

JOURNAL OF THE GEOLOGICAL SOCIETY

EDITORIAL BOARD

Chief Editor: Graham Shields (University College London, UK)

Editors

Peter Clift (Louisiana State University, USA)	Adrian Hartley (University of Aberdeen, UK)	Conall Mac Niocaill (University of Oxford, UK)	Veerle Vandeginste (University of Nottingham, UK)
Stephen Daly (University College Dublin, Ireland)	Philip Hughes (University of Manchester, UK)	Randall Parrish (University of Portsmouth, UK)	Igor Villa (University of Bern, Switzerland)
Philip Donoghue (University of Bristol, UK)	Stuart Jones (Durham University, UK)	Tyrone Rooney (Michigan State University, USA)	Sebastian Watt (University of Birmingham, UK)
Ian Fitzsimons (Curtin University, Australia)	Linda Kirstein (University of Edinburgh, UK)	Karel Schulmann (Université Louis Pasteur, Strasbourg, France)	Wenjiao Xiao (Chinese Academy of Sciences)
Deta Gasser (Høgskulen i Sogn og Fjordane, Norway)	Stephen Lokier (Bangor University, UK)	Carl Stevenson (University of Birmingham, UK)	Shihong Zhang (China University of Geosciences Beijing)
Yanni Gunnell (Université de Lyon, France)	John MacDonald (University of Glasgow, UK)	Yuntao Tian (Sun Yat-sen University, Guangzhou, China)	

Journal Manager: Patricia Pantoş (e-mail: patricia.pantos@geolsoc.org.uk)

The Journal of the Geological Society, ISSN: 0016-7649, (USPS 772590) is published bi-monthly in January, March, May, July, September and November by the Geological Society of London, Burlington House, Piccadilly, London W1J 0BG, UK.

The US annual subscription price is \$3,400 (online + print). Airfreight and mailing in the USA by agent named WN Shipping USA, 156-15, 146th Avenue, 2nd Floor, Jamaica, NY 11434, USA. Periodicals postage paid at Jamaica NY 11431.

US Postmaster: Send address changes to the Journal of the Geological Society, WN Shipping USA, 156-15, 146th Avenue, 2nd Floor, Jamaica, NY 11434, USA.

Subscription records are maintained at The Geological Society Publishing House Unit 7 Brassmill Enterprise Centre Brassmill Lane, Bath, BA1 3JN UK.

Air Business Ltd is acting as our mailing agent.

All other Subscriptions: All correspondence relating to trade subscriptions should be addressed to the Journal Subscriptions Department, Geological Society Publishing House, Unit 7, Brassmill Enterprise Centre, Brassmill Lane, Bath, UK, BA1 3JN (tel 01225 445046; fax 01225 442836; e-mail: sales@geolsoc.org.uk). The online + print subscription prices for 2019 can be found here: <https://www.geolsoc.org.uk/lprices>. More information about subscription options can be found at <http://www.geolsoc.org.uk/laccess>.

Outside Europe, the Journal is dispatched by various forms of airspeeded delivery.

Editorial correspondence and material submitted for publication: see inside back cover.

The Geological Society of London was founded in 1807. It is the oldest national geological society in the world and the largest in Europe. It was incorporated under Royal Charter in 1825 and is Registered Charity 210161. To find out about the Society and how you can join, please visit our website at www.geolsoc.org.uk or e-mail enquiries@geolsoc.org.uk.

© The Geological Society of London 2019. No reproduction, copy or transmission of all or part of this publication may be made without the prior written permission of the publisher. In the UK, users may clear copying permissions and make payment to The Copyright Licensing Agency Ltd, Saffron House, 6-10 Kirby Street, London EC1N 8TS UK, and in the USA to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, USA. Other countries may have a local reproduction rights agency for such payments. Full information on the Society's permissions policy can be found at: www.geolsoc.org.uk/permissions

Typeset by Nova Techset Private Limited, Bengaluru and Chennai, India.

Printed and bound by Henry Ling Ltd, Dorset Press, Dorchester, Dorset DT1 1HD, UK