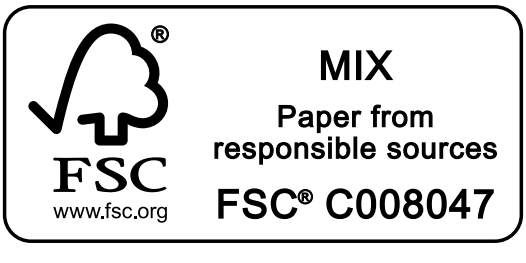
A SHORT INTRODUCTION TO CLIMATE CHANGE

A Short Introduction to Climate Change provides a clear, balanced and well-documented account of one of the most important issues of our time. It covers developments in climate science over the past 250 years, compares climates over geologic time and shows that recent climate change is more than the result of natural variability. It explains the difference between weather and climate by examining changes in temperature, rainfall, Arctic ice and ocean currents. It also considers the consequences of our use of fossil fuels and discusses some of the ways to reduce further global warming. In this book, Tony Eggleton avoids the use of scientific jargon to provide a reader-friendly explanation of the science of climate change.

Concise but comprehensive, and richly illustrated with a wealth of full-colour figures and photographs, *A Short Introduction to Climate Change* is essential reading for anyone who has an interest in climate science and in the future of our planet.

Tony Eggleton is an Emeritus Professor of the Australian National University. He graduated with first class Honours in Science from the University of Adelaide, then completed the degree of Doctor of Philosophy at the University of Wisconsin, USA. For his extensive research into mineralogy he was awarded the degree of Doctor of Science by the University of Adelaide in 1999.



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CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town,
Singapore, São Paulo, Delhi, Mexico City

Cambridge University Press
477 Williamstown Road, Port Melbourne, VIC 3207, Australia

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org
Information on this title: www.cambridge.org/9781107618763

First published 2013

Cover and text design by Denise Lane, Sardine Design
Copy-editing by Renée Otmar
Typeset by Newgen Publishing and Data Services
Printed in China by C & C Offset Printing Co. Ltd

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

A Cataloguing-in-Publication entry is available from the catalogue of the National Library of Australia at www.nla.gov.au

ISBN 978-1-107-61876-3 Paperback

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PREFACE

I had a most satisfying career, able to do what I really wanted, paid to teach and do scientific research and free to explore where my curiosity led me. That is the working life of many a scientist, and I was certainly one of the lucky ones. Now, I had never taken much notice of climate or the weather, at least no more than anyone whose day out is spoilt by rain. True, I did spend six years in Wisconsin, in the United States, where much of the evidence for the Great Ice Ages lies across the landscape, and in another way the last 30 years of my research have indeed been about weather. Not the coming and going of storms and droughts, but the effect the weather has upon rocks. You see, I am a geologist, and I was led by curiosity, coincidence and colleagues into the study of the way in which rocks become soil – mineral weathering. I looked deep into the heart of clays, photographing their relationship to the harder minerals out of which they grew with what was then the most amazing microscope in the world. On a wall in my office are images of minerals magnified to the point at which their constituent atoms are visible. When I retired, there were new opportunities to explore, from playing with grandchildren to travelling the grand landscape of Australia. And so it turned out. But after tidying up the loose ends of 40 years' scientific research, in the longest drought I have experienced and amidst a political storm over the evidence for global warming and a proposed Emissions Trading Scheme, I received a challenging message by email. In this book you will read about where that led.

Two years of reading and writing have taken me away from my wife, Glen, for countless hours – hours when we might have been doing more of those other things. For letting me work without complaint, for supporting me and for reading and gently improving what I wrote, my heartfelt thanks.

Our daughters, Rachel and Cate, added their wisdom and encouragement as each chapter appeared, and again as they were shuffled into their final sequence. Paul Coromandel also read the draft manuscript; his comments were instrumental in improving the text. The figures would still be pencil sketches if Geoff England had not shown me the finer points of computer draughting. My sister, Hilary, and cousins, John and Barbara and her husband Anton, also suggested improvements in the name of clarity. My family was of paramount importance, not just for suggesting ideas and changes, but also for pushing me away from my customary lecturing

style into what I hope is an engaging writing style. I am extraordinarily grateful to them all.

Colleagues at the Australian National University also advised me and informed the development of the book. First was Andrew Glikson, whose passion for the subject was infectious and whose fount of knowledge and resources made starting the job so much easier. Brad Opdyke, John Fitz-Gerald, Patrick De Deckker and Paul Tregoning listened to my questions and always had the answers.

There are a number of scientists whom I have never met but who generously and promptly replied to my emailed pleas for help. To Paul Halloran, Caroline Ummenhofer, Donna Roberts, Judith Lean, David Post, Claudine Chen, Sophie Dove and Ray Langenfelds, thank you for clarifying many issues.

Then, the first draft was completed and it needed peer review. Professor Will Steffen from my university's Climate Change Institute most generously agreed to read and critique what I had written. My thanks go to him for finding the time to read and correct that draft, for his positive response and for encouraging me to find a publisher. That took rather some time, and when I was discouraged it was Dr Barry Fordham who not only gave me the kick that sent me to Cambridge University Press, but then also read every word of the second draft and gave me succinct and sage advice on almost every paragraph. For the generous gifts of your time and wisdom, Barry, I am forever indebted. The text was greatly improved by the careful and detailed comments, corrections and advice given to me by Professor Martin Williams, to whom I am most grateful. My utmost thanks go to Professor Tom Wigley. At short notice he agreed to review the manuscript, and his vast experience and knowledge of the science of climate change were of immense help to me in the final stages of editing.

For photographs, my thanks to Hilary, John and Andrew Brooke, to Roger Hambly, Paul Halloran, Donna Roberts, Daniel Steiner, Ove Hoegh-Guldberg, James Morrow and Giselle Coromandel. I am grateful for the support of the Australian National University, through Professor Andrew Roberts, Director of the Research School of Earth Sciences, for a subsidy to help print this work in colour.

Finally, to my oldest friend, Sandy Facy, thanks. You got me started on the book with a question – and had to wait years for the answer.