About the Contributors

Marion E. (Pat) Bickford
Research Professor and Professor Emeritus of Earth Sciences, Syracuse University

Pat Bickford is a petrologist and isotope geochemist; most of his work has been on the U-Pb zircon geochronology of Paleo- and Mesoproterozoic rocks. His recent research activities have focused on studies of the age of anatexis in metapelites of the Adirondack Mountains, New York, and its tectonic implications; studies of Hf isotopic compositions in zircons from Paleoproterozoic igneous rocks in central Colorado to determine whether these ca. 1750 Ma rocks are juvenile and arc-related or derived from preexisting crust and rift-related; zircon dating of tuff beds in the Mesoproterozoic Chhattisgarh Basin of peninsular India; Sr isotopic studies of pore fluids, serpentine, and harzburgite clasts from mud volcanoes in the Marianas forearc; and studies of Hf isotopic compositions in zircons from Adirondack anorthosites and implications for the origin of anorthosites.
http://thecollege.syr.edu/profiles/pages/EAR_dev/Bickford-Marion.html

CHAPTER 1

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CHAPTER 2

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Scott Tinker is director of the Bureau of Economic Geology, the State Geologist of Texas, a professor holding the Allday Endowed Chair and acting associate dean of research in the Jackson School of Geosciences at the University of Texas at Austin, and director of the Advanced Energy Consortium. Tinker is past president of the American Association of Petroleum Geologists, the Association of American State Geologists, and the Gulf Coast Association of Geological Societies. He has given more than 600 lectures internationally to government, industry, academia, and the public in nearly 50 countries. He recently co-produced and narrated the major energy documentary film, *Switch*. While at the Bureau, he founded the Advanced Energy Consortium and helped initiate the Gulf Coast Carbon Center and Center for Energy Economics. Tinker serves on several private, public, academic, and government energy boards and advisory councils.
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Harry Lynch
Documentary Filmmaker, Arcos Films, Austin, Texas

Harry Lynch is an award-winning documentary director, writer, producer, and sometime cinematographer, specializing in complicated, long-timeframe projects. His work has been seen by millions of viewers, in IMAX and commercial theaters, on cable, international satellite and broadcast, online, and on video. *Switch* is his sixth film and second web project in the past 17 years. He is the co-founder of Trinity Films and the founder of Arcos Films.
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Mark Carpenter
Education Specialist, American Geosciences Institute

Mark Carpenter is a developer of Earth science education resources, including books, films, and computer-generated imagery, for middle school through college levels. He received a B.Sc. in geoscience from Exeter University, Devon, UK, and an M.Sc. from Wilfrid Laurier University (WLU), Ontario, Canada. At WLU, he designed and taught laboratory investigations prior to joining AGI.

Matthew Hoover
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Matthew Hoover is a developer of Earth science educational resources and curriculum programs at the elementary, middle, and high school levels. He received his B.S. in geology from Boston College, an M.A. in environmental policy from George Washington University, and an M.Ed. in curriculum and instruction from George Mason University. As a certified teacher, he has taught elementary and middle school Earth, life, and physical sciences. Prior to joining AGI, he worked for NASA's GLOBE Program, coordinating teacher trainings and designing environmental science investigations and learning activities for K–12 students.

CHAPTER 3

John Bredehoeft
The Hydrodynamics Group, Sausalito, California

John Bredehoeft worked as a research geologist and as the manager of the U.S. Geological Survey for 32 years. He is the author of more than 100 research papers in the refereed scientific literature. In the 1970s, Dr. Bredehoeft managed the entire water research program of the USGS. In the early 1980s, he was the West Coast regional manager responsible for all water activities of the USGS in the eight western states. In 1995, Bredehoeft left the USGS to start The Hydrodynamics Group. Dr. Bredehoeft was inducted as a member of the U.S. National Academy of Engineering. He received the M. King Hubbert and O.E. Meinzer Awards, The Horton Medal from the American Geophysical Union, and the Penrose Medal from the Geological Society of America. In 2013, Bredehoeft received the Marcus Milling Legendary Geoscientist Medal from the American Geosciences Institute.
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CHAPTER 4

Ronald Amundson
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Ronald Amundson received his M.S. and Ph.D. in soil science from the University of California at Riverside. He is professor of pedology and chair, Department of Environmental Science, Policy and Management at the University of California at Berkeley. He is a Fellow of the Soil Science Society of America.
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Garrison Sposito holds the Betty & Isaac Barshad Chair in Soil Science at Berkeley. Professor Sposito, whose academic degrees are in agriculture with a specialization in soil science, is the author of more than 600 publications, a Fellow of six international scientific societies, and a foreign member of the French Academy of Agriculture. He is the recipient of several awards for research in soil science and hydrology, including the Horton Medal of the American Geophysical Union in 2004 for "outstanding contributions to the geophysical aspects of hydrology." In 2008, he was designated a Legend in Environmental Chemistry by the American Chemical Society, the world's largest scientific organization.
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CHAPTER 5

Mary Lou Zoback
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Mary Lou Zoback received her Ph.D. in geophysics from Stanford University. For many years she was a senior research scientist at the U.S. Geological Survey, Menlo Park, California. She also served as chief scientist of the USGS Western Earthquake Hazards team. She then worked at Risk Management Solutions (RMS) in Newark, California, where she served as vice president of earthquake risk applications. At RMS she explored the societal role of earthquake insurance and quantified the costs and benefits of disaster management and risk reduction activities. Her current research interests focus on the relationship between active faulting and state of stress, quantifying earthquake likelihood, characterizing natural hazard risk, and valuing nature's defenses against natural hazards. She is a member of the National Academy of Sciences and was president of the Geological Society of America in 2000–2001.
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Eric Geist
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Eric Geist is a research geophysicist with the U.S. Geological Survey in Menlo Park, California, where he has worked for more than two decades. Throughout his career, he has focused on computer modeling of geophysical phenomena, including large-scale deformation of the Earth in response to tectonic forces and the physics of tsunami generation. His current research includes topics related to tsunami probability, with particular attention to the development of probabilistic hazard assessment methods.
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John Pallister
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John Pallister, who received his doctorate from the University of California, is a research geologist with the USGS Cascades Volcano Observatory in Vancouver. He heads the Volcano Disaster Assistance Program, which provides monitoring equipment and technical assistance to help countries around the world respond to volcanic activity.

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David Hill earned a B.S. in geology from San Jose State University, an M.S. in geophysics from the Colorado School of Mines, and a Ph.D. in geophysics from Caltech. His research with the U.S. Geological Survey has included the crustal structure and seismotectonics of the western U.S., volcano seismology, and most recently earthquake-earthquake and earthquake-volcano interactions through dynamic triggering. He served as

scientist-in-charge of the Long Valley Observatory from 1982–2009 (which included extended periods of intense caldera unrest) and was responsible for coordinating research on the sources of caldera unrest and explaining the results of the research and its implications for volcanic hazards to civil authorities and the resort communities of the eastern Sierra Nevada.

Simon Young
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Simon Young received his Ph.D. as a member of the Volcano Research Group at Lancaster University in the UK and worked for nine years at the British Geological Survey, the latter five years of which were largely spent in various roles at the Montserrat Volcano Observatory, including as its first director from 1999 to 2000. He then moved into the private sector as a consultant, and has amassed a wealth of experience in natural hazards risk assessment and most latterly in risk financing in support of sustainable development, largely supporting governments and other public-sector agencies in the pursuit of better understanding and management of natural hazards.

Wendy McCausland
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Wendy McCausland is a volcano seismologist for the USAID-USGS Volcano Disaster Assistance Program, which provides monitoring equipment and technical assistance to help countries around the world respond to volcanic activity. She received her Ph.D. from the University of Washington in geophysics, studying the time variation and migration patterns of Cascadia subduction tremor. She was awarded a Mendenhall Postdoctoral Fellowship to further study Cascadia subduction tremor by combining seismic and strainmeter data. Throughout her career she has studied seismicity of volcanic systems as well as subduction tremor, focusing on the challenges of limited data sets and forecasting volcanic eruptions using seismic data.

CHAPTER 6

Syed E. Hasan
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Syed E. Hasan received his Ph.D. from Purdue University, where he specialized in engineering-environmental geology and geotechnics. He currently serves as the director of the Center for Applied Environmental Research, and the graduate certificate program in waste management. In 1996, he published *Geology and Hazardous Waste Management* for which he received the Claire P. Holdredge Award from the Association of Environmental and Engineering Geologists. The Environmental Protection Agency honored Hasan for dedicated teaching in the environmental field, and he received the 1999–2000 Educators Environmental Excellence Award. The Department of Earth and Atmospheric Sciences, Purdue University, honored him with its Alumnus of the Year award for 2005. Hasan served as chair of GSA's Environmental and Engineering Geology Division (2006–2007) and the Geology and Health Division (2010–2011); and heads the Environmental Characterization and Remediation Technical Working Group of the Association of Environmental and Engineering Geologists. He also serves as an editor for the engineering geology section of the UNESCO publication *Encyclopedia of Life Support Systems*.

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After retiring from the U.S. Geological Survey, Bob Finkelman joined the Geosciences Department at the University of Texas at Dallas. His research interests include understanding the physical, chemical, and mineralogical properties of coal and how these properties affect coal's technological performance, economic byproduct potential, and environmental and health impacts, as well as understanding the impacts of geologic materials and processes on animal and human health (medical geology). http://www.utdallas.edu/geosciences/faculty/

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H. Catherine W. Skinner is presently a senior research scientist, and lecturer in geology and geophysics, Yale University and Yale Medical School, Departments of Orthopaedic Surgery and Rehabilitation. Since 1972 she has been chairman of the NRC/IOM (National Research Council/Institute of Medicine) Committee of NAS Earth Materials and Health, Research Priorities for Earth Science and Public Health (from 2004–2007); and president of the Connecticut Academy of Arts and Sciences (from 1985–1994). She is an American Association for the Advancement of Science Fellow and a Geological Society of America Fellow. She was awarded the Public Service Award from the Mineralogical Society of America in 1991.

CHAPTER 7

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Michael E. Wysession is a seismologist interested in mantle structure whose current collaborative seismic deployments are in Madagascar and the Midwest of North America. Wysession is a leader in geoscience literacy, having chaired the construction of the NSF Earth Science Literacy Principles. He was a lead writer, responsible for Earth and space science, for both the 2013 national K–12 *Next Generation Science Standards* as well as the National Research Council report *A Framework for K–12 Science Education*, on which the standards were based. Wysession has coauthored over 20 science textbooks for K–16 levels. http://epsc.wustl.edu/seismology/michael/web/index.html

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Linda R. Rowan is director of external affairs at UNAVCO, Inc. Previously she was director of geoscience policy at the American Geosciences Institute. She taught a course on Earth science and policy at George Mason University. Before diving boots-first into public policy, she worked as an editor at *Science Magazine* and a postdoctoral researcher at NASA–Johnson Space Center. She has a B.S. degree in geology and one in computer science/math from the University of Illinois at Urbana-Champaign and an M.S. and Ph.D. in geology from the California Institute of Technology.
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CHAPTER 8

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Barbara J. Tewksbury is professor of geosciences at Hamilton College, where she holds the Upson Chair. She is a structural geologist, working most recently in Iceland and in Egypt. She has been involved for many years at the national level in efforts to improve undergraduate geoscience education. She is a past president of the National Association of Geoscience Teachers and the American Geosciences Institute. Since 2002, she has been a principal investigator on the NSF-funded project On the Cutting Edge; she is also a Senior Fellow of the SENCER (Science Education for New Civic Engagements and Responsibilities) Project. She is currently involved in geological training for NASA astronaut candidates. In 1997, she was named New York State Professor of the Year by the Carnegie Foundation for the Advancement of Teaching.
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David W. Mogk is head of the Department of Earth Sciences and professor of geology at Montana State University. He received his M.S. and Ph.D. in geology from the University of Washington. His main research interests include evolution of Precambrian crust in southwestern Montana; characterization of the morphology, composition, structure, and surface chemistry of minerals; characterization of life in extreme environments; and geoscience education. He is volume coeditor of *Teaching Mineralogy, Earth and Mind I,* and *Field Geology Education*.
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Heather Macdonald, Chancellor Professor of Geology, received her B.A. from Carleton College and her M.S. and Ph.D. from the University of Wisconsin. She is co-director of the undergraduate marine science program at the College of William & Mary. A sedimentologist, she currently works primarily in geoscience education focusing on faculty professional development. Two ongoing projects include On the Cutting Edge (professional development for current and future geoscience faculty) and Supporting and Advancing Geoscience Education in Two-year Colleges (SAGE 2YC). She has received various awards for her teaching, including the Biggs Award given by the GSA Education Division and the Neil Miner Award given by the National Association of Geoscience Teachers.
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