

# Preface

The world is undergoing rapid change in many factors, especially climate, especially global warming, that control the structure, function and services of ecosystems. Increasing atmospheric concentration of greenhouse gases is proven to be responsible for global warming. Due to its powerful warming potential, methane ( $\text{CH}_4$ ), has a considerable impact on the earth's climate system second anthropogenic greenhouse gas only to  $\text{CO}_2$ . Sources of  $\text{CH}_4$  become highly variable for countries undergoing a heightened period of development (e.g. China) due to both human activity and climate change. An urgent need therefore exists to understand key sources of  $\text{CH}_4$ , such as wetlands (rice paddies and natural wetlands) and lakes (including reservoirs and ponds), especially those unique ones in specific countries, which are sensitive to these changes. This book was written to provide a systematic basis for understanding  $\text{CH}_4$  fluxes from unique wetlands of China and their sensitivity to environmental and biotic factors.

This book is intended to introduce  $\text{CH}_4$  fluxes from wetlands to climate managers, policy makers, practicing scientists, modellers, advanced undergraduate students, beginning graduate students from a wide array of disciplines, such as ecology, climatology, geography, forestry, microbiology, etc. We also provide access to the rapidly expanding literature in  $\text{CH}_4$  fluxes of wetlands in China that contribute to fully understanding of the budget of  $\text{CH}_4$  fluxes of wetlands in China and their trends.

The first chapter of the book (by Huai Chen, Ning Wu, Yanfen Wang, Changhui Peng) provides the context for understanding  $\text{CH}_4$  fluxes from wetlands. We introduce the importance of  $\text{CH}_4$  as a greenhouse gas and wetlands as the important source of  $\text{CH}_4$ , then briefly review the studies about  $\text{CH}_4$  fluxes from wetlands in China. We show why we chose Zoige alpine wetlands and Three Gorges Reservoir as the case studies in the book and list our objectives. The second chapter of the book (by Huai Chen, Ning Wu, Yanfen Wang, Dan Zhu, Yongheng Gao), we fully describe spatial (from habitats, ecosystem to landscape) and temporal variations (from diurnal, seasonal to inter-annual) of  $\text{CH}_4$  emissions from Zoige wetlands at different scales. The third chapter of the book (by Huai Chen, Xingzhong Yuan, Yixin He), we put our pioneer results about  $\text{CH}_4$  emissions from littoral wetlands and the surface of the Three Gorges Reservoir. The fourth chapter of the book (by Jianqing Tian, Huai Chen, Yanfen Wang),

we discuss about methanogens and methanogenesis in Zoige wetlands, as well as their changes responsive to vegetation types and climate change. The fifth chapter of the book (by Huai Chen, Changhui Peng, Qiu'an Zhu, Ning Wu, Yanfen Wang, Gang Yang), we review references in relation to  $\text{CH}_4$  emissions from rice paddies, natural wetlands, and lakes in China and then re-estimate the total amount based upon the review itself. In the last chapter of the book (by Qiu'an Zhu, Changhui Peng, Huai Chen), we try to model methane emissions from wetlands and a case study in China.

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