limnological issues. Most of the papers are on biological aspects of the streams in Nepal, Tibet and other high mountain areas of the world.

The 'Kathmandu Declaration' printed in the summary and highlights of the conference are, in my view, important documents emphasizing the need for co-operation at both regional and global levels and introducing ecohydrology as a science integrating various aspects of the hydrosphere with the atmosphere, geosphere, biosphere and various anthropogenic activities.

On the whole, the volume is slickly produced and well edited. It will be an invaluable source of reference material of interest to researchers in high mountain areas especially pertaining to Hindu Kush-Himalayan region.

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Isotope Tracers in Catchment Hydrology
edited by Carol Kendall & Jeffrey J. McDonnell
Published 1998 by Elsevier Science BV, Sara Burgerhartstraat 25, PO Box 211, 1000 AE Amsterdam, The Netherlands; price NLG480/US$276 (hardbound) and NLG158/US$91 (paperback); 839 + xxix pp.; ISBN 0 444 81546 5 (hardbound), 0 444 50155 X (paperback)

Advances in catchment hydrology over the last 20 years have been spurred by the development of isotope methods in hydrology. The objective of Isotope Tracers in Catchment Hydrology, as stated by the editors, is to present a new "earth systems" approach to catchments, i.e. a multidisciplinary approach that examines the entire landscape. That approach combines physical hydrology, geochemistry, and biochemistry. Part I of the book entitled Basic Principles consists of two main chapters (1, Fundamentals of Small Catchment Hydrology; and 2, Fundamentals of Isotope Geochemistry); Part II, Processes Affecting Isotope Composition consists of seven chapters (3, Isotopic Variations in Precipitation; 4, Isotopic Fractionation in Snow Cover; 5, Isotopic Exchange in Soil Water; 6, Plants, Isotopes and Water Use: a Catchment Scale Perspective; 7, Isotopes in Groundwater Hydrology; 8, Lithogenic and Cosmogenic Tracers in Catchment Hydrology; and 9, Dissolved Gases in Subsurface Hydrology); Part III, Case Studies in Isotope Hydrology consists of five chapters (10, Oxygen and Hydrogen Isotopes in Rainfall–Runoff Studies; 11, High Rainfall, Response-Dominated Catchment: a Comparative Study of Experiments in Tropical Northeast Queensland with Temperate New Zealand; 12, Snowmelt-Dominated Systems; 13, Arid Catchments; and 14, Groundwater and Surface-Water Interactions in Riparian and Lake-Dominated Systems); Part IV, Case Studies in Isotope Geochemistry consist of seven chapters (15, Use of Stable Isotopes in Evaluating Sulfur Biogeochemistry of Forest Ecosystems; 16, Tracing Nitrogen Sources and Cycles in Catchments; 17, Carbon Cycling in Terrestrial Environments; 18, Tracing of Weathering Reactions and Water Flowpaths: a Multi-Isotope Approach; 19, Erosion, Weathering, and Sedimentation; and 20, Applications of Uranium and Thorium-Series Radionuclides in Catchment Hydrology Studies); and Part V, Synthesis, which is neither adequately entitled nor indicated in the text, consists of two chapters (21, Modeling of Isotopes and Hydrogeochemical Responses in Catchment Hydrology; and 22, Isotopes as Indicators of Environmental Change). In fact, each chapter in Parts III and IV either starts with, or is mainly devoted to fundamentals of particular methods, which makes the chapters complete and easy to understand without referring to other chapters. Some chapters contain subchapters devoted to new research directions, which makes them even more complete.

Each chapter was written by one, two or three specialists, with the exception of five chapters written by larger teams. In general, 75 authors contributed to the book, which is fully justified by the variety of problems and methods covered, as documented by the short presentation of the contents given above. Of course, with such large numbers of chapters and contributors it is difficult to avoid repetitions and overlaps. However, as mentioned, some repetitions of the description of important methods and techniques by different authors in different applications should be regarded rather as an advantage of the book. The book positively differs from other books on isotope geochemistry or isotope hydrology as it starts
with the description of catchments instead of lengthy descriptions of isotopes. Also, the editors’ successful intention was to restrict the contents of the book to the catchment scale. Chapter 7 is an exception as it mainly deals with large basins. Although, as indirectly stated in the chapter, outflows from large groundwater systems can contribute to the outflows from small catchments, neither the description of such cases nor a case study is given.

The book is an excellent presentation of the problems encountered in catchment studies, and the editors’ successful intention was to restrict the contents of the book to the catchment scale. Chapter 7 is an exception as it mainly deals with large basins. Although, as indirectly stated in the chapter, outflows from large groundwater systems can contribute to the outflows from small catchments, neither the description of such cases nor a case study is given.

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Unfortunately, Chapter 7, Isotopes in Groundwater Hydrology, does not equal the high level of the whole book and cannot be recommended, especially as the tracer methods pertinent to catchment studies are better described in other chapters. The chapter contains mistakes, undefined terms, incorrect description of some aquifers (well-mixed reservoirs instead of reservoirs with exponential distribution of transit times, shortly exponential-flow reservoirs), and even incorrect and unclear presentation of some interpretation methods, which were better developed 20–30 years ago. For instance, curves in Fig. 7.12 represent an apparent effect related to using Darcy velocity instead of pore velocity. Figure 7.11 does not represent the distribution of ages for “a unidirectional flow in a semi-infinite medium” and, in addition, the curves are wrongly calculated (correct curves are shown in Fig. 21.1). The influence of matrix porosity on tracer ages is mentioned only on the occasion of $^{14}\text{C}$ exchange in the microporous matrix of carbonates, whereas the diffusion exchange of any tracer between the mobile water in fissures and immobile water in the micropores influences the movement and ages of any tracer. That effect was indicated first by S. S. D. Foster (J. Hydrol. 25, 1975. 159–165) and I. Neretnieks (Water Resour. Res. 17, 1981, 421–422), discussed in textbooks (J. A. Freeze & J. F. Cherry, Groundwater, Prentice-Hall, Englewood Cliffs, NY, USA, 1979).

In conclusion, in spite of the criticism expressed above in relation to Chapter 7, the book is highly recommended to all interested in catchment studies, environmental tracer hydrology, geochemistry, environmental changes and pedology.

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**Sustainability Criteria for Water Resource Systems**

*by Daniel P. Loucks, chair & John S. Gladwell, editor*

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The title suggests that this book develops definite sustainability criteria and provides recommendation for their use. In this context, a reader who expects to find well checked and broadly agreed upon recipes for assessment of sustainability may be disappointed, as the criteria do not constitute a major part of the volume. Moreover, having read the monograph, a reader still lacks guidelines as to the choice and the use of the criteria. This is, unfortunately, the state-of-the art in the field. Despite the many efforts undertaken at international and national levels, the profession is far from reaching a consensus as to the choice of a set of appropriate criteria and indicators for measuring sustainability.

There are different sustainability paradigms. The ecologist’s, economist’s, engineer’s and social scientist’s views on sustainable development do largely differ. This is not surprising as the very concept of sustainability can mean different things to different people and seems to defy a rigorous definition. In gross terms, sustainable development in the water context is about sharing the water resource with others—with the environment and with other humans. Sustainability means striving towards the inter-generational equity (now and in the future) and the intra-generational equity (all humans and other living beings at present).

In the volume, a multi-national group of distinguished experts discusses the essence of