



An Introduction to Metamorphic Petrology

Second Edition

This second edition is fully updated to include new developments in the study of metamorphism as well as enhanced features to facilitate course teaching. It integrates a systematic account of the mineralogical changes accompanying metamorphism of the major rock types with discussion of the conditions and settings in which they formed. The use of textures to understand metamorphic history and links to rock deformation are also explored. Specific chapters are devoted to rates and timescales of metamorphism and to the tectonic settings in which metamorphic belts develop. These provide a strong connection to other parts of the geology curriculum. Key thermodynamic and chemical concepts are introduced through examples which demonstrate their application and relevance. Richly illustrated in colour and featuring end-of-chapter and online exercises, this textbook is a comprehensive introduction to metamorphic rocks and processes for undergraduate students of petrology, and provides a solid basis for more advanced study and research.

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Cambridge University Press & Assessment
978-1-108-47155-8 — An Introduction to Metamorphic Petrology
2nd Edition
Bruce Yardley , Clare Warren
Frontmatter
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CAMBRIDGE
UNIVERSITY PRESS

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www.cambridge.org
Information on this title: www.cambridge.org/9781108471558
DOI: 10.1017/9781108659550

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First published 2021

A catalogue record for this publication is available from the British Library

ISBN 978-1-108-47155-8 Hardback
ISBN 978-1-108-45648-7 Paperback

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Preface

This book is a completely new edition of *An Introduction to Metamorphic Petrology*, originally published by Longman in 1989. It is designed as a core textbook for second- and third-year undergraduate metamorphic petrology courses, and to support more-advanced teaching. Our aim is to provide the background knowledge and understanding of metamorphic rocks needed by a professional geologist who will not become a petrology specialist, and to give a thorough foundation in the basics of metamorphic petrology for future researchers in the field. We have assumed a basic knowledge of chemistry, physics, maths and mineralogy, and some familiarity with the petrological microscope. Where more-detailed knowledge is necessary, this is provided in the text or in text boxes. There are worked examples for some of the quantitative parts of the course.

The book is designed to be worked through from start to finish, with many of the later chapters building on material presented earlier. Chapters 1–3 provide background to metamorphism and the underlying theory of metamorphic mineral assemblages. Chapters 4–6 describe the metamorphism of the three main protolith types, and Chapters 7 and 8 describe the textures of metamorphic rocks and what they tell us about processes. Chapters 9 and 10 tie metamorphic petrology to the underlying tectonic processes that cause metamorphism and include applications of geochronology to metamorphic rocks. These sets of chapters could be tackled independently if required.

For this edition we have extended the sections dealing with determining the conditions of metamorphism and links between metamorphism and deformation, and added a major new section on dating of metamorphic minerals. Links between metamorphism and tectonics are completely updated. Since the text touches on many interdisciplinary topics, we have given Further Readings at the end of each chapter. The text has been rewritten throughout, making use of many new field examples, and the generous decision by Cambridge University Press to produce the book in colour has allowed us to include many photographs and produce colour figures. We have also provided questions for students at the end of each chapter, and some of these can be readily adapted to match specific materials that the instructor has been using in practical classes. Supplementary material is also available at the website [<https://www.cambridge.org/IMP2e>].

Bruce Yardley
Clare Warren



Acknowledgements

This book reflects an approach to metamorphic rocks that has been influenced by many mentors, colleagues and students. We owe a debt to everyone who has helped us hone our skills in teaching and research, pointed us in new directions and shown us the errors of our ways. In particular, a number of friends and colleagues have supplied us with their original photographs or published images. Our thanks to Barbara Kunz, Catherine Mottram, Alex Copley, Joe Cann, Geoff Lloyd, Neil Mantel, Olivier Beyssac, Lucy Campbell, Becky Jamieson, Richard Taylor, Pedro Castiñeras, Jared Butler and Dave Prior. Also thanks to the many colleagues who graciously shared photos and figures that didn't eventually make it into the text.

We are grateful for perceptive and helpful discussions and comments along the way from anonymous reviewers and from Dave Pattison, Barbara Kunz, Thomas Müller, Becky Jamieson and Catherine Mottram. The project was only possible because of the support, understanding and patience of Susan Francis, Melissa Shivers and the rest of the team at Cambridge University Press, who made it possible to deliver the sort of book we wanted.

Last but not least, Clare owes thanks to Felix for putting up with so many lost weekends, while Bruce apologises profusely to Nick for putting her through this book writing nonsense again.