

**Residual Deposits:  
Surface Related Weathering Processes and  
Materials**

# Residual Deposits: Surface Related Weathering Processes and Materials

edited by

R. C. L. Wilson

Department of Earth Sciences, The Open University,  
Milton Keynes

1983

Published for  
The Geological Society of London,  
by Blackwell Scientific Publications  
Oxford London Edinburgh  
Boston Melbourne

Published by

Blackwell Scientific Publications  
Osney Mead, Oxford OX2 0EL  
8 John Street, London WC1N 2ES  
9 Forrest Road, Edinburgh EH1 2QH  
52 Beacon Street, Boston, Massachusetts 02108, USA  
99 Barry Street, Carlton, Victoria 3053, Australia

First published 1983

© 1983 The Geological Society. Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by The Geological Society for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that a base fee of \$02.00 per copy is paid directly to CCC, 21 Congress Street, Salem, MA 01970, U.S.A. 0305-8719/83 \$02.00.

DISTRIBUTORS

USA

Blackwell-Mosby Book Distributors  
11830 Westline Industrial Drive  
St Louis, Missouri 63141

Canada

Blackwell-Mosby Book Distributors  
120 Melford Drive, Scarborough  
Ontario M1B 2X4

Australia

Blackwell Scientific Book Distributors  
31 Advantage Road, Highett  
Victoria 3190

British Library Cataloguing in Publication Data

---

Wilson, R.C.L.

Residual deposits: surface related weathering processes and materials.—(Geological Society special publication, ISSN 0305-8719; no. 11)

1. Weathering

I. Title II. Series

551.3'02 QE570

ISBN 0-632-01072-X

---

# Contents

	Page
Preface: WILSON, R. C. L. ....	1
 <b>WEATHERING PROCESSES</b>	
WILSON, M. J. & JONES, D. Lichen weathering of minerals: implications for pedogenesis ...	5
SPEARS, D. A. Porewater reactions in the unsaturated zone with special reference to ground-water quality in England .....	13
CAWSEY, C. D. & MELLON, P. A review of experimental weathering of basic igneous rocks	19
 <b>KAOLINITES, LATERITES AND BAUXITES</b>	
WOPFNER, H. Kaolinisation and the formation of silicified wood on late Jurassic Gondwana surfaces .....	27
ESTEIOULE-CHOUX, J. Kaolinitic weathering in Brittany: genesis and economic importance .	33
VINCENT, A. The origin and occurrence of Devon Ball Clays .....	39
MONRO, S. K., LOUGHNAN, F. C. & WALKER, M. C. The Ayrshire Bauxitic Clay: an allochthonous deposit? .....	47
MARSHALL, T. R., AMOS, B. J. & STEPHENSON, D. Base metal concentrations in kaolinised and silicified lavas of the Central Burma volcanics .....	59
McFARLANE, M. J. A low level laterite profile from Uganda and its relevance to the question of parent material influence on the chemical composition of laterites .....	69
VALETON, I. Palaeoenvironment of lateritic bauxites with vertical and lateral differentiation .....	77
ESSON, J. Geochemistry of a nickeliferous laterite profile, Liberdade, Brazil .....	91
 <b>RED BEDS</b>	
GARDNER, R. Reddening of tropical coastal dune sands .....	103
PYE, K. Post-depositional reddening of late Quaternary coastal dune sands, north-eastern Australia .....	117
BESLY, B. M. & TURNER, P. Origin of red beds in a moist tropical climate (Etruria Formation; Upper Carboniferous, UK) .....	131
 <b>DURICRUSTS: CALCRETES, SILCRETES AND GYPCRETES</b>	
WOPFNER, H. Environment of silcrete formation: a comparison of examples from Australia and the Cologne Embayment, West Germany .....	151
VAN DE GRAAFF, W. J. E. Silcrete in Western Australia: geomorphological settings, textures, structures, and their genetic implications .....	159
SUMMERFIELD, M. A. Geochemistry of weathering profile silcrettes, southern Cape Province, South Africa .....	167
REEVES, C. C. (Jr) Pliocene channel calcrete and suspenparallel drainage in West Texas and New Mexico .....	179
CARLISLE, D. Concentration of uranium and vanadium in calcrettes and gypcretes .....	185
PARNELL, J. Ancient duricrusts and related rocks in perspective: a contribution from the Old Red Sandstone .....	197
KLAPPA, C. F. A process-response model for the formation of pedogenic calcrettes .....	211
TALMA, A. S. & NETTERBERG, F. Stable isotope abundances in calcrettes .....	221
NETTERBERG, F. & CAIGER, J. H. A geotechnical classification of calcrettes and other pedocretes .....	235
SHAW, R. P. Karstic residual fluorite-baryte deposits at two localities in Derbyshire .....	245
CATT, J. A. Cenozoic pedogenesis and landform development in south-east England .....	251

## Preface

This volume contains papers presented at the Geological Society on March 25th and 26th 1981, plus three additional contributions by researchers who were unable to be present at the meeting. The meeting brought together earth scientists with interests in geomorphology, geochemistry, pedology, sedimentology and applied geology. The multidisciplinary approach to the study of residual deposits is reflected in the 25 chapters of this book, which are arranged in four main groups:

*Weathering processes* (chapters 1–3);

*Kaolinities, laterites and bauxites*  
(chapters 4–11);

*Red beds* (chapters 12–14);

*Duricrusts: calcretes, silcretes and gypcretes*  
(chapters 15–25).

The last two chapters of the book deal with karst related fluorite–baryte deposits, and Cenozoic pedogenesis and landform development in south-east England.

Richard Crockett, Andrew Goudie and Don Highley provided invaluable suggestions during the planning of the meeting that led to this book.

R. C. L. WILSON, Department of Earth Sciences,  
The Open University, Walton Hall, Milton  
Keynes MK7 6AA.