Introduction To Modern Climate Change

Engaging with Climate ChangeEnergy and Climate ChangeClimate ChangeClimate Change ScienceA Short Introduction to Climate ChangeClimate Change, Media & CultureEngineering Response to Climate Change, Second EditionIntroduction to Modern Climate ChangeClimate ChangeThe Oxford Handbook of Climate Change and SocietyMoral Theory and Climate ChangeClimate JusticeDire PredictionsClimate and SocietyRadiative Forcing of Climate ChangeUnderstanding Earth's Deep PastGlobal Climate ChangeAn Introduction to Climate Change Economics and PolicyThe Atlas of Climate ChangeThe Science and Politics of Global Climate ChangeThe Climate ConnectionClimate Change Science: A Modern SynthesisIntroduction to Modern Climate ChangeAbrupt Climate ChangeEvidence-Based Climate ScienceChanging Climate PoliticsClimate Change and Climate ModelingThe Discovery of Global WarmingGlobal Warming and Climate Change DemystifiedBeyond Global WarmingContemporary Climate Change DebatesGlobal WarmingClimate ChangeClimate ChangeDiscourses of Global Climate ChangeEncyclopedia of global warming and climate changeClimate Change and the Course of Global HistoryIntroduction to Modern Climate ChangeThe Frigid Golden AgeModern Climate Change Science

Engaging with Climate Change

A clear, concise discussion of today’s hottest topics in climate change, including adapting to climate change and geo-engineering to mitigate the effects of change, Engineering Response to Climate Change, Second Edition takes on the tough questions of what to do and offers real solutions to the practical problems caused by radical changes in the Earth’s climate. From energy consumption and carbon dioxide emissions reduction, to climate-altering technologies, this new edition explores the latest concerns such as acidification of the ocean, energy efficiency, transportation, space solar power, and future and emerging possibilities. The editors set the stage by discussing the separate issues of the emissions of radiatively important atmospheric constituents, energy demand, energy supply, agriculture, water resources, coastal hazards, adaption strategies, and geo-engineering. They explain the difference between the natural and human drivers of climate change and describe how humans have influenced the global climate during past decades. Each chapter concludes with discussion questions, calculations, and possible research topics. See What’s in the Second Edition: New conceptual tools and research necessary for problems associated with fossil fuels Cutting-edge topics such as adaption and geo-engineering The latest concerns such as acidification of the ocean, energy efficiency, transportation, and space solar power Solutions to problems caused by changes in the Earth’s climate So much has changed in the 15 years since the publication of the first edition, that this is, in effect, a completely new book. However, the general theme is the same: the climate energy problem has become largely an engineering problem. With this in mind, the book explores what engineers can do to prevent, mitigate, or adapt to climate change.

Energy and Climate Change

Dagomar Degroot offers the first detailed analysis of how a society thrived amid the Little Ice Age, a period of climatic cooling that reached its chilliest point between the sixteenth and eighteenth centuries. The precocious economy, unusual environment, and dynamic intellectual culture of the Dutch Republic in its seventeenth-century Golden Age allowed it to thrive as neighboring societies unraveled in the face of extremes in temperature and precipitation. By tracing the occasionally counterintuitive manifestations of climate change from global to local scales, Degroot finds that the Little Ice Age presented not only challenges for Dutch citizens but also opportunities that they aggressively exploited in conducting commerce, waging war, and creating culture. The overall success of their Republic in coping with climate change offers lessons that we would be wise to heed today, as we confront the growing crisis of global warming.

Climate Change

Highlights the influence of saltatory evolution and rapid climate change on human evolution, migration and behavioural change. Growing concern over the potential impacts of climate change on our future is clearly evident. In order to better understand our present circumstances and deal effectively with future climate change, society needs to become more informed about the historical connection between climate and humans. The authors' combined research in the fields of climate change, evolutionary biology, Earth sciences and human migration and behaviour complement each other, and have facilitated an innovative and integrated approach to the human evolution-climate connection. The Climate Connection provides an in-depth text linking 135,000 years of climate change with human evolution and implications for our future, for those working and interested in the field and those embarking on upper-level courses on this topic.

Climate Change Science

The 2nd edition of An Introduction to Climate Change Economics and Policy explains the key scientific, economic and policy issues related to climate change in a completely up-to-date introduction for anyone interested, and students at all levels in various related courses, including environmental economics, international development, geography, politics and international relations. FitzRoy and Papyrakis highlight how economists and policymakers often misunderstand the science of climate change, underestimate the growing threat to future civilization and survival and exaggerate the costs of radical measures needed to stabilize the climate. In contrast, they show how direct and indirect costs of fossil fuels – particularly the huge health costs of local pollution – actually exceed the investment needed for transition to an almost zero carbon economy in two or three decades using available technology.

A Short Introduction to Climate Change

This highly acclaimed atlas distills the vast science of climate change, providing a reliable and insightful guide to this rapidly growing field. Since the 2006 publication of the first edition, climate change has climbed even higher up the global agenda. This new edition reflects the latest developments in research and the impact of climate change, and in current efforts to mitigate and adapt to changes in the world's weather. The atlas covers a wide range of topics, including warning signs, vulnerable populations, health impacts, renewable energy, emissions reduction, personal and public action. The third edition includes new or additional coverage of a number of topics, including agreements reached in Copenhagen and Cancun, ocean warming and increased acidity, the economic impact of climate change, and advantages gained by communities and business from adapting to climate change. The extensive maps and graphics have been updated with new data, making this edition once again an essential resource for everyone concerned with this pressing subject.

Climate Change, Media & Culture

"This book is aimed at non-science-major undergraduates and is tightly focused on the problem of anthropogenic climate change. The first half of the book focuses on the science of modern climate change, including evidence that the Earth is warming and a basic description of climate physics. It also covers concepts like radiative forcing, feedbacks, and the carbon cycle. The book shows many algebraibased calculations to illustrate the science. The second half of the book goes beyond science to address non-science issues such as the economics and our policy options to address climate change. The goal of the book is for a student to leave the class ready to engage in the public policy debate on this issue"--Provided by publisher.

Engineering Response to Climate Change, Second Edition

This bold and important new book presents current and emerging thinking on the social dimensions of climate change. Using clear language and powerful examples, it introduces key concepts and frameworks for understanding the multifaceted connections between climate and society. Robin Leichenko and Karen O'Brien frame climate change as a social issue that calls for integrative approaches to research, policy, and action. They explore dominant and relevant discourses on the social drivers and impacts of climate change, highlighting the important roles that worldviews and beliefs play in shaping responses to climate challenges. Situating climate change within the context of a rapidly changing world, the book demonstrates how dynamic political, economic, and environmental contexts amplify risks yet also present opportunities for transformative responses. Aimed at undergraduate students and others concerned with a critical challenge of our time, this informative and engaging book empowers readers with a range of possibilities for equitable and sustainable transformations in a changing climate.

Introduction to Modern Climate Change

Composed of two extensive sections, this book surveys important work in climate change science, mainly in the United States, and introduces contributions to the body of science that have arrived on the scene between January 2013 and February 2014. The opening section offers a broad examination of contemporary climate change science, with subsections on the Intergovernmental Panel on Climate Change (IPCC); Earth's energy imbalance and energy flow; carbon dioxide's role in the greenhouse effect; climate forcing, and climate feedbacks; Charles David Keeling and the Keeling Curve; the interfaces of atmosphere with oceans and land; paleoclimates and paleoclimatology; rising sea level; melting glaciers; deforestation; desertification; more violent storms, animal and human migration, extinction of species and more. The second section reviews and assesses the newest contributions to the body of research. Among the topics discussed are current and recent research on rising temperatures; the BEST study; the Global Historical Climatology Network (GHCN) and the National Climatic Data Center (NCDC); current and recent research on climate models, new research on global warming 56 million years ago; ecosystem impacts, projections of future climate and more. This book can be considered a bridge between the volumes of Farmer and Cook's Climate Change Science: A Modern Synthesis, as it arrives between the release of the first volume on the Physical Climate (2013) the second, on Earth's climate history, which is now in preparation. The book benefits a wide audience as its survey of the science of climate change provides an introduction to the subject and a discussion of current research in the field. The book may be used as a refresher for those who have had prior courses in climate science and related fields. Each chapter includes a comprehensive list of references for subjects discussed in the text.

Climate Change

Global warming and human-induced climate change are perhaps the most important scientific issues of our time. These issues continue to be debated in the scientific community and in the media without true consensus about the role of greenhouse gas emissions as a contributing factor. Evidence-Based Climate Science: Data opposing CO2 emissions as the primary source of global warming objectively gathers and analyzes scientific data concerning patterns of past climate changes, influences of changes in ocean temperatures, the effect of solar variation on global climate, and the effect of CO2 on global climate to clearly and objectively present counter-global-warming evidence not embraced by proponents of CO2. An unbiased, evidence-based analysis of the scientific data concerning climate change and global warming Authored by 8 of the world's leading climate scientists, each with more than 25 years of experience in the field Extensive analysis of the physics of CO2 as a greenhouse gas and its role in global warming Comprehensive citations, references, and bibliography Adaptation strategies are presented as alternative reactions to greenhouse gas emission reductions

The Oxford Handbook of Climate Change and Society

Climate change has become the most pressing moral and political problem of our time. Ethical theories help us think clearly and more fully about important moral and political issues. And yet, to date, there have been no books that have brought together a broad range of ethical theories to apply them systematically to the problems of climate change. This volume fills that deep need. Two preliminary chapters—an up-to-date synopsis of climate science and an overview of the ethical issues raised by climate change—set the stage. After this, ten leading ethicists in ten separate chapters each present a major ethical theory (or, more broadly, perspective) and discuss the implications of that view for how we decide to respond to a rapidly warming planet. Each chapter first provides a brief exposition of the view before working out what that theory "has to say" about climate change and our response to the problems it poses. Key features: • Up-to-date synopsis of climate science • Clear overviews of a wide range of ethical theories and perspectives by leading experts • Insightful discussions of the implications of these theories and perspectives for our response to climate change • A unique opportunity to assess the relative strengths and weaknesses of various ethical viewpoints.

Moral Theory and Climate Change

An unprecedented union of scientific analysis and stunning photography illustrating the effects of climate change on the global ecosystem.

Climate Justice

Climate Change is geared toward a variety of students and general readers who seek the real science behind global warming. Exquisitely illustrated, the text introduces the basic science underlying both the natural progress of climate change and the effect of human activity on the deteriorating health of our planet. Noted expert and author Edmond A. Mathez synthesizes the work of leading scholars in climatology and related fields, and he concludes with an extensive chapter on energy production, anchoring this volume in economic and technological realities and suggesting ways to reduce greenhouse-gas emissions. Climate Change opens with the climate system fundamentals: the workings of the atmosphere and ocean, their chemical interactions via the carbon cycle, and the scientific framework for understanding climate change. Mathez then brings the climate of the past to bear on our present predicament, highlighting the importance of paleoclimatology in understanding the current climate system. Subsequent chapters explore the changes already occurring around us and their implications for the future. In a special feature, Jason E. Smerdon, associate research scientist at Lamont-Doherty Earth Observatory of Columbia University, provides an innovative appendix for students.

Dire Predictions

Changes in climate are driven by natural and human-induced perturbations of the Earthâ€™s energy balance. These climate drivers or "forcings" include variations in greenhouse gases, aerosols, land use, and the amount of energy Earth receives from the Sun. Although climate throughout Earthâ€™s history has varied from "snowball" conditions with global ice cover to "hothouse" conditions when glaciers all but disappeared, the climate over the past 10,000 years has been remarkably stable and favorable to human civilization. Increasing evidence points to a large human impact on global climate over the past century. The report reviews current knowledge of climate forcings and recommends critical research needed to improve understanding. Whereas emphasis to date has been on how these climate forcings affect global mean temperature, the report finds that regional variation and climate impacts other than temperature deserve increased attention.

Climate and Society

The acceleration of global climate change creates a nexus for the examination of power, political rhetoric, science communication, and sustainable development. This book takes an international view of twenty first century environmental communication to critically explore mediated expressions of climate change.

Radiative Forcing of Climate Change

This third edition has been comprehensively updated to reflect the large changes in scientific knowledge and policy debates on climate change since the previous edition in 2009. It provides a concise but thorough overview of the science, technology, economics, policy, and politics of climate change in a single volume. It explains how scientific and policy debates work, outlines the scientific evidence for the reality and seriousness of climate change and the basic atmospheric science that supports it, and discusses policy options and the current state of the policy debate. By pulling these elements together, the book explains why the issue can be so confusing and provides guidance on practical routes forward. Anyone interested in climate change, the global environment, or how science is used in policy debates should read this book. It is the ideal textbook for undergraduate or graduate courses in environmental policy and climate change.

Understanding Earth's Deep Past

Periodic reports from the Intergovernmental Panel on Climate Change (IPCC) evaluate the risk of climate change brought on by humans. But the sheer volume of scientific data remains inscrutable to the general public, particularly to those who may

still question the validity of climate change. In just over 200 pages, this practical text presents and expands upon the essential findings of the IPCC's 5th Assessment Report in a visually stunning and undeniably powerful way to the lay reader. Scientific findings that provide validity to the implications of climate change are presented in clear-cut graphic elements, striking images, and understandable analogies.

Global Climate Change

Climate Change and the Course of Global History presents the first global study by a historian to fully integrate the earth-system approach of the new climate science with the material history of humanity. Part I argues that geological, environmental, and climatic history explain the pattern and pace of biological and human evolution. Part II explores the environmental circumstances of the rise of agriculture and the state in the Early and Mid-Holocene, and presents an analysis of human health from the Paleolithic through the rise of the state, including the Neolithic Demographic Transition. Part III introduces the problem of economic growth and examines the human condition in the Late Holocene from the Bronze Age through the Black Death, assessing the relationships among human technologies, climatic change, and epidemic disease. Part IV explores the move to modernity, stressing the emerging role of human economic and energy systems as earth-system agents in the Anthropocene. Supported by climatic, demographic, and economic data with forty-nine figures and tables custom-made for this book, A Rough Journey provides a pathbreaking model for historians of the environment, the world, and science, among many others.

An Introduction to Climate Change Economics and Policy

Contemporary Climate Change Debates is an innovative new textbook which tackles some of the difficult questions raised by climate change. For the complex policy challenges surrounding climate migration, adaptation and resilience, structured debates become effective learning devices for students. This book is organised around 15 important questions, and is split into four parts: What do we need to know? What should we do? On what grounds should we base our actions? Who should be the agents of change? Each debate is addressed by pairs of one or two leading or emerging academics who present opposing viewpoints. Through this format the book is designed to introduce students of climate change to different arguments prompted by these questions, and also provides a unique opportunity for them to engage in critical thinking and debate amongst themselves. Each chapter concludes with suggestions for further reading and with discussion questions for use in student classes. Drawing upon the sciences, social sciences and humanities to debate these ethical, cultural, legal, social, economic, technological and political roadblocks, Contemporary Debates on Climate Change is essential reading for all students of climate change, as well as those studying environmental policy and politics and sustainable development more broadly.

The Atlas of Climate Change

The science of climate change is a complex subject that balances the physical record and scientific fact with politics, policy, and ethics - and is of particular importance to the geosciences. This thoughtfully crafted new text and accompanying media encourage non-science majors to practice critical thinking, analysis, and discourse about climate change themes. Taking a cross-disciplinary approach, acclaimed educator and researcher, David Kitchen, examines not only the physical science, but the social, economic, political, energy, and environmental issues surrounding climate change. His goal: to turn knowledge into action, equipping students with the knowledge and critical skills to make informed decisions, separate facts from fiction, and participate in the public debate.

The Science and Politics of Global Climate Change

Energy and Climate Change: An Introduction to Geological Controls, Interventions and Mitigations examines the Earth system science context of the formation and use of fossil fuel resources, and the implications for climate change. It also examines the historical and economic trends of fossil fuel usage and the ways in which these have begun to affect the natural system (i.e., the start of the Anthropocene). Finally, the book examines the effects we might expect in the future looking at evidence from the "deep time" past, and looks at ways to mitigate climate change by using negative emissions technology (e.g. bioenergy and carbon capture and storage, BECCS), but also by adapting to perhaps a higher than "two degree world," particularly in the most vulnerable, developing countries. Energy and Climate Change is an essential resource for geoscientists, climate scientists, environmental scientists, and students; as well as policy makers, energy professionals, energy statisticians, energy historians and economists. Provides an overarching narrative linking Earth system science with an integrated approach to energy and climate change Includes a unique breadth of coverage from modern to "deep time" climate change; from resource geology to economics; from climate change mitigation to adaptation; and from the industrial revolution to the Anthropocene Readable, accessible, and well-illustrated, giving the reader a clear overview of the topic

The Climate Connection

Up-to-date new edition of leading textbook on global warming for students and general readers.

Climate Change Science: A Modern Synthesis

Syukuro Manabe is perhaps the leading pioneer of modern climate modeling. Beyond Global Warming is his compelling

firsthand account of how the scientific community came to understand the human causes of climate change, and how numerical models using the world's most powerful computers have been instrumental to these vital discoveries. Joined here by atmospheric scientist Anthony Broccoli, Manabe shows how climate models have been used as virtual laboratories for examining the complex planetary interactions of atmosphere, ocean, and land. Manabe and Broccoli use these studies as the basis for a broader discussion of human-induced global warming--and what the future may hold for a warming planet. They tell the stories of early trailblazers such as Svante Arrhenius, the legendary Swedish scientist who created the first climate model of Earth more than a century ago, and provide rare insights into Manabe's own groundbreaking work over the past five decades. Expertly walking readers through key breakthroughs, they explain why increasing atmospheric carbon dioxide has caused temperatures to rise in the troposphere yet fall in the stratosphere, why the warming of the planet's surface differs by hemisphere, why drought is becoming more frequent in arid regions despite the global increase in precipitation, and much more.

Introduction to Modern Climate Change

A non-heated discussion on global warming and climate change Interested in getting to the core of the reasons for the Earth's changing climate? Want an accurate reading on the science behind global warming? Here's your gauge! This easy-to-follow guide offers a temperate view of this hot topic. Global Warming & Climate Change Demystified starts by looking at scientific data gathered from weather instruments, satellite telemetry, ice cores, and coral sections that reveal how the Earth's temperature is changing. The book goes on to examine the causes of climate change, including both natural processes and human-generated greenhouse gases. Finally, the consequences of global warming are discussed and a wide variety of viable solutions that can be implemented by individuals as well as society as a whole are presented. Complete with end-of-chapter quizzes and a final review to test your knowledge, this book will teach you the fundamentals of global warming and climate change in an unbiased and thorough manner. This fast and easy guide offers: A thorough review of scientific data Details on the evidence of global warming worldwide Information on the origin and impact of greenhouse gases Explanations of alternatives to carbon-based energy sources Suggestions for local and global solutions Simple enough for a beginner, but challenging enough for an advanced student, Global Warming & Climate Change Demystified is your shortcut to understanding this important and timely issue.

Abrupt Climate Change

How can we help and support people to face climate change? Engaging with Climate Change is one of the first books to explore in depth what climate change actually means to people. It brings members of a wide range of different disciplines in the social sciences together in discussion and to introduce a psychoanalytic perspective. The important insights that result

have real implications for policy, particularly with regard to how to relate to people when discussing the issue. Topics covered include: what lies beneath the current widespread denial of climate change how do we manage our feelings about climate change our great difficulty in acknowledging our true dependence on nature our conflicting identifications the effects of living within cultures that have perverse aspects the need to mourn before we can engage in a positive way with the new conditions we find ourselves in. Through understanding these issues and adopting policies that recognise their implications humanity can hope to develop a response to climate change of the nature and scale necessary. Aimed at the general reader as well as psychoanalysts, psychotherapists and climate scientists, this book will deepen our understanding of the human response to climate change.

Evidence-Based Climate Science

Changing Climate Politics

The link between justice and climate change is becoming increasingly prominent in public debates on climate policy. This clear and concise philosophical introduction to climate justice addresses the hot topic of climate change as a moral challenge. Using engaging everyday examples the authors address the core arguments by providing a comprehensive and balanced overview of this heated debate, enabling students and practitioners to think critically about the subject area and to promote discussion on questions such as: Why do anything in the face of climate change? How much do we owe our descendants – a better world, or nothing at all? How should we distribute the burden of climate action between industrialized and developing countries? Should I adopt a green lifestyle even if no one else makes an effort? Which means of reducing emissions are permissible? Should we put hope in technological solutions? Should we re-design democratic institutions for more effective climate policy? With chapter summaries, illustrative examples and suggestions for further reading, this book is an ideal introduction for students in political philosophy, applied ethics and environmental ethics, as well as for practitioners working on one of the most urgent issues of our time.

Climate Change and Climate Modeling

The thoroughly updated second edition of an invaluable textbook for any introductory survey course on the science and policy of climate change.

The Discovery of Global Warming

Changing Climate Politics provides a comprehensive account of the current state of government action and political participation in the United States on the issue of climate change. Author Yael Wolinsky-Nahmias evaluates the role of the federal government, the courts, states, and cities in tackling the problems created by climate change, offering an inclusive and balanced assessment of progress and challenges. The book further explores the growing role of civic society in climate action plans, analyzing public opinion, the U.S. climate movement, policy making through ballot measures, consumer action, and the prospect of a social transformation toward a more sustainable society. This timely volume examines new approaches to policies and civic action on climate change addressing critical questions about the responsibilities and obligations of governments and citizens.

Global Warming and Climate Change Demystified

Provides a comprehensive, balanced and reader-friendly account of the developments in climate science over the past 250 years.

Beyond Global Warming

This book examines the arguments made by political actors in the creation of antagonistic discourses on climate change. Using in-depth empirical research from Sweden, a country considered by the international political community to be a frontrunner in tackling climate change, it draws out lessons that contribute to the worldwide environmental debate. The book identifies and analyses four globally circulated discourses that call for very different action to be taken to achieve sustainability: Industrial fatalism, Green Keynesianism, Eco-socialism and Climate scepticism. Drawing on risk society and post-political theory, it elaborates concepts such as industrial modern masculinity and ecomodern utopia, exploring how it is possible to reconcile apocalyptic framing to the dominant discourse of political conservatism. This highly original and detailed study focuses on opinion leaders and the way discourses are framed in the climate change debate, making it valuable reading for students and scholars of environmental communication and media, global environmental policy, energy research and sustainability.

Contemporary Climate Change Debates

The climate of the Earth is always changing. As the debate over the implications of changes in the Earth's climate has grown, the term climate change has come to refer primarily to changes we've seen over recent years and those which are predicted to be coming, mainly as a result of human behavior. This book serves as a broad, accessible guide to the science behind this often political and heated debate by providing scientific detail and evidence in language that is clear to both the

non-specialist and the serious student. * provides all the scientific evidence for and possible causes of climate change in one book * written by expert scientists working in the field * logical, non-emotional conclusions * a source book for the latest findings on climate change

Global Warming

An introduction to the principles of climate change science with an emphasis on the empirical evidence for climate change and a warming world. Additional readings are given at the end of each chapter. A list of "Things to Know" opens each chapter. Chapters are arranged so that the student is first introduced to the scientific method(s), examples of the use of the scientific method from other sciences drawn from the history of science with an emphasis on climate science. Climate science is treated in each chapter based on the premise of global warming. Chapter treatments on the atmosphere. biosphere, geosphere, hydrosphere, and anthroposphere and their inter-relationships are given.

Climate Change

This textbook is tightly focused on the problem of anthropogenic climate change. It is unique among textbooks on climate change in that it combines an introduction of the science with an introduction to the non-science issues such as the economic and policy options. Unlike more purely descriptive textbooks, it contains the quantitative depth that is necessary for an adequate understanding of the science of climate change. The goal of the book is for a student to leave the class ready to engage in the public policy debate on this issue. This is an invaluable textbook for any introductory survey course on the science and policy of climate change, for both non-science majors and introductory science students.

Climate Change

The climate record for the past 100,000 years clearly indicates that the climate system has undergone periodic--and often extreme--shifts, sometimes in as little as a decade or less. The causes of abrupt climate changes have not been clearly established, but the triggering of events is likely to be the result of multiple natural processes. Abrupt climate changes of the magnitude seen in the past would have far-reaching implications for human society and ecosystems, including major impacts on energy consumption and water supply demands. Could such a change happen again? Are human activities exacerbating the likelihood of abrupt climate change? What are the potential societal consequences of such a change? Abrupt Climate Change: Inevitable Surprises looks at the current scientific evidence and theoretical understanding to describe what is currently known about abrupt climate change, including patterns and magnitudes, mechanisms, and probability of occurrence. It identifies critical knowledge gaps concerning the potential for future abrupt changes, including

those aspects of change most important to society and economies, and outlines a research strategy to close those gaps. Based on the best and most current research available, this book surveys the history of climate change and makes a series of specific recommendations for the future.

Discourses of Global Climate Change

A capricious beast ever since the days when he had trudged around fossil lake basins in Nevada for his doctoral thesis, Broecker had been interested in sudden climate shifts. Here is his most surprising and important calculation.

Encyclopedia of global warming and climate change

A systematic examination by the best writers in a variety of fields working on issues of how climate change affects society, and how social, economic, and political systems can, do, and should respond.

Climate Change and the Course of Global History

Provides students with a solid foundation in climate science, with which to understand global warming, natural climate variations, and climate models. As climate models are one of our primary tools for predicting and adapting to climate change, it is vital we appreciate their strengths and limitations. Also key is understanding what aspects of climate science are well understood and where quantitative uncertainties arise. This textbook will inform the future users of climate models and the decision-makers of tomorrow by providing the depth they need, while requiring no background in atmospheric science and only basic calculus and physics. Developed from a course that the author teaches at UCLA, material has been extensively class-tested and with online resources of colour figures, Powerpoint slides, and problem sets, this is a complete package for students across all sciences wishing to gain a solid grounding in climate science.

Introduction to Modern Climate Change

This book introduces climate change fundamentals and essential concepts that reveal the extent of the damage, the impacts felt around the globe, and the innovation and leadership it will take to bring an end to the status quo. Emphasizing peer-reviewed literature, this text details the impact of climate change on land and sea, the water cycle, human communities, the weather, and humanity’s collective future. Coverage of greenhouse gases, oceanic and atmospheric processes, Pleistocene and Holocene paleoclimate, sea levels, and other fundamental topics provide a deep understanding of key mechanisms, while discussion of extreme weather, economic impacts, and resource scarcity reveals how climate

change is already impacting people’s lives—and will continue to do so at an increasing rate for the foreseeable future.

The Frigid Golden Age

There is little dispute within the scientific community that humans are changing Earth's climate on a decadal to century time-scale. By the end of this century, without a reduction in emissions, atmospheric CO2 is projected to increase to levels that Earth has not experienced for more than 30 million years. As greenhouse gas emissions propel Earth toward a warmer climate state, an improved understanding of climate dynamics in warm environments is needed to inform public policy decisions. In Understanding Earth's Deep Past, the National Research Council reports that rocks and sediments that are millions of years old hold clues to how the Earth's future climate would respond in an environment with high levels of atmospheric greenhouse gases. Understanding Earth's Deep Past provides an assessment of both the demonstrated and underdeveloped potential of the deep-time geologic record to inform us about the dynamics of the global climate system. The report describes past climate changes, and discusses potential impacts of high levels of atmospheric greenhouse gases on regional climates, water resources, marine and terrestrial ecosystems, and the cycling of life-sustaining elements. While revealing gaps in scientific knowledge of past climate states, the report highlights a range of high priority research issues with potential for major advances in the scientific understanding of climate processes. This proposed integrated, deep-time climate research program would study how climate responded over Earth's different climate states, examine how climate responds to increased atmospheric carbon dioxide and other greenhouse gases, and clarify the processes that lead to anomalously warm polar and tropical regions and the impact on marine and terrestrial life. In addition to outlining a research agenda, Understanding Earth's Deep Past proposes an implementation strategy that will be an invaluable resource to decision-makers in the field, as well as the research community, advocacy organizations, government agencies, and college professors and students.

Modern Climate Change Science

The warming of the Earth has been the subject of intense debate and concern for many scientists, policy-makers, and citizens for at least the past decade. Climate Change Science: An Analysis of Some Key Questions, a new report by a committee of the National Research Council, characterizes the global warming trend over the last 100 years, and examines what may be in store for the 21st century and the extent to which warming may be attributable to human activity.

ROMANCE ACTION & ADVENTURE MYSTERY & THRILLER BIOGRAPHIES & HISTORY CHILDREN'S YOUNG ADULT FANTASY HISTORICAL FICTION HORROR LITERARY FICTION NON-FICTION SCIENCE FICTION