QUATERNARY ENVIRONMENTAL CHANGE IN SOUTHERN AFRICA

Physical and Human Dimensions

Ongoing climate change necessitates advances in our understanding of the interrelationships between climate, landscape-shaping processes and human activity over long time periods, especially in areas that are already climatically stressed. Southern Africa is a key region in the story of human evolution during the last 2 million years but, until recently, relationships between human evolution, the archaeological record and environmental changes in this region have been poorly understood or connected.

This volume presents new ideas on macroscale landscape evolution; mountain, fluvial and aeolian processes; and environments in southern Africa during the Quaternary. Interdisciplinary in scope, it brings together an international team of experts to synthesise the latest research and understanding of landscape-human relationships in this region. It incorporates ideas and results from the emerging fields of geoarchaeology and cultural landscapes, and utilises the latest data and analytical techniques.

This is a key reference for researchers studying hominid evolution, geoarchaeology and environmental change, and provides a benchmark study of southern African landscape evolution during the Quaternary. It will also appeal to professionals and policymakers with interests in future human-landscape evolution in southern Africa.

JASPER KNIGHT is Professor of Physical Geography at the University of the Witwatersrand. He is a geoscientist with research interests in geomorphology and sediment system responses to climate change during the late Pleistocene and Holocene, specifically on glaciers, rivers, coasts and mountains, in Europe, the USA, Australasia and southern Africa.

STEFAN W. GRAB is Professor of Physical Geography at the University of the Witwatersrand. He is a geomorphologist with a research focus on cold region and mountain geomorphology, Quaternary environmental change in southern Africa, and quantifying climate change during recent and historical times.

QUATERNARY ENVIRONMENTAL CHANGE IN SOUTHERN AFRICA

Physical and Human Dimensions

Edited by

JASPER KNIGHT
University of the Witwatersrand, Johannesburg

STEFAN W. GRAB
University of the Witwatersrand, Johannesburg

CAMBRIDGE UNIVERSITY PRESS

Shaftesbury Road, Cambridge CB2 8EA, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India

103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of Cambridge University Press & Assessment,
a department of the University of Cambridge.

We share the University's mission to contribute to society through the pursuit of
education, learning and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781107055797

First published 2016

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

Library of Congress Cataloging-in-Publication data
Names: Knight, Jasper, editor. | Grab, S. W., editor.
Title: Quaternary environmental change in southern Africa : physical and human dimensions /
edited by Jasper Knight, University of the Witwatersrand, Johannesburg, and Stefan W. Grab,
University of the Witwatersrand, Johannesburg.
Description: Cambridge : Cambridge University Press, 2016. | Includes bibliographical references
and index.
Identifiers: LCCN 2015035034 | ISBN 9781107055797 (Hardback : alk. paper)
Subjects: LCSH: Paleoclimatology–Quaternary. | Paleoclimatology–Africa, Southern. |
Climatic changes–Africa, Southern.
Classification: LCC QC884.2.C5 Q83 2016 | DDC 551.7/90968–dc23 LC record available at
http://lccn.loc.gov/2015035034

ISBN 978-1-107-05579-7 Hardback

Contents

Contributors

Marion K. Bamford
Evolutionary Studies Institute, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Mark D. Bateman
Department of Geography, University of Sheffield, Sheffield, S10 2TN, UK

Greg A. Botha
Council for Geoscience, PO Box 900, Pietermaritzburg 3200, South Africa

James Brink
National Museum Bloemfontein, PO Box 266, Bloemfontein 9300, South Africa

Kristian J. Carlson
Institute for Human Evolution, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Hayley C. Cawthra
Marine Geoscience Unit, Council for Geoscience, 7535 Cape Town, South Africa; *and* Centre for Coastal Palaeoscience, Nelson Mandela Metropolitan University, PO Box 77000, Port Elizabeth 6031, South Africa

John S. Compton
Department of Geological Sciences, Louis Ahrens Building, Library Road, University of Cape Town, Rondebosch 7701, South Africa

J. Andrew G. Cooper
School of Environmental Studies, University of Ulster, Cromore Road, Coleraine, BT52 1SA, UK; *and* Geological Sciences, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Westville Campus, Private Bag X54001, Durban, South Africa

Ander de Lecea
Geological Sciences, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Westville Campus, Private Bag X54001, Durban, South Africa

Sarah Edlund
Department of Anthropology, University of Wisconsin-Madison, 1180 Observatory Drive, Madison, WI 53706, USA

William N. Ellery
Department of Environmental Science, Rhodes University, PO Box 94, Grahamstown 6140, South Africa

Jennifer M. Fitchett
School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Stefan W. Grab
School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Andrew N. Green
Geological Sciences, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Westville Campus, Private Bag X54001, Durban, South Africa

Michael C. Grenfell
Department of Earth Science, University of the Western Cape, Bellville 7535, South Africa

Suzanne E. Grenfell
Department of Geography and Environmental Studies, University of the Western Cape, Bellville 7535, South Africa

Jason Heaton
Birmingham-Southern College, Campus Box 549022, 900 Arkadelphia Road, Birmingham, AL 35254, USA

Karin Holmgren
Department of Physical Geography and Quaternary Geology, Stockholm University, S-10691 Stockholm, Sweden

Jasper Knight
School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Donovan C. Kotze
Centre for Water Resources Research, University of KwaZulu-Natal, Private Bag 01, Scottsville 3209, South Africa

Kathleen Kuman
School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Philip M. Marren
Department of Resource Management and Geography, University of Melbourne, Victoria 3010, Australia

Steve McCourt
School of Geological Sciences, University of KwaZulu-Natal, Westville Campus, Private Bag X54001, Durban, 4000, South Africa

Michael E. Meadows
Department of Environmental and Geographical Science, South Lane, Upper Campus, University of Cape Town, Private Bag X3, Rondebosch 7701, South Africa

Peter Mitchell
Institute of Archaeology, University of Oxford, 36 Beaumont Street, Oxford, OX1 2PG, UK; *and* School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Frank H. Neumann
Forschungsstelle für Paläobotanik, Westfälische Wilhelms-Universität, Heisenbergstrasse 2, 48149 Münster, Germany; *and* Evolutionary Studies Institute, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Rebecca Powell
Department of Environmental Science, Rhodes University, PO Box 94, Grahamstown 6140, South Africa

Lynne J. Quick
Department of Environmental and Geographical Science, South Lane, Upper Campus, University of Cape Town, Private Bag X3, Rondebosch 7701, South Africa

Jürgen Runge
Goethe Universität, Institut für Physische Geographie & Zentrum für interdisziplinäre Afrikaforschung (ZIAF), Altenhöferallee 1, 60438 Frankfurt am Main, Germany

Maria H. Schoeman
School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Louis Scott
Department of Plant Sciences, Faculty of Natural and Agricultural Sciences, University of the Free State, PO Box 339, 9300 Bloemfontein, South Africa

Paul Shaw
Department of Geography, Faculty of Food and Agriculture, University of the West Indies, St Augustine, Trinidad and Tobago

Rebekah G. Singh
Council for Geoscience, PO Box 900, Pietermaritzburg 3200, South Africa

Dominic Stratford
School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Arnaud J.A.M. Temme
Soil Geography and Landscape, WU Environmental Sciences, Wageningen University, PO Box 47, 6700AA Wageningen, The Netherlands

David S.G. Thomas
School of Geography and the Environment, University of Oxford, Oxford, OX1 3QY, UK

Stephen Tooth
Institute of Geography and Earth Science, Aberystwyth University, Aberystwyth, SY23 3DB, UK; *and* School of Geosciences, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa

Stephan Woodborne
iThemba Laboratories, Private Bag 11, WITS 2050, Johannesburg, South Africa

Sarah Wurz
Evolutionary Studies Institute *and* School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa; *and* Department of Archaeology, History, Cultural Studies and Religion, University of Bergen, Norway