

THE GEOLOGICAL SOCIETY
OF AMERICA®

Themed Articles

Anatomy of Rifting: Tectonics and Magmatism in Continental Rifts, Oceanic Spreading Centers, and Transforms

1256 Introduction: Anatomy of rifting: Tectonics and magmatism in continental rifts, oceanic spreading centers, and transforms
Carolina Pagli, Francesco Mazzarini, Derek Keir, Eleonora Rivalta, and Tyrone O. Rooney

1262 Upper mantle structure of the southern Arabian margin: Insights from teleseismic tomography
Félicie Korostelev, Sylvie Leroy, Derek Keir, Abdulhakim Ahmed, Lapo Boschi, Frédérique Rolandone, Graham W. Stuart, Mathias Obrebski, Khaled Khanbari, and Issa El-Hussain

Geothermal Energy from Sedimentary Basins: Challenges, Potential, and Ways Forward

1279 Heat flow and thermal modeling of the Appalachian Basin, West Virginia
Z.S. Frone, D.D. Blackwell, M.C. Richards, and M.J. Hornbach

1291 Geothermal energy characterization in the Appalachian Basin of New York and Pennsylvania
George R. Stutz, Elaina Shope, Gloria Andrea Aguirre, Joseph Batir, Zachary Frone, Mitchell Williams, Timothy J. Reber, Calvin A. Whealton, Jared D. Smith, Maria C. Richards, David D. Blackwell, Jefferson W. Tester, Jery R. Stedinger, and Teresa E. Jordan

CRevolution 2: Origin and Evolution of the Colorado River System II

1305 A new model for Quaternary lava dams in Grand Canyon based on $^{40}\text{Ar}/^{39}\text{Ar}$ dating, basalt geochemistry, and field mapping
Ryan S. Crow, Karl E. Karlstrom, William McIntosh, Lisa Peters, Laura Crossey, and Athena Eyster

Current Issue Articles

1343 Drainage network reveals patterns and history of active deformation in the eastern Greater Caucasus
Adam M. Forte, Kelin X. Whipple, and Eric Cowgill

1365 Crustal-scale tilting of the central Salton block, southern California
Rebecca J. Dorsey and Victoria E. Langenheim

1384 Surface uplift above the Jemez mantle anomaly in the past 4 Ma based on $^{40}\text{Ar}/^{39}\text{Ar}$ dated paleoprofiles of the Rio San Jose, New Mexico, USA
Michael A. Channer, Jason W. Ricketts, Matthew Zimmerer, Matthew Heizler, and Karl E. Karlstrom

1401 Deformation and magma transport in a crystallizing plutonic complex, Coastal Batholith, central Chile
Jeffrey R. Webber, Keith A. Klepeis, Laura E. Webb, José Cembrano, Diego Morata, Gabriela Mora-Klepeis, and Gloria Arancibia

1427 Topographically driven fluid flow within orogenic wedges: Effects of taper angle and depth-dependent permeability
Ryan M. Pollyea, Erik W. Van Dusen, and Mark P. Fischer

1438 Architecture of the aquifers of the Calama Basin, Loa catchment basin, northern Chile
Teresa Jordan, Christian Herrera Lameli, Naomi Kirk-Lawlor, and Linda Godfrey

1475 Provenance of a Permian erg on the western margin of Pangea: Depositional system of the Kungurian (late Leonardian) Castle Valley and White Rim sandstones and subjacent Cutler Group, Paradox Basin, Utah, USA
Timothy F. Lawton, Cody D. Buller, and Todd R. Parr

1507 Unlocking the correlation in fluvial outcrops by using a DOM-derived virtual datum: Method description and field tests in the Huesca fluvial fan, Ebro Basin (Spain)
Rubén Calvo and Emilio Ramos

1530 Tectonic evolution of the Mesozoic South Anyui suture zone, eastern Russia: A critical component of paleogeographic reconstructions of the Arctic region
Jeffrey M. Amato, Jaime Toro, Vyacheslav V. Akinin, Brian A. Hampton, Alexander S. Salnikov, and Marianna I. Tuchkova

1565 Late Cenozoic displacement transfer in the eastern Sylvania Mountain fault system and Lida Valley pull-apart basin, southwestern Nevada, based on three-dimensional gravity depth inversion and forward models
Sarah B. Dunn, John S. Oldow, and Nicholas J. Mueller

1590 Modern and ancient hiatuses in the pelagic caps of Pacific guyots and seamounts and internal tides
Neil C. Mitchell, Harper L. Simmons, and Caroline H. Lear

1607 North America's Midcontinent Rift: When rift met LIP
Carol A. Stein, Jonas Kley, Seth Stein, David Hindle, and G. Randy Keller

1617 Dating synfolding remagnetization: Approach and field application (central Sierra Madre Oriental, Mexico)
Samantha R. Nemkin, Elisa Fitz-Diaz, Ben van der Pluijm, and Rob Van der Voo

1629 Paleoseismologic evidence for large-magnitude (M_w 7.5–8.0) earthquakes on the Ventura blind thrust fault: Implications for multifault ruptures in the Transverse Ranges of southern California
Lee J. McAuliffe, James F. Dolan, Edward J. Rhodes, Judith Hubbard, John H. Shaw, and Thomas L. Pratt

GEOSPHERE is an online-only journal that targets an international audience and publishes high-quality research results from all fields of the geosciences. It particularly seeks papers that take advantage of the electronic format.

GEOSPHERE (ISSN 1553-040X) is published bi-monthly by The Geological Society of America, Inc. (GSA), with offices at 3300 Penrose Place, Boulder, Colorado. Mailing address is P.O. Box 9140, Boulder, CO 80301-9140, USA.

Copyright © 2015, 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 Geosphere, ISSN 1553-040X. 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 online journal Geosphere, [include year, month, and page number, if known, where 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, or political viewpoint. Opinions presented in this publication do not reflect official positions of the Society.

SUBSCRIPTIONS for 2015 calendar year. GSA Members and Fellows: \$35. GSA Student and K-12 Teacher Members: cost is included in membership. Nonmembers and institutions: \$245. For more details on subscription choices, formats, and pricing, visit www.geosociety.org/pubs/. For member and nonmember orders, call GSA Sales & Service at +1.888.443.4472 or +1.303.357.1000, or e-mail gsaservice@geosociety.org.

GSA ONLINE

Organization home page: www.geosociety.org
 Journals and books: www.gsapubs.org
 Manuscript submission:
www.editorialmanager.com/geosphere/



SCIENCE EDITORS

Shanaka de Silva
 Oregon State University
geosphere@geo.oregonstate.edu
 +1-541-737-1212

Raymond M. Russo
 University of Florida
r russo2010@gmail.com
 +1-352-392-6766

GEOSPHERE STAFF

Director of Publications:
 Jeanette Hamman

Editorial: Bridgette Moore;
geosphere@geosociety.org

Production: Eric Christensen

GSA OFFICERS

Executive Director: Vicki S. McConnell
President: Jonathan G. Price
Vice President: Claudia I. Mora
Past President: Harry Y. McSween, Jr.
Treasurer: Bruce R. Clark

PUBLICATIONS COMMITTEE

Julia A. Baldwin
 John J. Clague
 Ronadh Cox
 Richard Davis
 Shanaka de Silva
 David E. Fastovsky
 Robbie R. Gries
 John M. Holbrook
 Craig H. Jones
 Brian G. Katz
 Eric Kirby
 Christian Koerber
 Oliver Korup
 Joanne V. Lerud-Heck
 Jennifer A. Thomson
 Steven Whitmeyer

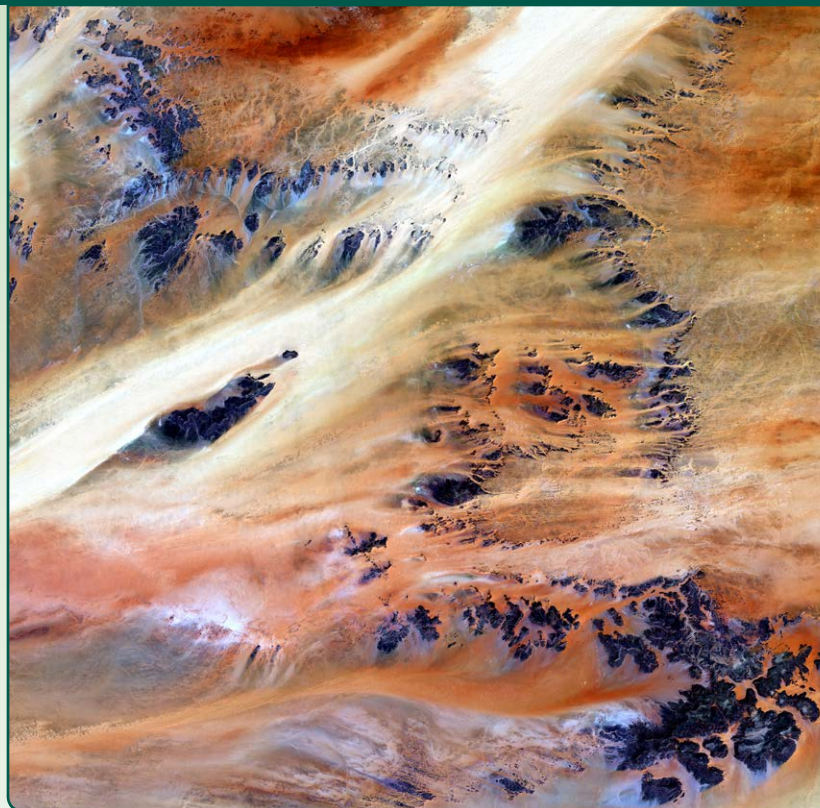
COUNCIL

2012–2016: Isabel P. Montanez
 William W. Simpkins
 Marilyn J. Suiter

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

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

2015–2019: Christopher (Chuck) M. Bailey
 Mary J. Kraus
 Frank J. Pazzaglia



A series of rocky outcroppings are a prominent feature of this Sahara Desert landscape near the Terkezi Oasis in the country of Chad. This image was acquired by Landsat 7's Enhanced Thematic Mapper plus (ETM+) sensor on October 22, 2000. This is a false-color composite image made using near infrared, green, and red wavelengths. The image has also been sharpened using the sensor's panchromatic band.

Credit: Image provided by the USGS EROS Data Center Satellite Systems Branch. This image is part of the ongoing Landsat Earth as Art series.

GEOSPHERE BOARD OF ASSOCIATE EDITORS

Valerio Acocella
 Università Roma Tre

Colin Amos
 Western Washington University

Clare E. Bond
 University of Aberdeen

Cinzia Cervato
 Iowa State University

Michael J. Cheadle
 University of Wyoming

Fred Day-Lewis
 U.S. Geological Survey

Rhawn Dennison
 Cornell College

Rita Economos
 University of California, Los Angeles

Susan Eriksson
 Eriksson Associates,
 Boulder, Colorado

G. Lang Farmer
 University of Colorado

Katherine A. Giles
 New Mexico State University

Andrew M. Goodliffe
 University of Alabama

David Hirsch
 Western Washington University

Jose M. Hurtado
 University of Texas at El Paso

Giampiero Iaffaldano
 The Australian National University

Pamela E. Jansma
 University of Texas at Arlington

Craig H. Jones
 University of Colorado

Richard R. Jones
 University of Durham

Todd LaMaskin
 University of North Carolina
 at Wilmington

Jeff Lee
 Central Washington University

Jan Marie Lindsay
 The University of Auckland

Gianreto Manatschal
 Institute Physique du Globe/Ecole et
 Observatoire des Sciences de la Terre/
 University of Strasbourg – CNRS

Brian D. Marshall
 U.S. Geological Survey

Francesco Mazzarini
 Istituto Nazionale di Geofisica
 e Vulcanologia

Brandon McElroy
 University of Wyoming

Roberto Stanley Molina-Garza
 Universidad Nacional Autónoma
 de México

Terry L. Pavlis
 University of Texas at El Paso

Eric J. Pyle
 James Madison University

Anthony E. Rathburn
 Indiana State University

Julie Roberge
 ESIA-Ticomán, Instituto
 Politécnico Nacional

Dibyendu Sarkar
 Montclair State University

Steven C. Semken
 Arizona State University

Michael H. Taylor
 University of Kansas

Barbara J. Tewksbury
 Hamilton College

Alan Whittington
 University of Missouri

Michael L. Williams
 University of Massachusetts

Lesli Wood
 University of Texas at Austin

Huaiyu Yuan
 Macquarie University