BOOK REVIEW

The Climate Crisis: An Introductory Guide to Climate Change

David Archer and Stefan Rahmstorf
Cambridge University Press; 2010; 249 pp.; ISBN 978-0-521-40744-1; $90.

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Human-induced climate change, sometimes called "global warming," has, unfortunately, become a "hot" topic, embroiled in controversy, misinformation, and claims and counterclaims. It should not be this way, because there are many scientific facts that provide solid information on which to base policy. There is a very strong observational, theoretical, and modeling base in physical science that underpins current understanding of what has happened to Earth's climate and why and what the prospects are for the future under certain assumptions. Moreover, these changes have impacts, which are apt to grow, on the environment and human society. To avoid or reduce these impacts and the economic and human effects of undesirable future climate change requires actions that are strongly opposed by those with vested interests in the status quo, some of whom have funded misinformation campaigns that have successfully confused the public and some politicians, leading to paralysis in political action. Without mitigation of climate change, one would suppose that at least society would plan sensibly for the changes already happening and projected, but such future adaptation plans are also largely in limbo. The implication is that we will suffer the consequences.

All of these aspects are addressed in this informative and attractive book, which is written for a fairly general but technically informed audience. The book is strongly based upon the 2007 Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) and therefore has a solid scientific basis. Many figures, graphs, and maps come from the three IPCC working group reports, although the captions often do not explain the detail shown. Given that the IPCC reports totaled nearly 3000 pages, to distill the complex material down to 249 pages is no mean task, and the authors have succeeded quite well.

The organization of the book follows the IPCC reports by first dealing with the physical science: the agents of change, the observed changes in climate, the roles of snow and ice and oceans, the paleoclimate perspective, and prospects for the future. The impacts chapter details effects of climate change on plants, animals, and humans; our ability to adapt to the changes; and how effects are compounded by other human activities, such as managed landscapes. It discusses vulnerability and how loss of a favorable environment adversely affects ecosystems, potentially leading to loss of biodiversity as the resilience thresholds for species are exceeded. Water and food security are dealt with, along with regional aspects of climate change. Options for avoiding or reducing climate change, such as energy efficiencies, changing the mix of fuels, and renewable energy, are succinctly dealt with before discussing climate policy. Each chapter opens with a summary of its content and concludes with an excellent discussion of the main findings and their implications. The book mostly follows the IPCC approach of being policy relevant but not policy prescriptive, while pointing out some fairly obvious conclusions and major challenges. It is balanced in explaining what is known with confidence and what is not and the uncertainties.

Although the book is a lot more readable than the full IPCC reports, and therefore valuable, a lot of concepts are assumed already known and several are not well introduced. Examples include climate "forcing," the boundary layer, scattering of light by aerosols, the cause of the urban heat island, and climate modeling. It belatedly notes that "climate is not just temperature" and misses the opportunity to adequately link global warming (heating), referred to as "radiative forcing" by IPCC and the book, to evaporation, precipitation, and the hydrological cycle. Natural variability is dealt with and the El Niño–Southern Oscillation (ENSO) is called out, but other important patterns of natural variability are, unfortunately, skipped over yet deserve emphasis to forestall expectations of relentless warming year after year.

Although published in 2010, the material stems from prior to early 2008, and thus no consideration is given to "climategate" or the failure of negotiations in Copenhagen in December 2009. Moreover, spurious decadal variations in ocean heat content are now understood to arise from erroneous assumptions in fall rates of expendable bathythermographs, and loss of oxygen and increasing dead spots in the ocean were not included in the ocean chapter (but are mentioned briefly in the impacts chapter). Occasionally, a first-person style intervenes, but on the whole the book is well written; I found only a few minor errors. This book should be read by anyone who is interested in climate change but does not have the time or commitment to read the IPCC reports.

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Correction

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The feature article "Scientific value of real-time Global Positioning System data," by W. C. Hammond et al. (*Eos, 92*(15), 125–126, doi:10.1029/2011EO150001, 2011), incorrectly states that precise positioning can be accomplished "when three or more spacecraft are in view." Because of the need to solve for GPS receiver clock offsets in addition to three geographic coordinates, the correct minimum number of satellites for precise positioning is four.

Correction

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The author affiliations in the 7 June 2011 meeting report "Standardizing experiments in geoengineering" (*Eos, 92*(23), 197, doi:10.1029/2011EO230008) contain an error. It is Olivier Boucher, not Alan Robock, who is now at Laboratoire de Météorologie Dynamique, Université Pierre et Marie Curie, CNRS, Paris, France.