

Preface

Climate and land-use change complicate current and future water management challenges through their complex and shifting interactions that alter space–time patterns of hydrological variability and induce uncertainty in the decision making processes. Limitations of traditional hydrological analyses and model approaches based on concepts of stationarity of hydrological events need to be understood and alternative methods explored to deal with environmental change. This volume includes a selection of papers which were presented at the International Association of Hydrological Sciences (IAHS) symposium on Climate and Land Surface Changes in Hydrology, conducted in Gothenburg, Sweden, as part of the IAHS-IAPSO-IASPEI Joint Assembly, 22–26 July 2013. The focus of the symposium was on field-based and modelling studies addressing the sensitivity of hydrological and hydrometeorological fluxes of the coupled land–atmosphere system to climate and land-use change at local, regional and global scales. The symposium was jointly sponsored by the IAHS international commissions on Coupled Land–Atmosphere Systems (ICCLAS), Remote Sensing (ICRS) and Surface Water (ICSW), and the Global Land/Atmosphere System Study (GLASS) of the Global Energy and Water Exchanges Project (GEWEX).

Important objectives of the symposium were to address the effects of past, current and future climate and land-use changes on hydrological processes, including climate–hydrology feedback processes, and to evaluate the impacts of such changes on water resources and flood and drought risks. Methodological approaches and results related to the representation of the coupled land surface–hydrological–climate system were of particular concern. This volume comprises a large number of significant model-based studies evaluating methodologies and impacts from using climate and weather prediction data including, for example, downscaling and uncertainty analyses. Furthermore, hydrological sensitivity and impacts due to spatial and temporal land use and land cover variability are reported for a wide variety of environmental settings. Observational and model-based investigations are presented to assess the significance of land cover and hydrological dynamics for the development of land surface heat fluxes and regional climate. A number of empirical hydroclimatological studies are captured herein, some from remote and data-scarce regions, and others using long-term multi-variable time series data or Earth Observations to evaluate temporal and spatial variability in precipitation, evapotranspiration and hydrological predictions.

The book has been organised in five thematic sections:

- Climate Change and Extreme Events
- Climate Change and Water Resources
- Climate and Spatial Hydrological Processes
- Land–Atmosphere Research in Hydrology
- Land Cover Change and Hydrological Processes

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It is our hope that this edited volume provides a state-of-the-art overview of research challenges, methodological approaches and scientific progress that will be useful for sharing insights and that will stimulate discussions related to the understanding and prediction of climate and land-use change impacts on hydrological processes, water resources, floods and drought risks.

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