

Preface

This special issue, entitled ‘The Hydrological Cycle and Water Security in a Changing Environment in China’, is the outcome of the 111 Project under Grant No. B08048 approved by the Ministry of Education (MoE) and State Administration of Foreign Experts Affairs (SAFEA), the People’s Republic of China, which has been implemented on the basis of the national platform of State Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering, Hohai University, Nanjing, China. MoE and SAFEA initiated the 111 Project that provides a fund for the research group through the Programme of Introducing Talents of Discipline to Universities.

The Earth is dynamic and changing. Climate change and increasing population, two driving forces in the dynamic Earth at present, are converging to create a water crisis affecting people and the environment. China lies in the East-Asian monsoon region. There are four water-related problems in the great continent of China: more water (flood) in eastern, southern and middle areas, less water (drought) in northern and western parts, water and soil losses, and water pollution. The specific geographical location and climate characteristics of China cause serious water disasters. Processes and elements of the hydrological cycle have changed dramatically in China due to both upper boundary (climate change) and lower boundary (land-use/cover change, population growth, increasing water supply, socioeconomic development activities), which make hydrological uncertainty, as well as risks of water supply and water disaster, increase.

This special issue contains 15 papers, which were selected from more than 30 manuscripts, and peer-reviewed following the guidelines and requirements of the international journal *Hydrology Research*. These papers include the following cases studies: the Three-Gorge Project in the Yangtze River, the middle-route source area of south-to-north water transfer project in China, Southwest Karstic plateau and North China, involving precipitation,

evapotranspiration, runoff, sediment, water quality, hydrological frequency analysis, vegetation dynamics, ecological water use, land-use/cover change, human impact on water regime, climate change impact on extreme flood and drought events. Therefore the special issue reflects the present situations of the hydrological cycle and water security in a changing environment, occurring in most parts of the great continent of China. It will provide readers with some experiences and valuable information in the largest developing country. It may be categorized into 5 groups. Group 1 contains Papers 1–4, mainly concerning human effects on runoff/evapotranspiration, and impacts of climate change on extreme hydrological events. Group 2 consists of Papers 5–7, introducing reservoir design flood, impacts of reservoir operation on sediment regime and downstream ecology. Group 3 comprises Papers 8–9, involving the influence of potential vegetation dynamics on watershed water budget due to future long-term climate change, as well as vegetation response assessment to meteorological drought in North China. Group 4 includes Papers 10–12, relating to hydrological issues in specific regions, such as Karst in South China, the tidal effect in East China, and a rainfall-runoff model in a small catchment. Group 5 consists of Papers 13–15, dealing with new innovative approaches to model hydrological variations, such as a new algorithm for computing the topographic wetness index, DEM resolution effects within scale-invariant TOPMODEL, and basin-scale actual evapotranspiration estimation and validation using MODIS images and hydrological model.

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