

## BOOK REVIEWS

**HYDROLOGIC SYSTEMS : Rainfall - Runoff Modelling, Vol. I - by Vijay P. Singh, Prentice Hall, Englewood Cliffs, New Jersey, 1988, pp 440.**

This book has been published by Prentice Hall, Englewood Cliffs, New Jersey (1988) in A-4 Size and consists of 440 pages. Since the publication of Handbook of Applied Hydrology by V.T. Chow need was being felt by researchers for good reference publications on various facets of hydrology. The volume-I on the Hydrologic Systems has been devoted to the aspect of Rainfall-Runoff Modelling. Dr. Singh's efforts to this effect are worth praising.

This publication has been planned in three parts. Part-I deals with the 'Preliminaries'. It consists of seven Chapters in which the various concepts and mathematical principles currently being in practice for rainfall runoff modelling have been described. Part-II of this volume deals with the various models which different researchers have produced in the past. These models have been summarised in eleven chapters and this forms the main body of this publication. The part III of this book is devoted to 'Flood Routing'. Old practices, classical techniques alongwith research efforts have been described in two chapters.

At the end of each chapter, the author has given 'Exercises'. In each exercise, nearly ten problems are given on the concepts/models described in the chapter. This effort has made the publication quite useful for the graduate students and research workers.

The publishers of the volume must be complemented for the good get up, nice printing and an excellent binding which makes it good library volume. It would be worth while for the libraries of the institutions dealing in graduate education and research to have copies of this publication for use of researchers.

Dr. B.S. Mathur  
Professor & Head  
Dept. of Hydrology  
University of Roorkee  
Roorkee - 247 667

**GROUND WATER QUALITY PROTECTION**—by Larry, W. Canter, Robert C. Knox, Deborah. M. Fairchild, Lewis Publishers, Inc., Michigan, USA, 1987, pages 562, US \$ 67.50.

The groundwater quantity is an important resource for any nation and the protection and appropriate management of groundwater have become a significant public issue in the last decades. Just a few years ago, water resources managers and hydrologists were unaware of many



potential pollution sources and extent of groundwater contamination. Because of increased demand for groundwater resource development and usages, the recognition of deterioration in groundwater quality resulting from point and diffuse source of pollution, continued development of laws and regulations directed towards pollution source control and cleaner ground water have resulted in importance of groundwater quality protection. Hence there is a major national need to disseminate this information to practicing groundwater professionals and to university students planning to enter the field of groundwater exploration. The basic purpose of the book is to cater towards this need.

The book opens with an introductory chapter of groundwater as an important resource. The various sub-sections covered under the chapter are aquifer systems; importance and use of ground water, natural quality and man made contamination. Mostly the standards and site specific situations of United States of America have been highlighted. The chapter 2 discusses an overview of groundwater hydrology giving due consideration to soil characteristics, aquifer systems, Darcy's laws, aquifer characteristics, pumping tests, laboratory tests. The chapter deals with basic mechanics of groundwater and the subject matter can be easily found in any standard text available on groundwater hydrology. The chapter 3 is devoted to groundwater information source and contains the various reports, periodicals and books available in this area as well as computer information systems which are available world wide on groundwater data. Various associations and organisations dealing with groundwater have been listed and this seems to be a very good reference material for any professional who is working in the area of groundwater hydrology.

The chapter 4 brings out the various sources of groundwater pollution. The pollution sources have been grouped under various categories. A summary of source characteristics, number of sources, points sources, hazardous waste sites, land fills, surface impoundments etc. have been discussed. The diffuse sources like agriculture, acid precipitation, dry deposition etc. have also been enumerated. However the discussions are limited only to developed countries. The chapter 5 stresses on pollutant transport and fate consideration. The various hydrodynamic processes, abiotic process, microcosm studies have been given. Various types of pollutants like bacteria, viruses, entoseam, phosorus, metals, organics, pesticides etc. have been brought out. The mention of mathematical models has also been made. Characteristics of pollutants sources like septic tank systems, solid waste disposal operations, land applications and related issues have been clearly explained. Chapter 6 is directed towards flow and solute transport modelling, the governing equations, types of models and examples of models are given. A mention of natural and artificial recharge, surface and groundwater relationship, conjuctive use, ground water management, pollutants transport and salt water intrusion has been made. The various problems encountered in computer models have also been listed. It is a very interesting and useful chapter which clearly gives the various equations governing groundwater flow like Laplace equatlon, Poisson's equation, transient flow equation. The chapter also brings out the physical models, analog models, numerical models including analytical and stochastic, computer models, and finite difference models.

Chapter 7 is devoted to assigning priorities to the pollutant sources. The rating of various groundwater pollution sites like land fill site, wastes soil site etc. have been done. A system for site rating has also been attempted and the various ranking according to hazards present has also been defined. Various indices like pesticides index, drasdic index have been given. Various



methodologies for empirical assessment have also been touched upon. Chapter 8 opens with groundwater monitoring and planning giving a list of some pertinent questions regarding the monitoring programme, the types of monitoring networks, planning of such networks, reasons for monitoring etc. Many examples of monitoring network in various States of USA have been given. Design of monitoring networks and operation of such networks have also been schematically explained. The chapter 9 concentrates on groundwater monitoring and analysis including the monitoring of vadose zones, saturated zones, wells including sampling protocol and sampling equipment. This shall definitely help in successful undertaking of a water quality monitoring programme. The various statistical analysis methods for groundwater quality data like basic statistics students t test, Fisher t tests, averaged replicate t tests, F tests etc. have been explained.

Chapter 10 focusses on control of groundwater pollution explaining the physical control measures insitu technology, groundwater transport. Classifications of various methodologies and few of such technologies have also been discussed. The chapter 11 which is the last chapter of the book is fully devoted to groundwater quality management. The examples of USA have been taken to explain the programme of groundwater quality management. The state level programme, local level programmes and the comparison of institutional responsibilities has been clearly brought out. The various elements in groundwater quality management programme have also been discussed.

The book is an excellent information source for the hydrologists engaged in groundwater monitoring and protection. The book will definitely find favour with the undergraduate and postgraduate students because of its well thought information on groundwater. The book has been written in a format so that it can serve as a text book for postgraduate students and reference material for the undergraduate students. The book is highly recommended for anybody who is responsible for maintaining the quality of groundwater and protection of groundwater resource. The presentation is simple and lucid for advanced as well as developing countries.

Dr. K. K. S. BHATIA  
Scientist E & Head,  
Man's Influence Division  
National Institute of Hydrology  
Roorkee - 247 667 (U.P.)

**MONSOON METEOROLOGY** — C.P. Chang and T. N. Krishnamurti, Oxford Monographs on Geology and Geophysics No. 7, Oxford University Press., 1987, Price U.S. \$ 85.00.

The phenomenon 'Monsoon' is global in character and affects a large part of the earth covering parts of Asia, parts of Africa and northern Australia. Monsoon year after year decides to a larger extent the economics of a number of countries in these regions covering nearly 50% of the total world's population.

Several special publications on the phenomena of the monsoon have appeared in recent years. The present volume includes summaries of the current understanding of many



aspects of monsoon meteorology. A first major review since the Global Weather Experiment, the book attempts to address topics covering a wide spectrum of monsoon and related phenomenon. These include local to planetary scale variations and diurnal to interannual phenomenon of monsoon dynamics. Special emphasis has been on the monsoon over Asia and its vicinity. These are discussed in Chapters 1 and 2 for summer and winter monsoons respectively.

The role of physical processes such as the influences on differential heating between the land and the ocean, the thermal and mechanical effects of the mountains of the monsoon region in controlling precipitation mechanism are presented in Chapter 3. Chapter 4 deals with the theoretical and dynamical modelling studies.

Certain articles such as those of Mooley and Shukla; Johnson and Houze and Murakami are of particular interest to those researchers dealing with the Indian summer monsoon, Summer or winter monsoon in the context of drought has not been dealt with directly though studies referring to weak monsoon or break monsoon were referred to. Similarly a more specific contribution on studies dealing with north east or winter monsoon, would have enhanced its utility to the Indian readers.

A lone article dealing with cloudiness over monsoon areas as seen by satellites is a valuable contribution by Dr. Murakami.

The book should be a good addition to any technical library.

K. S. Ramasastry  
Scientist 'E'  
National Institute of Hydrology,  
Roorkee - 247 667