CLIMATE CHANGE
Past, Present and Future

Marie-Antoinette Mélières and Chloé Maréchal

This book is designed for first- and second-year university students (and their instructors) in earth science, environmental science, and physical geography degree programmes worldwide. It provides a simple but masterly account, with a minimum of equations, of how the Earth's climate system works, of the physical processes that have given rise to the long sequence of glacial and interglacial periods of the Quaternary, and that will continue to cause the climate to evolve. The summaries at the end of each section constitute essential reading for policy makers and planners. Its straightforward and elegant description, with an abundance of well chosen illustrations, focuses on different time scales, and includes the most recent research in climate science by the United Nations Intergovernmental Panel on Climate Change (IPCC). It shows how it is human behaviour that will determine whether or not the present century is a turning point to a new climate, unprecedented on Earth in the last several million years.

Marie-Antoinette Mélières, Docteur d'Etat in physics, taught basic physics and, later, climate and environmental science at Joseph Fourier University of Grenoble 1 and at the University of Savoie. Her research has covered various areas ranging from molecular spectroscopy and atmospheric physics to environmental and climate science. In 1995 she established the newsletter Global Change, published by the French National Committee on Climate Change, under the authority of the Academy of Sciences. The Committee is the French branch of the four international programs IGBP, WCRP, IHDP and Diversitas. She continued to edit this publication until 2008.

Chloé Maréchal, PhD, geochemist, is Maître de Conférences in the Observatoire des Sciences de l'Univers at Université Claude Bernard Lyon 1, where she teaches Earth Sciences at first university degree level and at Masters level. In her research into the biogeochemical cycles of copper and zinc in the Earth's outer layers, she established a protocol for using isotopes of these elements by plasma-source mass spectrometry and investigated their isotopic fractionation in marine sediments, as well as in soils affected by human activity. She also worked on the geochemical cycle of boron, using its isotopic signal in marine biogenic carbonates as a tool in paleo-oceanographic reconstructions.

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Cover image: Banded iceberg drifting a couple of miles off the French station, Dumont d'Urville (Terre Adélie), Antarctica, © Emmanuel Lemeur, 2008/9

ISBN 978-1-118-70851-4

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WILEY Blackwell

Fondation Nicolas Hulot pour la nature et l'homme

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