

REVIEW

Applied Environmetrics Hydrological Tables. By T. BEER. Applied Environmetrics (118 Gordon St., Vic. 3103), 1991. US \$124.95.

According to the author, this book and accompanying software represent 'an ongoing commitment to provide personal computer based tools to those engaged in the management and study of the physical environment... The *Applied Environmetrics Hydrological Tables* consist of computer programs to provide hydrological data in tabular form. They are designed to provide hydrologists, civil engineers, meteorologists, and those who use hydrological data with the environmentally relevant data that they need.'

The concept of the 'computer as a book' is a fascinating one, which is well met by this publication. The book provides the context for the software, its installation and use, but thereafter the information on each of the hydrological items is included both in the booklet and on the disk. Thus after a brief familiarization with the software, the book simply provides reassurance, it is no longer essential to software use. Indeed the use of the software is extremely straightforward.

The set of tables is designed to work on a low-grade machine (no colour graphics card or hard disk are required). The software is provided on a double-sided, double-density (360k) MSDOS disk, although a 3.5 inch microdisk can be supplied on specific request. This ensures easy and wide use of the software, but given the very wide use of computers with only a 3.5 inch drive, I believe that it is a false economy not to supply automatically both disk sizes with the publication. I had to search to find a machine that could read the supplied disk so that I could copy the contents to a 3.5 inch version for use on my own computer.

The book and software are arranged in chapters, which, in terms of the tables available, cover the following topics. (1) Pressure conversions plus the physical properties of water. (2) Solar position, sunrise and sunset times and radiation through a cloudy atmosphere. (3) Evaporation from open water using the Penman combination method. (4) Open channel flow. (5) Small catchment hydrology. (6) Sedimentation in water. (7) Sediment transport using the Ackers–White formula. (8) Solubility of oxygen, nitrogen and argon at saturation in water. (9) Soil moisture properties, matrix potential, hydraulic conductivity. (10) Molecular transport properties of water and longitudinal dispersion. (11) Drought indexes. (12) Application of drought index – spread of a forest fire. (13) Special functions used in hydrology. (14) Extreme value statistics – Pearson type III distribution. (15) Metric and imperial conversions.

Thus a good range of tables is supplied, covering many of the frequently applied hydrological computations. In each case there is a very full specification of the bases for the calculations, including definitions of terms and constituent variables as well as the presentation of equations on which the estimates in the tables are based. Source references for the methods used and their alternatives are also provided, as are clearly specified cautions about the limitations on the applications of the techniques. Thus, in the context of the techniques for which tables are supplied, a very thorough suite of contextual information is available in the booklet and in the text files supplied embedded in the software.

I found the software easy and flexible to use, although the aim is simply to provide tables and thus the ability to change the form of estimation equations is strictly limited.

The user accesses the tables in a semi-interactive way, so that having selected one of the above items, tables are provided in response to a series of user-defined inputs. Tables are then displayed which meet the user inputs. These tables can be further customized, either through specifying the precise values of the independent variable for which a dependent variable estimate is required, or through customizing their general layout and colour scheme.

There are some limitations in the product which I feel are worth mentioning. Perhaps the most significant criticism is that under many of the above-listed items, only one approach to the computations is supplied. This makes sense when a particular approach is widely accepted, as with the Penman formula for open-water evaporation estimation and the Manning equation for open-channel flow. However, I would have welcomed a wider choice of approach under some of the headings. In particular, it would be very useful to have access to more than the Ackers-White formula for estimating sediment transport, and it could be deemed to be essential to have access to more than the Pearson type III distribution for extreme value analysis. If such choice means the removal of some of the items from the above list, then I would have accepted that penalty. For example, items 8, 10 and 12 are not essential to the hydrologist. Furthermore, item 5, whose title is enticing, turns out to be based on the Rational Formula.

In conclusion, the concept behind these hydrological tables is an innovative one and, despite my criticisms, I think that many environmental scientists will find them a very useful tool. A second edition, with greater emphasis on choice of technique for the most commonly used hydrological computations, would be invaluable.

ANGELA GURNELL