

... crops the book does a poor job, that are wrong, such as on p. 13: "caused by viscous friction" (The water and SAE 30 motor oil!) and "because of light hydrogen atoms", "daily estimates of ET are being misleading. The estimator may be formulated over short time periods when completely lack the conciseness and

theory but the recipes in Chapters first problem encountered is that Penman's equation under 'Radiation balance' and 'ET estimation using the index' it is hard to be quite sure that the Turc methods seem to be gone. Units of the Penman wind function material has been added. ASCE 90 on vapour pressure and latent heat is correct. It is difficult to know what the book is heavily based on ASCE

... as a set of soil-water adjustment for evaporation to actual evaporation, treatment, but no: the text merely refers to Reference Crop evaporation to be preferred in particular circumstances. It is similarly rudimentary and not gives only pan and energy balance. It is warned that lakes are subject to errors with area, but the methods given cause large seasonal errors, but no errors are mentioned because, it seems, that use data from pans or standard

... ery appears to be a draft version of "Evapotranspiration" on p. 2. It contains "Information" and "See sections ZZZ on Potential ET" is split into two entries under the entry. Repetition is that the Penman equation is given on coefficients given to seven or more. Equations 4.8 are duplicated. Equation (4.14) and (4.9) are repeated as (4.30) and (4.35) and p. 239. These duplications

result from problems with the logical structure of the book. In other cases the faults are more due to carelessness. An underscore character appears in some section headings, such as "2.3.15 Extraterrestrial radiation R_a " but not in others; "2.3.16 Clear day solar radiation R_{so} ". The Richardson number is given as R_i and R_i in the same paragraph on p. 17. Times and Helvetica type fonts are used in the tables, apparently at random, with point sizes ranging from about 9–20 (e.g. Tables 5.1 and 5.2). The bold and underline style at the top of p. 58 does not match the rest of the book. Pages 150 and 151 are printed in reverse order.

Overall, the book is poorly organized, poorly written and poorly edited. If you want a manual of methods for calculating evaporation from irrigated crops then the ASCE 90 is a far better choice, and you will still have \$100 in your pocket.

Reference

Jensen, M.E., Burman, R.D. and Allen, R.G., 1990. Evapotranspiration and Irrigation Water Requirements. Manual of Practice No. 70, ASCE, New York.

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Integrated River Basin Development, Celia Kirby and W.R. White (Editors), Wiley, Chichester, 1994, XIX + 537 pp., hardcover, £65, ISBN 0-471-95361-X.

This collection of 47 papers was presented at the International Conference on Integrated River Basin Development held at Wallingford, UK, in September 1994. Organizers and sponsors include the Institute of Hydrology and the International Association for Hydraulic Research. Authorship is dominated by the UK, but authors come from 21 other countries as well.

The objective of the collection is to describe the current state of water resource management, particularly in terms of sustainability and multiple resource values. Papers are grouped under the topics: sustainable resources, integrated quantity and quality objectives, groundwater/surface water interaction, management of low river flows, impact of rural land-use change, erosion and sedimentation, impact of urban and industrial development, and river basin management. The majority of papers are found in the first and last sections. Modeling and assessment/planning procedures figure prominently throughout. Subject areas range from forests to megacities and from small catchments to the continent of Africa. Water supply and flood management are strong points of many papers; aquatic biology receives light attention.

As R.L. Brown (p. 12) comments, "the concept of integrated basin development is recognized as highly desirable but is very far from being applied universally". To an extent, this state of affairs is reflected in this volume. In general the contributions from UK authors display a very advanced stage of understanding of geomorphic, hydrologic, and social systems and the social processes necessary to carry that knowledge into useful practice. Many of the papers from other parts of the world, on the other

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hand, generally describe assessment and water management systems in earlier stages of development. Clearly there is a tragic extent of water systems so poorly developed and so poorly known that there can be no reporting in conferences such as this.

Despite the Editors' stated objective to deal with sustainable development, clear, explicit definition and discussion of this concept begins late in the book where authors draw on principles from the UK Strategy on Sustainable Development and the Rio Declaration. A recurring theme of papers on sustainable river basin management is the need to mesh basin development with social factors in a world of substantial uncertainty. This will prove increasingly challenging in the face of rapid population growth, particularly in megacities and in rural areas with previous limited development because of high flood, drought, or sedimentation hazard.

The book is clearly a proceedings volume with attendant unevenness in quality of papers in terms of their information content, figure and caption quality, and clarity of writing. In some respects it seems like two, intermingled books—one by UK authors presenting views of basin development in the UK and other parts of the world, based on a common, well-developed perspective mixed with a second collection of papers by authors from other countries who provide a series of brief vignettes of conditions in their countries. Despite this variability, the volume is a useful reference in integrated water resources development of river basins.

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○ *Fractals in Reservoir Engineering*, H.H. Hardy and R.A. Beier, World Scientific, London, 1994, Hardcover, XIV + 359 pp., ISBN 981-02-2069-3.

According to their best ever definition (by Mandelbrot himself) "fractals are objects whose form is extremely irregular and/or fragmented at all scales". The new book of Conoco scientists Hardy and Beier takes us for a guided tour to the fractal world of 'hydrocarbon reservoirs', from the scale of well-logs (a few feet vertical resolution) to the inter-well scale (10^3 m). Of course, this is the range of interest for the reservoir engineer, while the fascinating very small scales (10^{-8} m) of the thin sections, and the regional scale (10^5 m) of basin analysis are only mentioned in passing.

In the Preface, the authors paraphrase Mandelbrot's classic observation that "Clouds are not spheres, mountains are not cones," by adding "and hydrocarbon reservoirs are not cylindrical tanks". The book, however, does not deal with the fractal 'shape' of the reservoirs, or with their fractal size distribution, but only with the fractal distribution of the rock-physical properties (porosity, permeability) inside them, and with the consequences of the fractally distributed porosity and permeability on reservoir simulation.

The book consists of seven chapters. Chapters 1 and 2 provide the well presented background information on statistical fractals, fractal Brownian motion (fBm) and fractal Gaussian noise (fGn), their generation and basic properties. In Chapter 3