

# GEOLOGY

FEBRUARY 2017 | VOLUME 45 | NUMBER 2

- 99 Tidal rhythmites in the southern Bouse Formation as evidence for post-Miocene uplift of the lower Colorado River corridor**  
Brennan O'Connell, Rebecca J. Dorsey, and Eugene D. Humphreys
- 103 Tracing crustal evolution by U-Th-Pb, Sm-Nd, and Lu-Hf isotopes in detrital monazite and zircon from modern rivers**  
Xiao-Chi Liu, Yuan-Bao Wu, Christopher M. Fisher, John M. Hanchar, Luke Beranek, Shan Gao, and Hao Wang
- 107 Overbank sedimentation from the historic A.D. 2011 flood along the Lower Mississippi River, USA**  
Franklin T. Heitmuller, Paul F. Hudson, and Richard H. Kesel
- 111 Regional variability in the frequency and magnitude of large explosive volcanic eruptions**  
Tom Sheldrake and Luca Caricchi
- 115 Silicified glendonites in the Ediacaran Doushantuo Formation (South China) and their potential paleoclimatic implications**  
Zhou Wang, Jiasheng Wang, Erwin Suess, Guangzhe Wang, Can Chen, and Shuhai Xiao
- 119 An urban collection of modern-day large micrometeorites: Evidence for variations in the extraterrestrial dust flux through the Quaternary**  
M.J. Genge, J. Larsen, M. Van Ginneken, and M.D. Suttle
- 123 Barrier island migration dominates ecogeomorphic feedbacks and drives salt marsh loss along the Virginia Atlantic Coast, USA**  
Charles D. Deaton, Christopher J. Hein, and Matthew L. Kirwan
- 127 The dynamics of gold in regolith change with differing environmental conditions over time**  
Ravi Anand, Mel Lintern, Rob Hough, Ryan Noble, Mike Verrall, Walid Salama Jens Balkau, and Nigel Radford
- 131 A new attraction-detachment model for explaining flow sliding in clay-rich tephtras**  
Max O. Kluger, Vicki G. Moon, Stefan Kreiter, David J. Lowe, G.J. Churchman, Daniel A. Hepp, David Seibel, M. Ehsan Jorat, and Tobias Mörz
- 135 A probabilistic analysis of meteorically altered  $\delta^{13}\text{C}$  chemostratigraphy from late Paleozoic ice age carbonate platforms**  
Blake Dyer, John A. Higgins, and Adam C. Maloof
- 139 Foreland exhumation controlled by crustal thickening in the Western Alps**  
Stéphane Schwartz, Cécile Gautheron, Laurence Audin, Thierry Dumont, Jérôme Nomade, Jocelyn Barbarand, Rosella Pinna-Jamme and Peter van der Beek
- 143 Evidence of an axial magma chamber beneath the ultraslow-spreading Southwest Indian Ridge**  
Hanchao Jian, Satish C. Singh, Yongshun John Chen, and Jiabiao Li
- 147 Contrasting magmatic cannibalism forms evolved phonolitic magmas in the Canary Islands**  
S. Turner, T. Kokfelt, K. Hoernle, T.S. Johansen, F. Hauff, C. Lundstrom, P. van den Bogaard, and A. Klügel
- 151 Storage filters upland suspended sediment signals delivered from watersheds**  
James Pizzuto, Jeremy Keeler, Katherine Skalak, and Diana Karwan
- 155 Mantle earthquakes, crustal structure, and gravitational instability beneath western North Island, New Zealand**  
Jesse-Lee Dimech, Tim Stern, and Simon Lamb
- 159 Large subglacial meltwater features in the central Barents Sea**  
L.R. Bjarnadóttir, M.C.M. Winsborrow, and K. Andreassen
- 163 Global-ocean redox variation during the middle-late Permian through Early Triassic based on uranium isotope and Th/U trends of marine carbonates**  
Maya Elrick, Victor Polyak, Thomas J. Algeo, Stephen Romaniello, Yemane Asmerom, Achim D. Herrmann, Ariel D. Anbar, Laishi Zhao, and Zhong-Qiang Chen
- 167 Resolving the role of carbonaceous material in gold precipitation in metasediment-hosted orogenic gold deposits**  
Si-Yu Hu, Katy Evans, Dave Craw, Kirsten Rempel, and Kiliti Grice
- 171 Combining radiocarbon and cosmogenic ages to constrain the timing of the last glacial-interglacial transition in the Uinta Mountains, Utah, USA**  
Jeffrey S. Munroe and Benjamin J.C. Laabs
- 175 Explosive eruption of El Chichón volcano (Mexico) disrupted 6<sup>th</sup> century Maya civilization and contributed to global cooling**  
Kees Nooren, Wim Z. Hoek, Hans van der Plicht, Michael Sigl, Manfred J. van Bergen, Didier Galop, Nuria Torrescano-Valle, Gerald Islebe, Annika Huizinga, Tim Winkels, and Hans Middelkoop
- 179 Late Quaternary climatic control of Lake Baikal (Russia) turbidite systems: Implications for turbidite systems worldwide**  
Dimitris Evangelinos, C. Hans Nelson, Carlota Escutia, Marc De Batist, and Oleg Khlystov
- 183 Nonequilibrium degassing, regassing, and vapor fluxing in magmatic feeder systems**  
J.M. Watkins, J.E. Gardner, K.S. Befus
- 187 Early Cenozoic drainage reorganization of the United States Western Interior–Gulf of Mexico sediment routing system**  
Glenn R. Sharman, Jacob A. Covault, Daniel F. Stockli, Anton F.-J. Wroblewski, and Meredith A. Bush
- 191 RESEARCH FOCUS: Tracking large volcanic eruptions and their regional variability**  
José Luis Macías

# GEOLOGY

GEOLOGY publishes timely, innovative, and provocative articles relevant to its international audience, representing research from all fields of the geosciences.

GEOLOGY (ISSN 0091-7613 USPS 994-580 CODEN GLGYB) is published monthly by the Geological Society of America, Inc. (GSA), with offices at 3300 Penrose Place, Boulder, Colorado, USA. Mailing address is P.O. Box 9140, Boulder, CO 80301-9140, USA. Periodicals postage paid at Boulder, Colorado, and at additional mailing offices. Postmaster: Send address changes to *Geology*, Sales & Service, P.O. Box 9140, Boulder, CO 80301-9140, USA.

Copyright © 2017, The Geological Society of America, Inc. (GSA). All rights reserved. Copyright not claimed on content prepared wholly by U.S. government employees within the scope of their employment. Individual scientists are hereby granted permission, without fees or further requests to GSA, to use a single figure, a single table, and/or a brief paragraph of text in other subsequent works and to make unlimited photocopies of items in this journal for noncommercial use in classrooms to further education and science. In addition, an author has the right to use his or her article or a portion of the article in a thesis or dissertation without requesting permission from GSA, provided the bibliographic citation and the GSA copyright credit line are given on the appropriate pages. For any other form of capture, reproduction, and/or distribution of any item in this journal by any means, contact: Permissions, GSA, P.O. Box 9140, Boulder, CO 80301-9140, USA, fax +1-303-357-1073, editing@geosociety.org; reference *Geology*, ISSN 0091-7613. Permission is granted to authors to post the abstracts only of their articles on their own or their organization's Web site providing the posting includes this reference: "The full paper was published in the Geological Society of America's journal *Geology*, [include year, month, and page numbers, if known, where the article appears or will appear]."

GSA provides this and other forums for the presentation of diverse opinions and positions by scientists worldwide, regardless of their race, citizenship, gender, religion, sexual orientation, or political viewpoint. Opinions presented in this publication do not reflect official positions of the Society.

SUBSCRIPTIONS for 2017 calendar year. GSA Members and Fellows: \$89 (print + online), \$89 (international print + online), \$60 (online only). GSA Student, K–12 Teacher, and Early Career Professional Members: \$45 (print only; online included in membership). Nonmembers and institutions: \$1125 (print + online). Details on subscription choices, formats, and pricing, at [www.geosociety.org/pubs/](http://www.geosociety.org/pubs/). For all orders, call GSA Sales & Service at +1.888.443.4472 or +1.303.357.1000, or e-mail [gsaservice@geosociety.org](mailto:gsaservice@geosociety.org). Claims: for nonreceipt or damaged copies, please contact GSA Sales & Service. Claims are honored for one year; please allow sufficient delivery time (up to 8 weeks) for overseas copies.

## GSA ONLINE

Organization home page: [www.geosociety.org](http://www.geosociety.org)  
Journals and books: [www.gsapubs.org](http://www.gsapubs.org)  
Manuscript submission: [www.editorialmanager.com/geology/](http://www.editorialmanager.com/geology/)

## EDITORS

**Dennis Brown**  
Instituto de Ciencias de la Tierra "Jaume Almera," CSIC  
[dbrown@ictja.csic.es](mailto:dbrown@ictja.csic.es)

**Brendan Murphy**  
St. Francis Xavier University  
Curtin University  
[bmurphy@stfx.ca](mailto:bmurphy@stfx.ca)

**Judith Totman Parrish**  
University of Idaho  
[Geology.editor.jtp@gmail.com](mailto:Geology.editor.jtp@gmail.com)

**Mark C. Quigley**  
University of Melbourne  
[mark.quigley@unimelb.edu.au](mailto:mark.quigley@unimelb.edu.au)

**James Schmitt**  
Montana State University  
[jschmitt@montana.edu](mailto:jschmitt@montana.edu)

## EDITORIAL BOARD

**2015–2017**  
Ilya N. Bindeman  
Katharine Cashman  
Sally A. Gibson  
Christopher W. Hamilton  
Yvette D. Kuiper  
Jade Star Lackey  
Peir K. Pufahl  
Christie D. Rowe  
Natalie A. Starkey  
Kevin G. Taylor  
Rebecca Williams

**2016–2018**  
Jennifer L. Aschoff  
Rónadh Cox  
Jean Louise Dixon  
Eduardo Garzanti  
Elizabeth Hajek  
Christopher L. Hill  
Ganqing Jiang  
Zheng-Xiang Li  
Shoufa Lin  
Steven Micklethwaite  
J. Gregory Shellnutt  
Steven A.F. Smith  
Fabrizio Storti  
Brian Windley  
Xing Xu

## 2017–2019

Lisa Ely  
Karen Harpp  
Matthew Huber  
Ethan G. Hyland  
Simon A. Kattenhorn  
D. Alex Patthoff  
E. Troy Rasbury  
James D. Schiffbauer

## COUNCILORS

**2013–2017**  
Elizabeth J. Catlos  
John J. Clague  
Neil Fishman

**2014–2018**  
Timothy J. Bralower  
Anke Friedrich  
Stephen G. Pollock

**2015–2019**  
Christopher M. Bailey  
Mary J. Kraus  
Frank J. Pazzaglia

**2016–2020**  
F. Edwin "Ed" Harvey  
Mark Little  
Marjorie A. Chan

## GEOLOGY STAFF

**Director of Publications**  
Jeanette Hammann

**Managing Editor**  
Lyne Yohe  
[lyohe@geosociety.org](mailto:lyohe@geosociety.org)

**Editorial Staff**  
Jennifer Olivarez  
[jolivarez@geosociety.org](mailto:jolivarez@geosociety.org)

**Production**  
Heather L. Sutphin

## GSA OFFICERS

**Executive Director**  
Vicki S. McConnell

**President**  
Claudia I. Mora

**Vice President**  
Isabel P. Montanez

**Past President**  
Jonathan G. Price

**Treasurer**  
Bruce R. Clark



**COVER:** Gray lower Jurassic marly limestones of the Digne nappe (Western Alpine foreland, south-east France) thrust over Oligocene "red molasse," which is preserved in an erosional half-window following recent uplift. See "Foreland exhumation controlled by crustal thickening in the Western Alps" by Schwartz et al., p. 139–142.

**Photo by:** Thierry Dumont

**Cover design by:** Heather L. Sutphin