

Preface

This volume contains the papers accepted for oral presentation at Symposium HS2005 on *Water Quality and Sediment Behaviour of the Future: Predictions for the 21st Century*, held Wednesday 11th to Friday 13th July at the XXIVth General Assembly of IUGG. This symposium was proposed by three commissions and a working group of IAHS: the IAHS International Commissions on Water Quality (ICWQ), Continental Erosion (ICCE), and Groundwater (ICGW), and the Predictions in Ungauged Basins (PUB) Working Group, with the objective of bringing together experts to provide a state-of-the-art review of our current understanding of how water quality and sediment behaviour might alter as a result of climate and land-use change during the 21st Century. The aim was to examine, for both surface water and groundwater systems, not only the nature and controls of future changes in water quality and sediment behaviour, but also what the implications of these will be for human use of water and for freshwater ecosystems, and how well our science is equipped to predict the future in this regard. The theme of the symposium, therefore, set a very broad canvas which is reflected in the eclectic nature of the papers accepted for presentation. However, these have been grouped into three sub-themes, which are described below.

Examination of sediment and nutrient behaviour in surface waters is the subject of the first group of papers, which include discussions of sediment yields and how they have been altered in some of the major rivers of the world (Guyot *et al.*; Li *et al.*) and different approaches to modelling sediment behaviour at continental, national and basin scales (Tramblay *et al.*; Collins *et al.*; Heppenstall *et al.*). Modelling and monitoring of fluxes of sediment together with chemistry are addressed by Chikita *et al.* and by Horowitz *et al.*, while the specific problems of sediment removal in storm-water ponds of urban environments and the nature of sediment-associated phosphorus transfers in small agricultural catchments are discussed by Morgan *et al.* and Deasy *et al.*, respectively. Several papers focus on the important nutrients of nitrogen and phosphorus and how their behaviour may be impacted by climate change, groundwater–surface water interactions and storm events (Rosberg & Arheimer; Krause *et al.*; Onodera *et al.*), as well as the most appropriate ways of estimating and modelling nutrient fluxes (Pinheiro *et al.*; Shrestha & Rode).

Water quality problems associated with metals and other contaminants are the focus of the second group of papers. These include discussions of temporal and spatial trends of metal contamination in a range of environments (lake, regulated river, suburban watershed and urban ponds) encompassing freshwater systems of very different scales (Yao *et al.*; Thoms; Armienta *et al.*; Poletto & Merten; Jones *et al.*). Application of new models to predict Biochemical Oxygen Demand and pesticides are presented (Rustum *et al.*; Pacioni *et al.*), and more general assessments of water quality changes and associated problems in South American and African environments are considered (Bonotto & de Lima; Kithiia). With respect to monitoring water quality problems, the potential of low-cost samplers (Lima & Koide), and of community involvement (Conrad) are also explored.

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The final group of papers deals with broader management issues and pays particular attention to problems of groundwater contamination and soil erosion. Vörösmarty *et al.* highlight the important impacts that management of freshwater resources may have on coastal deltas, while Sherman *et al.* and Alves & Loucks demonstrate the usefulness of modelling in understanding how water quality may be effectively managed. Several studies highlight the vulnerability of groundwater systems to contamination and the need for careful management (Serrat; Saito *et al.*; Lihua *et al.*; Chourasia), while the causes, implications and controls of soil erosion are discussed in the concluding papers (Aboulkader; Feiznia & Nosrati; Sepideh *et al.*; Sharma & Sharma).

Finally, I particularly wish to express my thanks to my co-convenor, Dirk de Boer, who assisted significantly with the selection of papers for this volume, and to Cate Gardner and her team at IAHS Press for preparing the papers for publication as a Red Book.

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