

# Climate Change and Microbial Ecology

## Current Research and Future Trends (Second Edition)



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The distribution and function of microorganisms are of crucial importance for the Earth's biogeochemical cycles. Effects of microbial communities on the carbon and nitrogen cycles are particularly important for climate gases. These biogeochemical cycles are significantly impacted by global climate change and microbes may respond by accelerating or alleviating human-caused change. Understanding microbial ecology in the different ecosystems is essential for our ability to assess the importance of biogeochemical cycles-climate feedbacks.

In the first edition of this acclaimed book, a broad range of renowned scientists reviewed the most important hot-topics in the area of climate change and microbial ecology, thus providing a timely and authoritative overview of this increasingly important area. Climate change is continuing unabated and this new, expanded edition contains revised and updated chapters and the addition of four new chapters covering more of the topical fields in this important area of climate science.

This is an essential book for every microbial ecologist from the PhD student to the experienced scientist and is also recommended for everyone interested in the field of global climate change.

- Chapter 1.** Impacts of Climate Change on Cyanobacteria in Aquatic Environments (*Hans W. Paerl*)
- Chapter 2.** Climate Change Effects on Planktonic Bacterial Communities in the Ocean: From Structure and Function to Long-term and Large-scale Observations (*Ingrid Brettar, Manfred G. Höfle, Carla Pruzzo and Luigi Vezzulli*)
- Chapter 3.** Climate Change, Microbial Communities and Agriculture in Semiarid and Arid Ecosystems (*Felipe Bastida, Alfonso Vera, Marta Díaz, Carlos García, Antonio Ruíz-Navarro and José Luis Moreno*)
- Chapter 4.** Responses of Aquatic Protozoans to Climate Change (*Hartmut Arndt and Mar Monsonís Nomdedeu*)
- Chapter 5.** Terrestrial Fungi and Global Climate Change (*Irina Sidorova and Elena Voronina*)
- Chapter 6.** Impact of Climate Change on Aquatic Hyphomycetes (*Verónica Ferreira*)
- Chapter 7.** Aquatic Viruses and Climate Change (*Rui Zhang, Markus G. Weinbauer and Peter Peduzzi*)
- Chapter 8.** Microbes in Aquatic Biofilms under the Effect of Changing Climate (*Anna M. Romaní, Stéphanie Boulétreau, Verónica Díaz Villanueva, Frédéric Garabetian, Jürgen Marxsen, Helge Norf, Elisabeth Pohlen and Markus Weitere*)
- Chapter 9.** Climate Change, Microbes, and Soil Carbon Cycling (*Timothy H. Keitt, Colin R. Addis, Daniel L. Mitchell, Andria Salas and Christine V. Hawkes*)
- Chapter 10.** Environmental Change and Microbial Contributions to Carbon Cycle Feedbacks (*Lei Qin, Hojeong Kang, Chris Freeman, Juanita Mora-Gómez and Ming Jiang*)
- Chapter 11.** Climate Change and Nitrogen Turnover in Soils and Aquatic Environments (*Gero Benckiser*)
- Chapter 12.** Changes in Precipitation Patterns: Responses and Strategies from Streambed Sediment and Soil Microbes (*Giulia Gionchetta, Aline Frossard, Luis Bañeras and Anna Maria Romaní*)
- Chapter 13.** Groundwater Microbial Communities in Times of Climate Change (*Alice Retter, Clemens Karwautz and Christian Griebler*)
- Chapter 14.** Ecosystem Metabolism in River Networks and Climate Change (*Vicenç Acuña, Anna Freixa, Rafael Marcé and Xisca Timoner*)
- Chapter 15.** Microbial Communities and Processes under Climate and Land-use Change in the Tropics (*Stephen A. Wood, Krista McGuire and Jonathan E. Hickman*)
- Chapter 16.** Geoengineering the Climate via Microorganisms: a Peatland Case Study (*Christian Dunn, Nathalie Fenner, Anil Shirsat and Chris Freeman*)

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