

*In the Footsteps of Warren B. Hamilton:
New Ideas in Earth Science*

edited by

Gillian R. Foulger

Department of Earth Sciences, Durham University
Durham DH1 3LE, UK

and Institute of Marine Geodynamics, College of Marine Geosciences
Ocean University of China, Qingdao 266100, China

Lawrence C. Hamilton

Department of Sociology, University of New Hampshire
Durham, New Hampshire 03824, USA

Donna M. Jurdy

Department of Geological Sciences
Northwestern University, Evanston, Illinois 60208, USA

Carol A. Stein

Department of Earth & Environmental Sciences
University of Illinois at Chicago, 845 W. Taylor Street
Chicago, Illinois 60607-7059, USA

Keith A. Howard

U.S. Geological Survey, 345 Middlefield Road
Menlo Park, California 94025, USA

Seth Stein

Department of Earth & Planetary Sciences and Institute for Policy Research
2145 Sheridan Road, Northwestern University
Evanston, Illinois 60208-3130, USA



THE
GEOLOGICAL
SOCIETY
OF AMERICA®

Special Paper 553

3300 Penrose Place, P.O. Box 9140 ■ Boulder, Colorado 80301-9140, USA

2022

Copyright © 2022, The Geological Society of America (GSA), Inc. All rights reserved. Copyright is 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 volume for noncommercial use in classrooms to further education and science. Permission is also granted to authors to post the abstracts only of their articles on their own or their organization's Web site providing that the posting cites the GSA publication in which the material appears and the citation includes the address line: "Geological Society of America, P.O. Box 9140, Boulder, CO 80301-9140 USA (<https://www.geosociety.org>)," and also providing that the abstract as posted is identical to that which appears in the GSA publication. 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 that 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 volume by any means, contact Permissions, GSA, 3300 Penrose Place, P.O. Box 9140, Boulder, Colorado 80301-9140, USA; fax +1-303-357-1070; editing@geosociety.org. 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.

Published by The Geological Society of America, Inc.
3300 Penrose Place, P.O. Box 9140, Boulder, Colorado 80301-9140, USA
www.geosociety.org

Printed in U.S.A.

GSA Books Science Editors: Joan Florsheim, Christian Koeberl, and Nancy Riggs

Library of Congress Cataloging-in-Publication Data

Names: Foulger, Gillian R., 1952– editor.

Title: In the footsteps of Warren B. Hamilton : new ideas in earth science / edited by Gillian R. Foulger, Department of Earth Sciences, Durham University Durham, UK and Institute of Marine Geodynamics, College of Marine Geosciences, Ocean University of China, China, Lawrence C. Hamilton, Department of Sociology, University of New Hampshire, Durham, New Hampshire, USA, Donna M. Jurdy, Department of Geological Sciences, Northwestern University, Evanston, Illinois, USA, Carol A. Stein, Department of Earth & Environmental Sciences, University of Illinois at Chicago, Chicago, Illinois, USA, Keith A. Howard, U.S. Geological Survey, Menlo Park, California, USA, Seth Stein, Department of Earth & Planetary Sciences and Institute for Policy Research, Northwestern University, Evanston, Illinois, USA.

Description: Boulder, Colorado : The Geological Society of America, 2022. |

Series: Special paper ; 553 | Includes bibliographical references. |

Summary: "This unusual book, published to honor Warren Bell Hamilton, comprises a diverse, cross-disciplinary collection of bold new ideas in Earth and planetary science. This volume is a rich resource for researchers at all levels looking for interesting, unusual, and off-beat ideas to investigate or set as student projects"— Provided by publisher.

Identifiers: LCCN 2021059858 (print) | LCCN 2021059859 (ebook) | ISBN 9780813725536 (paperback) | ISBN 9780813795539 (ebook)

Subjects: LCSH: Hamilton, Warren Bell, 1925–2018. | Earth sciences—Research. | Geology—Research.

Classification: LCC QE40 .I57 2022 (print) | LCC QE40 (ebook) | DDC 550.72—dc23/eng20220215

LC record available at <https://lcn.loc.gov/2021059858>

LC ebook record available at <https://lcn.loc.gov/2021059859>

Cover: Warren B. Hamilton, near Arapahoe Pass, Colorado, September 2009. Courtesy of Lawrence C. Hamilton.

Contents

Introduction vii
Gillian R. Foulger, Lawrence C. Hamilton, Donna M. Jurdy, Carol A. Stein, Keith A. Howard,
Seth Stein, and Bruce Julian

WARREN B. HAMILTON'S APPROACH TO SCIENCE

1. *On the last paper of Warren B. Hamilton* 1
Lawrence C. Hamilton

2. *From crisis to normal science, and back again: Coming full “Kuhn cycle” in the career of Warren B. Hamilton* 7
Thomas Rossetter

3. *Rittmann’s heritage: A philosophical approach for current research* 21
Daniele Musumeci, Arnaldo Angelo De Benedetti, Stefano Branca, and Luigi Ingaliso

TECTONICS

4. *Icelandia* 29
Gillian R. Foulger, Laurent Gernigon, and Laurent Geoffroy

5. *Revisiting hotspots and continental breakup—Updating the classical three-arm model* 41
Carol A. Stein, Seth Stein, Molly M. Gallahue, and Reece P. Elling

6. *Linear magnetic anomalies and the limits of oceanic crust in oceans* 59
Laurent Geoffroy, Laurent Gernigon, and Gillian R. Foulger

7. *The African continental divide: Indian versus Atlantic Ocean spreading during Gondwana dispersal* 73
Alexander L. Peace and Jordan J.J. Phethean

8. *Volcano distribution and tectonics: A planetoidic perspective* 83
Edgardo Cañón-Tapia

9. *Cenozoic magmatism and plate tectonics in western North America: Have we got it wrong?* . . . 95
Allen F. Glazner

10. *Large-magnitude oceanic intraplate seismicity: Implications for lithosphere evolution* 109
Junjiang Zhu, Sanzhong Li, Huilin Xing, Changsheng Wang, Guoming Yang,
Zixiang Xiong, Shengsheng Zhang, and Xianzhi Cao
11. *Teleseismic tomography: Equation one is wrong* 121
Bruce R. Julian and Gillian R. Foulger
12. *Tectonic hydrogen and tectonic oxygen production through deforming piezoelectric minerals in the presence of water* 127
Huifang Xu, Kuang-Sheng Hong, Meiye Wu, and Seungyeol Lee
13. *Plate convergence, consumption, collision, coupling, capture, and formation of mantle waves—Linkages to global orogenesis and epeirogeny* 137
Thomas H. Anderson
14. *Detrital zircon record of the Mesoproterozoic Belt basin and implications for horizontal and vertical tectonic models* 159
Stuart D. Parker and Marc S. Hendrix
15. *Earthquake weather and climate change: Should we stress about the forecast?* 177
Miles P. Wilson, Gillian R. Foulger, Christopher Saville, Samuel P. Graham, and
Bruce R. Julian
16. *Dependence of discharge, channel area, and flow velocity on river stage and a refutation of Manning's equation* 193
Robert E. Criss

PLANETARY

17. *Challenging the dipolar paradigm for Proterozoic Earth* 201
James W. Sears
18. *Links of planetary energetics to moon size, orbit, and planet spin: A new mechanism for plate tectonics* 213
Anne M. Hofmeister, Robert E. Criss, and Everett M. Criss
19. *How spin down and radioactive decay drive rocky planet evolution* 223
Robert E. Criss and Anne M. Hofmeister
20. *New mechanism for forming thick granitic continental crust at Phanerozoic convergent margins* 233
C.C. Lundstrom, X. Lin, K. Brueckel, C. Campe, X. Nan, K. Ortega, P. Akrie, M. Yu, and
S. Marshak
21. *Gravity field aspects for identification of cosmic impact structures on Earth* 251
Jaroslav Klokočník, Aleš Bezděk, and Jan Kostelecký
22. *Role of Earth-Moon rotational dynamics in the shaping of the surface of our planet* 261
Marcus P. Borom
23. *Terrestrial ejecta suborbital transport and the rotating frame transform* 271
Thomas H.S. Harris

24. *Postulating an unconventional location for the missing mid-Pleistocene transition impact: Repaving North America with a cavitated regolith blanket while dispatching Australasian tektites and giving Michigan a thumb* 293
Michael E. Davias and Thomas H.S. Harris
25. *Parent crater for Australasian tektites beneath the sands of the Alashan Desert, Northwest China: Best candidate ever?* 323
Jiří Mizera, Zdeněk Řanda, Václav Suchý, Vladimír Strunga, Jaroslav Klokočník, Jan Kostecký, Aleš Bezděk, and Zdeněk Moravec
26. *Geochemical indicators of a biogenic component in source materials of moldavites* 335
Jiří Mizera and Zdeněk Řanda
27. *Layered sediments on Mars deposited by impacts instead of by liquid water.* 347
Donald M. Burt

MAGMATISM

28. *Igneous activity in central-southern Italy: Is the subduction paradigm still valid?* 355
Michele Lustrino, Claudio Chiarabba, and Eugenio Carminati
29. *B" not D" as the source of intraplate volcanism* 371
Alan D. Smith
30. *Dense melt residues drive mid-ocean-ridge "hotspots"* 379
Jordan J.J. Phethean, Martha Papadopoulou, and Alexander L. Peace
31. *Does the British Isles Paleocene dike swarm reflect the former location of the Iceland hotspot?* 391
Ian W.D. Dalziel and Lawrence A. Lawver
32. *A peralkaline solution, hydrofracturing model for quartzofeldspathic veins and pegmatites* . . . 401
R.P. Wintsch and P. Resor
33. *Forearc magmatism along southwest Japan is caused by rupturing of the subducting slab* . . . 423
Hidehisa Mashima

