

The GEOLOGY *of* AUSTRALIA

The Geology of Australia provides a vivid and informative account of the evolution of the Australian continent over the past 4400 million years. Starting with the Precambrian rocks which hold clues to the origins of life and the development of an oxygenated atmosphere, it then covers the warm seas, volcanism and multiple orogenies of the Palaeozoic which built the eastern third of the Australian continent. This illuminating history then details the breakup of Gondwana and development of climates and landscapes in modern Australia, and finally the development of the continental shelves and coastlines. Separate chapters cover the origin of the Great Barrier Reef, the basalts in Eastern Australia and the geology of the Solar System.

From Uluru to the Great Dividing Range, from sapphires to the stars,
The Geology of Australia is a comprehensive exploration of the timeless forces
that have shaped this continent and that continue to do so.

David Johnson holds an adjunct position as a Senior Principal Research Fellow
in the School of Earth Sciences, James Cook University.

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David Johnson

School of Earth Sciences
James Cook University



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For my parents, Peter and Rua Johnson

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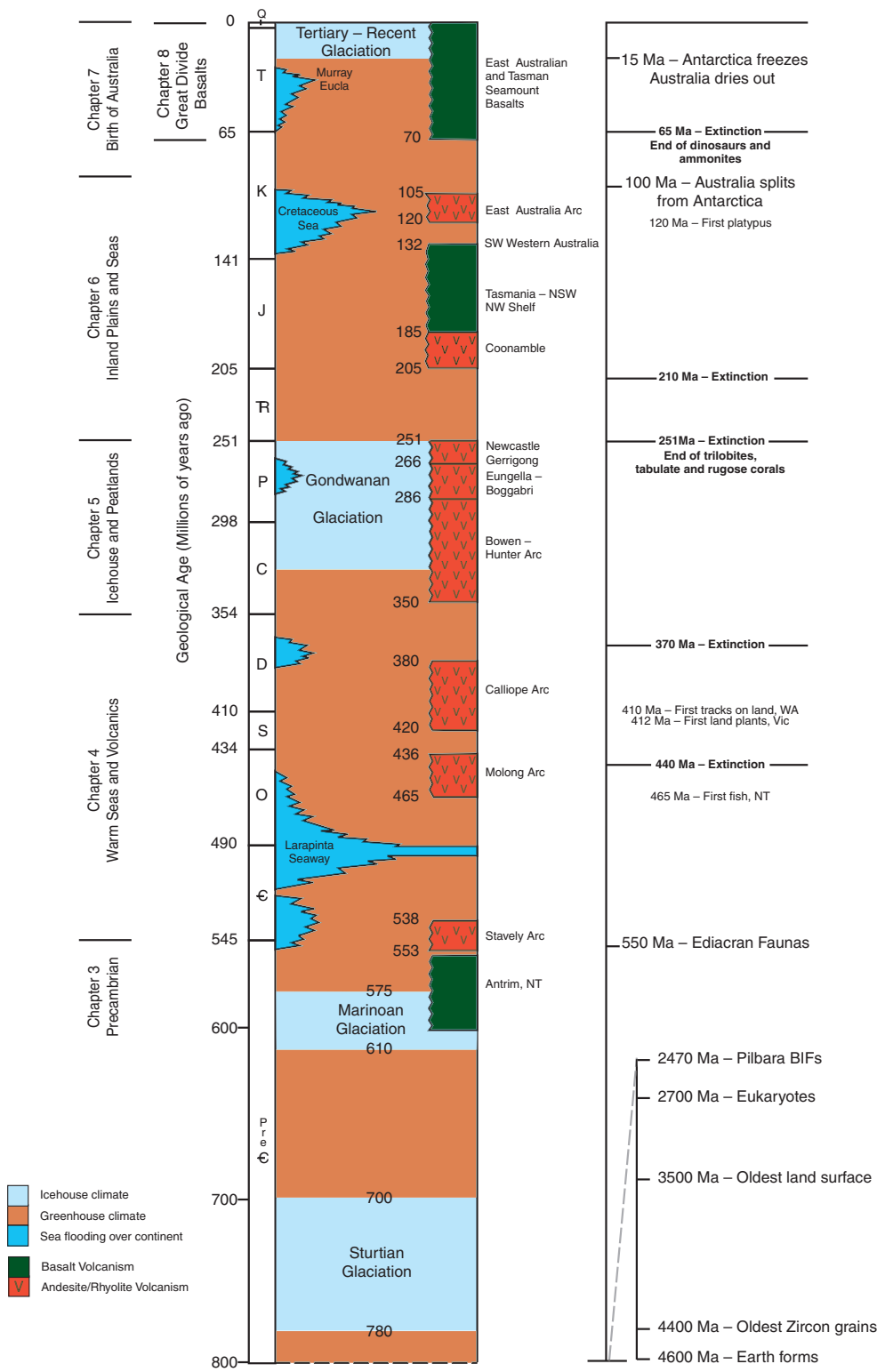
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Contents

	Preface	ix
	Acknowledgements	xi
	Abbreviations and units	xii
I	AN AUSTRALIAN PERSPECTIVE	1
	Australia: age, stability, climate, main features	1
	Box 1.1 Radiometric dating of rocks	3
	Box 1.2 What is geology?	13
	Australian geology	14
2	THE EARTH: A GEOLOGY PRIMER	19
	Model of the Earth	19
	Plate tectonics	21
	Box 2.1 Age-dating the rocks	22
	Minerals	30
	Types of rocks	32
	Box 2.2 Metamorphism	39
	Shaping of the landscape	41
	Box 2.3 The Australian regolith and soils	43
	Coastal and offshore areas	46
	Orogenic cycle	48
	Geological time scale	49
3	BUILDING THE CORE OF PRECAMBRIAN ROCKS	52
	The original Earth	52
	Archaean	55
	Proterozoic	60
	Box 3.1 Geology of Uluru and Kata-Tjuta	67
	Origin of life	68
	Box 3.2 Wilpena Pound and the Ediacaran fauna	71
	Supercontinents: Rodinia and Gondwana	73
4	WARM TIMES: TROPICAL CORALS AND ARID LANDS	79
	Part of Gondwana	79
	Explosive radiation of life	80
	Fossils	82
	Box 4.1 How are fossils preserved?	86
	Warm seas with arid plains, volcanic arcs and deep troughs	88
	Late Devonian upheaval	94
	Granites	95
	Box 4.2 Cooma – granite emplacement and metamorphism 435–433 Ma	96

5	ICEHOUSE: CARBONIFEROUS AND PERMIAN GLACIATION	99
	A glaciated continent	99
	The volcanic arc	106
	Development of the coal basins	108
	Box 5.1 <i>Glossopteris</i> and the vegetation of the cold-climate peatlands in Gondwana	110
	Box 5.2 Burning mountain: Mount Wingen	113
6	MESOZOIC WARMING: THE GREAT INLAND PLAINS AND SEAS	118
	Warm plains and then seas	118
	Box 6.1 The great extinction of life 251 Ma ago	119
	The great inland plains	120
	Box 6.2 The Sydney Basin	128
	Development of inland seas	131
7	BIRTH OF MODERN AUSTRALIA: FLOWERING PLANTS, MAMMALS AND DESERTS	139
	Australia emerges	139
	Box 7.1 Pollen data from brown coal and other Tertiary deposits	149
	The last 15 million years: cooling and growth of the ice-caps	151
	Box 7.2 Evidence for climate change	154
	Australia's arid interior	155
8	EASTERN HIGHLANDS AND VOLCANOES BARELY EXTINCT	164
	Volcanic provinces	164
	Box 8.1 Basalts as a source of gemstones	173
	Seamount chain offshore	176
	Origins of the volcanics and the Great Divide	177
9	BUILDING THE CONTINENTAL SHELF AND COASTLINES	182
	Origin of the outline	182
	Box 9.1 Australia's Exclusive Economic Zone	186
	Sea levels	188
	Types of coasts	190
	Box 9.2 Tsunamis	194
	Box 9.3 Coastal erosion problems	197
	The Australian coastline	200
	Box 9.4 Comparison of Sydney Harbour and Port Phillip Bay	207

I 0	GREAT BARRIER REEF	213
	Introduction to reefs	213
	Box 10.1 Effects of cyclones on the Great Barrier Reef	214
	Reef types	217
	Reef deposits	221
	Formation of the Great Barrier Reef	223
	Box 10.2 Extent of terrigenous sediment in the Great Barrier Reef	227
	Continental slope and trough seaward of the Great Barrier Reef	229
I 1	PLANETS, MOONS, METEORITES AND IMPACT CRATERS	232
	Earth in context	232
	The Sun	232
	The planets	233
	Earth's Moon	236
	Meteorites	240
	Impact craters	241
	Box 11.1 Large meteorite impacts: Eltanin and Chicxulub	246
	Past and future of Earth in the Solar System	248
I 2	CYCLES IN A CONTINENTAL JOURNEY	252
	Global wandering	252
	Cycles of deformation	255
	Cycles of climates	259
	Evolution and extinctions	267
	Epilogue – lessons of geological perspective	269
	Index	273



Preface

Most of the general books on Australian geology were written in the 1800s and early 1900s, and the popular classics by Charles Laseron, *The Face of Australia and Ancient Australia*, were published in the 1950s. A list of general books on the geology, soils and fossils of Australia is given at the end of Chapter 1.

It is time for a new summary of Australian geology, since so many new understandings have been generated in the last 50 years. This book is written basically in the order in which Australia formed, starting with the oldest rocks and working towards the most recent events. In this way we build Australia block by block, episode by episode, and also trace the development of the Earth's climate and life. The diagram at left shows the major events in Australian geological history. Geological time is written as 'millions of years' for general statements and as 'Ma' (mega-anna) when measured accurate dates are given for particular events.

This book uses a minimum of scientific jargon, though it is impossible to bypass all technical words. Indeed, in coming to terms with the scientific basis for many of the decisions we make about managing the Australian environment and commercial development we all need a smattering of technical knowledge. I have kept it to a minimum. Each technical term is explained in a geology primer (Chapter 2). Instead of a glossary, which merely defines the word using other technical terms, Chapter 2 briefly sets each in context. With respect to the sources of the data and theories summarised in this book, I have included the principal sources and other useful references at the end of each chapter, with a short list of websites.

Finally, this book is about the development of the Australian continent and the evolution of its major components and of the landscape in particular. Many of the localities mentioned are listed in the index, so those travelling can understand and appreciate the underlying geology. The map (p. x) shows many of the main localities referred to in this book.

However, it has not been possible to include details of the origin of our many world-class ores, coal and petroleum deposits, and of the economic geology which underpins so much of our quality of life – that will have to wait for another day.



Main localities mentioned

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My particular thanks to my parents and especially my late father for fostering my interest in geology as a youngster and for the many outcrops and meat pies we sampled together. My thanks also to my wife and children who tolerated my absences from our family life on field trips.

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Many people have provided advice on source material and data, access to illustrations, or critical comments on sections of text, and the book has been much improved by their advice. I hope I have included everyone in this list and apologise if anyone has been omitted: Ross Andrew, Mark Barley, Al Bashford, Peter Betts, Alex Bevan, Ted Bryant, Gavin Birch, Ray Cas, Allan Chivas, Jonathan Claoue-Long, Lindsay Collins, Jim Colwell, Keith Crook, Mohinudeen Faiz, Michael Gagan, David Gillieson, Vic Gostin, Iain Groves, Bob Henderson, Chris Herbert, Robert Hill, Richard Jenkins, Barry Kohn, Bill Laing, Mark Leonard, Bernd Lottermoser, David Lowry, Ian MacDougall, Ken McNamara, Nick Oliver, Ken Page, Alex Ritchie, Mick Roche, Peter Roy, Mike Rubenach, Peter Schouten, Jeffrey Stillwell, Caroline Strong, Lin Sutherland, Fons VandenBerg, Peter Whitehead, Simon Wilde, Stephen Wroe, Ann Young, Bob Young.

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DAVID JOHNSON
 Herberton, April 2004

Length, thickness

kilometres	km
metres	m
millimetres	mm
micrometres	µm
nanometres	nm

Slope

metres per kilometre	m/km
----------------------	------

Area

square kilometres	km ²
hectares	ha

Volume

cubic metres	m ³
cubic kilometres	km ³

Density

kilograms per cubic metre	kg/m ³
---------------------------	-------------------

Pressure

kilobars	kbar
----------	------

Atmospheric pressure

hectopascals	hPa
--------------	-----

Temperature

degrees Celsius	°C
Kelvin	K

Time

year	yr
second	s
million years (10 ⁶)	Ma
billion years (10 ⁹)	Ga

Speed

kilometres per second	km/s
metres per second	m/s
millimetres per year	mm/yr

Vertical height

metres above sea level	m ASL
------------------------	-------

*Abbreviations
and units*

*Units follow the International
System of Units (SI).*