GLACIERS AND RELATED ENVIRONMENTS IN CHINA

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Science Press
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FOREWORD I

This book represents the culmination of a half century of Chinese research into the cryospheric sciences that was initiated and led by its Editor-in-Chief Professor Shi Yafeng, the father of glaciology in China. The book contains 11 chapters reporting the findings of more than 20 authors. Its principal editors are Prof. Huang Maohuan, a physical glaciologist, Dr. Yao Tandong, an ice core and climatic glaciologist, and He Yuanqing, glaciologist and English editor.

The scope of the book is broad, spanning glacier classification and distribution, their physical characteristics and motion, and their mass and energy balances. Snow and ice chemistry including organic matter and micro-organisms, and studies of ice cores, receive extensive attention. There are also chapters on snow cover and its links to climate change, glacier runoff and modelling, and snow and ice hazards following discussion of ice core records of environmental change, there is a detailed review of the Quaternary glaciations in China. The final chapter examines future scenarios of the state of glaciers and water resources in China, a topic of key importance for the country.

The text is complemented with numerous maps, tables and illustrations and it provides western scientists with an up-to-date and comprehensive view of glaciology in China. The material will also serve as valuable input to the Climate and Cryosphere (CliC) Project of the World Climate Research Programme which is addressing the role of the cryosphere in the global climate system.

Roger G. Barry

Distinguished Professor of Geography

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1 August 2005

FOREWORD Ⅱ

Although the Chinese Academy of Sciences has supported glacier studies for the last half century, many of the results of glacier-related research in China have been inaccessible to non-Chinese readers. This book makes that work available to a wide public for the first time, and illustrates both the breadth and the depth of Chinese studies of snow and ice since the late 1950s. The Editor-in-Chief, Professor Shi Yafeng, led and directed glaciological studies in China from the late 1950s and played a large part in the production of the 23-volume *Inventory of Glaciers in China* compiled during the last two decades of the twentieth century. Details of many of the glaciers are presented in this book. A considerable number are of particular interest because, in contrast to the glaciers of Europe and North America, their dominant accumulation period coincides with the warm season, when precipitation is associated with the summer monsoon.

The establishment of laboratories equipped with modern analytical instruments has played a vital part in the acquisition of glaciological data in China since the 1990s. The deposition of Asian dust on glaciers and snowfields in springtime is significant, the microparticles providing seasonal dating horizons in ice cores. The high resolution data are of particular value in relation to predictions about future climatic conditions. Research reported in Chinese journals, and now presented in this book, has provided a record of climatic and environmental changes in China since the last interglacial; the observations are of importance far beyond the boundaries of China.

Snow and ice meltwater makes a vital contribution to the Chinese economy, whilst the hazards associated with snow, ice, frost and meltwater have severe impacts on society. China's scientists have done much to increase understanding of these hazards; their observations of snow cover variations, based on more than 2000 stations reporting daily snow depths, are important to a large proportion of the country's population.

More than half of the works cited in this book are in Chinese, or were published in Chinese scientific journals. This account of research undertaken in China should be of great value to everyone with an interest in glaciers and their environments worldwide.

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6 July 2005

PREFACE

Since the professional institution for glaciology attached to the Chinese Academy of Sciences (CAS) was established in 1958, studies of glaciers in alpine regions, later extended to Arctic and Antarctic regions, and then of Quaternary glaciations all over China, have been developed gradually. The study fields include general glaciology, hydrology and climatology in glaciated regions, the physics of snow and ice, glaciochemistry, the extraction and analysis of ice cores, the seasonal snow cover, snow and ice hazards and their control measures, and climatic and environmental changes in relation to glaciers. The study methods include expeditions, static observations, laboratory experiments and analyses, and a glacier inventory across China. It was my honor to manage the studies from 1958 to 1984. Since then, I have become engaged in this field until the present time. Therefore, I am lucky enough to have witnessed the whole development of glaciology in China. Nowadays, the papers published in scientific periodicals are increasing so rapidly that there are thousands already, calling eagerly for integrated studies both for a single discipline and as a whole, so as to convenient the citing and reference providing for a broad range of scholars. For an integrated study, we have produced two Chinese monographs: *An Introduction to the Glaciers in China* (Science Press in 1988) with 322 references and *Glaciers and Their Environments in China—the Present, Past and Future* (Science Press in 2000) with 794 references. We are pleased to have them widely used by Chinese scholars.

However, due to language difference between China and the western countries, the progress of glaciology in China, of which most accounts have been published in Chinese, is difficult for western scientists to appreciate. Therefore, we decided to publish an English edition based on *Glaciers and Their Environments in China—the Present, Past and Future* (in Chinese), as you see here, named *Glaciers and Related Environments in China*, which in fact is an optimized version, with new research data till 2005 and a revised structure. It is our hope, through publishing this monograph, to enable foreign scientists to understand systematically the current situation and historical progress of glacier research and other relevant environmental studies within the Chinese territory, so as to promote more cooperation with foreign glaciologists, who also share the wish to develop further the field and to face effectively the widespread concerns as global warming, water cycle changes, glacier shrinking and deteriorating environments.

The 30 authors who prepared this book include experienced senior experts, as well as active young experts in the relevant disciplines from the Cold and Arid Regions Environmental and Engineering Research Institute and the Institute for Tibetan Plateau

Research, Chinese Academy of Sciences. An Editor in Chief and three Associate Editors edited the monograph. As an Editor-in-Chief, I initiated and implemented the preparation of the monograph, did the overall organization work, and checked and approved officially all the manuscripts. As the Associate Editors, Prof. Huang Maohuan completed a great deal of the editorial work, Prof. Yao Tandong checked all the manuscripts, and Prof. He Yuanqing improved the English of all the manuscripts.

I am grateful to the Director Prof. Wang Tao and Vice-Director Prof. Ding Yongjian of the Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences for their financial support for the preparation and publication of this book. I should like to thank Science Press for publishing the monograph, and thank the National Natural Science Foundation of China for sponsoring the publication. I should also like to acknowledge Mister Cheng Daoyuan for improving the English of some chapters, Miss Zhu Guocun for drawing the figures, and staff from the Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences for providing data, figures and photos.

Shi Yafeng

Member and Professor

Chinese Academy of Sciences

25 September 2005

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