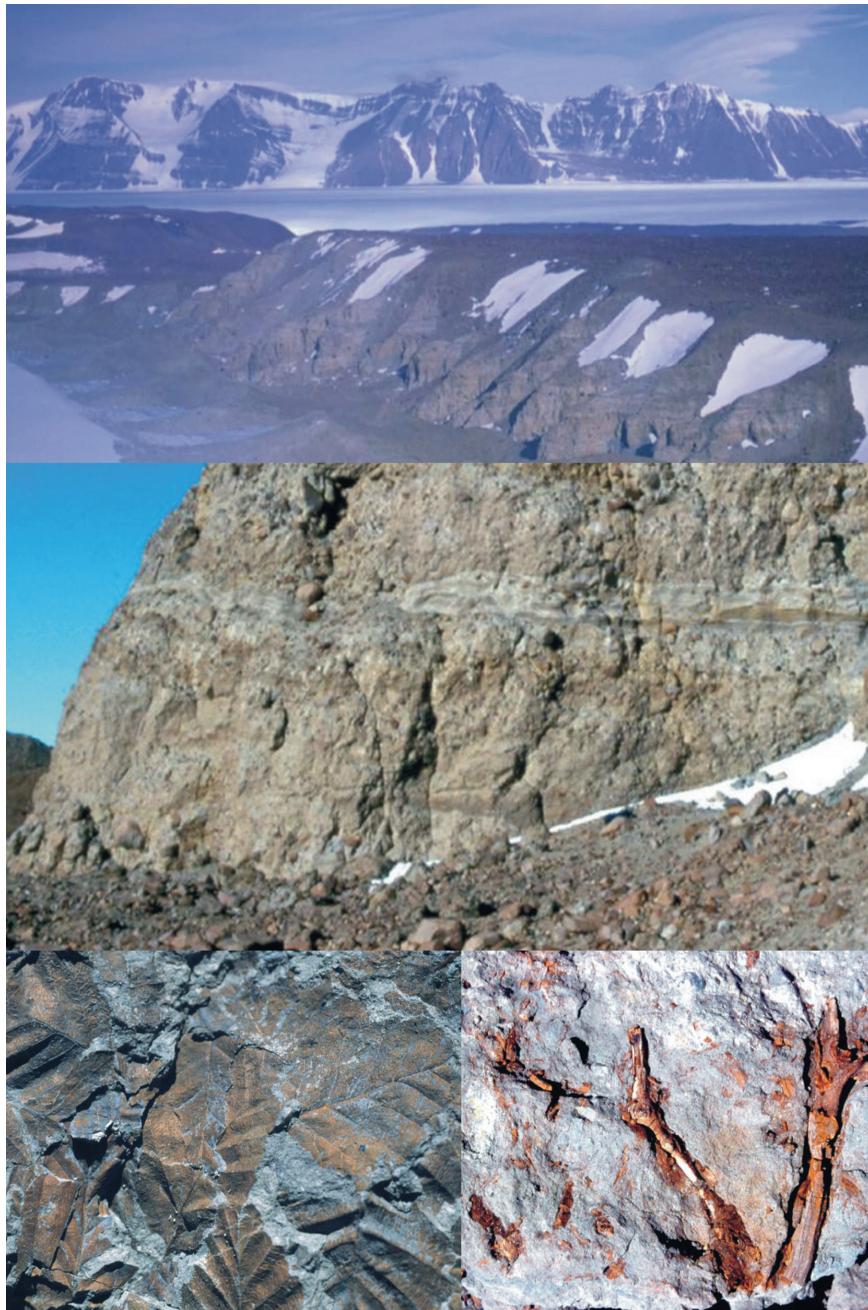


# Earth and Environmental Science

## Transactions of the Royal Society of Edinburgh



volume 104 part 1 2013

## Special Issue

### Antarctic Earth Sciences



11th International Symposium  
on Antarctic Earth Sciences

Published by The RSE Scotland Foundation, 22–26 George Street, Edinburgh EH2 2PQ



The Royal Society of Edinburgh is committed to the widespread dissemination of scientific knowledge and has published the *Transactions of the Royal Society of Edinburgh* since 1785, when James Hutton's 'Theory of the Earth' was published in volume 1. The journal evolved to the *Transactions of the Royal Society of Edinburgh: Earth Sciences* in 1980 and is now (as from 2007) the *Earth and Environmental Science Transactions of the Royal Society of Edinburgh*. Through this journal, the Society continues to encourage and support the international Earth and Environmental Science communities by:

- publishing a journal of international standing and authorship;
- publishing substantial papers on all scientific aspects of the earth and its surface environments;
- publishing without page charges;
- reproducing photographs and artwork to the highest standard, where appropriate at a size larger than is customary; and
- aiming to have papers reviewed within three months by at least two referees of international standing; usually publishing within six months of acceptance.

**The Editorial Board welcomes original manuscripts in the Earth and Environmental Sciences. It also welcomes proposals for Special Issues in these areas.**

#### Editorial Board (as at October 2012)

Paul BISHOP  
(Chairman & Editor-in-Chief)  
University of Glasgow

Mike BENTON  
University of Bristol

Maggie CUSACK  
University of Glasgow

Donald DAVIDSON  
University of Stirling

Doug FETTES  
British Geological Survey,  
Edinburgh

Ian PARSONS  
University of Edinburgh

Andrew SMITH  
(Deputy Chairman)  
Natural History Museum,  
London

Susan WALDRON  
University of Glasgow

P. AHLBERG  
Lund University  
Sweden

P. A. ALLEN  
Imperial College  
London, UK

M. ARIMA  
Yokohama National University  
Japan

S. BANNO  
Kyoto University  
Japan

R. L. CARROLL  
McGill University  
Montreal, Canada

I. W. D. DALZIEL  
University of Texas at Austin  
USA

J. F. DEWEY  
University College, Oxford  
UK

P. DONOGHUE  
University of Bristol  
UK

J. DOWDESWELL  
Scott Polar Research Institute  
University of Cambridge, UK

J. C. KNOX  
University of Wisconsin  
Madison, USA

D. WALOSZEK  
Universität Ulm  
Germany

C. T. WILLIAMS  
The Natural History Museum  
London, UK

*Journals & Archive Officer: Royal Society of Edinburgh: Mrs Vicki M. Hammond*

**COPYRIGHT:** It is the policy of the Royal Society of Edinburgh not to charge any royalty for the production of a single copy of any one article made for private study or research. Specific permission will not be required for photocopying multiple copies of copyright material, to be used for *bona fide* educational purposes, provided this is done by a member of the staff of the university, school or other comparable institution, for distribution without profit to student members of that institution, and provided the copies are made from the original journal. Requests for the copying or reprinting of any article for any other purpose should be sent to the Journals & Archive Officer at the Royal Society of Edinburgh. (publications@royalsoced.org.uk).

*Earth and Environmental Science Transactions of the Royal Society of Edinburgh* publishes one volume per year, usually in three or four parts. Volume 104 (2013) will be published in three parts – two single issues and one double issue.

An annual subscription costs GBP281/ USD530 (Print plus Online) or GBP256/USD475 (Online only). Orders should be placed with Customer Services, Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU UK

Telephone: +44 (0)1223 326070; Fax: +44 (0)1223 325150; email: journals@cambridge.org

*EESTRSE* is indexed/abstracted in the following: Current Contents/Physical, Chemical & Earth Sciences; Biosciences Information Service; Geoabtracts; GEOBASE; Mineralogical Abstracts; Science Citation Index; SciSearch; VINITI (All-Russian Institute of Scientific and Technical Information); *Zoological Record*.

© 2013 The Royal Society of Edinburgh.

The Royal Society of Edinburgh, Scotland's National Academy, is Scottish Charity No. SC 000470

---

**Cover image:** Setting, facies and fossils of Oliver Bluffs, near the head of the Beardmore Glacier, Antarctica. Photo credits: Allan Ashworth (top image) and Jane Francis. See Barrett, pp. 31–53.

# Antarctic Earth Sciences

## ISAES XI Plenary Volume

*Guest Editors*

Martin Siegert  
Tom Bradwell

ISBN: 978 0 902198 91 3

# CONTENTS

Martin SIEGERT and Tom BRADWELL Antarctic Earth Sciences: Preface	1
Ian W. D. DALZIEL Antarctica and supercontinental evolution: clues and puzzles	3
Bryan C. STOREY, Alan P. M. VAUGHAN and Teal R. RILEY The links between large igneous provinces, continental break-up and environmental change: evidence reviewed from Antarctica	17
P. J. BARRETT Resolving views on Antarctic Neogene glacial history – the Sirius debate	31
J. L. WADHAM, R. DE'ATH, F. M. MONTEIRO, M. TRANTER, A. RIDGWELL, R. RAISWELL and S. TULACZYK The potential role of the Antarctic Ice Sheet in global biogeochemical cycles	55
Alan K. COOPER Future progress in Antarctic science: improving data care, sharing and collaboration	69



ISAES XI Delegates on the steps of Our Dynamic Earth, Edinburgh, July 2011.