E = Earaheedy Basin
 P = Padbury Basin
 B = Bryah Basin
 Y = Yerrida Basin
 M.O. = Mangaroon Orogeny (1680 - 1620 Ma)
 C.O. = Capricorn Orogeny (1830 - 1780 Ma)
 G.O. = Glenburgh Orogeny (2005 - 1960 Ma)



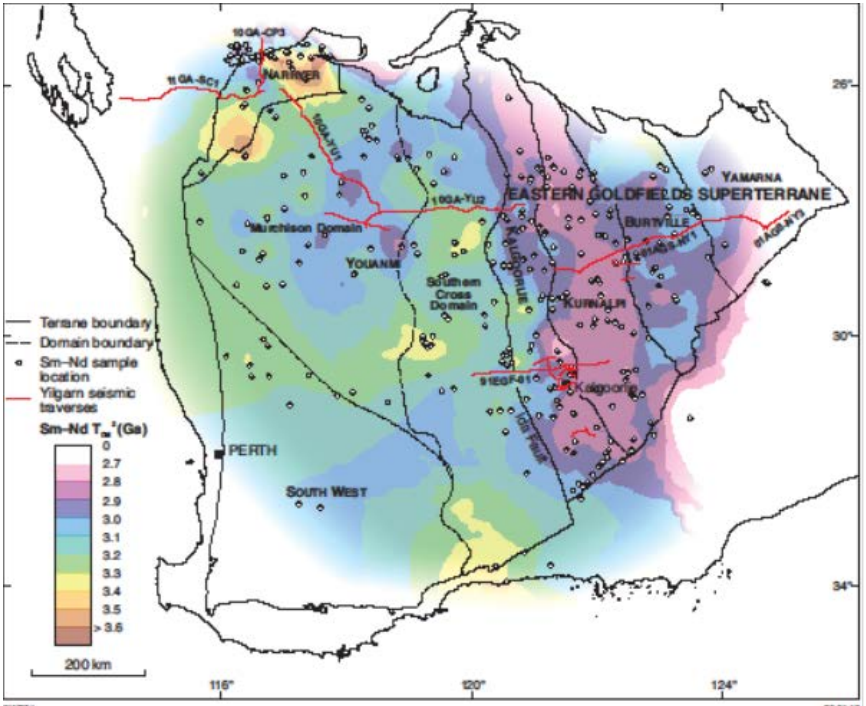
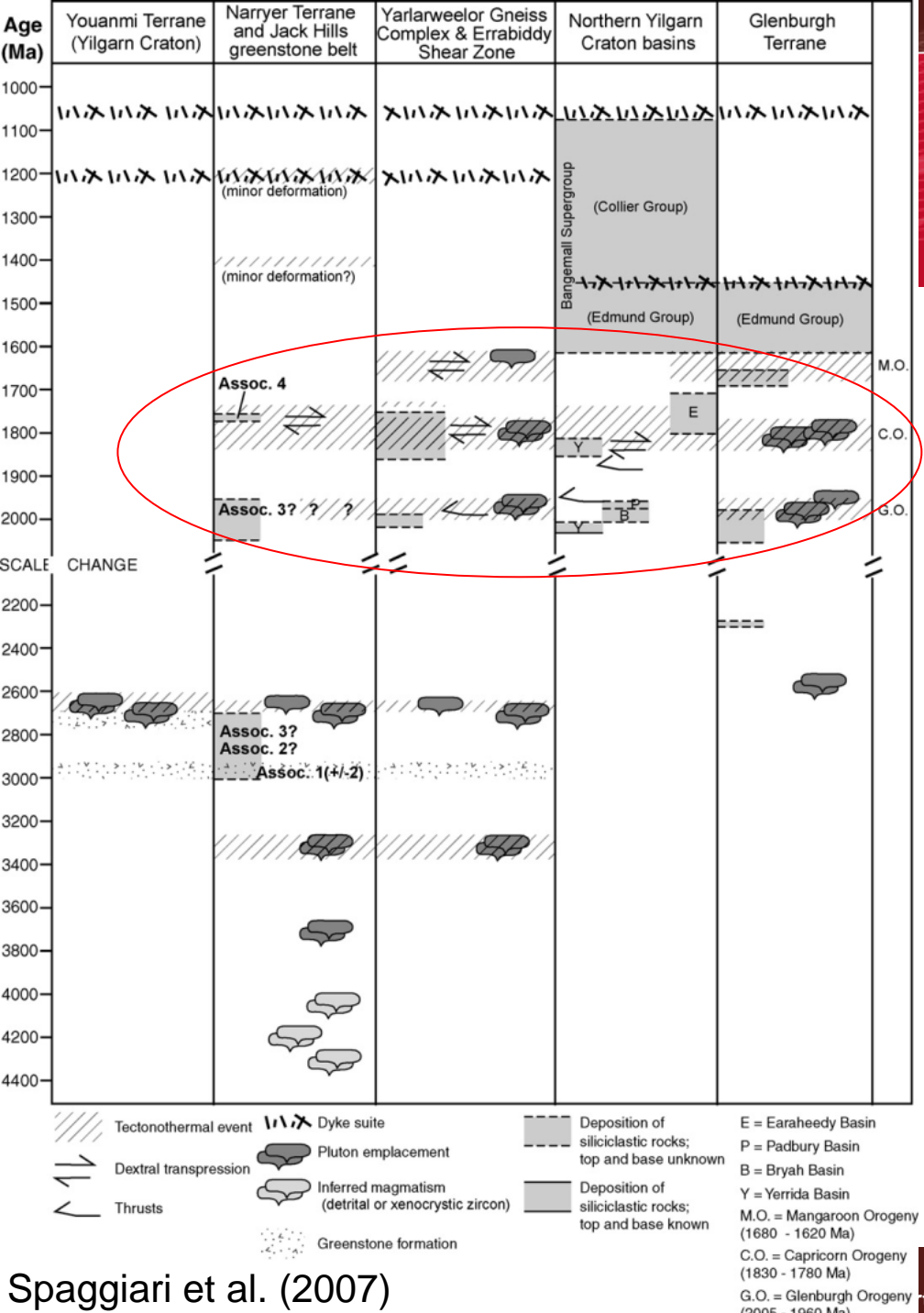
Spaggiari et al. (2007)



Spaggiari et al. (2007)



Spaggiari et al. (2007)

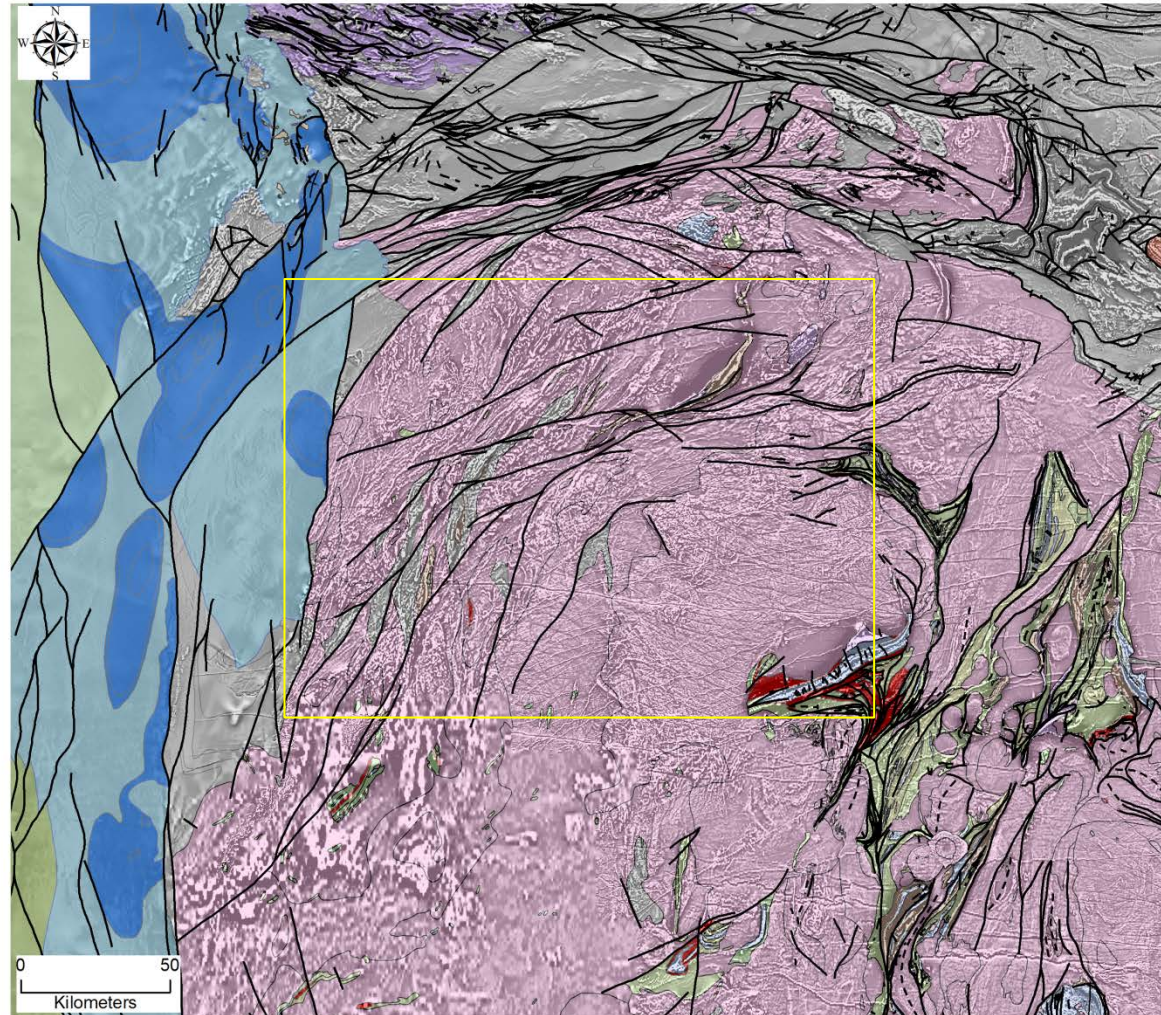


Spaggiari et al. (2007)

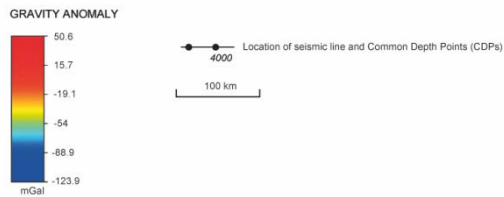
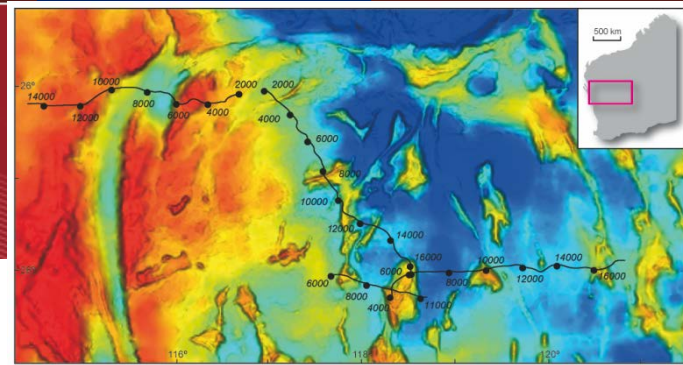
Geological Overview NW-Yilgarn

Different pattern in aeromagnetics:

- Different structural history
- Less greenstones
- Proterozoic overprint

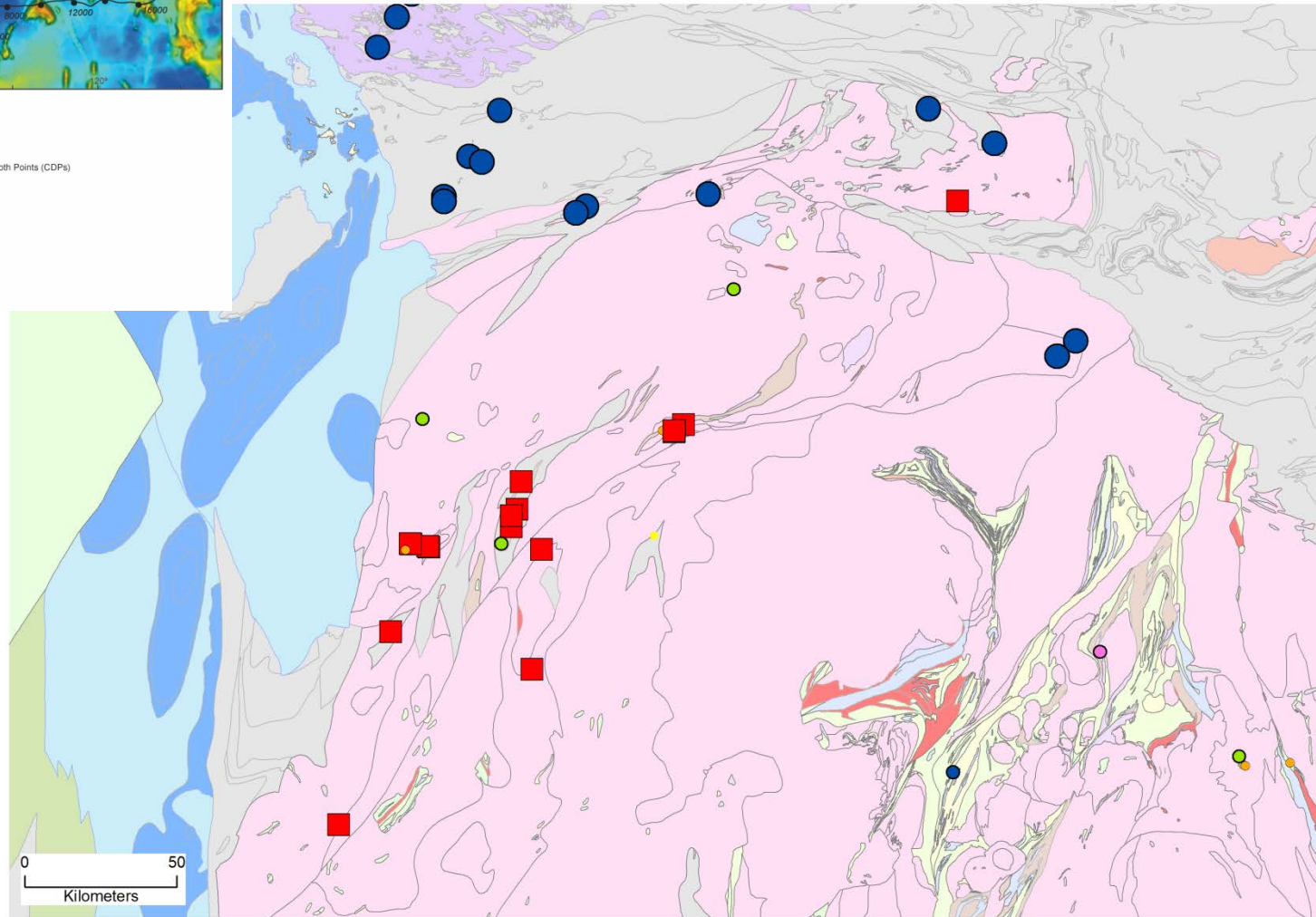


Geochronology

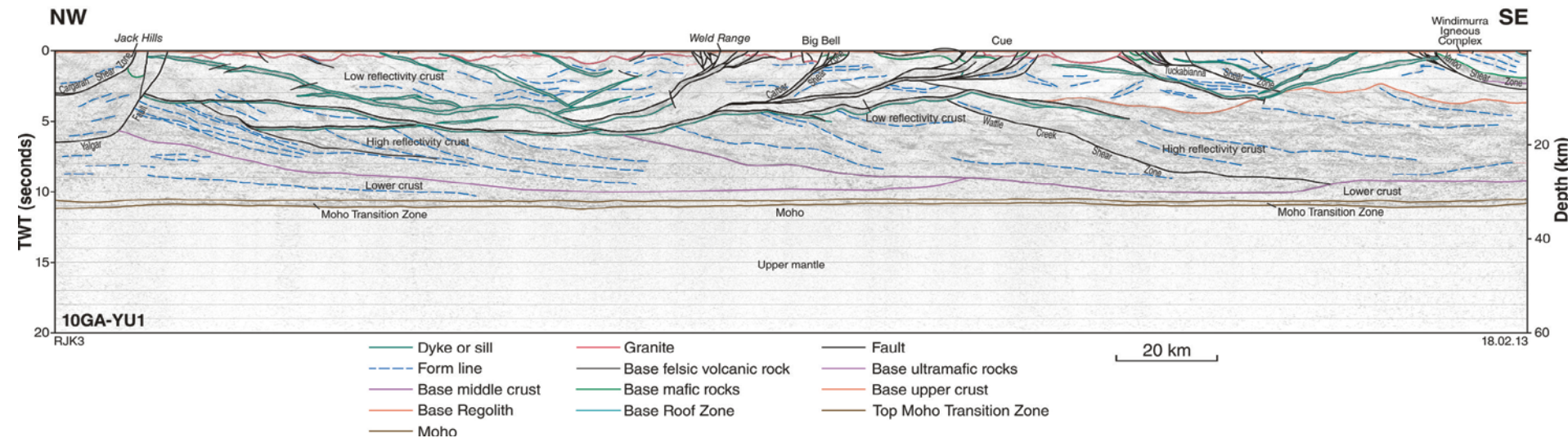
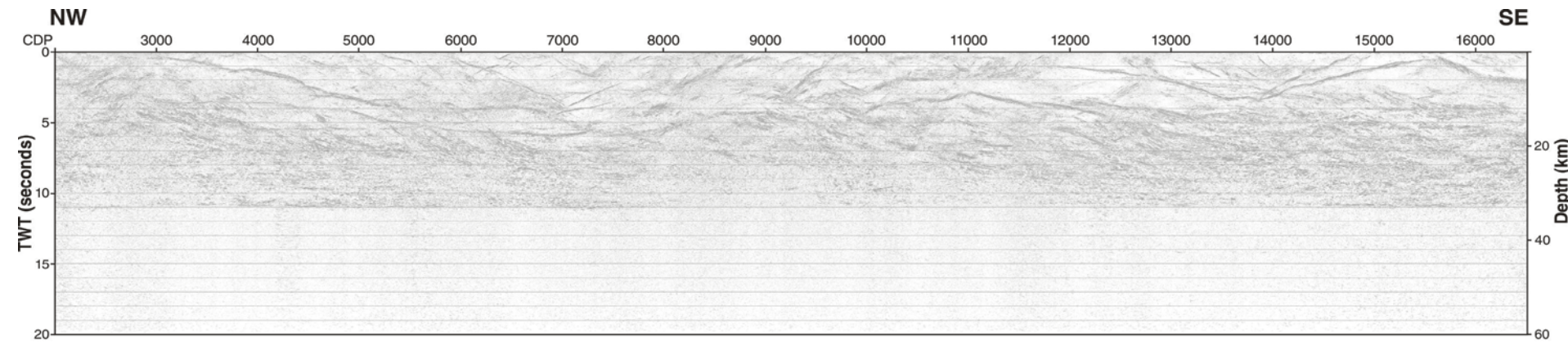


Zircon:

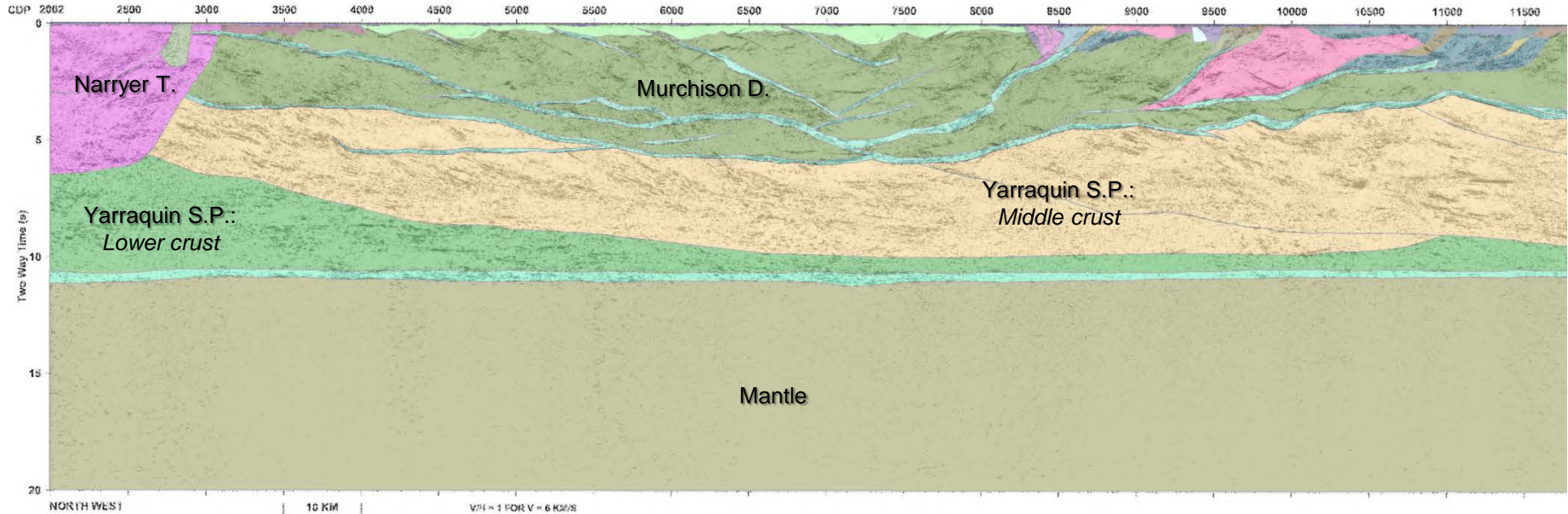
- >3 Ga
- <2500 Ma



Seismic profile 10GA-YU1 west



Major crustal components 10GA-YU1



Preliminary migrated seismic section for Youanmi Seismic Survey (L199) line 10GA-YU1. Static corrections to remove time delays due to weathering and elevation have been applied, so that T = 0 corresponds to a datum of 450 m AHD.

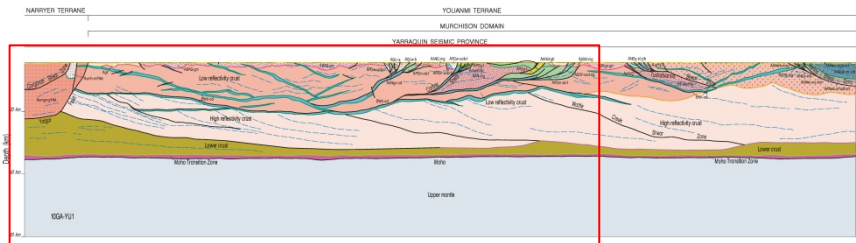
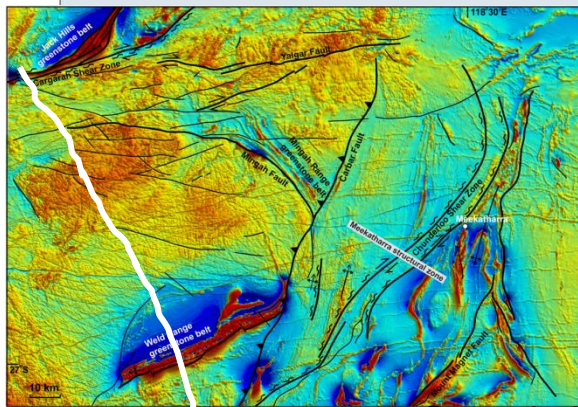
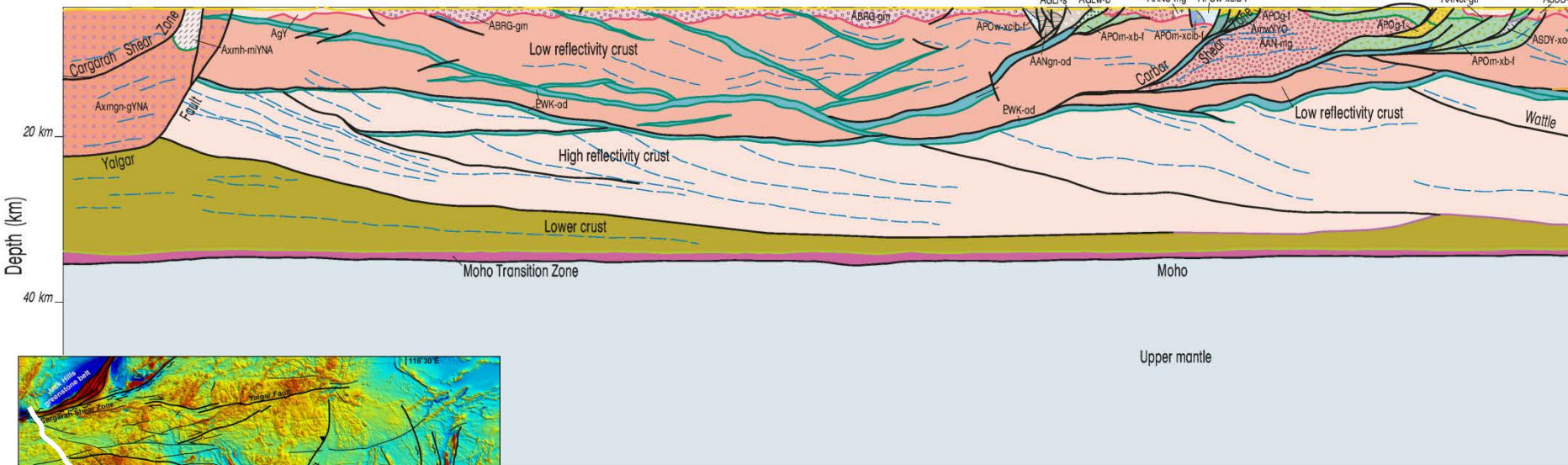
Greenstone belts

Jack Hills

Weld Range

Big Bell

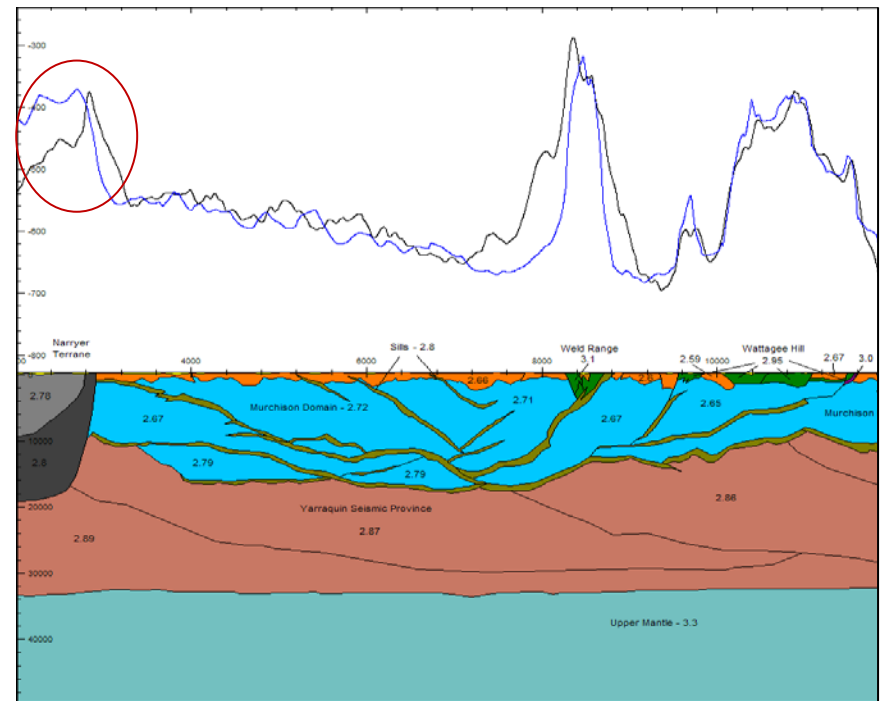
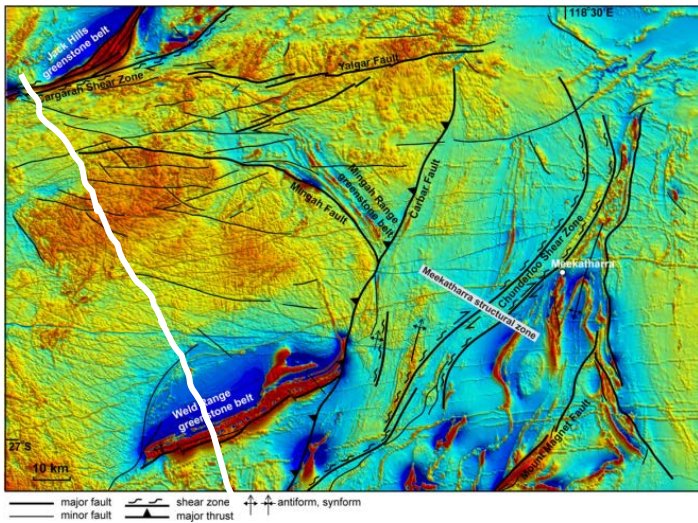
Cue



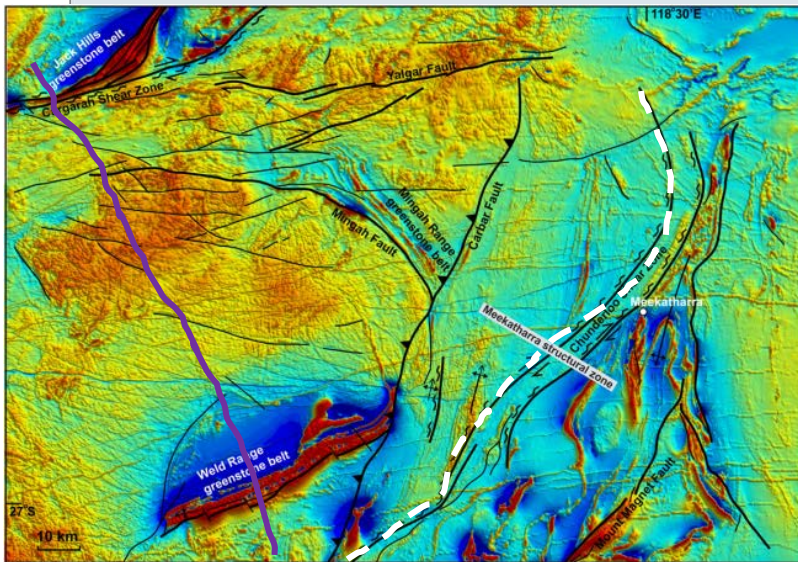
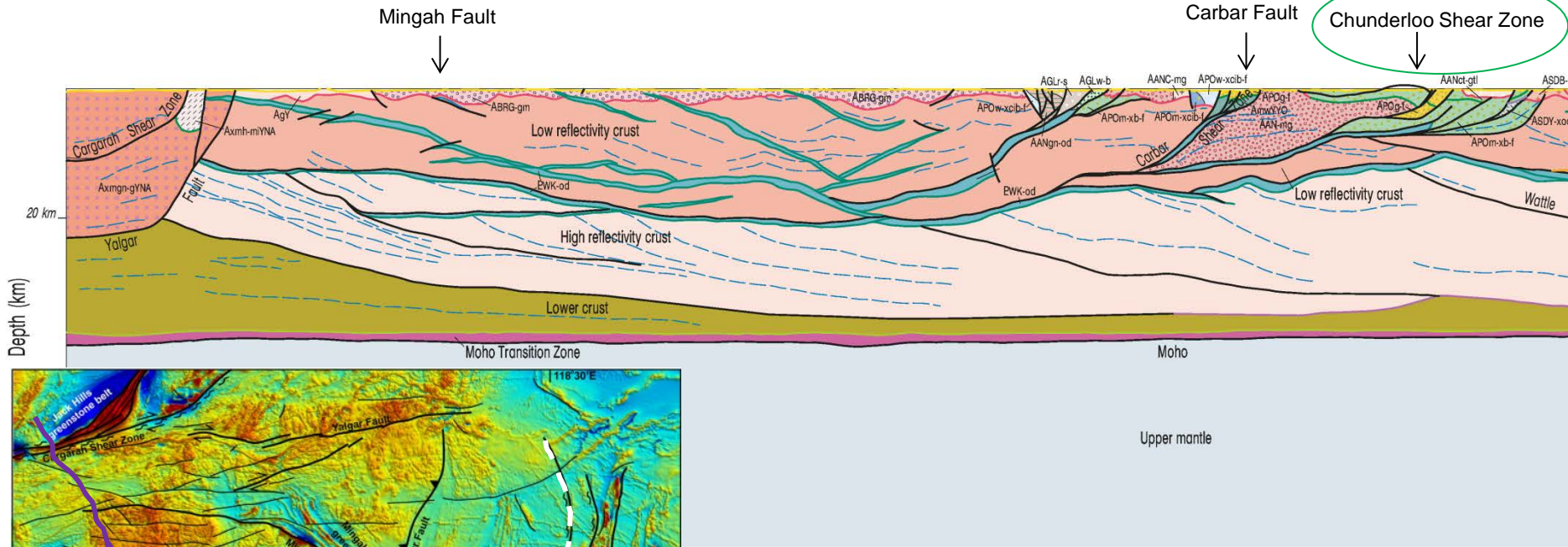
Spaggiari et al. 2008

Jack Hills greenstone belt

- Archean greenstone succession
- Proterozoic sediments & felsic rocks.



Major structures YU1 west: Muchison Domain

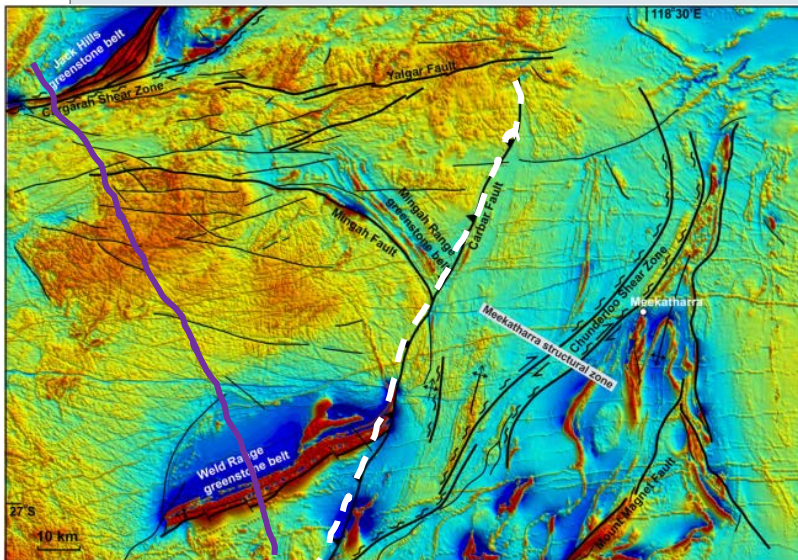
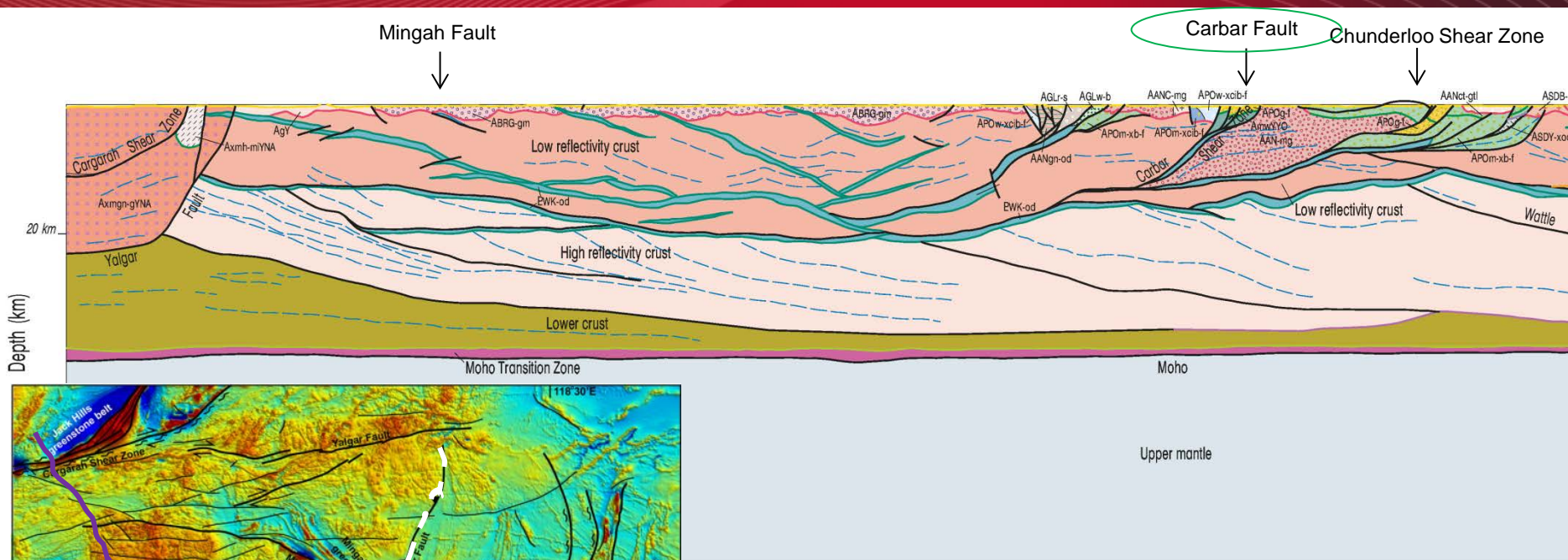


major fault
 minor fault
 shear zone
 major thrust
 antiform, synform

Spaggiari et al. 2008

- Scoop-like structure with change of dipping direction of faults and shear zones

Major structures YU1 west: Muchison Domain

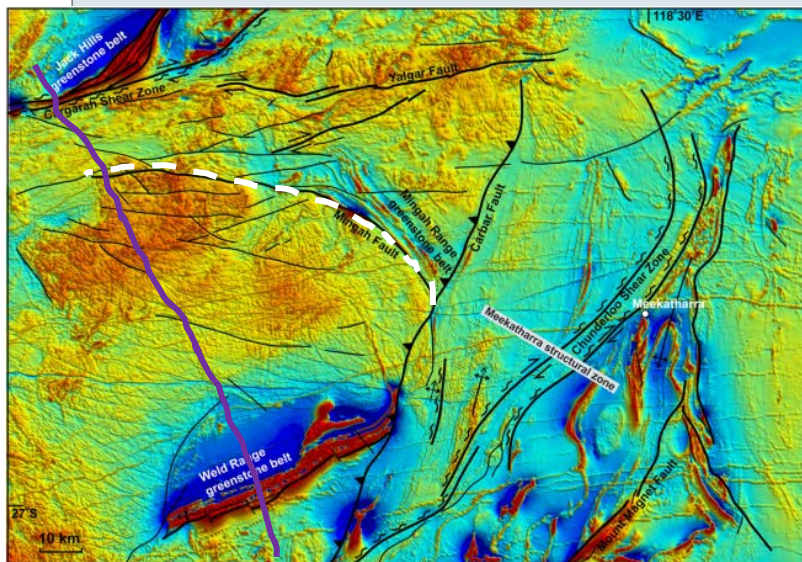
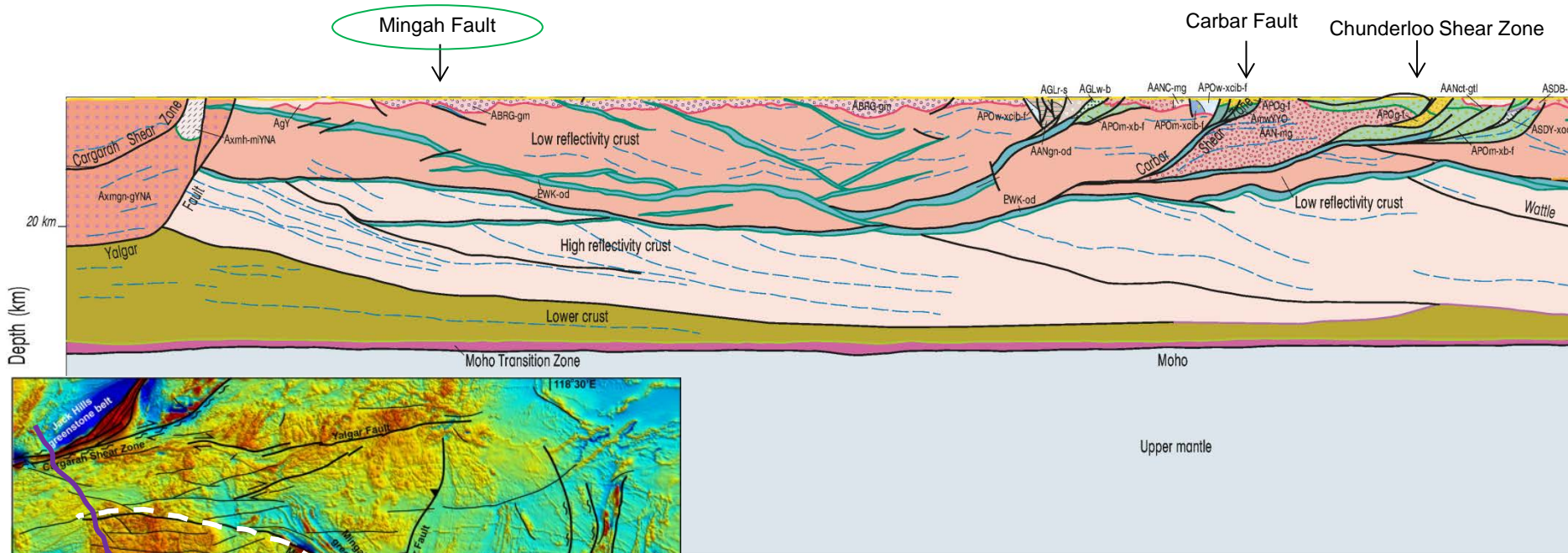


major fault
 minor fault
 shear zone
 major thrust
 antiform, synform

Spaggiari et al. 2008

- Scoop-like structure with change of dipping direction of faults and shear zones

Major structures YU1 west: Muchison Domain

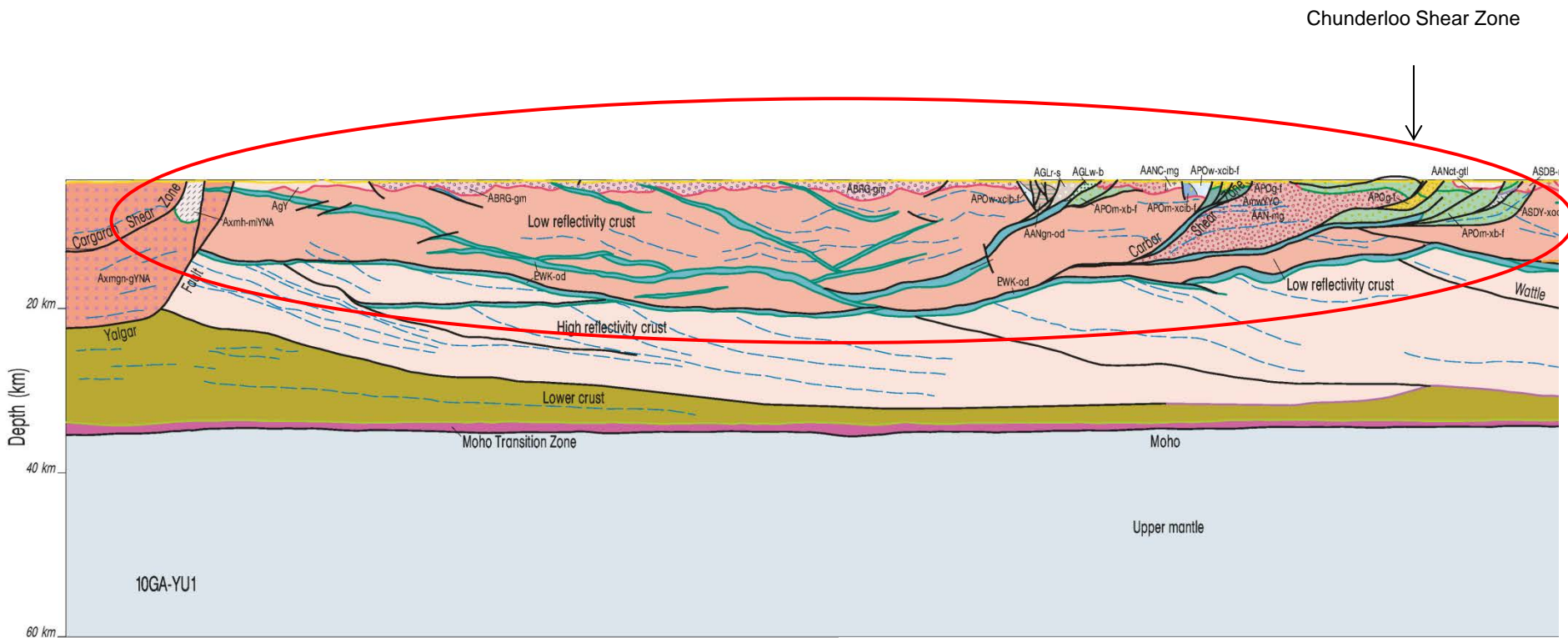


major fault
 minor fault
 shear zone
 major thrust
 antiform, synform

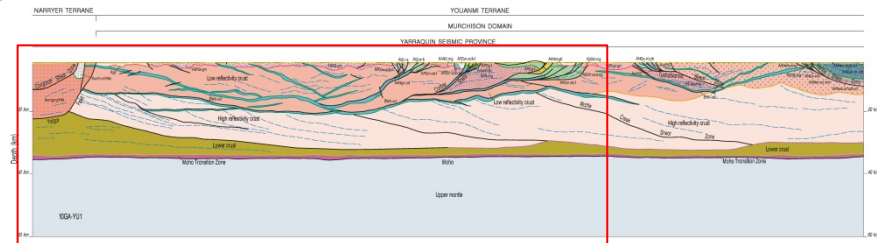
Spaggiari et al. 2008

- Scoop-like structure with change of dipping direction of faults and shear zones

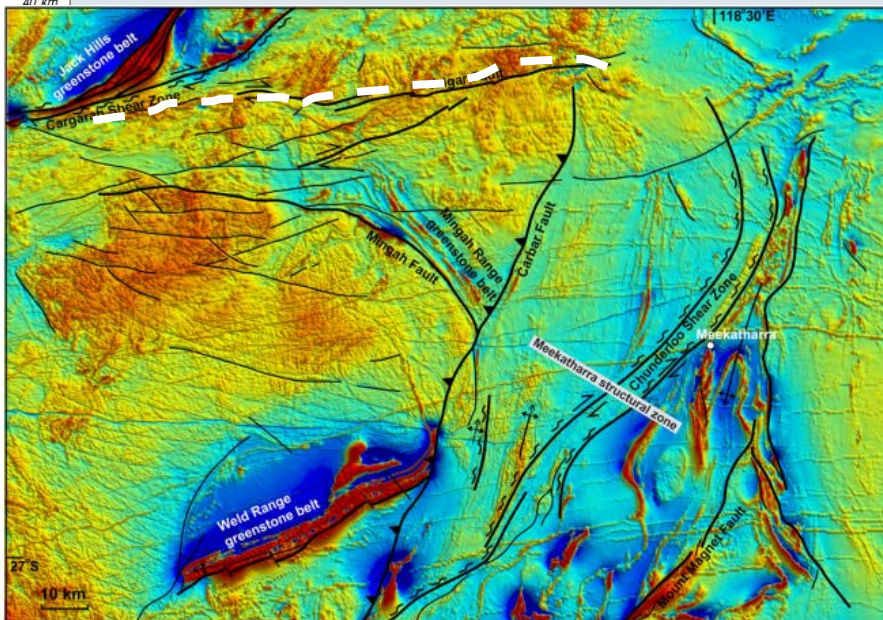
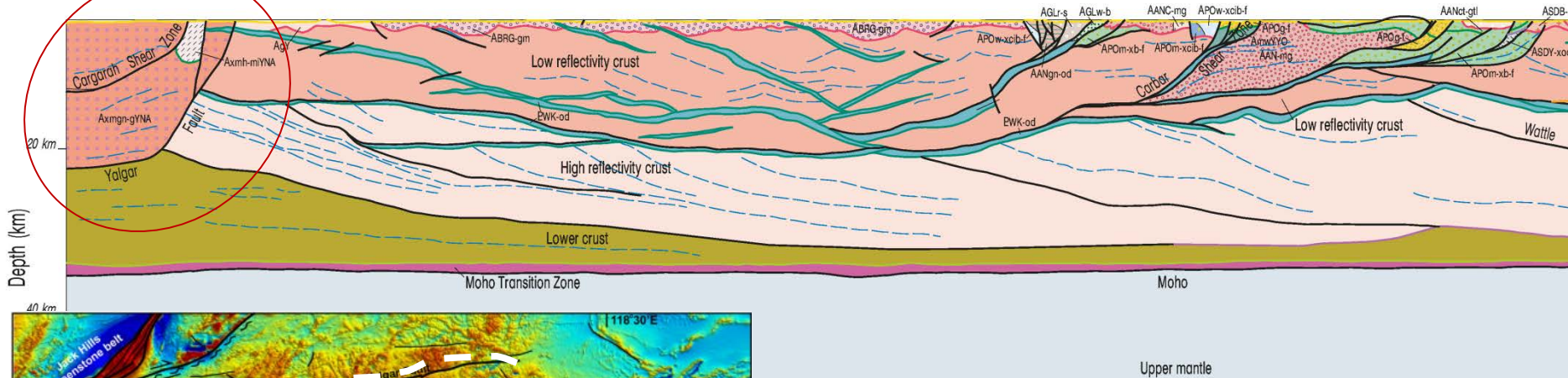
Major structures & units on YU1 west



Sills, shear zones,
or both ?



Major structures YU1 west: Narryer Terrane

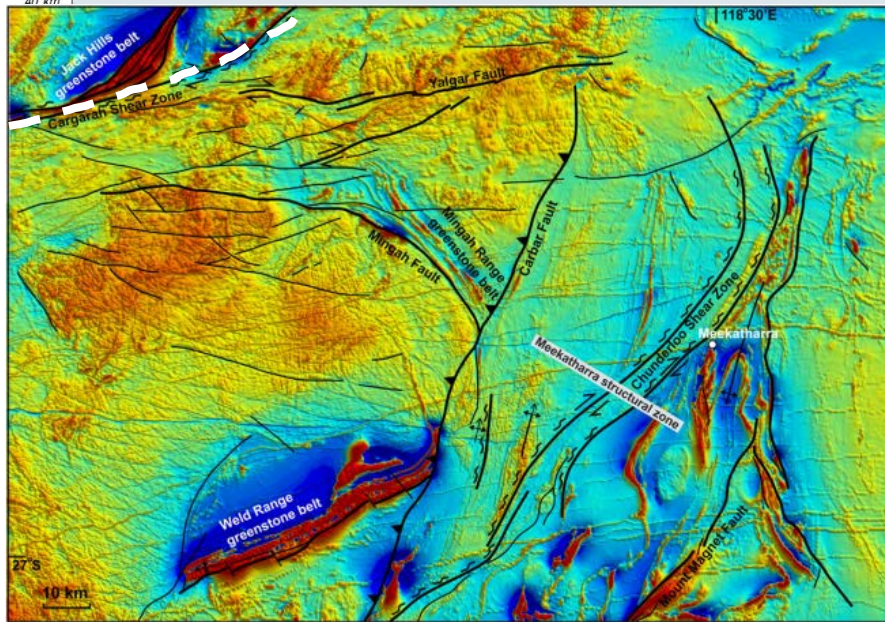
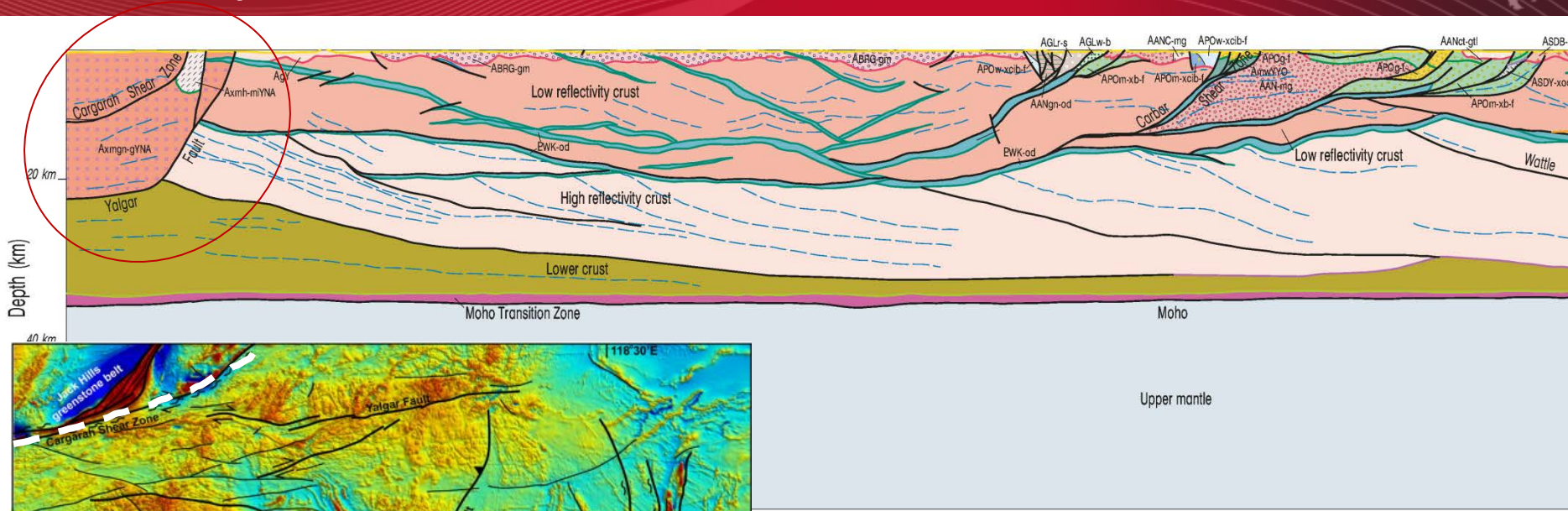


— major fault — shear zone ↕ antiform, synform
--- minor fault — major thrust

Spaggiari et al. 2008

- Northwest dipping faults and shear zones
- Proterozoic and younger re-activation/reworking of the Yalgar Fault

Major structures YU1 west: Narryer Terrane

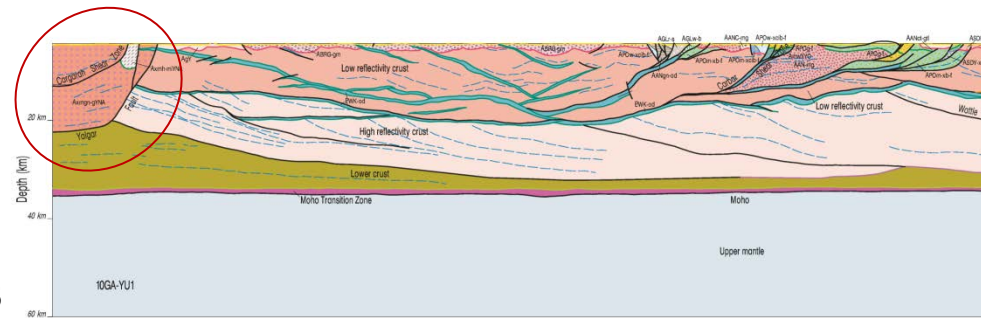
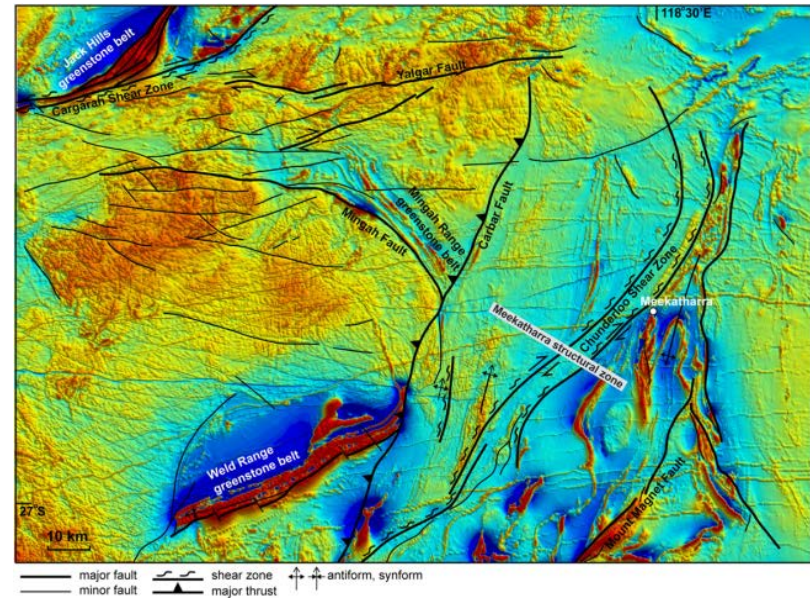
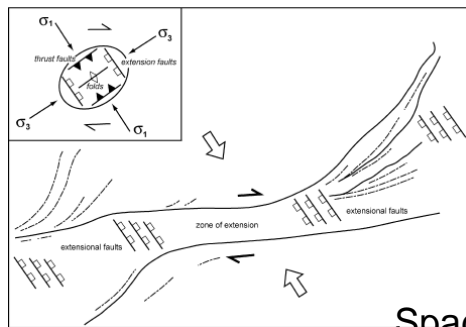
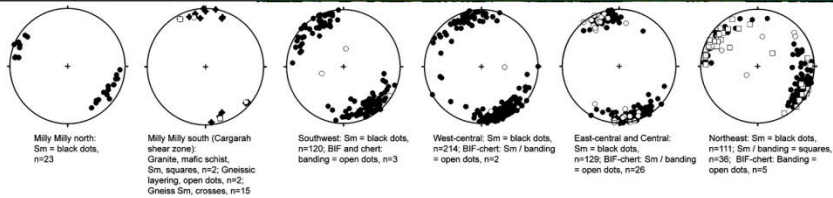
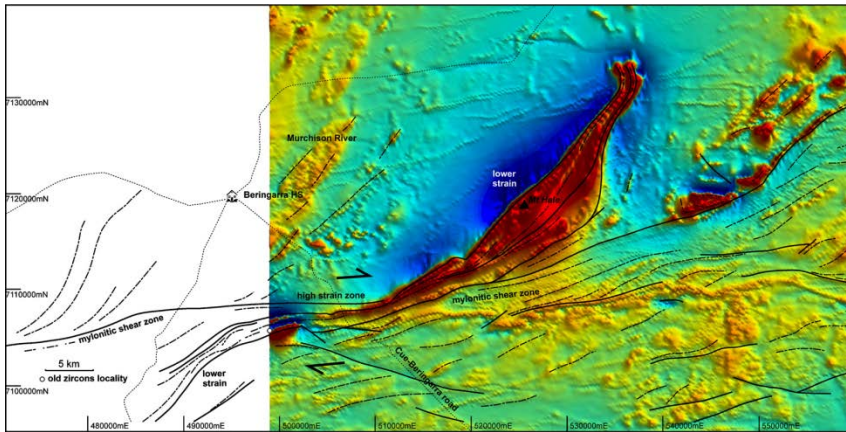


major fault
 minor fault
 shear zone
 major thrust
 antiform, synform

Spaggiari et al. 2008

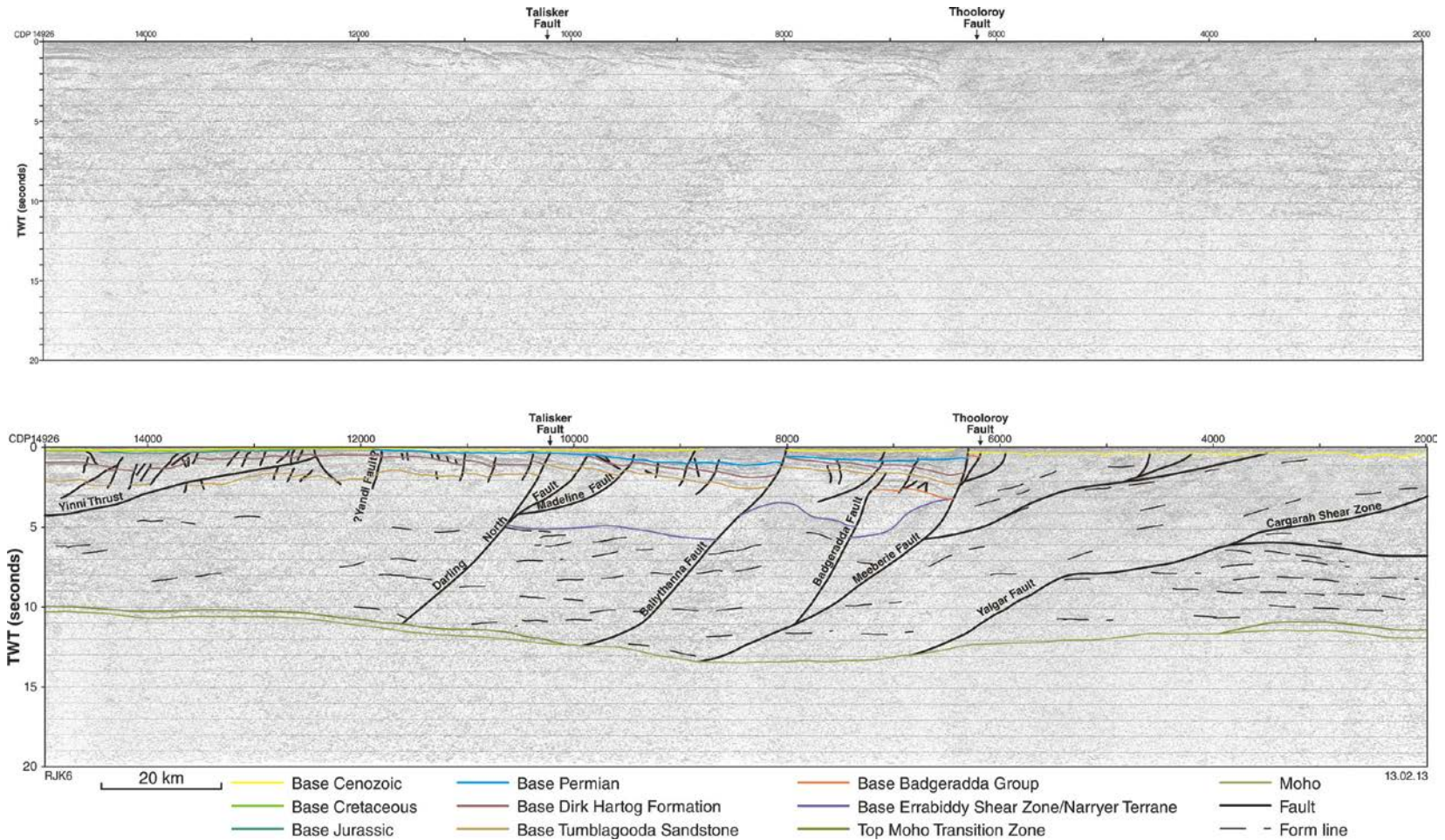
- West dipping faults and shear zones

Major structures on YU1 west: Jack Hills greenstone belt

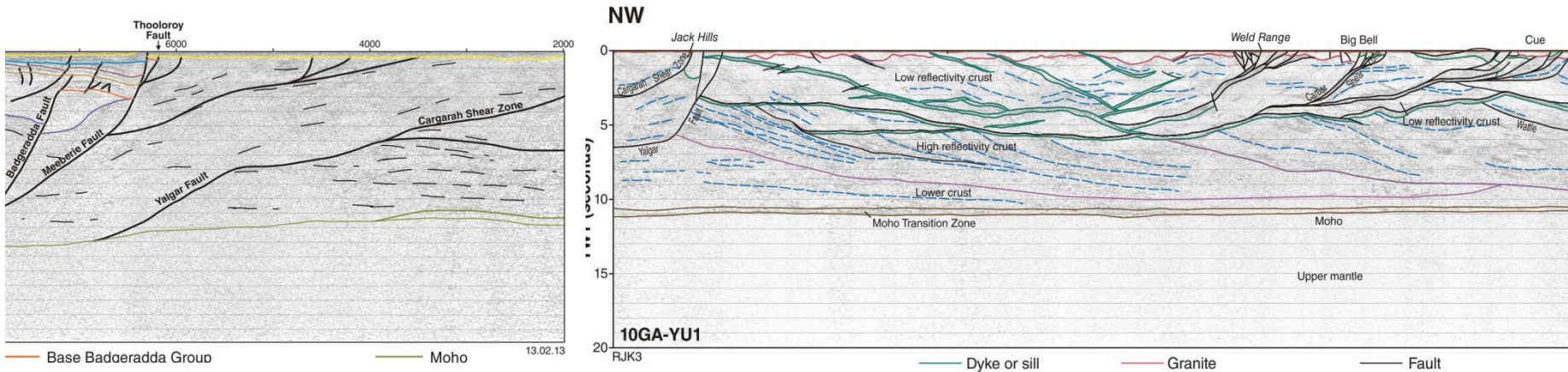


Spaggiari et al. 2008

Southern Carnarvon seismic line (SC1)

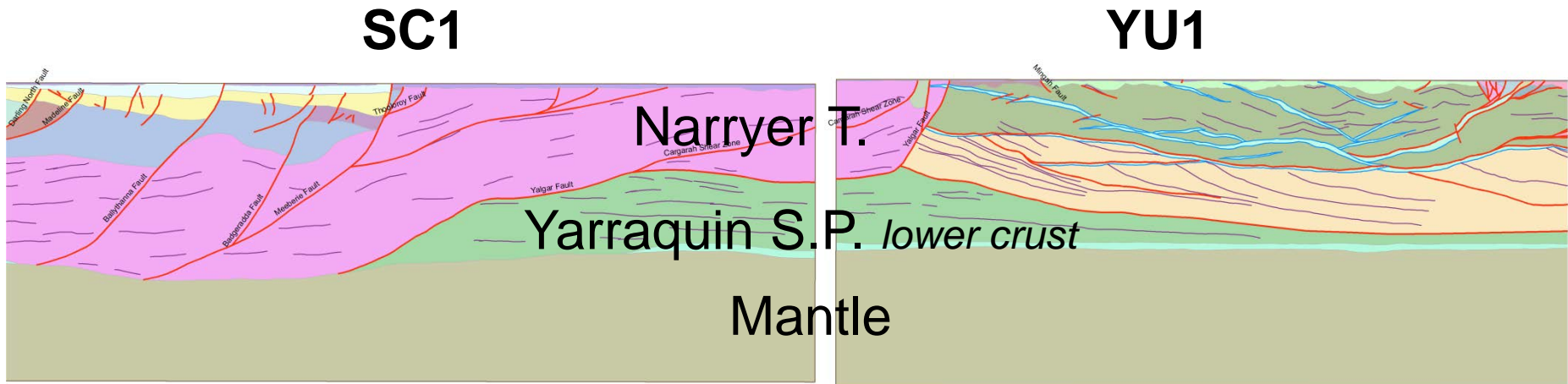


Transition YU1 & SC1



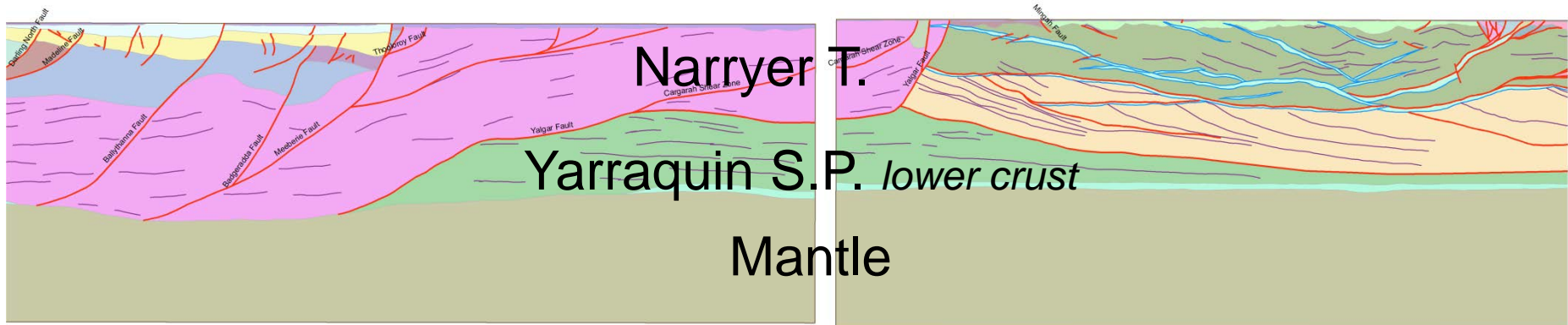
- Continuation of Yalgar F. and Cargarah SZ.
- Continuation of lower crust
- Change in dipping direction of faults and shear zones

Transition YU1 & SC1

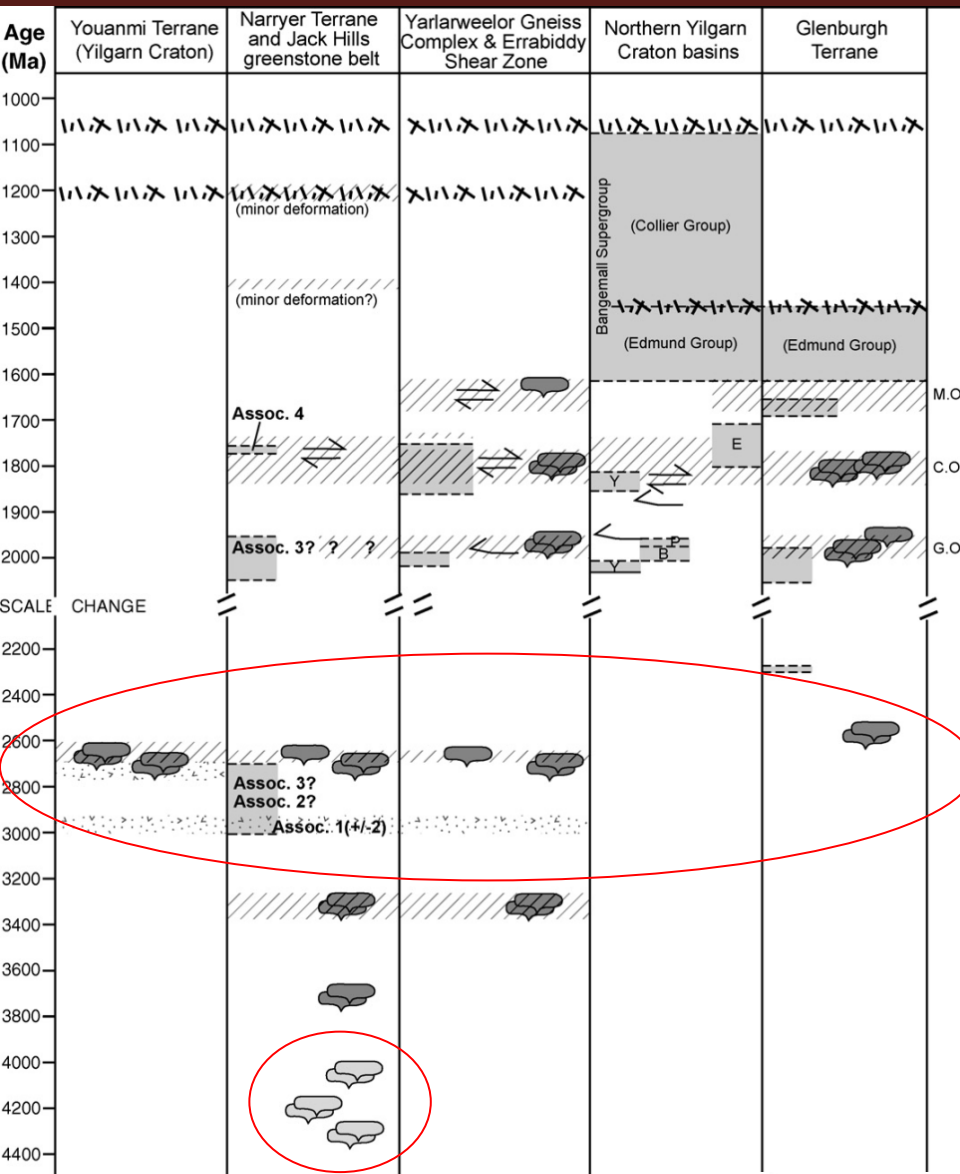


- Continuation of Yarraquin S.P. & Narryer Terrane
- No Moho offset across Terrane boundary (Narryer & Murchison)
- Slightly deeper Moho beneath the basins

Transition YU1 & SC1



- Different reflections of crustal blocks
- SE dipping reflection in the Middle Yarraquin Seismic province
- Movement along the Yalgar Fault
- Younger re-activation of the Yalgar Fault



Narryer Terrane: Exotic block or not?

- Quartzite with old detrital zircons in Youanmi and South West T.
- Main events known all over Yilgarn
- Meeberrie & Dugel gneiss in Narryer T.
- Older metamorphism (3.2 Ga) in Narryer T.

