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Preface: HS01 – Changes in Flood Risk and Perception in Catchments and Cities

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Many major and devastating floods have recently occurred around the world, and it seems that their number and magnitudes have increased. Changes in flood events can be attributed to a range of natural, and social, processes, including air temperatures, weather patterns, precipitation extremes, as well as the impacts of flood management infrastructure. Drivers of change also include land use change, such as the intensification of agricultural management and surface sealing due to urbanisation, as well as modifications to the river system. At the same time, the economic value of assets in flood prone areas have increased throughout the world with urbanisation encroaching on the flood plains and exposing an increasing number of people to floods. These factors all contribute to changes in levels, perceptions, and experiences of flood risk. The potential increase in flood risks has raised the level of awareness of flood issues held by stakeholders,, and has changed their perception towards flood risks. This poses a major challenge to water resources management, as flood risk changes need to be accounted for in design and regional planning decisions. Yet, the knowledge of the system is often incomplete which raises the question of decision making under uncertainty. This volume of the Proceedings of the International Association of Hydrological Sciences (PIAHS) brings together contributions to a Symposium on “Changes in Flood Risk and Perception in Catchments and Cities” at the 26th IUGG General Assembly to be held in Prague in June 2015. The symposium was organised by the International Commission on Water Resources Systems (ICWRS) together with the International Commissions on Remote Sensing (ICRS), Statistical Hydrology (ICSH) and Surface Water (ICSW) in the frame of the Panta Rhei initiative of the IAHS. The aim of the symposium was to discuss new approaches to characterising temporal and spatial changes of flood characteristics in catchments and river basins, analyse the impact of such changes on the flood risk and propose new developments of flood risk management. The papers of this volume are organised into five blocks. The volume starts with the topic of urban flood risk and urbanisation effects. Newby et al. (2015) and Gaitan and ten Veldhuis (2015) explore the estimation of urban flood risk with spatial analysis techniques. Abidin et al. (2015) specifically focus on the flood risk related to land subsidence of a coastal city. A set of papers (Kaspersen et al., 2015; Salavati et al., 2015; Chen et al., 2015; Shimizu et al., 2015) examines the effect of urbanisation on changes in the flood magnitudes and the associated risks in a range of environments. The second block of papers is dedicated to river training and reservoir effects. Akyurek et al. (2015), Egüen et al. (2015), Tanaka et al. (2015), Motovilov et al. (2015) and Belikov et al. (2015) all analyse different scenarios of the effect of reservoirs, polders and other infrastructure measures on flood runoff, inundation areas and the associated flood risk with the aim of maximising their mitigation efficiency. Gusyev et al. (2015) and Kwak et al. (2015) specifically focus on the effectiveness of water infrastructure in Bangladesh.

The following set of papers is more diverse but they are all related, in some way, to detecting and estimating flood risk change. Hall et al. (2015) report on an initiative of doing collaborative flood research beyond administrative boundaries. Odunuga et al. (2015) and Yu et al. (2015) are specif-

ically interested in the role of land-use while Hlavčová et al. (2015) and Casse and Gosset (2015) analyse the role of changes in snow melt and rainfall, respectively. Perdigão and Blöschl (2015) relate the long-term evolution of floods to landscape-climate feedbacks. Umer et al. (2015) and Adeloye and Mwale (2015) estimate flood risk and vulnerability in complex landscapes.

Seven papers deal with design flood estimation based on methods of different complexity. Zeimetz et al. (2015), Xu et al. (2015) and Lebedeva et al. (2015) estimate design floods by detailed rainfall-runoff modelling. Hejduk et al. (2015) and Kohnová et al. (2015) advance the SCS Curve number method for flood event estimation. In contrast, Schulte and Schumann (2015) and Szolgay et al. (2015) perform extreme value statistics to estimate the dependence of floods at confluences, and the dependence of flood peaks and volumes, respectively.

The final set of papers is dedicated to perceptions and the management of floods. Allasia et al. (2015) and Höllermann and Evers (2015) assess the perception of flood risk by lay people and experts and propose robust flood management strategies under uncertainty. Three papers (Borrell Estupina et al., 2015; Carisi et al., 2015; Tassi et al., 2015) present tools to assist in decision making in terms of flood alerts, flood risk changes and cultivating plants on roofs to reduce flood runoff, respectively. Finally, Pandey and Amarnath (2015) and White et al. (2005) examine the potential of flood warning, and Zappa et al. (2015) analyse a range of flood control measures for optimising flood management.

The papers in this volume clearly illustrate that the research underlying flood risk assessment and management is a vibrant and dynamic field. Novel approaches are proposed that are not only theoretical appealing but also cater for the realities of data availability and the operational needs of flood management in divers setting. It is hoped that this volume will contribute to advancing the science of hydrology and the foundations of water resource management in a changing world.