

Preface

Since the industrial revolution, climate changes caused by greenhouse gas emissions have attracted the attention globally from a diverse community including both politicians and scientists; however, the pending issues on the research of the climatic impact of land cover and land-use changes via terrestrial biogeophysical processes is far from resolved. The scientific community needs to provide comprehensive scientific support for global change adaptation. Land cover and land-use changes directly lead to change in the surface condition, thereby changing the surface albedo and surface roughness, and then affects surface heat balance and water cycles. In addition, the urban expansion causes aggravation of urban heat island effect. It is of significance to understand climatic impacts accompanied by biogeophysical processes induced by land-use changes, which is critical for food safety, extreme climate, biodiversity protection, and a series of problems. Land-use change, in turn, is occurring in the context of climate changes at a variety of scales.

Quantitative analysis for the impacts of land use and land cover changes on surface climate is one of the core scientific issues to understand the influence of human activities on global climate. This book first comprehensively analyzed the primary scientific issues about the impacts of land use and land cover changes on the surface climate in [Chap. 1](#). Major models used in the study of land use impact on climate were introduced in [Chap. 2](#), which lay a foundation for the subsequent researches in this book. While in [Chap. 3](#), major methods of projecting the land use change were introduced, this would facilitate the study in the land use change impact.

From [Chaps. 4 to 6](#), studies of climate effect of different types of land use change were introduced respectively. In [Chap. 4](#), the climate effect due to the cultivated land change was simulated in typical areas, namely Northeast China and Northern China plain. [Chapter 5](#) focuses on the grassland change. In [Chap. 6](#), studies on the urban land change impact were introduced. Three case studies were made in different designated study areas, namely Beijing–Tianjin–Tangshan Metropolitan area, Jiangsu, and Wuhan Metropolitan. When it comes to the different areas worldwide, [Chap. 7](#) proves that the methods and models showed

above can be applied to other countries in the world. Finally yet importantly, [Chap. 8](#) explores the advancement in the models, data, and application for observing and estimating the land use impacts on surface climate, and points out further research needs and priorities, which hopefully will provide some references for related studies.

The authors claim full responsibility for any errors appearing in this work.

April 2014

Xiangzheng Deng
Burak Güneralp
Jinyan Zhan
Hongbo Su

Land Use Impacts on Climate

Deng, X.; Güneralp, B.; Zhan, J.; Su, H. (Eds.)

2014, IX, 269 p. 105 illus., 66 illus. in color., Hardcover

ISBN: 978-3-642-54875-8