



Book Review

One for the expert, and a better one for the layperson

Ecology of Climate Change. The Importance of Biotic Interactions. Post, E. 2013. Princeton University Press, Princeton, NJ xxiii+373 pp. \$37.50 (hardcover). ISBN 978-0-691-14847-2.

The Thinking Person's Guide to Climate Change. Henson, R. 2014. American Meteorological Society, Boston, MA. 516 pp. \$30.00 (paperback). ISBN 978-1-935704-73-7.

Scientific books and papers on climate change, now coming in a constant stream, can puzzle even the most well-informed person. There are always some, however, who stand out from the crowd, as do Eric Post and Robert Henson. Besides their main topic being identical, these two books differ substantially in perspective and target audience. The *Ecology of Climate Change* is clearly written for the scientific community, whereas *The Thinking Person's Guide to Climate Change* targets the general public interested in contemporary environmental problems.

The subtitle of Post's book raised high hopes in me because not many attempts have been made to untangle ecological relationships and biotic interactions at a lower than species level. Post, however, promises to discuss population-, and sometimes individual-level interactions across multiple trophic levels and shed light on how they are likely to operate under a changing climate. Because simple, species-poor arctic or subarctic communities are excellent models for understanding the complex processes in changing ecosystems, examples of the author's own long-term data set from Kangerlussuaku, Greenland, are often used throughout the book.

The author introduces the conceptual framework of the tension and facilitation-promotion hypotheses in the preface, declaring their importance in understanding the responses species, populations, and ecosystems have to climate change. The first hypothesis predicts declining effects of climatic factors on population dynamics in the case of strong biotic interactions (tension), whereas the latter predicts increasing strength in biotic interactions as the effects of climate increase (facilitation or promotion). Although the duality of these theories recurs in several chapters, their value for climate-change ecology lacks a detailed explanation; thus, the amalgamation of the tension and facilitation-promotion hypotheses with climate-change science does not seem convincing. After providing fundamental evidence of recent climate change from a climatological viewpoint in the first chapter, Post

drives the reader into a paleoecological discussion of one of the most fascinating periods in the history of life: the Pleistocene large-mammal extinctions (chapter 2). Although, at first, the connection between this and the subsequent sections seems loose, the unfolding parallels between a rapidly changing climate, mass extinctions, and human activity in prehistoric times versus now become clear by the end of the chapter.

The next three chapters made this book so appealing to me. Chapter 3 discusses the phenological aspects of climate change, but, unlike works with a similar focus, it emphasizes the variation in phenological responses to climate change in spatially separated populations and, consequently, the scale dependency of our assessments on shifts in species' phenologies. Post argues that, besides climatological constraints, a number of biotic factors, such as population density of the preceding year, intra- and interspecific competition or resource availability can influence the timing of key life-history events. Therefore, the overall phenological response to a changing climate also depends on these factors. Building complex analytical frameworks around several scenarios that show how stress factors can influence the timing of life-history events, he successfully incorporates phenology into models of population dynamics. These models are then further developed describing population dynamics and stability in the face of climate change. Post also shows that strong density dependence in populations stabilizes population dynamics, whereas strong density independence (strong dependence on climatic factors) has a destabilizing effect. Moreover, he points out that synchrony between fluctuating populations of a species can increase extinction risk. The book takes a fresh look at the niche concept as well, exploring how climate change will alter a species' realized niche within its fundamental niche, depending on temperature, precipitation changes, and potential old or new competitors.

In chapter 6 the author focuses on the stability of communities under climate change. The author separates communities in which species interact across trophic levels and those in which species interactions are on the same trophic level and uses the terms *vertical* and *lateral* communities, respectively. This chapter talks about rarely discussed temporal and ephemeral communities and how climate change is likely to alter their species composition and the potential development of nonanalogue communities.

The last three chapters summarize knowledge on the effects of climate change on ecosystems as a whole rather than putting the issue into new perspectives or trying

to integrate this part of the book into the previously followed conceptual framework. This may, thus, leave the reader feeling that the message is too general or that ground-breaking scientific ideas are lacking, which could be expected based on the previous issues of this prestigious series.

Although the general structure is logical, in some places I found the book rather difficult to read, very likely due to the unnecessarily long sentences that partly repeat previously explained sections. My expectations may have been too high, but I believe that, besides being a great general overview about the ecology of climate change, this book did not succeed in communicating the “importance of biotic interactions” as promised. Nonetheless, it is still a valuable addition to the ecologist’s bookshelf, and I am convinced it will help many researchers who work with climate change.

The Thinking Person’s Guide to Climate Change, in contrast, is aimed at the general public more than the specialist. In spite of this, it is still worthy reading for professionals working in ecology, meteorology, geology, or any segment of the environmental sciences. The book is a collection of an almost overwhelmingly large amount of the current knowledge on climate change. It covers most of the issues related to the topic, from geophysics to soil microbiology and through phenological changes to the impact of global warming on human life and possible political as well as technological solutions. Moreover, it does all this in such a clear and logical style, simplifying the most complex processes through a series of examples and short explanations, that it will be easily understood by any reader.

Henson provides more than a compilation of current knowledge. Unlike most climate-change-related books, this work pays great attention to both the already happening and the potentially forthcoming effects of climate change on societies and humankind. The vivid examples of the contemporary problems caused by global warming from locations that are likely to be known to people living in the United Kingdom, Europe, and the United States bring the threat close to the reader. Droughts in the U.S. south, increasing wildfires in Australia, and thawing permafrost in Northern Europe and Asia are all signs of global climate change that are well visible to those in the developed world and require urgent action. Besides listing symptoms and making predictions for the future,

the book goes further and devotes an entire chapter to explaining the science behind climatological measurements, weather forecasts, and climate-change scenarios. Henson openly admits and discusses the limitations and uncertainties of scientific models. He also explains on what grounds climate-change deniers dispute the existence of climate change and that it is caused by humans. I believe this honest approach can break the ice of negligence and convince readers that climate change is happening now and we are responsible for it. As Henson puts it, “. . . one thing remained crystal clear: the greenhouse gas content of our atmosphere has entered territory never before explored in human history. Given what we know about these gases, the implications for our climate are profound.”

What I found particularly helpful was Henson’s lists of the most influential political events and the decisions and the reasons behind them because they inform understanding of climate-change mitigation strategies and the use of international treaties. The book does not stop with understanding, it also emphasizes the responsibility everyone has to control emissions of greenhouse gases and provides actions everyday people can take to combat climate change.

Because the book focuses on atmospheric and other environmental events and sparingly discusses the climate-change threats to ecosystems, nature-minded readers may need to read further. The lack of references, however, does not help the interested readers in this. This is a lamentable shortcoming. Even though the authors of articles and scientific journals in which certain information bits are published are often mentioned, identification of a particular paper is difficult and thus the interested reader is discouraged from further investigation.

I wish this book were on the shelves of bookstores all around the world, translated to most languages, because this would enable the huge family of interested readers to get detailed insight into the problems climate change causes and to get involved in the battle against climate change.

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