



VIII GeoSciEd 2018 – 8th Quadrennial Conference of the International Geoscience Education Organisation (IGEO)

– *Geosciences for Everyone* –

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Campinas – Sao Paulo – Brazil, July 2018



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A computer animation on Phanerozoic movements and paleogeography of the Australian Plate

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2010



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Questions

- How to relate past positions of continents to global and regional environmental changes?
- How to describe and to understand the wandering of continents during Phanerozoic?



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Interpreting the path of Australian plate from Cambrian to Recent...

- Computer animation designed to overcome preconceptions and common-sense ideas on climate change
 - Focus on Phanerozoic geological drift of a selected plate
- Series of maps integrated in flash software and converted to *animated graphics interchange format (GIF)*



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Movements of Australia

- Paleogeography and dynamics of a moving plate
 - Events of subsidence or uplift
- Paleoclimatic studies
 - At a given period there is a huge variety of climates for each single position



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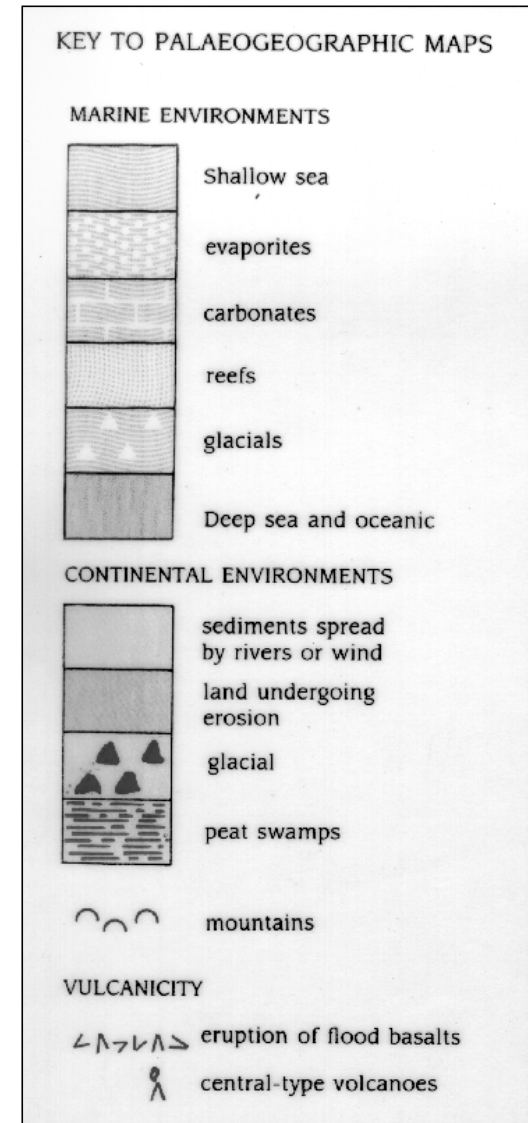
Changes of latitudinal position help to explain many geological points

- Paleoenvironmental evidence from:
 - Sandstones, shales, limestones and diamictites
- Paleogeography can be crossed with data on:
 - Biological distribution and diversity
 - Volcanism
 - Hot spots
 - Mountain ranges
 - Sedimentary basins

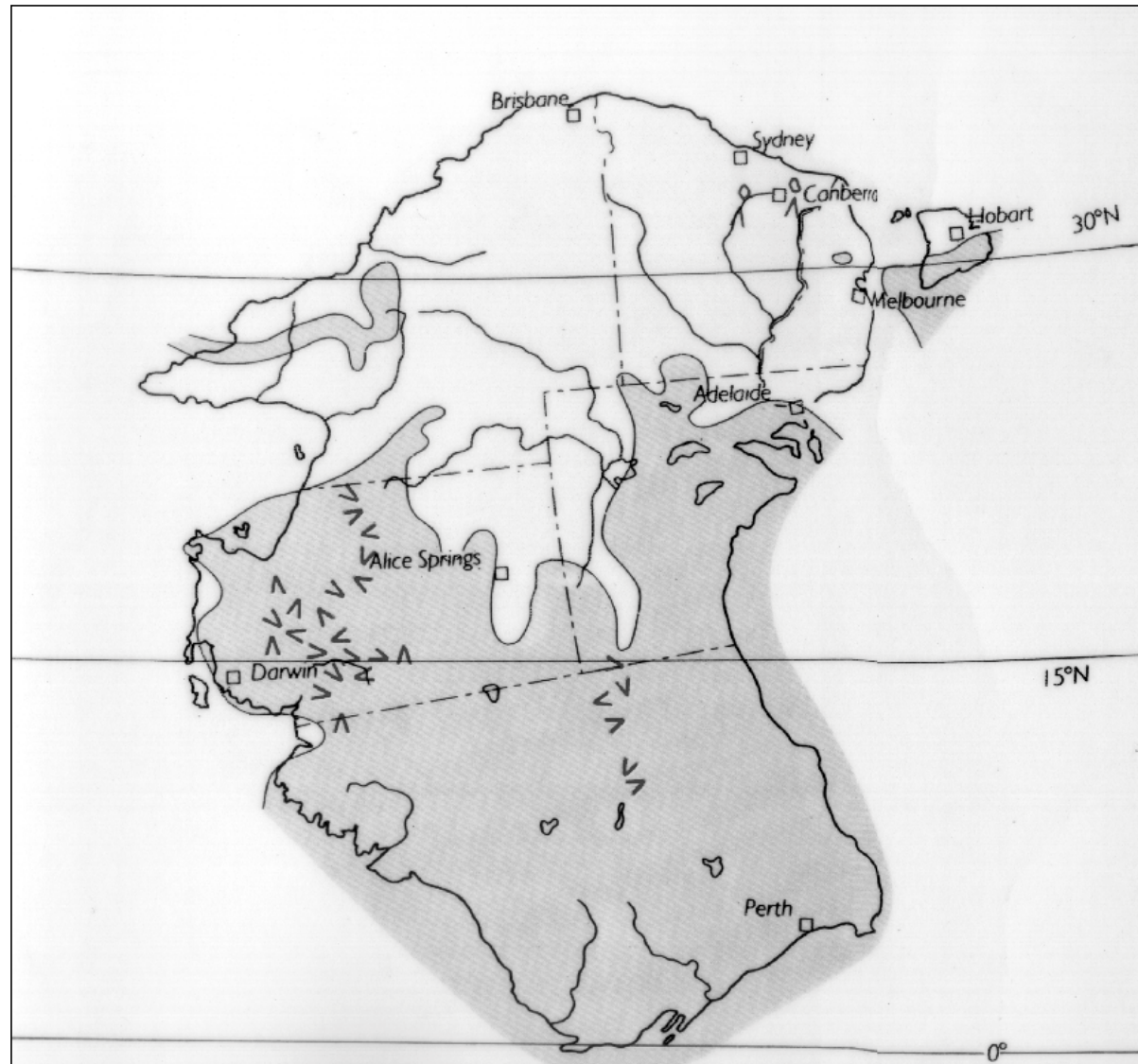
Legend for paleogeographic maps

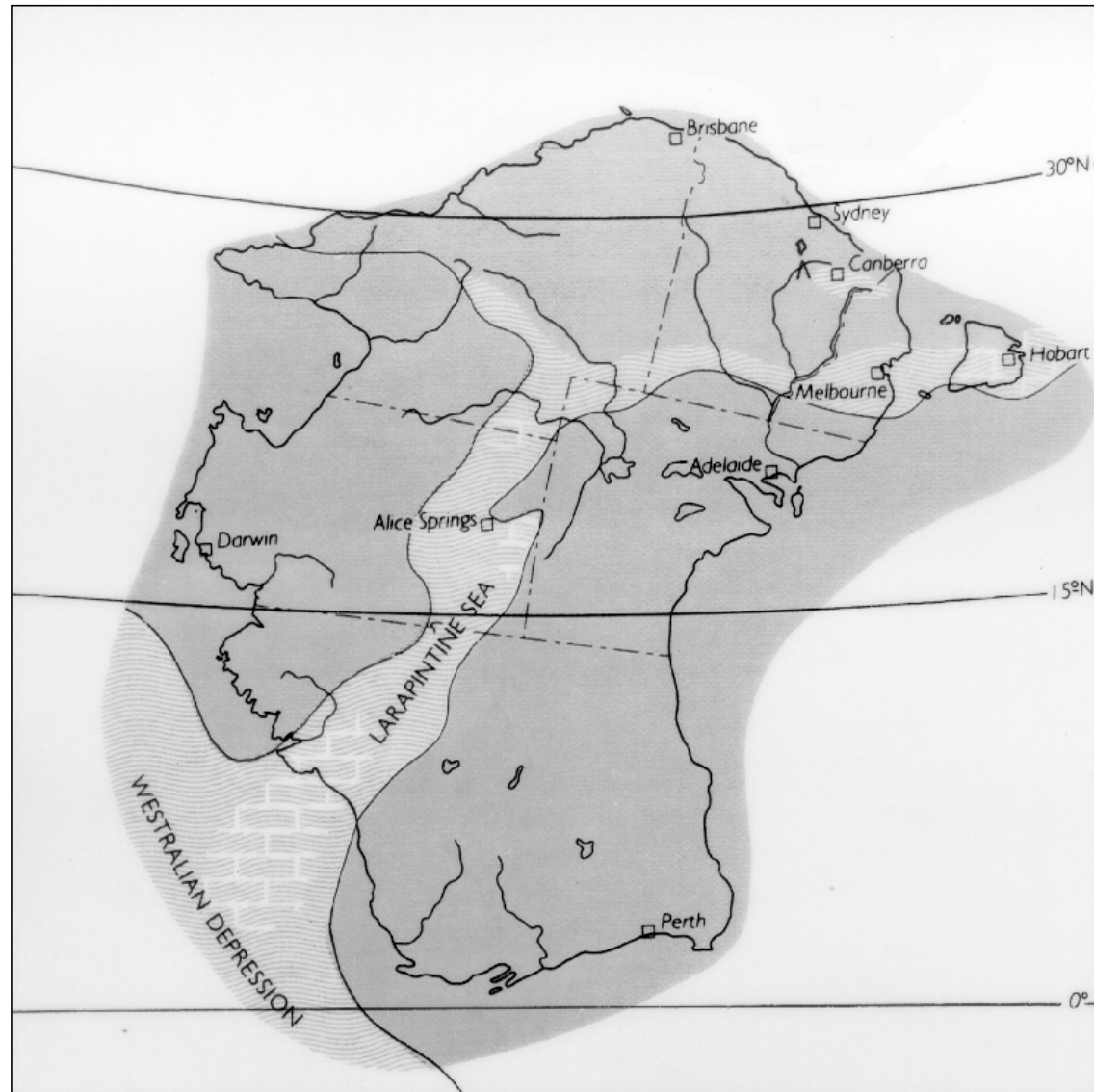
Source:

White M. 1999. *Reading the rocks: animals and plants in prehistoric Australia and New Zealand*. 2 ed. Singapore: Kangaroo Press. 256p.

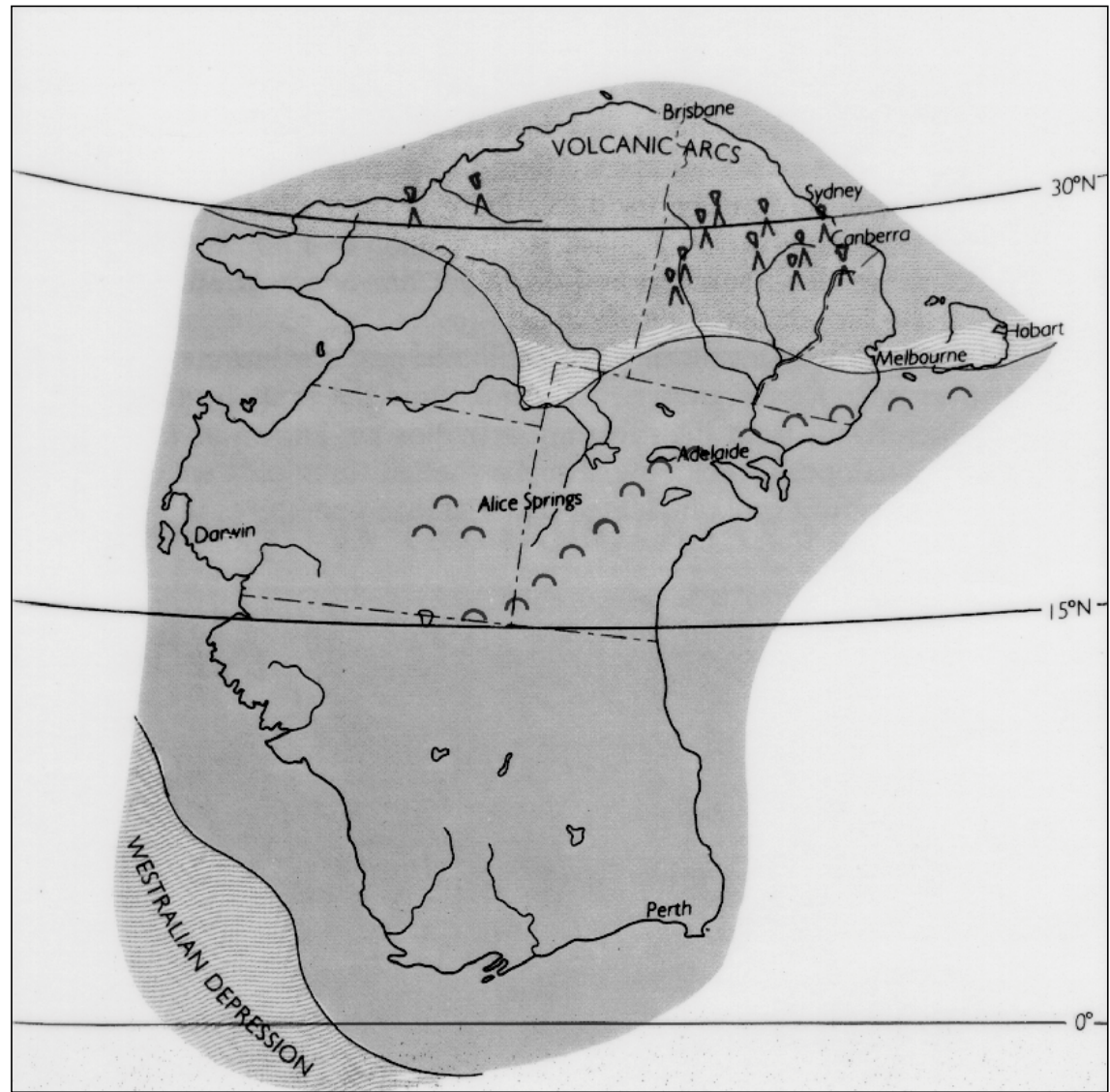


520 Ma

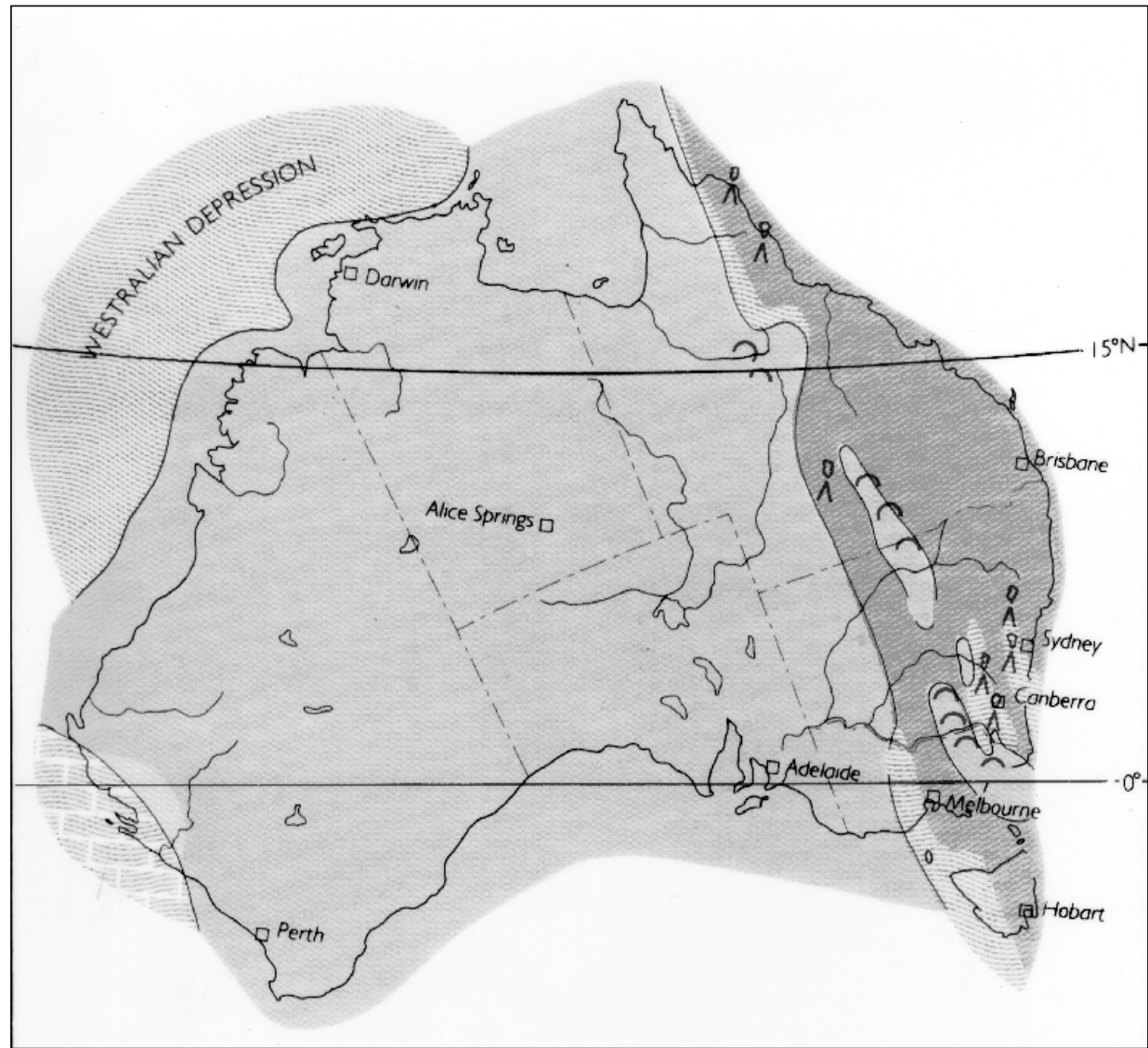




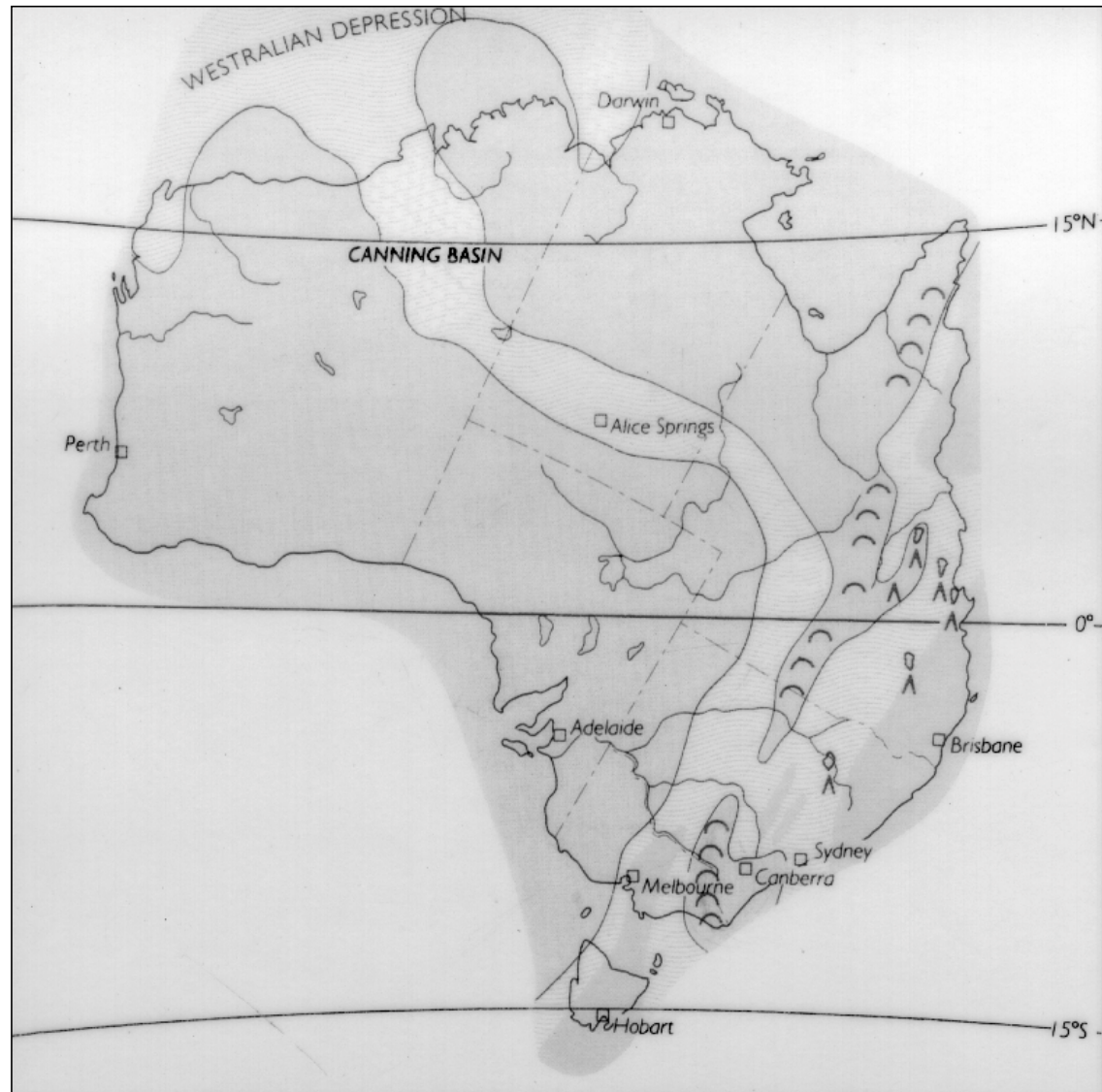
460 Ma



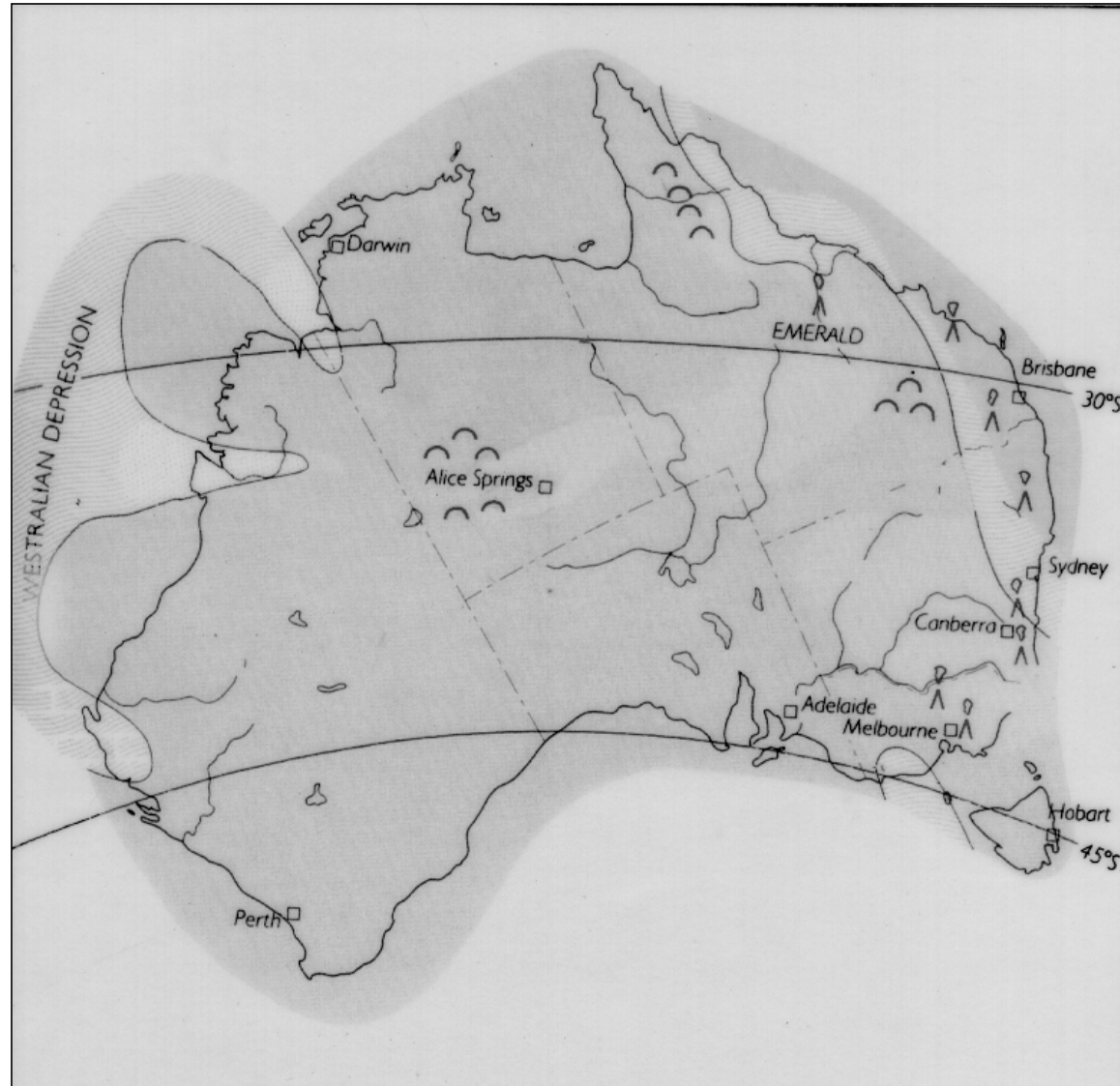
445 Ma



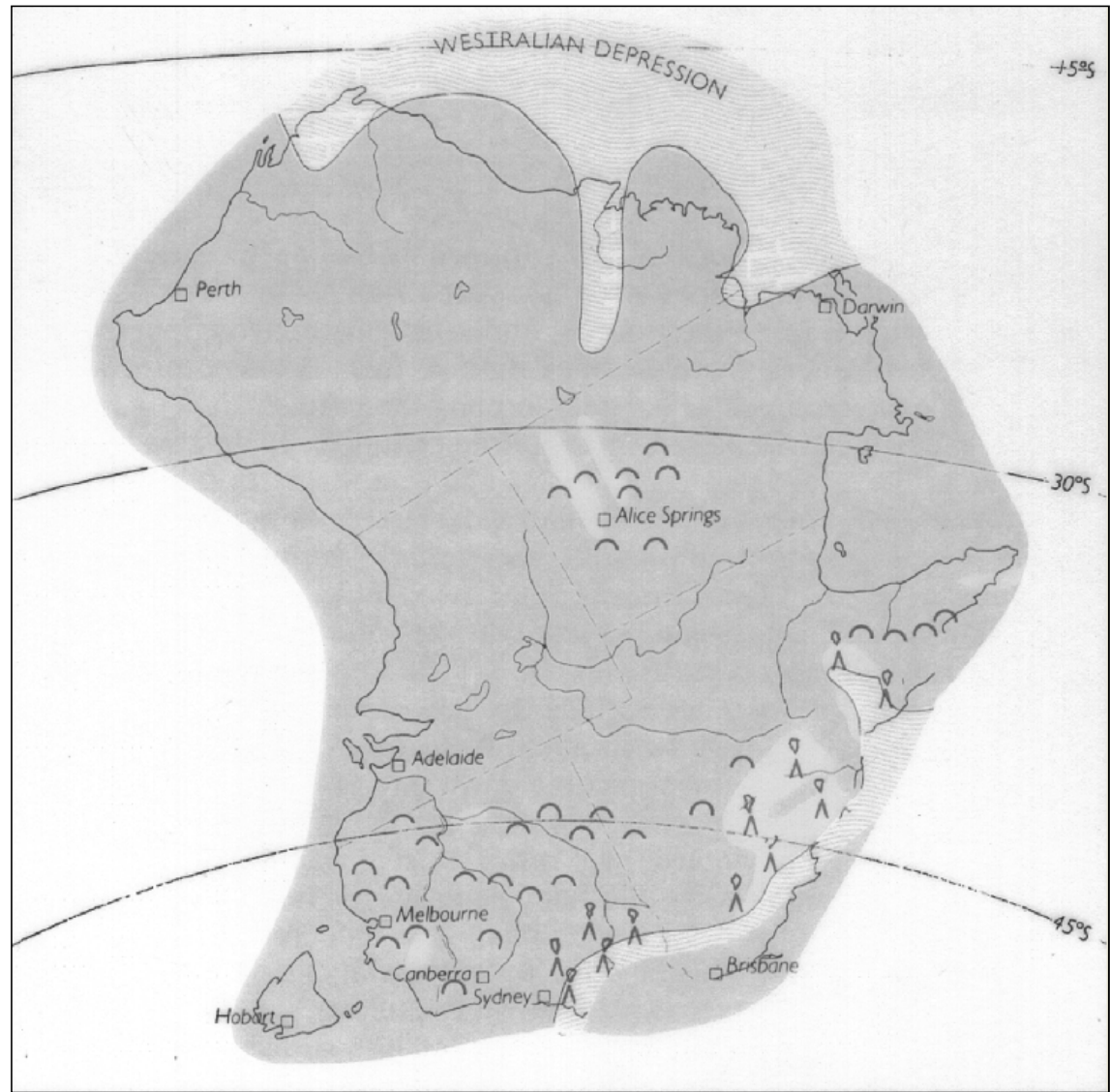
420 Ma



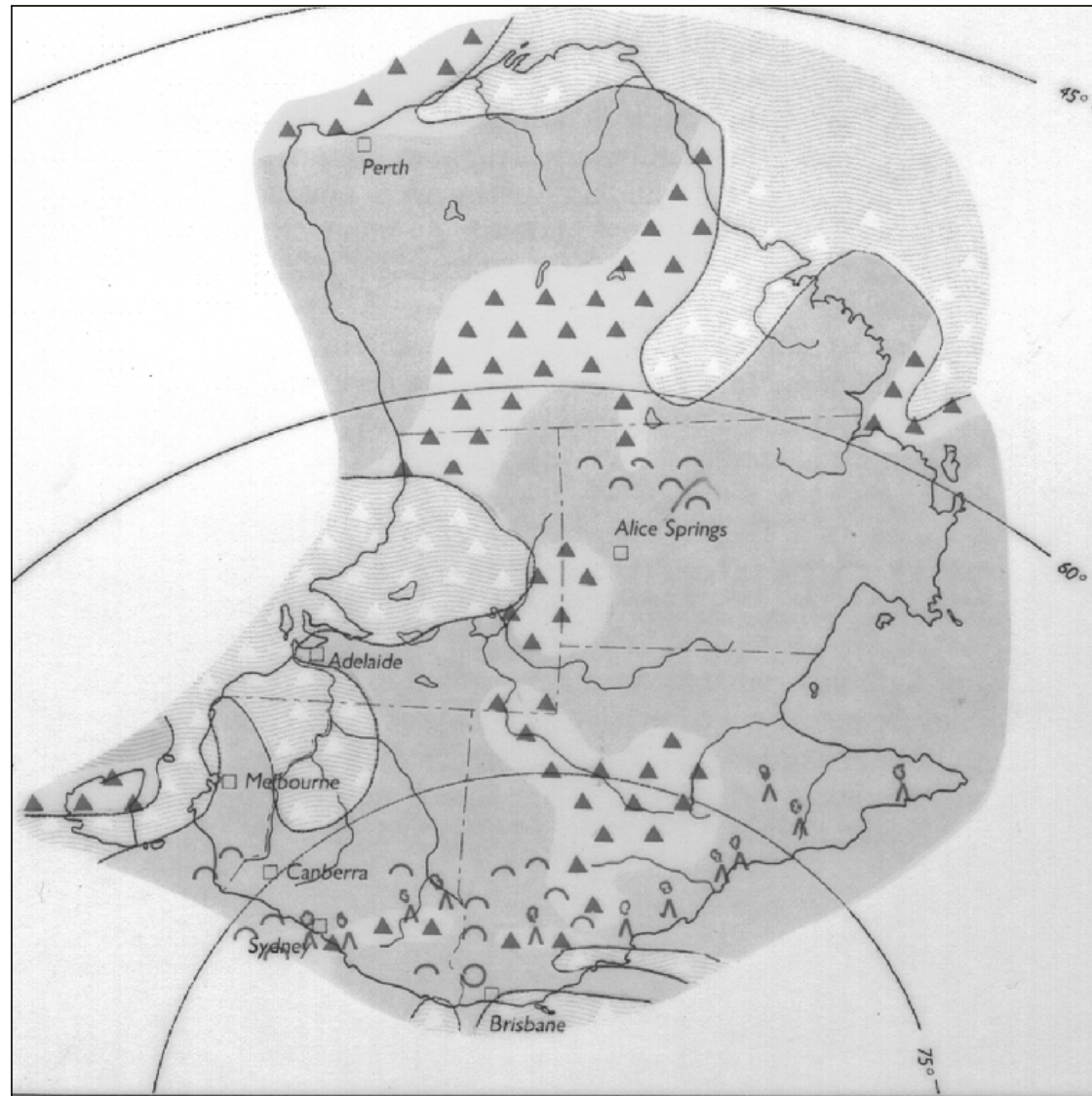
400-380 Ma



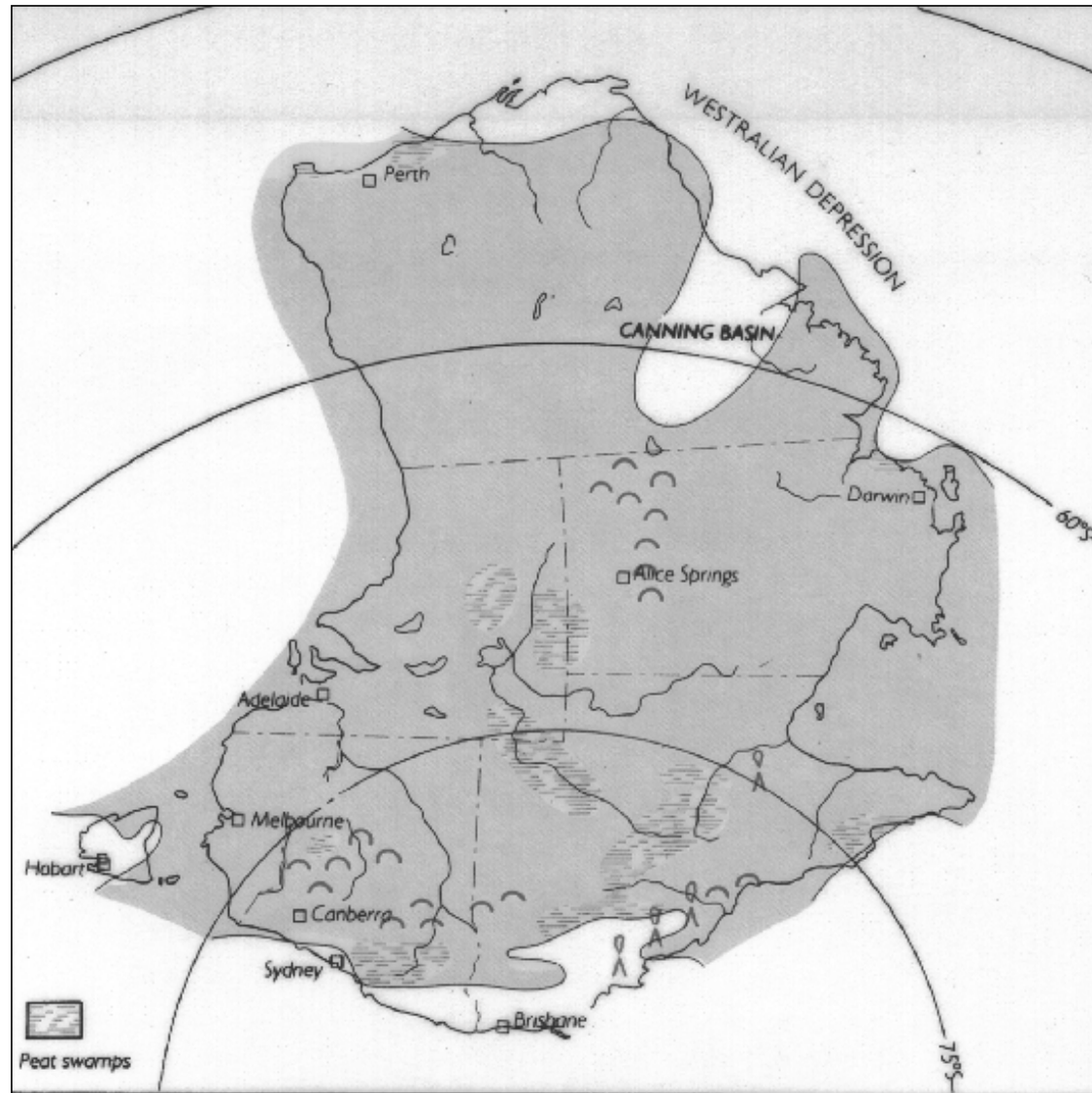
365 Ma



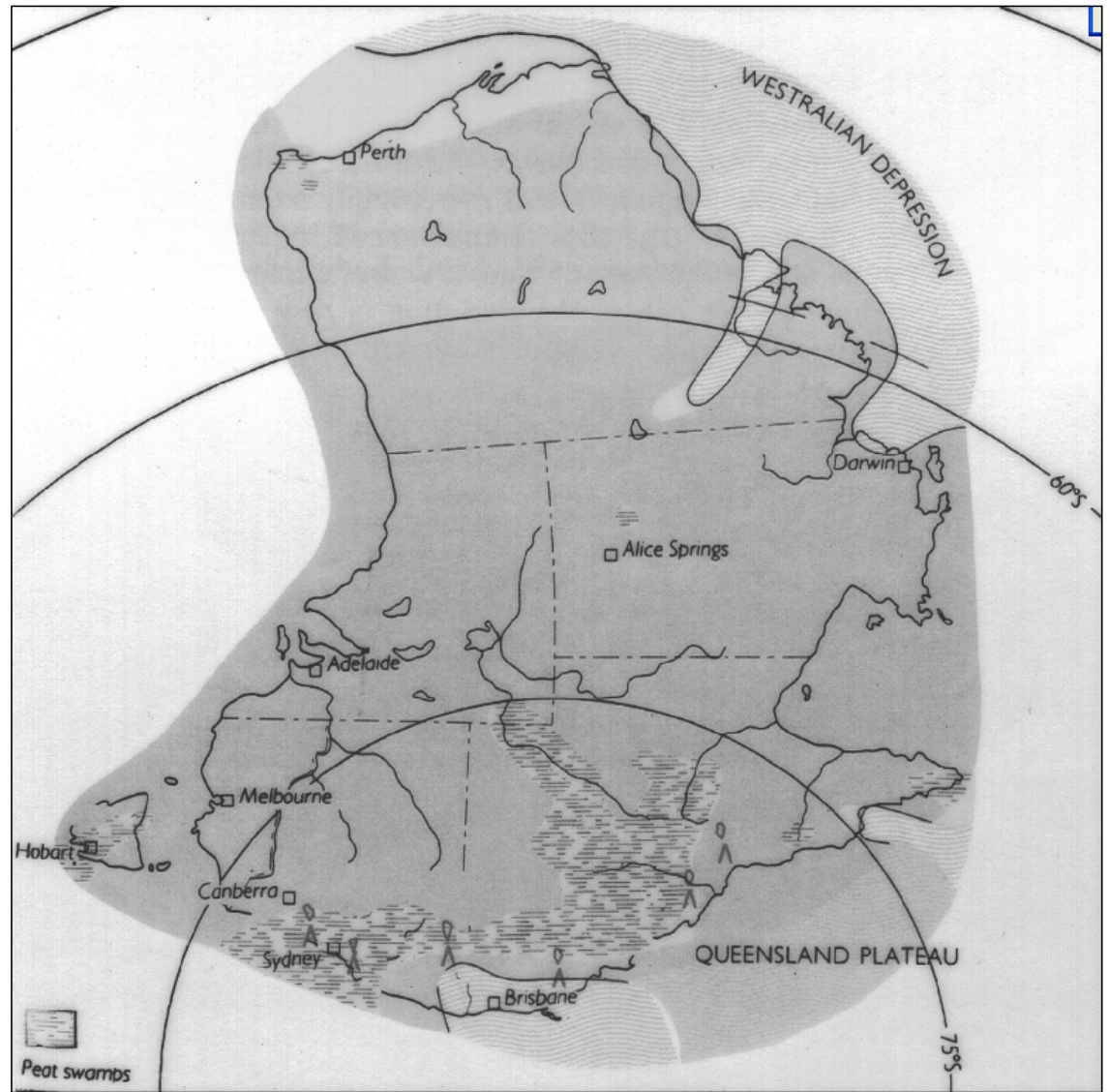
345 Ma



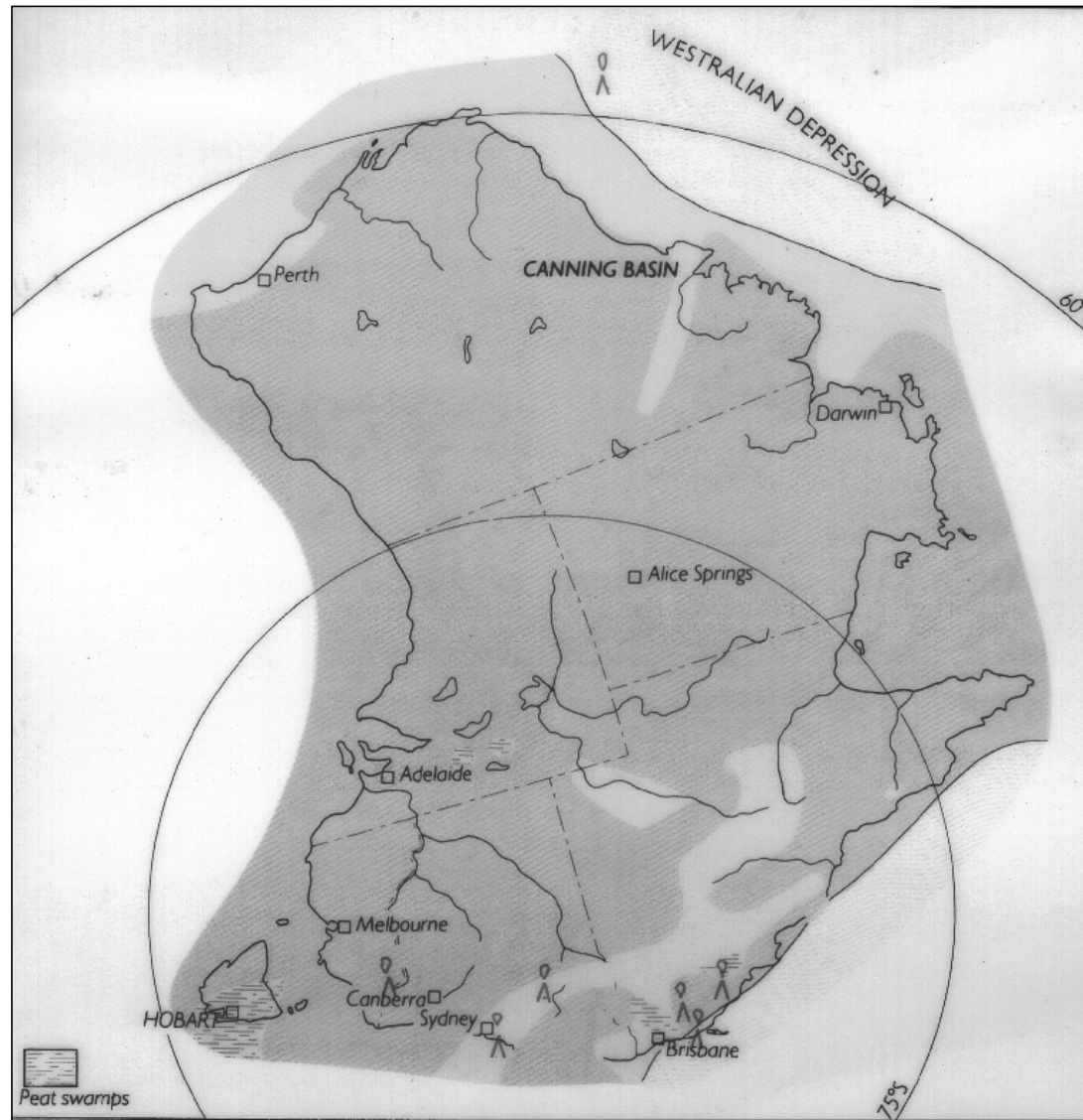
300-280 Ma



270 Ma

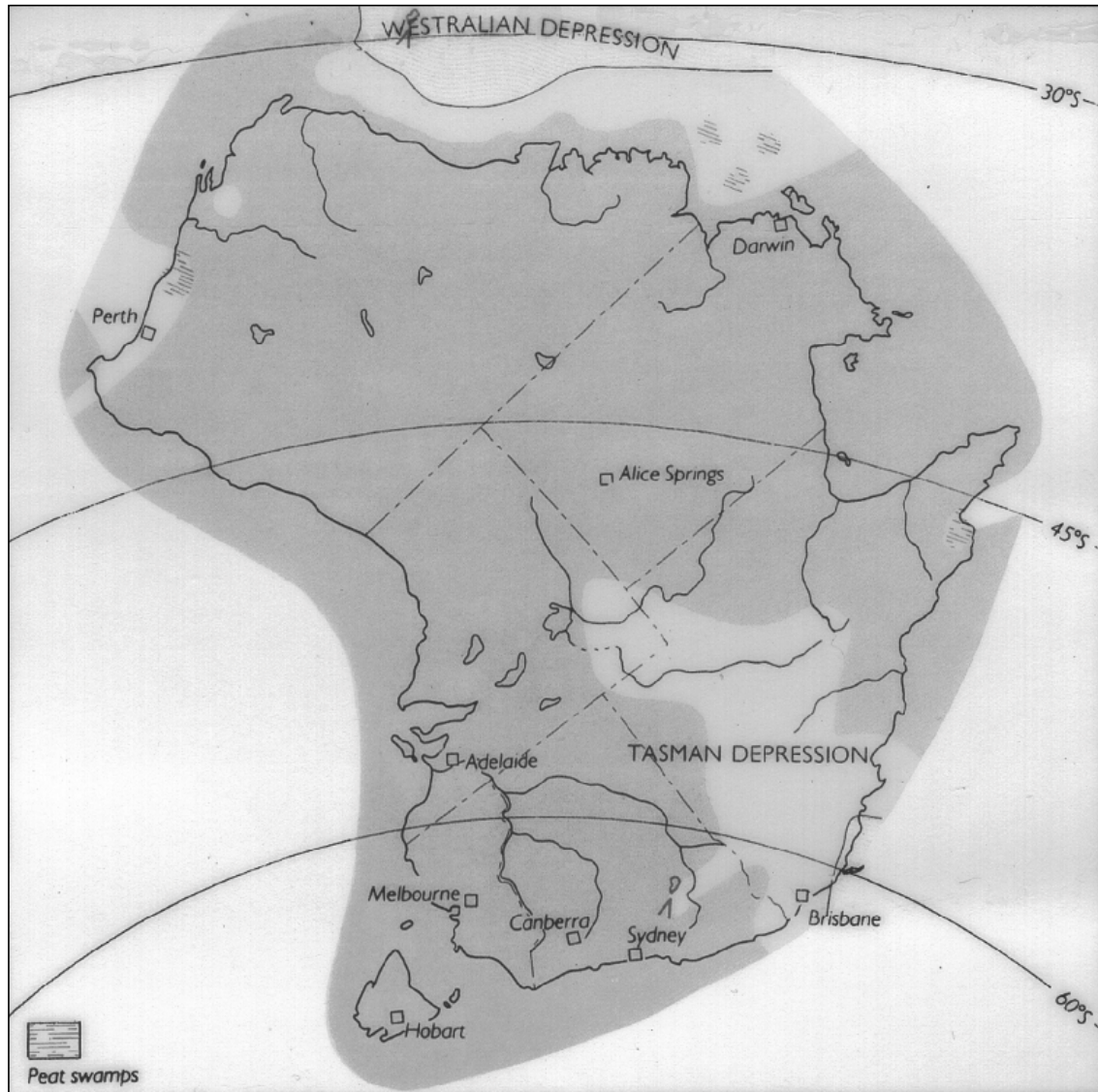


250 Ma

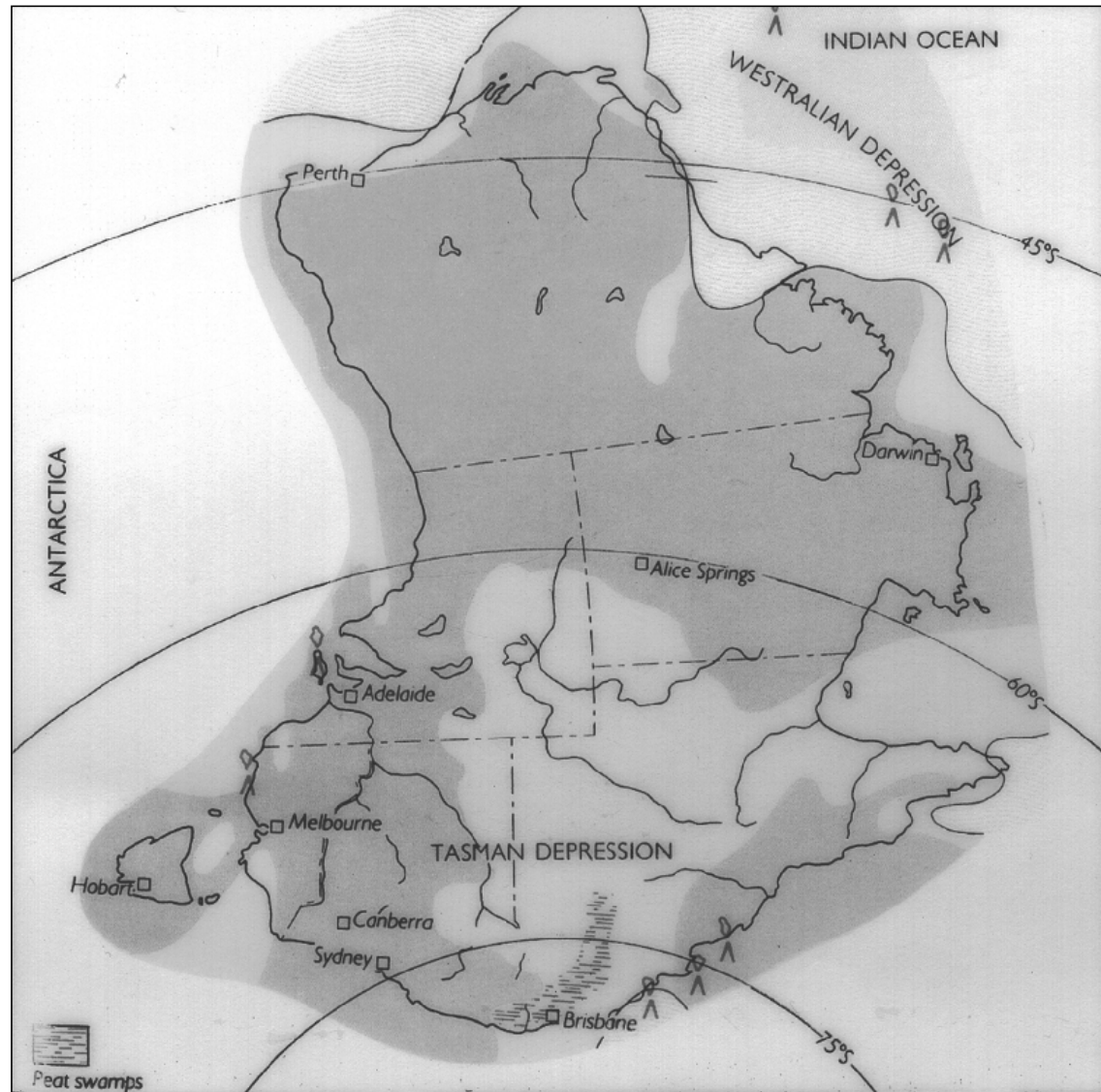


220 Ma

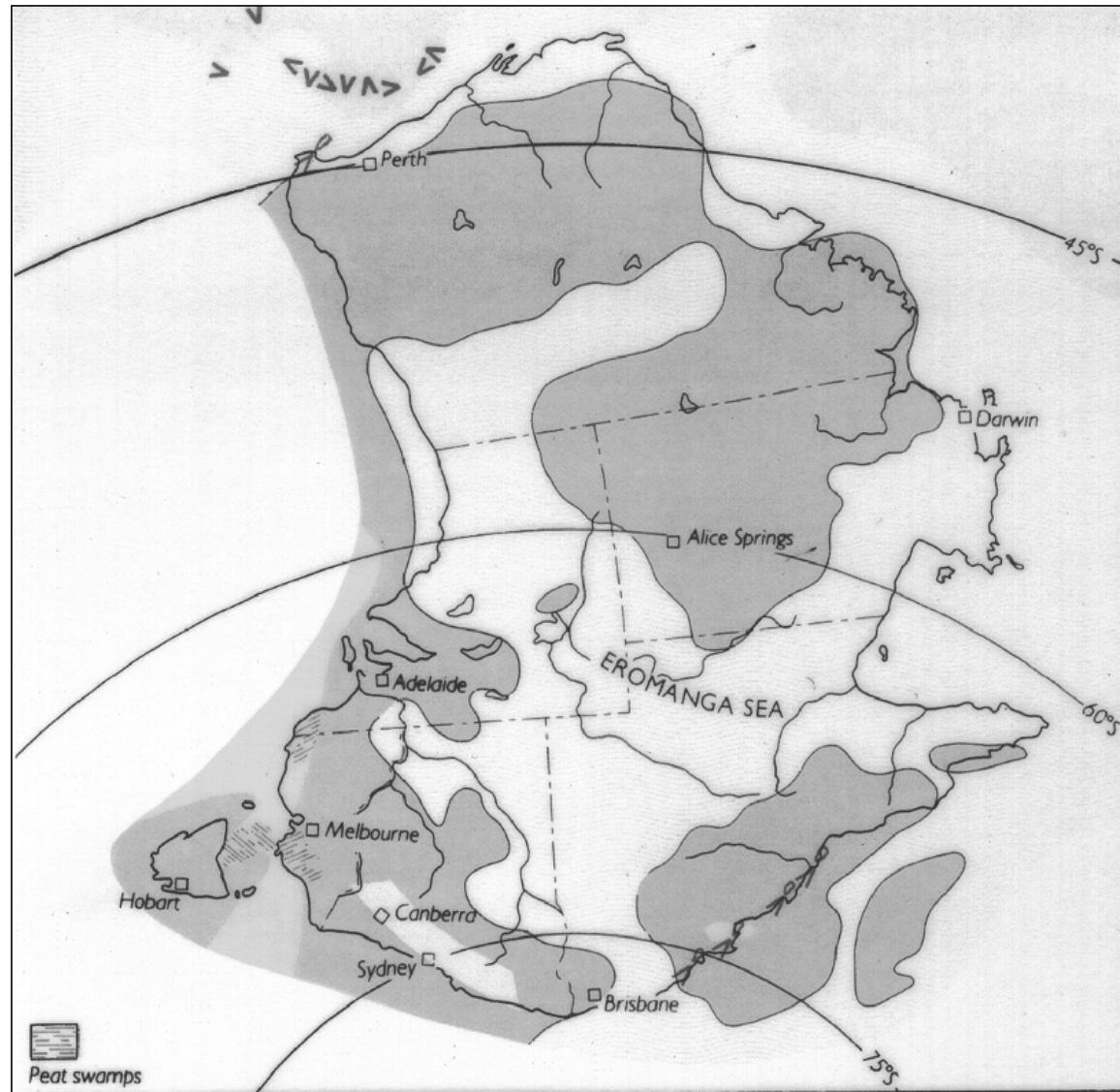
200 Ma



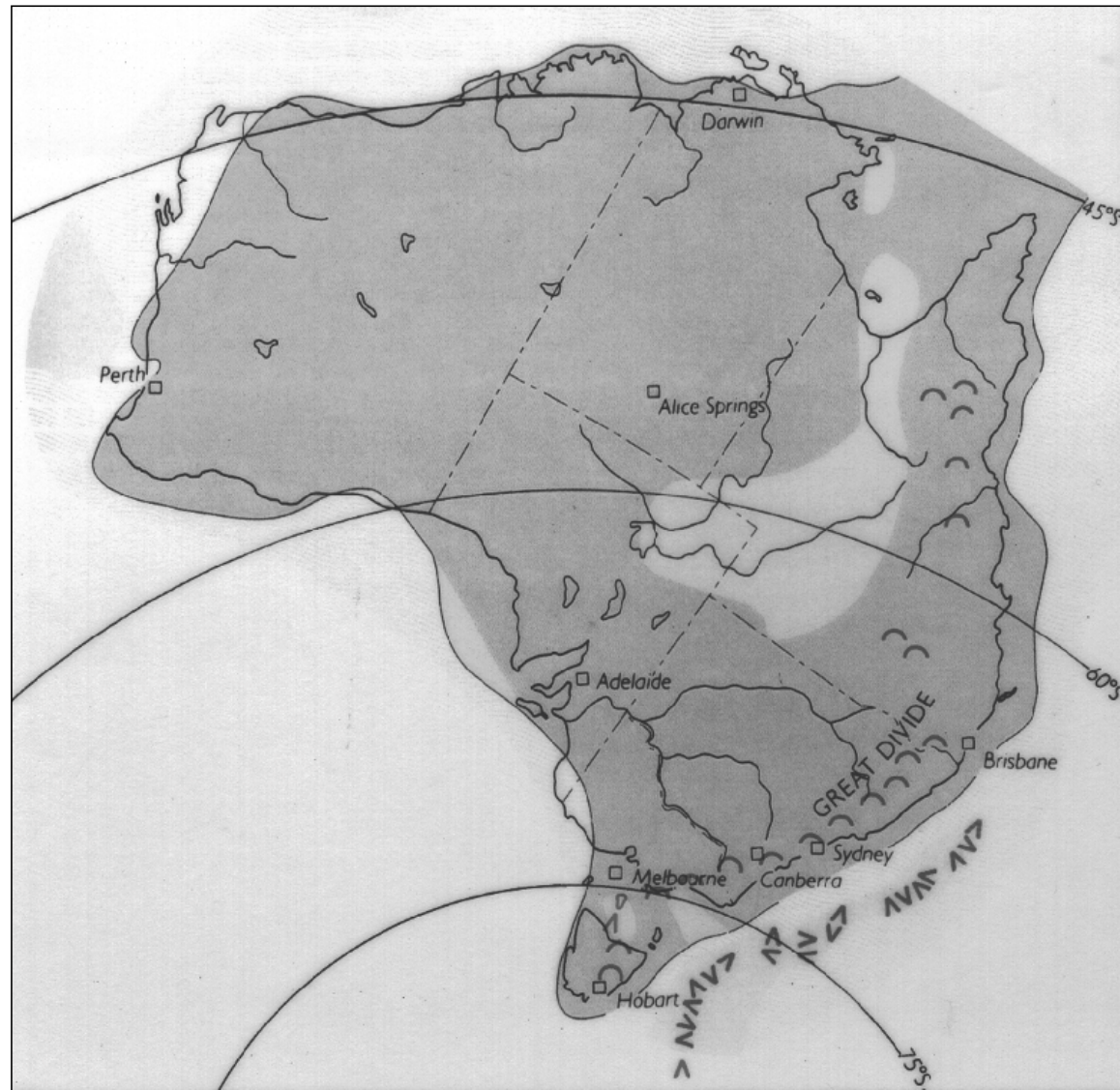
170-140 Ma



120 Ma

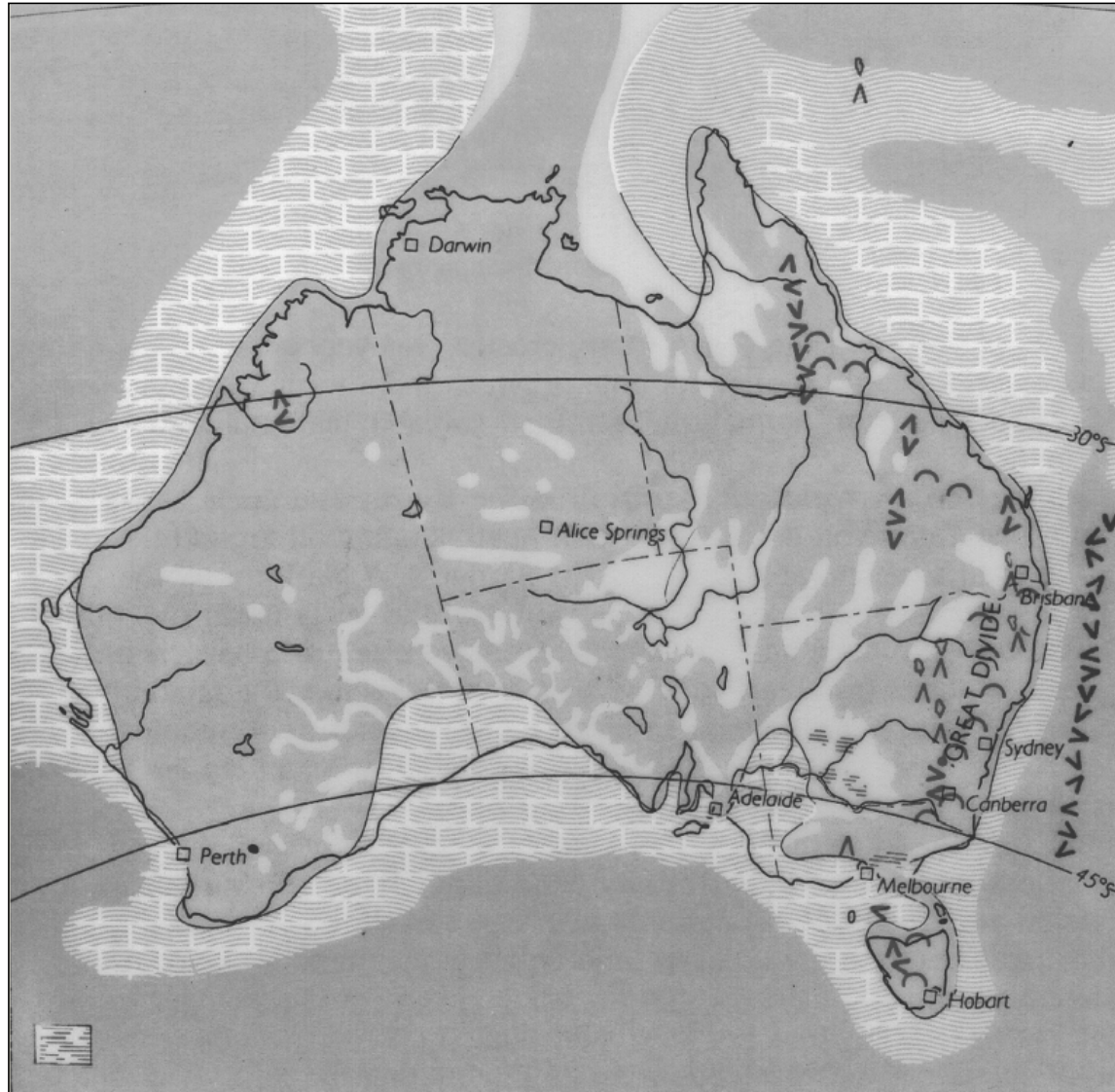


80 Ma

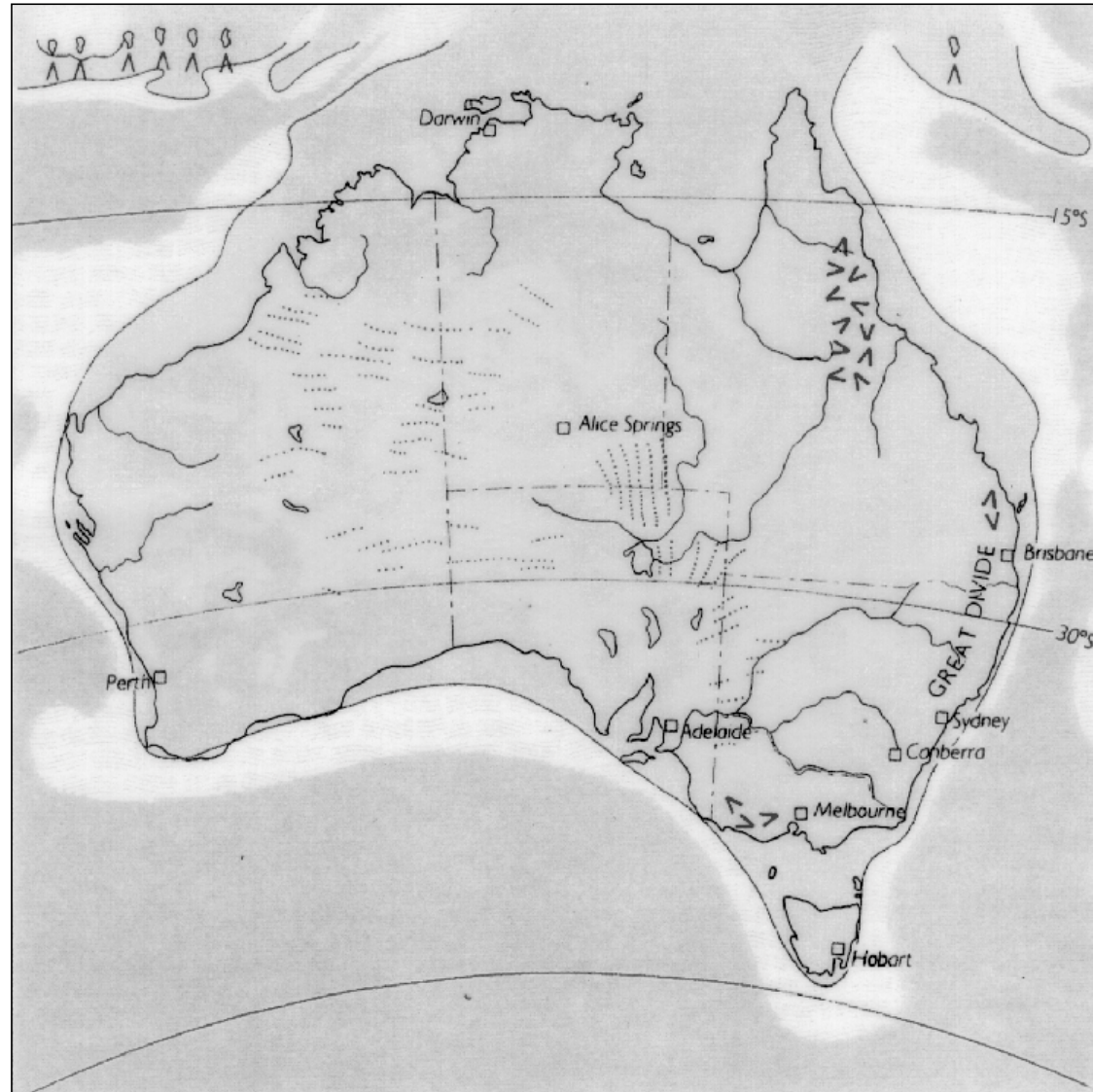




60 Ma



20 Ma



1 Ma

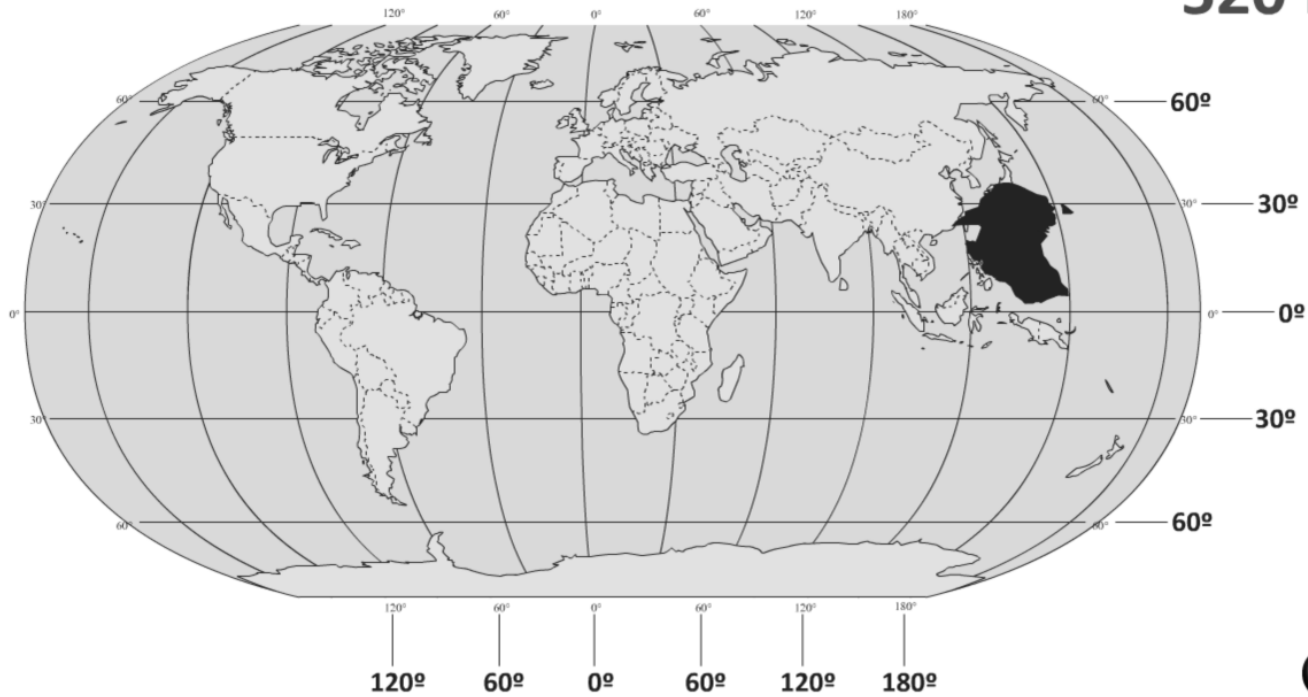
The maps result from a collective, not isolated, effort

- Maps produced by a broad group of:
 - Geologists, geophysicists and other professionals
 - Associated to oil and mineral exploration companies and Australia governmental agencies

Animation MovimientoAustralia.swf

El movimiento del continente australiano

520 Ma



Éon	Fanerozóico										
Era	Paleozóico						Mesozóico			Cenozóico	
Período	Cámbrico	Ordoviciano	Silur.	Devoniano	Carbonífero	Permiano	Triásico	Jurásico	Cretáceo		
542 Ma	488,3	443,7	416,0	359,2	299,0	251,0	199,6	145,5	65,5	0	
± 1,0	± 1,7	± 1,5	± 2,8	± 2,5	± 0,8	± 0,4	± 0,6	± 4,0	± 0,3		



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Control of present-day world climates

- Debate should focus on the interactions between spheres
- The animation helps developing and exploring concepts of climate change, as long as it requires:
 - a) An understanding of paleo-environments
 - b) Historical and epistemological aspects of modern studies on Planet Earth dynamics



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Conclusions

- The maps are an example of the need of collaborative work by research groups, a definitive characteristic of modern Earth Sciences
- The “Australian dance” animation may bring students a motivating tool



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Thank you for your attention!

THE END