

THE GEOLOGY OF AUSTRALIA

The Geology of Australia provides a vivid and informative account of the evolution of the Australian continent over the last 4400 million years.

This illuminating history begins with the Precambrian rocks that hold clues to the origins of life and the development of an oxygenated atmosphere, then covers the warm seas, volcanism and the multiple cycles of Palaeozoic mountain building, which built the eastern third of the Australian continent. It details the breakup of the supercontinent Gondwana, the development of climates and landscapes in modern Australia, and the creation of the continental shelves and coastlines. Separate chapters cover the volcanic origins of the basalts in Eastern Australia, formation and development of the Great Barrier Reef and the geology of the Solar System.

This second edition features two new chapters, covering the evolution of life on Earth, and a geological perspective on climate change. A geology primer explains the key terms and principles of earth sciences in easily understood language.

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

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For my parents, Peter and Rua Johnson

THE GEOLOGY
OF AUSTRALIA
second edition

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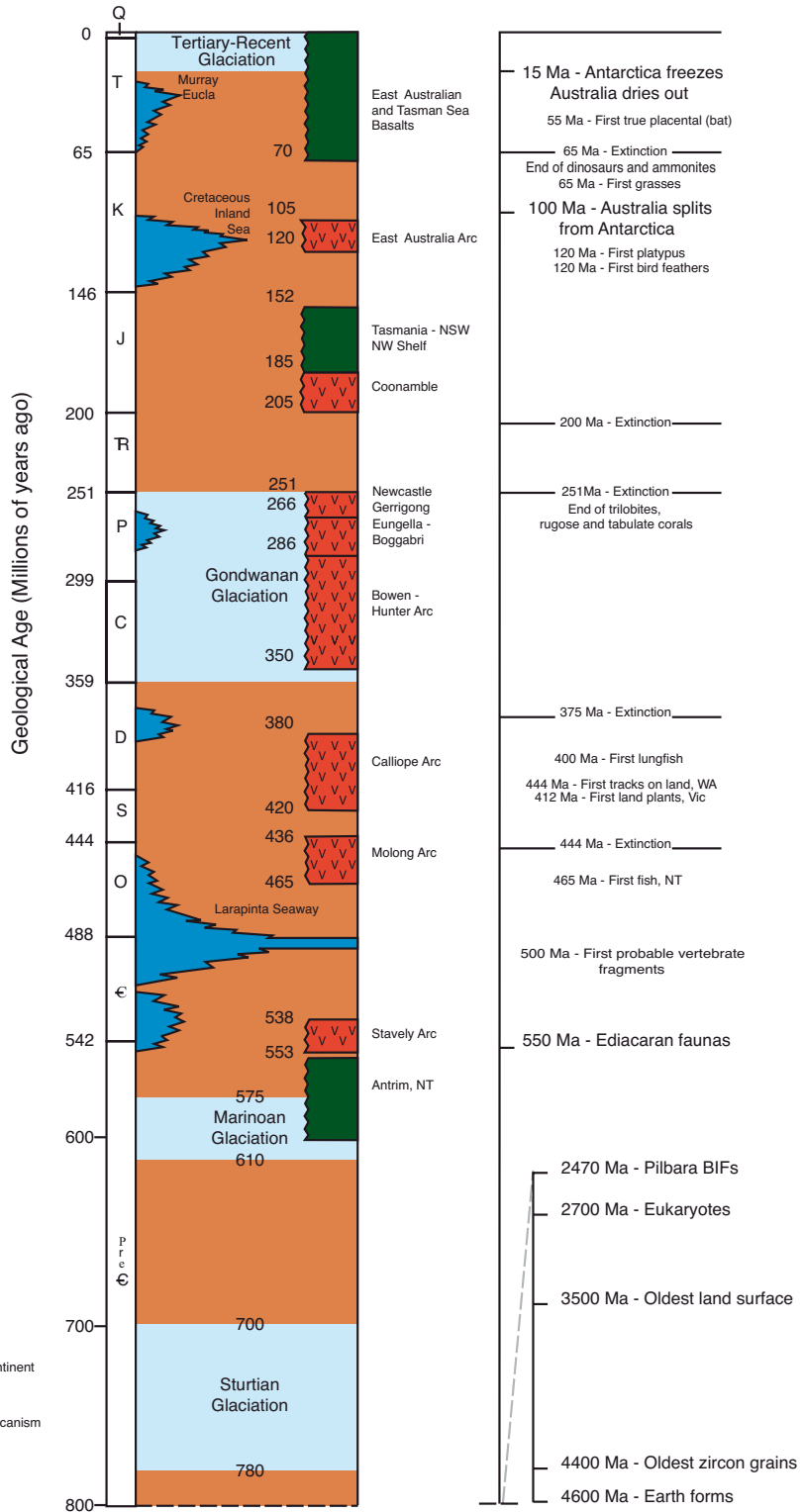
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Contents

Preface	ix
Acknowledgements	x
Abbreviations and units	xii
1 An Australian perspective	1
Australia: age, stability, climate, main features	1
Box 1.1 Radiometric dating of rocks	5
Box 1.2 What is geology?	15
Australian geology	16
2 The Earth: A geology primer	21
Model of the Earth	21
Plate tectonics	24
Box 2.1 Age-dating the rocks	26
Minerals	33
Types of rocks	37
Box 2.2 Two types of volcanoes	38
Box 2.3 Metamorphism	48
Shaping of the landscape	49
Box 2.4 The Australian regolith and soils	51
Box 2.5 Caves	53
Coastal and offshore areas	57
Orogenic cycle	58
Geological time scale	59
3 Building the core of Precambrian rocks	63
The original Earth	63
Archaean	67
Proterozoic	72
Box 3.1 Geology of Uluru and Kata-Tjuta	78
Origin of life	80
Box 3.2 Wilpena Pound and the Ediacaran fauna	83
Supercontinents: Rodinia and Gondwana	84
4 Warm times: Tropical corals and arid lands	89
Part of Gondwana	89
Explosive radiation of life	90
Warm seas with arid plains, volcanic arcs and deep troughs	93
Granites	100
Box 4.1 Cooma – granite emplacement and metamorphism 435–433 Ma ago	101

5	Icehouse: Carboniferous and Permian glaciation	105
	A glaciated continent	105
	The volcanic arc	113
	Development of the coal basins	114
	Box 5.1 <i>Glossopteris</i> and the vegetation of the cold-climate peatlands in Gondwana	117
	Box 5.2 Burning mountain: Mt Wingen	120
6	Mesozoic warming: The great inland plains and seas	123
	Warm plains and then seas	123
	Box 6.1 The great extinction of life 251 Ma ago	125
	The great inland plains	126
	Box 6.2 The Sydney Basin	134
	Development of inland seas	136
7	Birth of modern Australia: Flowering plants, mammals and deserts	145
	Australia emerges	145
	Box 7.1 Pollen data from brown coal and other Tertiary deposits	156
	The last 15 million years: cooling and growth of the ice-caps	157
	Australia's arid interior	160
8	The history and evolution of life on Earth	167
	Fossils	167
	Box 8.1 How are fossils preserved?	174
	History and evolution of life on earth	184
9	Eastern highlands and volcanoes barely extinct	189
	Volcanic provinces	189
	Box 9.1 Basalts as a source of gemstones	199
	Seamount chain offshore	201
	Origins of the volcanics and the Great Divide	202
10	Building the continental shelf and coastlines	207
	Origin of the outline	207
	Box 10.1 Australia's Exclusive Economic Zone	212
	Sea levels	213
	Types of coasts	215
	Box 10.2 Tsunamis	220
	Box 10.3 Coastal erosion problems	223
	The Australian coastline	225
	Box 10.4 Comparison of Sydney Harbour and Port Phillip Bay	232
11	Great Barrier Reef	237
	Introduction to reefs	237
	Box 11.1 Effects of cyclones on the Great Barrier Reef	239
	Reef types	241

Reef deposits	245
Formation of the Great Barrier Reef	246
Box 11.2 Extent of terrigenous sediment in the Great Barrier Reef	251
Continental slope and trough seaward of the Great Barrier Reef	253
12 Planets, moons, meteorites and impact craters	255
Earth in context	255
Meteorites	264
Impact craters	265
Box 12.1 Large meteorite impacts: Eltanin and Chicxulub	271
Past and future of Earth in the Solar System	273
13 A geological perspective on climate change	277
Geological factors influencing climate change	277
Box 13.1 Solar heating or greenhouse gas warming?	287
Scales of climate change	291
Box 13.2 Evidence for climate change	292
Mechanisms of short-term climate change	295
14 Cycles in a continental journey	299
Global wandering	299
Cycles of deformation	306
Cycles of climates	309
Evolution and extinctions	311
Epilogue – lessons of geological perspective	313
Sources and references	317
Figure sources	335
Index	340



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.

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. Websites for further reading are included at the end of chapters as appropriate. With respect to the sources of the data and theories summarised in this book, I have included the principal sources and references at the end of the book, grouped in chapter lists. A list of general books on the geology, soils and fossils of Australia is given at the start of the Sources and References section at the end of the book.

I have taken the opportunity to expand this second edition; to update information such as new age determinations, to explain more carefully aspects which have been raised with me by colleagues, to answer questions commonly asked of me in public, and to cover in more detail the wonderful fossil record of life on Earth that is preserved in Australian rocks. The scales and causes of climate change, as far as we know them, are summarised more fully in a separate chapter.

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. xi) 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.

David Johnson, Herberton, March 2009

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I have been fortunate to study and work with a wide range of geologists and other scientists during my time in industry and at the three universities with which I was associated as a student and staff member. It is impossible to single out every contribution made by these people – whether they were my lecturers, my colleagues or my own students – but certainly all have contributed to my own knowledge and continued interest in Australian earth sciences. Because this is a general book I trust those scientists not cited individually will accept my apologies for I could not clog the text with every source as is normal in a scientific paper.

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David Johnson, Herberston, March 2009