Preface

doi: 10.1007/s00376-011-1000-0

During recent decades, regional climate extremes in the context of global climate change have received increasing attention in China, as have increasing economic losses associated with droughts, rainstorms, cold surges, and heat waves. Do climate extremes become more frequent or stronger in China, especially under current and likely further global warming? What are the mechanisms linking changes in the regional climate extremes and global climate change? This Special Issue is a collection of 18 papers, mainly from a National Basic Research Program project named Climate Extremes in China under Global Warming (2009CB421401), sponsored by the Ministry of Science and Technology of China, and from other relevant projects aimed at answering these or other relevant questions.

This special collection provides climatological overviews of droughts, extreme precipitation, hot and cold extremes, and seasonal cycles in the region and changes in these climate extremes during the last half century, based on updated observations. Some new concepts (e.g., the local seasonal extremes and phases) and novel methods (e.g., the Ensemble Empirical Mode Decomposition) were applied to quantify changes in climate extremes and seasonal cycles more comprehensively than in previous works. Mechanisms linking large-scale atmospheric circulation patterns and thermal anomalies in the oceans to typical regional extreme events in China were investigated via statistical analyses and numerical modeling. A case study of the effect of urbanization on climate trends in wind based on homogenized observations around Beijing indicates the importance of homogenization of climate observations in the study of climate change. The collection also includes some preliminary analyses of projections of climate extremes in China under global warming scenarios from different models.

Although it cannot include all interesting results emerging from the relevant research projects, this Special Issue undoubtedly serves as an updated reference for understanding and quantifying climate extremes and changes in China. As a Principal Investigator of the ongoing project, I look forward to more insightful studies of mechanisms linking regional climate extremes and global climate change as well as more reasonable regional climate projections, especially those dealing with climate extremes in the East Asian Monsoon area.

Dr. YAN Zhongwei

CAS Key Laboratory of Regional Climate-Environment in East Asia