

## BOOK REVIEWS

FLOODS — HYDROLOGICAL, SEDIMENTOLOGICAL AND GEOMORPHOLOGICAL IMPLICATIONS. K. Beven and P. Carling, eds. J. Wiley and Sons Ltd, Chichester, U.K., 290 p., 1989. £STG39.00.

This well-produced volume contains some of the presentations from the joint meeting of the British Geomorphological Research Group (instigators of *Earth Surface Processes* in 1976) and the British Hydrological Society held at the University of Lancaster in 1988.

In spite of an impressive list of contributors, the content of the papers is disappointing on the whole. Very few new ideas emerge; a lot of very competent reviewing and summarising is done, some detailed analyses are reported, and, refreshingly, some flood events are described. A lot of run-of-the-mill science is contained in this book and, frankly, it's hard to see much of it being very useful.

In their introductory "Overview" the editors encounter an apparently insoluble problem, that of defining a "flood" and distinguishing it from a "non-flood". In purely hydrological (or sedimentological or geomorphological) terms there probably isn't any identifiable threshold; *all* flow events are, simply, flow events. A flow event becomes a flood as soon as it affects human life or living. This simple point, that floods are only identifiable by their effect on people, might be the cause of the rather aimless character of much of the material in this book; *none* of it deals with the effects of flows on people (though Carolyn Roberts deals very competently with the effects of urbanisation on river flows). Malcolm Newson's wry summary of flood progress in U.K. in recent years does at least admit that floods are a hazard, but one gets the impression that the other authors consider people to be outwith the realms of objective, respectable science; possibly true, but if so there is something wrong with science.

The other major contributions are a summary of storm runoff generating processes by T. P. Burt; a note on the effect of floodplain storage on floodwave attenuation by David Archer; a critical review of competence equations by Paul Komar; two papers on paleoflood inference, by Victor Baker and by Smith and Boardman; a report on an Irish bog-burst event by Coxon, Coxon and Thorne; and an analysis of the factors causing channel change on river Dee in the last 200 years by Lindsey McEwen. For those readers requiring an introduction to open-channel hydraulics, Dr Donald Knight provides a crash course, half of which deals with the hydraulics of overbank flows. Finally, John Lewin hands down some priestly thoughts and fundamental questions about the future of flood geomorphology.

This book is a conference proceedings volume. It has some useful bits, and many that are not. Whether the world is a better place for its existence is doubtful, and one must ask why this conference justifies a book. There are many possible answers.

*Tim Davies*

MATHEMATICAL STATISTICS WITH APPLICATIONS IN FLOOD HYDROLOGY. J. Reimann. Published by Akadémiai Kiadó, Budapest, 1989, 330 p. Hard cover. Price around \$NZ70.

The stated aims of this book are to provide the practising or student hydrologist with a variety of statistical techniques for extracting flood protection information from hydrologic records. Examples in this book use peak over threshold records of stage and flood duration from the River Tisza, Hungary. Some use is made of the annual maximum stage while other hydrologic variables (rainfall, temperature, runoff conditions) get but a brief mention.

The book is arranged in three sections. The first is a brief introduction to probability theory, with chapters on the axioms of probability distributions, and Markov chains. In subsequent sections the reader is referred back to these fundamentals — a system that works well.

The second section is on statistical inference. Chapters deal with empirical distribution functions and order statistics, estimation, and hypothesis testing. Strengths are a useful introduction to empirical density functions and a variety of goodness of fit, homogeneity and randomness tests. Weaknesses are a superficial and confusing look at decision making and a lack of some basic order and extreme value statistics.

The third section is on stochastic relationships between random variables, with chapters on correlation and regression. There is material here on positively correlated variables that is new to me.

There is only a table of contents to guide you around the book. No subject or author indices are given. Citations seem somewhat on the lean side with only 28 books and 49 papers referenced. Many of these are "classics" so perhaps the author aims for quality rather than quantity. Figures are clear and useful, but some of the tables are confusing. The three page main data set would be better presented in an appendix. The typeface and page layout are easy on the eye and the book is attractive and solidly bound. Five statistical tables are included (normal, chi-squared, Kolmogorov, Students'  $t$ , Poisson).

To be honest, I always struggle with mathematical statistics. In this case, the notation is usually well defined and consistent. It's the written word which, on occasions, compounds my usual difficulty in extracting learning from a mathematical text. Sometimes it is funny: "However, a swindle of nature may also occur. . .". For the main, it's just irritating to wade through sentences such as: "It is this information that will be utilized to make a decision on  $g$  that is the value of  $X$  will be decisive to the choice that which one from the decision  $g = d$  will be made." After several re-readings these passages make sense — just.

In summary, who would use this book? The book is a hybrid between mathematical statistics and hydrology and seems too specialised to be an undergraduate text for either discipline. I think the engineering student would be better served by a general knowledge of statistical techniques and when to use them, rather than how they are derived. I suspect that this emphasis on application rather than derivation applies to the practising engineer as well. The book has more to offer the graduate student or hydrologist researching the black art of flood frequency statistics. In particular, the book is slanted towards the use of the peak over threshold series rather than the annual maximum series. It's the only text I know that covers some of the work of Gupta, Todorovic

and Zelenhasic. Hence, while not for general consumption, the book has value for those interested in the peak over threshold approach to flood frequency statistics.

*Jim Young*