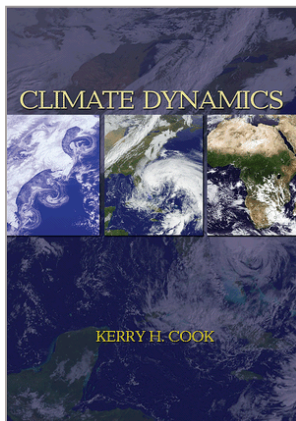




Climate Dynamics

A book review



By Kerry H. Cook

PRINCETON UNIVERSITY
PRESS

216 pages | Hardback
1st edition | July 2013
ISBN 978-0-69-112530-5

Price: \$65 / £44.95 (~€49)

Limiting climate change and mitigating its adverse effects is certainly one of the major challenges of today and for decades to come. It will also require cooperation across many disciplines from humanities to engineering and the natural sciences. As a consequence, it is of great importance that a wide array of audiences is equipped with a basic knowledge of the climate system's fundamental processes and feedbacks. Not only will this promote a better understanding of the Earth system, but will also lead to more informed discussions about climate science and its implications for society and policy decisions.

[Climate Dynamics](#), by Kerry H. Cook, is a short, accessible introductory textbook aimed at undergraduate students. It does not assume prior knowledge in Earth or atmospheric sciences and is thus intended for a broader audience of future engineers, scientists and policymakers. The book has a quantitative approach, which introduces the fundamental equations of the climate system and develops, for instance, a series of simple concept models for the illustration of the greenhouse effect. It is therefore recommended that readers have a basic understanding of calculus and physics. However, pages are never overloaded with equations.

This concise textbook is based on Cook's 20 plus years of experience teaching courses in climate dynamics at Cornell University and the University of Texas at Austin. While the book itself appears to be based on lecture notes, this is not necessarily a disadvantage, considering the author's expertise and the number of students the material was likely tested on. The text is precise and well written and the high-quality grayscale illustrations support the concepts and introduce students to the commonly found visualisations of the field. However, sometimes figures are accompanied by bullet-point style explanations rather than comprehensive text. The chapters are often relatively short and introduce key concepts in a clear

manner, though a few more words would probably help novice climate students to make the most of their reading.

Climate Dynamics is divided into three parts: chapters 1–3 provide a description of the mean climate state and its variability on all timescales from seasonal variation to solar and orbital forcings. At the same time the reader is given an introduction to basic climate variables, their observation and typical presentation. Chapters 4–6 introduce the climate system's fundamental processes, such as radiation, thermodynamics and heat fluxes as well as the forces that make up atmospheric dynamics. The following chapters 7–9 show the reader how these processes lead to global atmospheric and oceanic circulations as main pathways for balancing the global energy budget. The final chapters 10–12 address climate change through changing atmospheric composition and atmospheric feedbacks and give a very brief introduction to climate modelling, but do not discuss the magnitude or impacts of climate change.

Climate Dynamics really shines when it devotes time and space to certain key processes such as the greenhouse effect. Over several pages a sequence of quantitative and increasingly realistic models of the atmosphere with radiation-absorbing layers are introduced, which greatly help the reader understand the principal cause and mechanism of current climate change. The same is to be said for the description of climate variability and its different timescales, a topic rarely understood in public discussion. However, due to the shortness of the text and its concise style, the book may not satisfy the curious reader who would like to get a deeper understanding of the climate system. For example, it misses a chance to point the reader to additional readings.

Overall, the book is an excellent basis for outlining an undergraduate climate dynamics course that can be taught in one term. It introduces and describes all processes and parts of the climate system that are necessary for its understanding.

Tobias Gerken

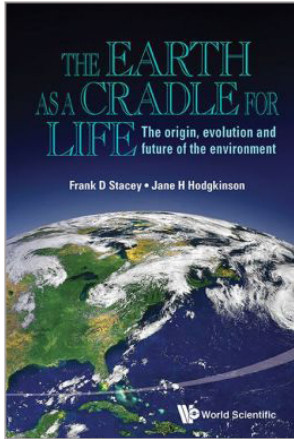
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More information

A supplementary Solutions Manual, restricted to professors using the text in their courses, is available for this book: <http://press.princeton.edu/titles/10041.html>.

The Earth as a Cradle for Life: The Origin, Evolution and Future of the Environment

A book review



By Frank D. Stacey and Jane H. Hodgkinson

WORLD SCIENTIFIC

308 pages | Hardcover
1st edition | July 2013
ISBN 978-981-4508-32-2

Price: £46 (~€55)

The grand theme at the centre of the book is that man can be viewed as a product of his environment, and consequently, as the Earth has grown, we have evolved in tandem with it. It is laid out chronologically, with the genesis of the Earth as a planet in the first part, Earth processes and cycles in the second part, and human influences in the final section. Each part has five major chapters, and the book concludes with some thoughts by the authors, a concise summary and a subject index.

[The Earth as a Cradle for Life](#) benefits from being highly subdivided, with each section being only two or three paragraphs long. This compartmentalised style makes the book very easy to skim through and quickly understand the basics of its particular subject. It is even possible to understand the rationale by reading the subject headings. It also affords the book an incredibly large breadth of subject matter for such a short volume. The downside to this style, however, is that some subjects are not dealt with in as much depth as perhaps is necessary, and others are just mentioned in passing. In fact, there are some important topics whose absence almost seems like something of an oversight. In particular, I was surprised at the lack of a section about ocean circulation, which underpins the climate and governs the cycling of nutrients.

The book is punctuated with frequent and well-chosen figures. Though the diagrams themselves are well designed, the quality is surprisingly poor. Often the scale is unnecessarily stretched, or too small, but in general, the resolution is so poor that the text can be difficult to read. This makes them often difficult to interpret and certainly unsuitable for reproduction.

There will be few readers who are not at least moderately familiar with many of the concepts covered in this book, yet this volume offers a fresh take on the science, and contains material which is certain to be new to many. This book straddles the line between a textbook and a general-interest volume quite comfortably, making it suitable for anyone with a basic understanding of science that wants to place modern climate change in the context of the Earth's history.

Oliver Knevvit

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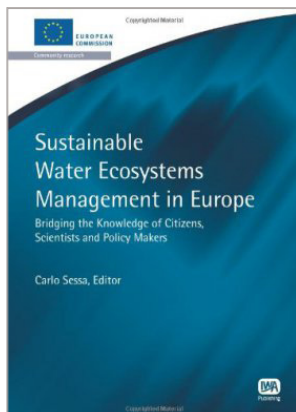
The subject matter of this book will be very familiar – perhaps depressingly so – to most readers. It documents the intricate and, at times, highly fortuitous series of events that lead to making the Earth into a cradle for life, as the authors describe it. It then documents the effect that man has had in interfering with this finely balanced and inconceivably complex system, and its catastrophic outcomes: namely, a rapid and most likely irreversible warming of the Earth's atmosphere, ocean acidification and rapid ecosystem destruction.

There are many books that cover this precise subject, yet this volume can still be considered highly original. Much of this relates to the tone of the text. The authors adopt a far more conversational language than that found in other similar books, closer in style to Kant than to a textbook. Indeed, from the opening preface to the conclusions at the end, the book reads more like a grand thesis, with arguments built up point by point, with evidence and explanations given to support each statement. This is not to say that the grand conclusions are particularly unusual: though an Edmund Halley quote in the preface alludes to a “new and so bold a supposition”, the authors' interpretations of the evidence are broadly similar to those of the recent report by the Intergovernmental Panel on Climate Change. The sense of seeking to convince the reader, however, lends the book a clear, decisive and ultimately highly readable tone.

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Earth Surface Dynamics

Sustainable Water Ecosystems Management in Europe: Bridging the Knowledge of Citizens, Scientists and Policy Makers

A book review



Edited by Carlo Sessa

IWA PUBLISHING

148 pages | Paperback
1st edition | August 2012
ISBN 978-178-0401-14-0

Price: €114.75 (IWA members price: €86.06)

Coastal areas provide a multitude of services: they house wildlife, offer recreation opportunities for humans and have economic value for the fishery sector. Furthermore, they accommodate a high share of people living in the European Union (EU): about 200 million individuals, or 44% of the population of EU member states with a sea border. The high number of people living in these areas puts pressure on the coastal ecosystems, which are prone to pollution, over-exploitation and degradation. The EU wants to halt the deterioration of these ecosystems and has drawn up a policy framework to regulate the quality of coastal waters with sustainable management. To find a broad support for the regulations, the [European AWARE Project](#) was set up to realise sustainable management of water ecosystems by connecting research, people and policymakers in Europe.

[Sustainable Water Ecosystems Management in Europe: Bridging the Knowledge of Citizens, Scientists and Policy Makers](#), edited by AWARE Project Coordinator Carlo Sessa, illustrates how the different stakeholders can be engaged in the sustainable management of water ecosystems. The book's title mentions the bridge between scientists, policymakers and citizens, but the emphasis throughout the volume is clearly on engaging the public. Readers will learn little about the coastal areas or their deterioration; rather, the book focuses on reporting on the AWARE project and providing a guide for bringing scientists, policymakers and the public together for ecosystem management. The key concept of the book is "integrated adaptive ecosystem management" – a complex notion that is translated into practical guidelines and illustrated by clear case studies throughout the paperback's 10 short chapters.

The book takes off with a foreword by Carlo Sessa and researcher Francesca Somma that highlights the relevance of the topic that is dealt with in the chapters that follow: public engagement in the research-policy cascade. They advocate real engagement, rather

than idle talk. People should get easily accessible information to make an informed decision on their involvement. Only then, can they really agree to produce valuable ideas for the management of ecosystems.

Different chapters in the first part of the book deal with the AWARE project, its rationale, concepts and foundations. Together with a presentation of the institutional and policy framework for coastal waters at the EU level, this is rather dry but necessary basic information. More lively and hands-on are the chapters on the experience of the panel of 30 citizens who participated in case studies of the AWARE project (in Gulf of Riga in Latvia and Estonia, in the Southern North Sea in Belgium and France, and in Sacca di Goro in Italy). These chapters report very specifically on how citizens actively participated in decision-making processes for coastal area management. For readers who were unsatisfied with the given scientific information on coastal areas up to here, the case-study chapters provide facts and figures on nutrient cycling, river flow, geographical and chemical details of the coastal areas. Continuing with the philosophy of involving citizens in water ecosystems management, the book features the participants' own conclusions of the project in the form of the AWARE Citizens' Declaration in the appendix.

The book concludes with a practical guide for 'knowledge brokerage', the processes that contribute to improving the science-citizen-policy interface. The last chapter contains concrete tips to bridge people, scientists and policymakers in the water sector and beyond, so that the experiences gained in the field of water ecosystems can be translated to other projects.

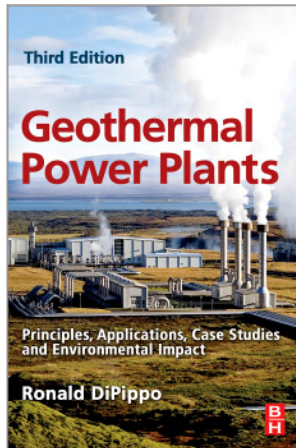
This book is not an easy-to-read volume with visually attractive illustrations that you want to have on your bookshelf. But it is a practical guide if you are aiming at closing the gap that exists between scientists, policymakers and the broad public.

Eline Vanuytrecht

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Geothermal Power Plants: Principles, Applications, Case Studies and Environmental Impact

A book review



By Ronald DiPippo

BUTTERWORTH-
HEINEMANN (ELSEVIER)

624 pages | Hardcover
3rd edition | May 2012
ISBN 978-008-0982-06-9

Price: €92.95

[Geothermal Power Plants](#) is a highly detailed book that seeks to provide an explanation to both the underlying principles and the technical challenges of power generation from geothermal resources. Although it states it is intended for students, researchers, engineers and designers, it is heavily weighted towards the energy industry and practical applications, and does require significant background knowledge, particularly of the geophysical concepts involved in reservoir geology, and classical mechanics.

The book has been written by Ronald DiPippo, Chancellor Professor Emeritus of Mechanical Engineering at the University of Massachusetts and geothermal expert. His research into thermodynamics of high-temperature and pressure gases, his work as a geothermal consultant in nine different countries and his experience in mechanical engineering in both the public and private sectors make him the ideal author for a book of this nature.

The first chapter aims to familiarise the reader with the geology of geothermal zones, and it does this very well. The pace of the author's writing in this first part of the book is steady, making this chapter a pleasure to read. The links between fracking and geothermal energy, and between different types of geothermal energy and their environmental impact, are concisely discussed and are later expanded on in the final chapter.

In chapter two, the author explains the viability of any particular site as a geothermal resource and illustrates the various factors site viability is dependedn on by using bullet-pointed lists. This information could prove very useful to potential investors in the industry who desire to know the complexity behind a project's viability and the procedures that apply to the exploratory stage.

However, the knowledge level jumps dramatically once geochemical and geophysical techniques enter the picture, and again in chapter four, where reservoir geology is discussed. To aid understanding, the author provides extensive references and the appendices contain more information.

If you are unfamiliar with the general layout and operation of a power plant, chapter three provides a decent, easily readable description, but the book becomes quite a heavy onslaught of information from chapter five onwards. Given time, due to the amount of detail the book possesses, there is much information to be obtained here, however the task of doing so can be quite daunting. Once you start to see the structure of the book it becomes easier to digest, but this only became apparent to me on the second read-through.

Chapters 5–10 form Part Two of the volume, which details the different types of geothermal power plant possible. Chapter 11 onward forms Part Three, which is composed of case studies from various geothermal power plants across the world. I found that supplementing the power plant types with real examples to be very useful, and also enlightening, as there were many I did not know of (such as Turkey, which has three of the most highly efficient units in the world, and Russia's Kamchatka peninsula).

In all, this is a valuable book that could benefit from either becoming more accessible to the intended audience or from changing its focus to a purely engineering audience. I can see this book being very useful indeed for those actively working in the geothermal energy sector.

Holly Ferrie

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