



The Global Carbon Cycle (Princeton Primers in Climate)

By David Archer

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The Global Carbon Cycle is a short introduction to this essential geochemical driver of the Earth's climate system, written by one of the world's leading climate-science experts. In this one-of-a-kind primer, David Archer engages readers in clear and simple terms about the many ways the global carbon cycle is woven into our climate system. He begins with a concise overview of the subject, and then looks at the carbon cycle on three different time scales, describing how the cycle interacts with climate in very distinct ways in each. On million-year time scales, feedbacks in the carbon cycle stabilize Earth's climate and oxygen concentrations. Archer explains how on hundred-thousand-year glacial/interglacial time scales, the carbon cycle in the ocean amplifies climate change, and how, on the human time scale of decades, the carbon cycle has been dampening climate change by absorbing fossil-fuel carbon dioxide into the oceans and land biosphere. A central question of the book is whether the carbon cycle could once again act to amplify climate change in centuries to come, for example through melting permafrost peatlands and methane hydrates.

The Global Carbon Cycle features a glossary of terms, suggestions for further reading, and explanations of equations, as well as a forward-looking discussion of open questions about the global carbon cycle.

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Editorial Review

Review

Second Place in the 2012 Book Series in the Professional Scholarly Series category, New York Book Show

"Archer's book, *The Global Carbon Cycle*, one of the Princeton Primers in Climate, is a detailed, but readable look at the science behind the way the Earth reacts to carbon and other factors that relate to global climate. He discusses changes in the Earth's temperature throughout history and the reasons behind. Such factors as the gradual warming of the sun and changes in the Earth's orbit are examined. Without some understanding of the science that goes beyond parroting what we hear in the form of sound bites on the evening news, we cannot have an informed discussion."--**Brad Sylvester, Yahoo News**

"[David Archer] clearly presents the treatments of changes in the Earth's orbital trajectory, anthropogenic increases in atmospheric carbon dioxide, ocean pH swings, and temperature shifts. Archer's use of three different timescales to clarify Earth's historical climate cycles illustrates his mastery of thermodynamics and chemical equilibria."--**Choice**

"If you want to understand why scientists can't seem to find consensus on climate change, then this book, through its honest acknowledgement of how much we don't know and what we can't completely predict, will help."--**Pat Thomas, Geographical**

"An easily readable format, this lightweight book is an excellent companion to those who need a quick on-the-go reference or for those who need a compendium for their office or lab. . . . *The Global Carbon Cycle* is an authoritative book with numerous examples explaining scientific phenomena associated the global carbon cycle. *The Global Carbon Cycle* book also contains a glossary of terms along with an excellent bibliography for further reading."--**Gabriel Thoumi, Mongabay.com**

"Archer's book is a must read for specialists and graduate students in geochemistry, palaeoclimatology, and modern climate change. This is an essential source of fresh information on carbon cycling on the Earth."--**Dmitry A. Ruban, Palaeontologie allgemein**

From the Back Cover

"Fossil-fuel carbon is our dangerous treasure. David Archer brilliantly and lucidly provides the essential background on Earth's carbon cycle that we need to make wise decisions about future use."--**Richard B. Alley, Pennsylvania State University**

"David Archer is one of the world's leading experts advancing our understanding of the consequences of carbon dioxide emissions in the context of geologic time. Archer's book explains how the consequences of our fossil-fuel economy will outlast even our nuclear waste. This book is essential reading--it wakes us up to the long-term consequences of our fossil-fuel folly."--**Ken Caldeira, Carnegie Institution for Science**

"Archer has written a well-constructed text that explores the major factors regulating atmospheric CO₂ across different geological time scales up to and including the current human-driven trends from fossil-fuel burning and deforestation. He explains clearly and in an engaging fashion a number of difficult concepts

associated with various feedback mechanisms between Earth's climate and the carbon cycle. The science is first-rate."--**Scott C. Doney, Woods Hole Oceanographic Institution**

"This book will serve both students and researchers seeking to understand this critical component of the Earth system. Until now, there hasn't been a text that clearly discusses the carbon cycle across time scales and that connects the often-confusing dots to elucidate its role in climate change."--**Galen A. McKinley, University of Wisconsin--Madison**

About the Author

David Archer is professor of geophysical sciences at the University of Chicago. He is the author of "The Long Thaw: How Humans Are Changing the Next 100,000 Years of Earth's Climate" and "Global Warming: Understanding the Forecast", and the coauthor of "The Climate Crisis: An Introductory Guide to Climate Change".

Users Review

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