

Acknowledgments

Our Changing Climate: An Introduction to Climate Science and the associated instructional resources are the result of an extensive collaboration between many individuals with extensive scientific backgrounds and classroom experience. This book is primarily the work of Chad M. Kauffman (Professor of Earth Sciences, California University of Pennsylvania) and Joseph M. Moran (Professor Emeritus of Earth Science, University of Wisconsin-Green Bay), both of whom worked for the American Meteorological Society's Education Program. Dr. Kauffman was afforded a yearlong sabbatical from California University of PA to complete work on this book.

Kira A. Nugnes, Managing Editor/Content Specialist, AMS Education Program, oversaw the editorial process of the textbook from beginning to end. She played a principal role in reviewing content, verifying topical research, synthesizing suggestions of reviewers, assembling the manuscript for internal consistency and serving as a liaison between the authors and guest essayists. Her work on this project cannot be overstated. Bernard A. Blair, Education Publications & Instructional Technology Manager, AMS Education Program, met the numerous technical challenges in putting this edition into a digital format compatible with a myriad of digital platforms. He oversaw the transition of draft copies into digital form with his deft technical skills and attention to detail. Both Kira and Bernard met the numerous technical challenges of editing and formatting the book with their exceptional attention to detail, dedication and enthusiasm.

The production of *Our Changing Climate* was a team effort that benefited greatly from critical content and editorial reviews provided by the professional staff of the AMS Education Program: James A. Brey, Director, Ira W. Geer, Senior Education Fellow, Robert S. Weinbeck (also of SUNY College at Brockport), Katie L. O'Neill, Content Specialist and Anupa Asokan, Outreach and Marketing Program Assistant and Assistant Content Specialist. Anupa was a particularly valuable asset not only in making many of the stylistic decisions and color scheme choices but also, given her ocean sciences background, an immense asset for Chapter 7. She was also the guest author for the *For Further Exploration* in Chapter 7. Lindsey Johnson Systemann, Outreach and Marketing Program Assistant and Associate Graphic Designer, expanded her role in the program by creating scores of new figures that are incorporated in this edition. Elizabeth W. Mills, Associate Director of the AMS Education Program, consulted on many aspects of the book layout and served as a copy-editor to Chapter 11. AMS staff personnel Diem Tran and Maude Mason were valuable office resources, enabling an efficient writing process. Also in the Washington, DC office to provide insights and perspective on all things climate-related was Richard E. Hallgren, AMS Executive Director Emeritus and former Permanent Representative of the United States with WMO (1979-1988).

We acknowledge with much appreciation the advice, constructive criticisms and other contributions to *Our Changing Climate* provided by the following individuals: Swarndeeep S. Gill, Mario Majcen, Thomas R. Mueller, Kyle Fredrick, Daniel Harris, Susan A. Jasko, Gregg Gould and Lawrence L. Moses (emeritus) of California University of Pennsylvania; Edward J. Hopkins of the University of Wisconsin-Madison. The administration of California University of Pennsylvania was immensely helpful in allowing Kauffman to take a sabbatical leave for such an extensive period: Geraldine M. Jones, Bruce Barnhart, John Kallis and Thomas D. Wickham. In addition, alumni from the Earth Sciences program at California University of Pennsylvania provided critical assistance and advice during the process: Patrick C. Taylor, Neil Barton, Elizabeth N. Smith, Thomas Hafer, Kevin R. Wagner and Kyle Olmstead. One alumna in particular, now an instructor at Montour School District, Katie L. Mercadante went above and beyond to help provide valuable classroom feedback, constructed review and test bank questions and other instruction-

al resources. Her assistance and professionalism were immeasurable. The following experts provided a thorough review of multiple chapters while still in draft form: Kathleen V. Schreiber of Millersville University, Samantha Kaplan, University of Wisconsin-Stevens Point, Brent R. Skeeter, Salisbury University, Swarndeeep S. Gill, California University of Pennsylvania, Jamie D. Mitchem of Gainesville State College, Cary Mock, University of South Carolina, Peter Neff of Victoria University of Wellington and Shalini Mohleji of the AMS Policy Program. David M. Anderson of the NOAA Paleoclimatology Program provided initial guidance for Chapter 9, Jason P. Briner of SUNY-Buffalo contributed useful resources for the same chapter along with Linda Morris of the National Science Teachers Association (NSTA) who provided even more valuable assets germane to the topics herein. AMS Executive Director, Keith Seitter, provided valuable guidance and commentary for Chapter 14, having reviewed it efficiently and thoroughly. A special thanks to Paul Higgins, Director of the AMS Policy Program, for allowing us to include major section of his work in Chapter 13. We thank all past instructors of AMS Climate Studies for their very helpful comments.

This edition is a unique offering from the AMS Education Program not only because it is first textbook to be designed specifically for a digital format but also because experts external to the program drafted the *For Further Exploration* essays. Such experts included Dr. Chandana Mitra of Auburn University; Jeffrey Sellen from Western State Colorado University; Dr. Amanda S. Adams of the University of North Carolina at Charlotte; Dr. Akua Asa-Awuku from the University of California, Riverside; Daniel Harris of California University of Pennsylvania; Matt Finkenbinder of The University of Pittsburgh; Patrick C. Taylor from the NASA Langley Research Center; Scott Sheridan of Kent State University; Swarndeeep S. Gill from California University of Pennsylvania; Dr. J. Marshall Shepherd from the University of Georgia. Each of the essay authors was timely in their responsiveness and courteous with the edits we requested of them. We cannot thank them enough for adding a unique element to this edition. It is a much better book because of their contributions. A special thanks to Sonia Kreidenweis of Colorado State University for helping us to identify potential essayists.

We acknowledge with great appreciation the assistance of the following persons who answered questions about supplied images, provided caption content for said figures or gave explicit permission for image usage: Dr. Murray Peel of the University of Melbourne, Melbourne School of Engineering; Mary Ann Muller of Taylor & Francis Group; Andrew Tait of National Institute of Water and Atmospheric Research (NIWA) in New Zealand; James Detwiler of Penn State University; Geoff Dutton of NOAA; Ed Dlugokencky of NOAA; David Darling, The Worlds of David Darling, Encyclopedia of Science; Josh Tenneson (www.cohiker.com); University Corporation for Atmospheric Research (UCAR); Michelle Bambarly; Norwegian Polar Institute; Commonwealth Scientific and Industrial Research Organisation (CSIRO); Jan Null of Golden Gate Weather Services; Sarah Youngquist; Sarah Karnas of Ensia; David Littschwager; Michael E. Mann, Penn State University; Peter Kolb of Montana State University; Dave Stahle of University of Arkansas; Sophie Warny of Louisiana State University, Baton Rouge; Kate Griener of Louisiana State University, Baton Rouge; Thompson Webb of Brown University; Jennifer Collins of Ocean Leadership; Matthew Wright of Ocean Leadership; Chaoyong Hu of China University of Geosciences; Eric Matson of the Australian Institute of Marine Science; Edward Brook of Oregon State University; University of Copenhagen, Centre for Ice and Climate; Rod Benson, Montana Science Teacher; James Gleick; Timothy Lenton of University of Exeter; CNA Corporation, Markus Berger of Andermatt Swiss Alps; Benjamin Cook of Lamont Doherty Earth Observatory, Columbia University; Yaneer Bar-Yam of New England Complex Systems Institute (NECSI); Durland Fish, Theodore Holford and John Brownstein all from the Yale School of Medicine; Surafel Abebe of the AMS Education Program; and Gallup, Inc.

A special note concerns the use of units in *Our Changing Climate*. Generally the International System of Units (abbreviated SI, for *Système Internationale d'Unités*) is employed with equivalent English or other units following in parentheses. Exceptions are units used by convention or convenience in climate science or the user community (e.g., knots, calories, millibars). Also, the equivalence between units is given in context; that is, where general estimates are used, approximate values are shown in all units.

Development work ultimately culminating in the national dissemination of the *AMS Climate Studies* course associated with this book was supported by NASA. For this support and encouragement we are very grateful to Jack Kaye, Associate Director of Research of the Earth Science Division within NASA's Science Mission Directorate, and Ming-Ying Wei, Manager of Education Programs, NASA's Office of Earth Science. We acknowledge with much appreciation the assistance of the following NASA scientists who reviewed sections of *Climate Studies*: Michele M. Rienecker, Global Modeling and Assimilation Office, NASA Goddard Space Flight Center; David H. Rind, NASA Goddard Institute for Space Studies; and Norman G. Loeb, NASA Langley Research Center.