

Yaning Chen *Editor*

# Water Resources Research in Northwest China



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ISBN 978-94-017-8016-2 ISBN 978-94-017-8017-9 (eBook)

DOI 10.1007/978-94-017-8017-9

Springer Dordrecht Heidelberg New York London

Library of Congress Control Number: 2014930889

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# Preface

With the increasing concern of global environmental and ecological degradation, there has been an urgent need to investigate the related water cycle changes. Designed for both academic and business sectors, this book examines the major issues in water resources research in Northwest China, approximately one fourth of the nation's entire land area and one of the world's largest arid regions. The arid region of Northwest China is characterized by its extremely vulnerable water resources and associated ecological environment. The large alpine snow and ice cover has contributed to the development of numerous inland streams, forming a unique landscape characterized by mountain-oasis-desert ecosystems. Water, largely originated from the mountain areas, has been a most critical factor to drive the energy and mass circulation in this region, which responds sensitively to the global climate change. This book focuses on some possible impacts of climate change on hydrology and water resources in the arid region of Northwest China. The contributing authors for this book include Yaning Chen, Weihong Li, Zongxue Xu, Zhongqin Li, Jianhua Xu, Xianwei Wang, Yanjun Shen, Zhi Li and Huaijun Wang, all of whom are active researchers in water resources research in arid and cold environments.

This book comprises 11 chapters discussing various aspects in water resources research. Specifically, the book begins with an introductory chapter (Chap. 1) discussing the physical geography and socioeconomic aspects in Northwest China. Chaps. 2-7 discuss the climate system and hydrologic system changes, some implications of these changes in relation to potential evapotranspiration, the hydrological cycle, and the spatiotemporal variations of the snow cover and glaciers through remote sensing, geographic information systems, and statistical analysis. Chaps. 8 and 9 focus on the model description and experimental design to interpret the hydro-climatic process, emphasizing the integration of water, climate, and land ecosystems through field observations and computer-based simulations. Chaps. 10 examines some extreme hydrological events and presents a study using the historical trend method to investigate the spatial and temporal variability of changing temperature and precipitation extremes in the hyper-arid region of Northwest China. And the Chap. 11 of this book discusses some possible strategies for sustainable watershed management. We believe that the lessons from this study area can be useful for other arid areas in the world.

The research reported in this book has been supported by the National Basic Research Program of China (973 Program: 2010CB951003). The Editor is grateful to all of those who contributed papers and revised their papers one or more times and those who reviewed papers according to our requests and timelines. The book project would not have been completed without the help and assistance from several staff members at Springer, especially Margaret Deignan and Takeesha Moerland-Torpey. Acknowledges are due to Dr. Xiaojun Yang for his help in many ways.

Urumqi, Xingjiang, China  
15 July 2013

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