

The SAGE Handbook of Environmental Change



Volume 2

Edited by
John A. Matthews, Patrick J. Bartlein, Keith R. Briffa,
Alastair G. Dawson, Anne de Vernal,
Tim Denham, Sherilyn C. Fritz and Frank Oldfield



Contents

VOLUME 2 HUMAN IMPACTS AND RESPONSES

List of Figures	ix
List of Tables	xiii
SECTION IV HUMAN-INDUCED ENVIRONMENTAL CHANGES AND THEIR IMPACTS ON GEO-ECOSYSTEMS	1
25 Monitoring Global Land Cover <i>Sietse O. Los and Jamie Williams</i>	3
26 Human Impacts on Terrestrial Biota and Ecosystems <i>Craig Miller and Iain Gordon</i>	25
27 Human Impacts on Lacustrine Ecosystems <i>Richard W. Battarbee, Helen Bennion, Peter Gell and Neil Rose</i>	47
28 Human Impacts on Coastal and Marine Geo-Ecosystems <i>Ben Daley</i>	71
29 Human Impacts on the Atmosphere <i>Kevin J. Noone</i>	95
SECTION V PATTERNS, PROCESSES AND IMPACTS OF ENVIRONMENTAL CHANGE AT THE REGIONAL SCALE	111
30 Environmental Change in the Humid Tropics and Monsoonal Regions <i>Mark B. Bush and William D. Gosling</i>	113
31 Environmental Change in the Arid and Semi-Arid Regions <i>Xiaoping Yang</i>	141
32 Environmental Change in the Mediterranean Region <i>Miryam Bar-Matthews</i>	163

33	Environmental Change in the Temperate Forested Regions <i>Matt McGlone, Jamie Wood and Patrick J. Bartlein</i>	188
34	Environmental Change in the Temperate Grasslands and Steppe <i>Pavel E. Tarasov, John W. Williams, Jed O. Kaplan, Hermann Österle, Tatiana V. Kuznetsova and Mayke Wagner</i>	215
35	Environmental Change in the Arctic and Antarctic <i>Marianne S. V. Douglas</i>	245
36	Environmental Change in Mountain Regions <i>Martin Beniston</i>	262
37	Environmental Change in Coastal Areas and Islands <i>Patrick Nunn</i>	282
SECTION VI PAST, PRESENT AND FUTURE RESPONSES OF PEOPLE TO ENVIRONMENTAL CHANGE		299
38	Testing the Role of Climate Change in Human Evolution <i>Simon P. E. Blockley, Ian Candy and Stella M. Blockley</i>	301
39	The Origins and Spread of Early Agriculture and Domestication: Environmental and Cultural Considerations <i>Deborah M. Pearsall and Peter W. Stahl</i>	328
40	Complexity, Causality and Collapse: Social Discontinuity in History and Prehistory <i>Georgina Endfield</i>	355
41	Vulnerabilities and the Resilience of Contemporary Societies to Environmental Change <i>Donald R. Nelson</i>	374
42	Disease, Human and Animal Health and Environmental Change <i>Matthew Baylis and Andrew P. Morse</i>	387
43	Policy and Management Options for the Mitigation of Environmental Change <i>Katie Moon and Chris Cocklin</i>	406
44	Socioeconomic Adaptation to Environmental Change: Towards Sustainable Development <i>Chris J. Barrow</i>	426
	Index	447

VOLUME 1 APPROACHES, EVIDENCE AND CAUSES

List of Figures	ix
List of Tables	xv
Notes on Contributors	xvii
Introduction	
1 Background to the Science of Environmental Change <i>John A. Matthews, Patrick J. Bartlein, Keith R. Briffa, Alastair G. Dawson, Anne De Vernal, Tim Denham, Sherilyn C. Fritz and Frank Oldfield</i>	1
SECTION I APPROACHES TO UNDERSTANDING ENVIRONMENTAL CHANGE	35
2 Philosophical and Methodological Perspectives on the Science of Environmental Change <i>Stephan Harrison</i>	37
3 Direct Observation and Monitoring of Climate and Related Environmental Change <i>Keith Alverson</i>	53
4 Reconstructing and Inferring Past Environmental Change <i>Frank M. Chambers</i>	67
5 Dating Environmental Change and Constructing Chronologies <i>Mike Walker</i>	92
6 Modelling Environmental Change and Developing Future Projections <i>Reto Knutti</i>	116
7 Approaches to Understanding Long-term Human–Environment Interactions: Past, Present and Future <i>John A. Dearing</i>	134
SECTION II EVIDENCE OF ENVIRONMENTAL CHANGE AND THE GEO-ECOLOGICAL RESPONSE	163
8 Environmental Change in the Geological Record <i>Jane Francis, Alan M. Haywood, Daniel Hill, Paul Markwick and Claire McDonald</i>	165
9 Evidence of Environmental Change from the Marine Realm <i>Ian D. Goodwin and William R. Howard</i>	181
10 Evidence of Environmental Change from the Cryosphere <i>Shawn Marshall</i>	211

11	Evidence of Environmental Change from Terrestrial Palaeohydrology <i>Wim Z. Hoek</i>	239
12	Evidence of Environmental Change from Terrestrial and Freshwater Palaeoecology <i>Alison J. Smith</i>	254
13	Evidence of Environmental Change from Aeolian and Hillslope Sediments and Other Terrestrial Sources <i>Joseph A. Mason</i>	284
14	Environmental Change and Archaeological Evidence <i>Tim Denham</i>	305
15	Evidence of Environmental Change from Annually Resolved Proxies with Particular Reference to Dendrochronology and the Last Millennium <i>Eugene R. Wahl and David Frank</i>	320
16	Early-Instrumental and Documentary Evidence of Environmental Change <i>Cary J. Mock</i>	345
	SECTION III CAUSES, MECHANISMS AND DYNAMICS OF ENVIRONMENTAL CHANGE	361
17	Plate Tectonics, Continental Drift, Vulcanism and Mountain Building <i>Paul Bishop</i>	363
18	Extraterrestrial Causes of Environmental Catastrophes <i>Elisabetta Pierazzo and H. Jay Melosh</i>	384
19	Astronomical Theory and Orbital Forcing <i>André Berger and Qiuzhen Yin</i>	405
20	Millennial-Scale Climatic Events During the Last Glacial Episode <i>Siwan M. Davies and Anders Svensson</i>	426
21	Solar and Volcanic Forcing of Decadal- to Millennial-scale Climatic Variations <i>Raimund Muscheler and Erich Fischer</i>	444
22	Ocean–Atmosphere Interactions on Interannual to Decadal Time Scales <i>Mathias Vuille and René D. Garreaud</i>	471
23	Responses of Biogeochemical Cycles in the Sea to Environmental Change <i>Thomas F. Pedersen and Rainer Zahn</i>	497
24	Anthropogenic Drivers of Environmental Change <i>Jemma L. Gornall, Andrew J. Wiltshire and Richard A. Betts</i>	517
	Index	537