Preface

In recent years the attention of the International Commission on Continental Erosion (ICCE) has been directed in its symposia and subsequent publications to the erosion and yield of particulate material. However, it has emerged from many past and present investigations undertaken in the earth sciences and related disciplines that solid matter transport represents only one, and sometimes a subordinate, component of river loads and that a comprehensive discussion of continental erosion must also feature the processes of solute release and the magnitude of dissolved yields. Opinion has been growing in ICCE that the time is ripe for a meeting focussed on the latter themes, and the present symposium thus provides an opportunity to take stock of recent progress in the study of dissolved loads of rivers. This symposium is jointly organized with the International Commission on Water Quality (ICWQ) and this welcome collaboration also offers the chance to review surface water quantity/quality relationships and their implications for the practical problems of water management.

Many advances and developments have characterized academic and applied studies of water quality in recent years, and although it is not possible to cover every aspect of these investigations in a single publication, it is equally hoped that this volume will provide a representative selection and useful summary of current work on the topics of dissolved loads of rivers and surface water quantity/quality relationships. These proceedings are divided into three major sections and in each the first paper provides a more general review of the theme. Spatial and temporal variations in dissolved loads and solute concentrations are discussed first and individual papers highlight global, continental, regional and more local spatial variations. Studies in the United States, Africa, India and Western and Eastern Europe are reported and findings from contrasting environments, including glacierised mountains and agricultural lowlands, are presented. Within this section, papers also focus on the temporal response of dissolved substances and loads to discharge and other factors which have been revealed through detailed investigation of individual storm events and by statistical analysis of records from more routine water quality monitoring.

A second group of papers is concerned with sources of dissolved material, solute budgets and denudation. Atmospheric and geological sources of stream solutes are considered, and the quantification of weathering reactions, undertaken in one paper for sandstone and shale lithologies, emerges as a particularly worthwhile objective in studies of solute production. The important, but sometimes overlooked, influence of biological controls on chemical mass balances is stressed in several papers and the theme of solute budgeting is addressed not only for the river but also for lacustrine and estuarine environments. The magnitude of dissolved and particulate loads and the balance of chemical and mineral denudation are also discussed in this section at countrywide and drainage basin scales.

Application of surface water quantity/quality relationships to the

utilization and management of water resources constitutes a third theme, and this group of papers encompasses a discussion of the impact, in general, of hydraulic projects and more specific studies of the consequences of river regulation and the role of stormwater detention basins in quality control. Several papers isolate the impact of agricultural land drainage on the transport of nutrients, especially nitrate, in rivers and numerical simulation techniques, described in one paper and based on the coupling of models of hydrological and chemical behaviour, would seem to offer a very promising method of assessing the impact of particular agricultural practices. The use of real time forecasting models is also discussed in the context of other chemicals derived from urban environments. Some attention is given in this section to more general principles underlying the monitoring and calculation strategies which may be employed to determine chemical fluxes, and the volume is appropriately concluded by a consideration of longer-term human impacts on water quality as revealed by two studies of the heavy metal content of lake sediments.

We look forward to a full and productive discussion of all these themes at the symposium, which has generously been supported by UNESCO, UNEP and ICSU, and hope that our meeting on the dissolved loads of rivers and surface water quantity/quality relationships will not only adequately reflect current developments but will also identify future needs and areas of research.

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