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978-0-521-40744-1 - The Climate Crisis: An Introductory Guide to Climate Change

David Archer and Stefan Rahmstorf

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The Climate Crisis

An Introductory Guide to Climate Change

DAVID ARCHER AND STEFAN RAHMSTORF

Most climate scientists wholeheartedly agree with the above statement by the US president. An incredible wealth of scientific data on global warming has been collected in the last few decades. The history of the Earth's climate has been probed by drilling into the polar ice sheets and the sediment layers of the oceans' vast depths. Great advances have been made in computer modeling of our climate. Each year, over 10,000 scientific papers are published with the key word "climate." This book provides a concise and accessible overview of what we know about ongoing climate change and its impacts, and what we can do to confront the climate crisis. It gives a readable account of the treasure trove of information contained in the Intergovernmental Panel on Climate Change reports, and also brings the subject completely up-to-date with current science and policy.

The Climate Crisis: An Introductory Guide to Climate Change makes essential scientific information on climate change accessible to a broad audience. Obtaining sound information is the first step in preventing a serious, long-lasting degradation of our planet's climate, helping to ensure our future survival.

David Archer is a professor of Geophysical Sciences at the University of Chicago. Dr. Archer has published over 70 scientific papers on a wide range of topics on the carbon cycle and its relation to global climate. He teaches classes on global warming, environmental chemistry, and geochemistry. His previous books include *Global Warming: Understanding the Forecast* (2006) and *The Long Thaw: How Humans are Changing the Next 100,000 Years of Earth's Climate* (2008). He is a regular contributor to the website realclimate.org.

Stefan Rahmstorf is professor of Physics of the Oceans, and head of department at the Potsdam Institute for Climate Impact Research. Dr. Rahmstorf is a member of the Academia Europaea and of the German Advisory Council on Global Change (WBGU). He is also one of the lead authors of the *Fourth Assessment Report* of the Intergovernmental Panel on Climate Change. In 2007 he became an Honorary Fellow of the University of Wales. He has published over 50 scientific papers (14 of which in *Nature* and *Science*) and co-authored two previous books: *Der Klimawandel* (2006) and *Wie bedroht sind die Ozeane?* (2007), published in English as *Our Threatened Oceans* (2009). He is a co-founder and regular contributor to the website realclimate.org.

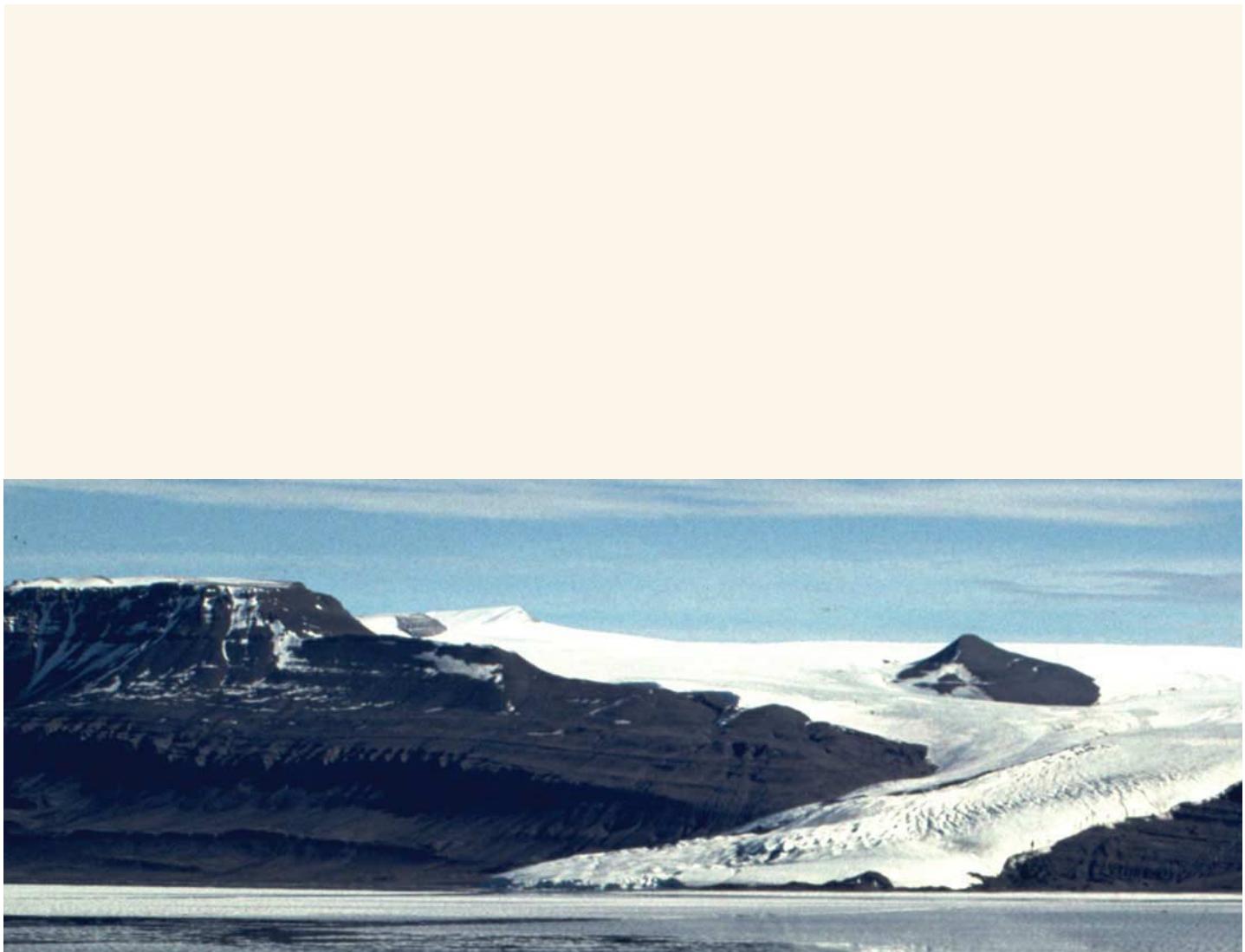
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Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore,
São Paulo, Delhi, Dubai, Tokyo

Cambridge University Press

The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org

Information on this title: www.cambridge.org/9780521407441

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First published 2010

Printed in the United Kingdom at the University Press, Cambridge

A catalog record for this publication is available from the British Library

Library of Congress Cataloging-in-Publication Data

Archer, David, 1960–

The climate crisis : an introductory guide to climate change / David Archer, Stefan
Rahmstorf.

p. cm.

ISBN 978-0-521-40744-1 (hardback) – ISBN 978-0-521-73255-0 (pbk.)

1. Climatic changes. 2. Climatic changes—Government policy. I. Rahmstorf, Stefan.

II. Title.

QC903.A73 2009

363.738'74—dc22 2009038901

ISBN 978-0-521-40744-1 Hardback

ISBN 978-0-521-73255-0 Paperback

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Few challenges facing the world are more urgent than combating climate change. The science is beyond dispute and the facts are clear.

Barack Obama

(November 18, 2008)

Preface



Most climate scientists would wholeheartedly agree with this statement by the newly elected US president, indeed would have agreed with it twenty years ago. The US National Academy of Sciences first warned of impending global warming in a historic report in 1979, and the head of the NASA climate research division, James Hansen, famously declared, “global warming is here,” in a congressional hearing in 1988. That same year, the World Meteorological Organization founded the Intergovernmental Panel on Climate Change (IPCC).

Since then an incredible wealth of scientific data on global warming has been collected. The history of the Earth’s climate has been probed by drilling into the Greenland and Antarctic ice sheets and the sediment layers of the oceans’ vast depths. Great advances in computer modeling of our climate have been made. Each year, over 10,000 scientific papers are published with a key word “climate.”

In this book we aim to provide an overview of what we know about the ongoing climate change and its impacts, and what we can do to confront the climate crisis. We base this account closely on the *Fourth Assessment Report* of the IPCC – a three-year effort of hundreds of scientists from around the world to assess and summarize the scientific literature.

The IPCC has issued four major reports on the state of our climate since it was founded: the first in 1991, the most recent one in 2007. It has earned a reputation as the by far most authoritative, comprehensive and impartial source of scientific information on climate change, earning a Nobel Peace Prize in 2007 for its efforts. The first IPCC report provided the scientific basis for the Global Environment Summit in Rio de Janeiro in 1992, where the United Nations Framework Convention on Climate Change was passed. In this treaty, unique in the history of humanity, nations of the world pledged to stabilize greenhouse gas concentrations in the atmosphere at a level that prevents a “dangerous interference with the climate system.”

IPCC reports are heavy documents (the three volumes of the most recent one total over 2,500 pages) written in carefully couched scientific language. Few non-experts would ever want to read the entire report, and it is not surprising that media accounts are mostly based only on the official report *Summaries for Policy Makers*. These summaries are terse documents with wording carefully negotiated between government representatives from around the world, examined and discussed and agreed upon line by line. Much of what scientists really think – and write in the full report – is not found in these summaries.

We see a need for a more accessible and readable account of the treasure trove of information contained in the IPCC reports, and we attempt to provide it in this book. Although we both contributed to the latest IPCC report, our account is by no means an “official” view of the IPCC. To the contrary, where we see weaknesses with the report we provide a critical and candid perspective. We also include more recent information, given that the cut-off date for scientific papers considered by IPCC was between spring and autumn 2006. Important new findings have been published in scientific journals since then. We do make it transparent to our readers which information comes from the IPCC report, which from more recent papers, and where we add our own perspective.

We hope that this book will make essential scientific information on climate change more accessible to a broad audience, since obtaining sound information is the first step in preventing a serious, long-lasting degradation of our planet’s climate.