Climate Variability and Ecosystem Response at Long-Term Ecological Research Sites

EDITED BY
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CLIMATE VARIABILITY AND ECOSYSTEM RESPONSE AT LONG-TERM ECOLOGICAL RESEARCH SITES

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Global climate change is a central issue facing the world today. The topic has received intense national and international attention as exemplified by the continuing series of books produced by the Intergovernmental Panel on Climate Change. The issue of potential global warming is constantly addressed by the popular news media. Long-Term Ecological Research (LTER) sites can provide unique perspectives on this topic because of their large legacy of past ecosystem research and observations and their ability to act as a network and provide intersite comparisons. Furthermore, well over half the LTER sites have a climate investigation component as one of their main working hypotheses, and all the sites study the interaction of climate and ecosystems to some degree. The question-oriented organization adopted in this volume and some of the results described in it will provide an important stimulus to future research on the topic.

Climate variability and ecosystem response has been one of the ongoing areas of interest in the LTER since the inception of the program in 1980. The theme has been part of the fifth core area of research in the LTER program, namely, the study of patterns and frequency of disturbances, and the theme also has relevance to several of the other core areas of research. Climate Variability and Ecosystem Response was the title of a workshop held in 1988 that gave rise to a monograph written by the LTER Climate Committee in 1990 (Greenland and Swift 1990, 1991). A second monograph entitled “El Niño and Long-Term Ecological Research Sites” (Greenland 1994) arose out of another workshop held at the 1993 LTER All Scientists Meeting at Estes Park, Colorado. Climate Variability and Ecosystem Response was again the title of the Fall 1997 Long-Term Ecological Research (LTER) Coordinating Meeting in Santa Barbara. Some of the abstracts from the papers at this meeting will be posted at the LTER Climate Committee web site http://
intranet.ternet.edu/committees/climate/. Ongoing interest in this topic led to the planning of three workshops on the same topic for the August 2000 All Scientists Meeting LTER at Snowbird, Utah. The Snowbird workshops dealt with the overall theme as it applied to the quintennial, decadal, and century to millennial timescales. A series of questions were employed to focus the presentations and discussion on the topic. Material from these meetings and workshops together with selected additional material form the basis of the content of this book.

The compilation of work such as this is the result of a very large amount of time, energy, and resources provided by numerous people and organizations. We thank all those who helped run the various workshops over the years and all those who contributed papers and presentations to them. We especially thank the successive leaders of the LTER program, former leader Dr. Jerry Franklin, University of Washington, and current leader Dr. Jim Gosz (Chair) and Dr. Bob Waide (Executive Director), both of the University of New Mexico, for their ongoing support. Dr. David Coleman, University of Georgia, chair of the LTER Publications Committee, Mr. Kirk Jensen, Executive Editor, and Mr. Keith Faivre, Production Editor, Oxford University Press, have also been extremely supportive. The copyeditor at Oxford University Press made major improvements to the text. We also thank Dr. Andrew Fountain, Portland State University, Dr. Berry Lyons, Ohio State University, and Dr. Glen Juday, University of Alaska, who were earlier coeditors of the project. All of these people are noteworthy for extremely selfless action, and they continue the long tradition in the LTER program of putting the good of the program before the interests of individuals. We also thank the National Science Foundation Division of Environmental Biology, Long-Term Programs for funding to all parts of the LTER Program and especially the Network Office, which supported several of the meetings that culminated in this book. Any opinions, findings, conclusions, and recommendations expressed in the material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

We would also like to acknowledge the following institutions and journals for permission to reproduce some previously published material: BioScience, Physical Geography, and Geografiska Annaler Series A.

Several of the chapters in this book went through multiple internal review processes—especially those chapters with multiple authors. At least one person has reviewed all of the chapters in this book. Five outside reviewers reviewed the overall outline of the book. The concluding materials were kindly and constructively reviewed by Dr. Bruce Hayden of the University of Virginia. Specifically, he is responsible for suggesting that future attention be given to the problem of detecting the climate signal in ecosystem dynamics. Other persons who provided help for reviews include Dr. John A. Harrington, Jr., Dr. Peter Lamb, Dr. Nathan Mantua, Dr. Charles W. Martin, Dr. Aaron Moody, Dr. Timothy R. Seastedt, and Dr. Marilyn Walker. We thank them for their help, and we apologize to anyone we may have inadvertently omitted.

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