

Lake Kivu

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Editors

Lake Kivu

Limnology and biogeochemistry
of a tropical great lake

 Springer

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ISBN 978-94-007-4242-0

ISBN 978-94-007-4243-7 (eBook)

DOI 10.1007/978-94-007-4243-7

Springer Dordrecht Heidelberg New York London

Library of Congress Control Number: 2012937795

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Printed on acid-free paper

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Preface

During the first decade of the twenty-first century, a great deal of new knowledge has accumulated on Lake Kivu, in particular thanks to projects run in parallel by Swiss and Belgian research teams. Eawag, in Switzerland, was mainly interested in investigating further the peculiar physical structure and the biogeochemical cycling in Lake Kivu. Their research began with an emergency expedition following the eruption of the volcano Nyiragongo in January 2002. What was the impact of the lava flow that devastated part of the city of Goma and finally entered the lake? Did it disturb the stratification of the lake, and could it trigger a massive eruption of the gases stored in the lake, threatening people and animals all around the lake? Following that volcanic event, studies were conducted for measuring carbon dioxide and methane in the deep waters. Important knowledge gaps were identified concerning the formation of methane in the lake and its link to the nutrient cycling and physical processes. These open questions were tackled in research partnership projects in cooperation with universities in Rwanda and the Democratic Republic of the Congo.

With the objective of assessing Lake Kivu biological resources and their sustainability, and of understanding the mixolimnion ecosystem function, biologists and ecologists also conducted studies in Lake Kivu in the past decades, related to plankton composition and dynamics, following studies which began in the 1980s on the development of the sardine fishery. This sardine, *Limnothrissa miodon*, endemic to Lake Tanganyika, was introduced in the mid 1950 to increase the fishery yield of the lake, as the pelagic zone supported seemingly large amounts of plankton, but no planktivore. The introduction of the *sardine* has been widely considered as a great success and, from the fishery standpoint, is still cited as an example of species introduction with a positive incidence on the livelihood of the poor local population. By contrast, some scientists were less optimistic and, based on observation of a dramatic zooplankton decrease, predicted the collapse of the sardine fishery. If such a collapse did not happen so far, as the annual yield has maintained itself as the fishing methods evolved, the actual sardine production did not meet the expectations, i.e. 35,000 t y⁻¹ for the whole lake, estimated by the biogenic capacity of Lake Kivu waters and by comparison with Lake Tanganyika. The research project on the ecosystem of the “biozone”, supported by the Belgian Cooperation to Development,

aimed precisely at assessing the ecosystem changes brought about by the sardine introduction, as well as to understand why the sardine fishery had a low yield compared to its original habitat and to other systems where *Limnothrissa* was introduced.

This book has no other objective than gathering the scientific knowledge on Lake Kivu, which may be timely, in the perspective of tapping the lake gas resources for energy production, in a region which needs energy for its development. At the same time, several chapters deal with different aspects of tropical limnology, including elements of comparison with other East African Great Lakes.

Contents

1 Lake Kivu: Past and Present	1
Jean-Pierre Descy, François Darchambeau, and Martin Schmid	
2 Stratification, Mixing and Transport Processes in Lake Kivu	13
Martin Schmid and Alfred Wüest	
3 Nutrient Cycling in Lake Kivu	31
Natacha Pasche, Fabrice A. Muvundja, Martin Schmid, Alfred Wüest, and Beat Müller	
4 Variability of Carbon Dioxide and Methane in the Epilimnion of Lake Kivu	47
Alberto V. Borges, Steven Bouillon, Gwenaël Abril, Bruno Delille, Dominique Poirier, Marc-Vincent Commarieu, Gilles Lepoint, Cédric Morana, Willy Champenois, Pierre Servais, Jean-Pierre Descy, and François Darchambeau	
5 Phytoplankton of Lake Kivu	67
Hugo Sarmento, François Darchambeau, and Jean-Pierre Descy	
6 Microbial Ecology of Lake Kivu	85
Marc Llíros, Jean-Pierre Descy, Xavier Libert, Cédric Morana, Mélodie Schmitz, Louissette Wimba, Angélique Nzavuga-Izere, Tamara García-Armisen, Carles Borrego, Pierre Servais, and François Darchambeau	
7 Zooplankton of Lake Kivu	107
François Darchambeau, Mwapu Isumbisho, and Jean-Pierre Descy	
8 Fishes in Lake Kivu: Diversity and Fisheries	127
Jos Snoeks, Boniface Kaningini, Pascal Masilya, Laetitia Nyina-wamwiza, and Jean Guillard	

9 Paleolimnology of Lake Kivu: Past Climate and Recent Environmental Changes 153
Natacha Pasche

10 Methane Formation and Future Extraction in Lake Kivu..... 165
Alfred Wüest, Lucas Jarc, Helmut Bürgmann, Natacha Pasche, and Martin Schmid

11 Lake Kivu Research: Conclusions and Perspectives 181
Jean-Pierre Descy, François Darchambeau, and Martin Schmid

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