

# JOURNAL OF THE GEOLOGICAL SOCIETY EDITORIAL BOARD

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

## Editors

Kathryn Cutts (Universidade Federal de Ouro Preto, Brazil)	Adrian Hartley (University of Aberdeen, UK)	John MacDonald (University of Glasgow, UK)	Rosalie Tostevin (University of Cape Town, South Africa)
Stephen Daly (University College Dublin, Ireland)	Ashleigh Hood (University of Melbourne, Australia)	Randall Parrish (University of Portsmouth, UK)	Igor Villa (University of Bern, Switzerland)
Philip Donoghue (University of Bristol, UK)	Philip Hughes (University of Manchester, UK)	Tyrone Rooney (Michigan State University, USA)	Sebastian Watt (University of Birmingham, UK)
Deta Gasser (Høgskulen i Sogn og Fjordane, Norway)	Linda Kirstein (University of Edinburgh, UK)	Karel Schulmann (Université Louis Pasteur, Strasbourg, France)	Martin Whitehouse (Naturhistoriska riksmuseet, Stockholm, SE)
Amy Gilligan (University of Aberdeen, UK)	Stephen Lokier (Bangor University, UK)	Carl Stevenson (University of Birmingham, UK)	Wenjiao Xiao (Chinese Academy of Sciences)
Peter Grindrod (Natural History Museum, London, UK)	Xiaoya Ma (University of Exeter, UK)	Yuntao Tian (Sun Yat-sen University, Guangzhou, China)	Shihong Zhang (China University of Geosciences Beijing)

**Journal Manager:** Patricia Pantoş (e-mail: [patricia.pantos@geolsoc.org.uk](mailto: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 \$3,570 (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](mailto:sales@geolsoc.org.uk)). The online + print subscription prices for 2019 can be found here: <https://www.geolsoc.org.uk/lcprices>. More information about subscription options can be found at <http://www.geolsoc.org.uk/lcaccess>.

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](http://www.geolsoc.org.uk) or e-mail [enquiries@geolsoc.org.uk](mailto:enquiries@geolsoc.org.uk).

© The Geological Society of London, 2020. Except as otherwise permitted under the Copyright, Designs and Patents Act, 1988, this publication may only be reproduced, stored or transmitted, in any form or by any other means, with the prior permission in writing of the publisher, or in the case of reprographic reproduction, in accordance with the terms of a licence issued by the Copyright Licensing Agency in the UK, or the Copyright Clearance Centre in the USA. In particular, the Society permits the making of a single photocopy of an article from this issue (under Sections 29 and 38 of this Act) for an individual for the purposes of research or private study. Open access articles, which are published under a CC-BY licence, may be re-used without permission, but subject to acknowledgement.

Full information on the Society's Permission Policy can be found at: <https://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