INTEGRATED REGIONAL ASSESSMENT OF GLOBAL CLIMATE CHANGE

The aim of integrated regional assessment (IRA) is to promote a better understanding of – and more informed decisions on – how regions contribute to and respond to global environmental change. Understanding the regional implications of global environmental change is important, because it is at regional levels that global environmental change mitigation must be practiced and that human impacts will be felt. This book provides both a detailed treatment of the methodological challenges of IRA and a set of international examples illustrating the practice and results of assessments at the regional scale.

The first nine chapters of the book address IRA as a concept and process and set the stage from a methodological perspective. They address questions of scale, uncertainty, and quantitative versus qualitative approaches, as well as some particular conceptual frameworks for assessment. The next five chapters illustrate a range of IRA activities that have combined qualitative and quantitative approaches in innovative ways. The final five chapters look at IRA as a process from an implementation perspective.

This volume is the culmination of the START/CIRA/IHDP initiative responding to the needs of the global research programs International Geosphere–Biosphere Programme (IGBP), the World Climate Research Programme (WCRP), and the International Human Dimensions Programme on Global Environmental Change (IHDP). The book is ideal for researchers and policy makers in environmental science and policy.

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CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore,
São Paulo, Delhi, Dubai, Tokyo

Cambridge University Press
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United Kingdom by Cambridge University Press, UK

www.cambridge.org
Information on this title: www.cambridge.org/9780521518109

First published 2009

Printed in the United Kingdom at the University Press, Cambridge

A catalog record for this publication is available from the British Library

Library of Congress Cataloging in Publication data
Knight, C. Gregory.
Integrated regional assessment of global climate change / C. Gregory Knight, Jill Jäger.
p. cm.
Includes index.
ISBN 978-0-521-51810-9
1. Climatic changes. 2. Global environmental change. I. Jäger, Jill. II. Title.
QC903.K57 2009
304.2′5–dc22 2009022114

ISBN 978-0-521-51810-9 Hardback

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Foreword

Global climate change is occurring at an unprecedented rate and affecting all facets of the Earth's ecosystems as well as our societies. Human activities lie at the very heart of global change and alter the Earth's environment from a local to global scale and from biogeochemical to hydrological and ecological processes. Human behavior is, for example, responsible for a variety of large-scale changes, which range from systematic developments such as climate change to cumulative impacts such as the decrease in biological diversity. Quite suitably, the current era of Earth's history has been named the Anthropocene. Consequently, there is an increasing realization that these human–environment interactions give rise to complex and dynamic socio-ecological systems in which both anthropogenic and biophysical drivers play central roles in environmental changes. Climate change is the most prominent one. It affects socio-ecological systems and significantly impacts on human development, well-being, and vulnerability. Inevitably, the human dimensions of climate change are increasingly becoming issues of governance, adaptation strategies, and scientific agendas. It is impossible then to address climate change without placing humans and society at the center of the debate.

As a biogeophysical phenomenon, climate change occurs over a range of spatial scales. The regional implications of global climatic change are vast and it is at this level that assessment of environmental change, and society's response and adaptation to change are crucial. With the vast number and variety of actors at a regional level in a social system it is important to include integrated systems in the assessments of change. Appreciation of this large-scale impact of global climate change and the types of impact on society requires new perspectives such as that of "integrated regional assessments." This book addresses both the dearth of knowledge of the regional dimensions of global climate change and describes the combined approach of a regional perspective with integrative assessments. Integration is a key term highlighting the interdisciplinary nature that involves cross sectoral stakeholder collaboration from the realms of science, policy, and

society. The choice of scale in this approach is significant as it is one attribute that can guide the examination of global environmental problems. The regional implications of climate change are significant as it is at this level that impacts are felt by humans and that mitigation and adaptation must be practiced. For instance, it is here that the ecosystem services paradigm becomes important. The related processes of environmental change affect all ecosystems whether directly or indirectly. Consequently, changes of ecosystem services will directly affect the people within this region that rely on these services for their well-being and security.

This book sets out what is known about integrated regional assessment, specifically focusing on climate change, and addresses a number of important but difficult questions. What are the concepts and processes of integrated regional assessment? Why is a regional level of spatial specificity needed in environmental assessments? What is the global context of integrated regional assessment? How can integrated regional assessments be applied to scientific agendas and deployed at local and national levels? How can integrated regional assessments be used in collaboration with national assessment processes and scientific agendas? The spatial context of integrated regional assessment is emphasized in a range of case studies that have combined qualitative and quantitative approaches in innovative ways. By raising and attempting to address these questions in this volume, the editors and authors endeavor to highlight an approach of environmental change research which has previously received little focus.

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