

Preface

Since the 1986 Albuquerque International Symposium on Drainage Basin Sediment Delivery* the International Commission on Continental Erosion (ICCE) of the International Association of Hydrological Sciences (IAHS) has organized a number of successful international symposia focusing on many aspects of erosion and sedimentation. Recent years have seen a growing awareness of the role fluvial sedimentary systems play in determining not only the physical structure of rivers and flood plains, but also their ecological functioning. This has seen hydrologists and geomorphologists make significant contributions to the study of ecological issues. In 1999, the IAHS held its first hydro-ecology workshop “Riverine Ecological Response to Changes in Hydrological Regime, Sediment Transport and Nutrient Loading”† in Birmingham (UK) which focused on the ecological response of changes in flow regime. In recognition that the ecological functioning of riverine systems is influenced by sediments as well as flow regimes, it is timely that the Alice Springs symposium has significant focus on eco-geomorphology.

As the world’s demands on water resources increase and the human impact on the landscape broadens, the attention of river managers turns to balancing the needs of humans with those of riverine ecosystems. Thus, the need for information on the way the structure and functioning of fluvial sedimentary systems impacts on riverine ecology becomes imperative. The flood plain plays a crucial role in riverine ecosystems, as a temporary storage of water, sediments and nutrients, particularly in lowland river systems. Consequently any management for ecological health needs to address the role the flood plain plays. Deconvolving the influence of anthropogenic changes from the natural spatial and temporal variability is also central to determining management options. The provision of information which allows managers to address and understand both structure and function relies on the use and development of new techniques. The Alice Springs Symposium is a contribution to UNESCO IHP-V Project 2.1 “Vegetation, Land Use and Erosion”, which explicitly addresses this theme.

Alice Springs, in central Australia, was chosen as an appropriate location to hold the 2002 Symposium on the Structure Function and Management Implications of Fluvial Sedimentary Systems as it is located in an area which encapsulates some of the more interesting aspects of the fluvial sedimentary systems. The region is characterized by high temporal and spatial variability of streamflow and sediment movement and as a consequence the physical character of the river channels is highly complex. Moreover, dryland riverine ecosystems are now being recognized as having high biodiversity whereas they were

* *Proceedings available from IAHS Press: Drainage Basin Sediment Delivery, edited by R. F. Hadley, Publ. no. 159 (August 1986), price only £9.00, 488 + x pages.*

† *Proceedings available from IAHS Press: Hydro-ecology: Linking Hydrology and Aquatic Ecology, edited by M. C. Acreman, Publ. no. 266 (October 2001), price £33.00, 162 + xiv pages.*

previously regarded as impoverished. Indigenous flora and fauna communities have sophisticated adaptations to lengthy periods of stress induced by drought. The lack of recognition of these complex eco-geomorphological responses means that the management challenges of balancing the needs of humans and the riverine ecosystem within dryland regions are great.

The papers in this proceedings cover a wide range of topics pertaining to the fluvial sedimentary system, recognizing the importance of these systems and the way in which they are managed to the health of riverine systems. They have been divided into four main themes: The papers in the section on *Eco-geomorphology: linking the physical form of fluvial sedimentary systems with ecological response* captures research on the relationships between the physical form of river systems and ecological functioning. These papers are complemented by the section on *Flood plains: the role of temporary storage in the exchange of sediment and nutrients*, recognizing the importance of flood plains to fluvial ecological processes. This theme focuses on the conveyance and cycling of contaminants, sediment and nutrients through temporary storage. The third theme *Variability: magnitude and frequency controlling sedimentary systems* promotes the way in which understanding the effects of temporal and spatial variation on our river systems is key to their management. Central to advances in our understanding of fluvial sedimentary systems are innovative techniques for their study. The fourth theme: *Techniques: new approaches in the study of fluvial sedimentary systems* presents advances in the application of remote sensing, hydraulic modelling and tracing to the study of these systems. Each section is concluded by a keynote paper which summarizes the main issues presented within the theme papers and provides insight into the challenges which face that field of research into the future.

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