

Preface

This symposium is the third, dealing with the subject of erosion and sediment yield, which has been organized by the International Commission on Continental Erosion (ICCE) in recent years. The first, the *Symposium on Erosion and Solid Matter Transport in Inland Waters*, which was held in Paris in July 1977, was sponsored jointly by UNESCO and ICCE and dealt with a number of specific themes. These included the relationship of erosion and sediment yield to climate and drainage basin and channel characteristics, the relationship between source area erosion and sediment yield, and processes of sediment generation, conveyance and deposition operating in semiarid zones (cf. IAHS Publication no. 122). This was followed by the very successful *Symposium on Erosion and Sediment Transport Measurement* staged in Florence in June 1981 which dealt with many aspects of measurement techniques (cf. IAHS Publication no. 133). The decision as to the theme of this third symposium was taken during a plenary meeting of the Commission at the IUGG General Assembly in Canberra in December 1979. Opinion suggested that this would be a useful opportunity to review and discuss recent developments in the explanation and prediction of erosion and sediment yield.

Like all branches of hydrology, erosion and sediment yield studies have evidenced many advances and developments during the last decade. To some extent these have reflected the improvements and innovations in measurement techniques highlighted at the Florence Symposium and the general advance of techniques of analysis and modelling. Equally, however, they are a response to an increasing concern for the economic and social problems associated with soil erosion and land degradation and for the environmental problems involved in developing new areas of the globe for agricultural production, and to the growing incidence of sedimentation problems in water resource development projects. In addition, recent emphasis on the role of suspended sediment in the transport of nutrients and contaminants and in non-point pollution has introduced a new dimension to sediment studies. Attention must now also focus on such considerations as the geochemistry of the sediment, the concentrations of sediment-associated nutrients and contaminants, the relationship between sediment and source material properties, and the mechanisms involved in the preferential enrichment of certain sediment fractions during erosion and conveyance. New questions have been introduced and a new urgency has been given to many existing problems and research needs.

Although not covering all possible themes, the papers included in this volume will provide a useful perspective of many recent developments in the explanation and prediction of erosion and sediment yields. The Commission lecture which appears as the first paper has been chosen to demonstrate to hydrologists working in other branches of the subject the environmental significance of sediment studies, and is a timely reminder of the wide ranging effects of human activity on river systems. The group of papers concerned with erosion processes provides examples of recent attempts

to provide a better understanding of the factors influencing soil erodibility, of improvements in the explanation and representation of erosion mechanics and of the significance of mass movement and subsurface runoff processes in certain areas of the world.

The papers dealing with sediment yields and channel adjustments cover a wide range of themes and introduce new information on sediment yields in such areas as Japan, India and Morocco, and on the various processes contributing to sediment yields in specific areas. Furthermore, the examples of channel adjustment to sediment transport conditions from Poland, the Federal Republic of Germany and the People's Republic of China provide an excellent complement to the case of the Platte River presented in the Commission Lecture. The theme of modelling and prediction is addressed by a group of 14 papers which provide coverage of topics ranging from physically-based modelling strategies, simulation of channel network development, and prediction of landslide incidence, through to the application of the USLE in various areas of the world, a valuable attempt to produce a global inventory of present and future soil loss, and the problems of data availability.

Finally, the awakening interest in sediment properties is represented by papers dealing with the heavy metal content of suspended sediment, the particle size and geochemistry of fluvial sediment, a fascinating analysis of the behaviour of suspended sediment under conditions of hyperconcentration in the Yellow River and its tributaries, the use of ^{137}Cs in the study of sediment sources, and the considerable potential of lake sediment studies in extending the time-base of sediment yield studies. We look forward to a wide-ranging and useful discussion of these developments in the explanation and prediction of sediment yields at the Symposium and to the identification of future research needs.

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