

## Book reviews

**Queensland's Rainfall History** by Jacqui Willcocks and Phillip Young (Queensland Department of Primary Industries, Brisbane, 1991) ISBN 0 7242 3913 8. Soft cover. 304 pp, \$60.00.

The title of this book gives one a good idea of its content, as it is basically a data resource with the information presented graphically. It would appeal to those who require a large amount of material in an easy to digest format.

There has been a growing public awareness of climate issues in recent years, mostly as a result of media interest in global change and the thinning of the ozone layer. Seasonal forecasts issued by the Bureau of Meteorology and some commercial enterprises have also brought climate into the spotlight. The result has been an increased demand, particularly in rural areas, for historical climate data. This publication would satisfy most of that demand as far as Queensland rainfall is concerned.

A fairly brief introduction covers such topics as the broadscale meteorological features affecting Queensland, rainfall variation, moving averages, the data used, and an explanation of the graphs. The meteorology is quite simplistic, but this is reasonable as it is aimed at the lay person. Some space is also devoted to the Southern Oscillation Index (SOI). A map of average summer rainfall is compared to the summer rainfall totals when the SOI is high and low respectively. The importance of the SOI is well highlighted by these diagrams.

The book analyses rainfall data for 269 long-term rainfall stations throughout Queensland. Each station has a record commencing 1900 or earlier, with the odd missing value being substituted with an estimated one. The data are grouped into five broad geographic zones as follows: north Queensland, central Queensland, southeast Queensland, south Queensland, and western Queensland.

A page is devoted to each station. There are three line-graphs and a decile table of monthly rainfall, which is labelled as a probability distribution table. A better term for the table would have been frequency distribution table, and I would have preferred to have seen the extremes labelled 'Lowest' and 'Highest' rather than '100% of yrs >' and '100% of yrs <', respectively. In fact the term probability is quite misleading because it implies that the extremes can never be equalled or exceeded, and this is obviously not the case.

The three graphs consist of (a) annual rainfall for all years, (b) ten-year moving averages of summer and winter rainfall, and (c) five-year moving averages of summer and winter rainfall.

My complaints with the publication are few, the main one being the lack of a location map showing all stations. This could have best been done by using a separate location map for each zone. Instead, there is a cumbersome method of using latitude and longitude via a table at the front of the book, and a coarse map of the State. There are no comments as to the quality of data or of any estimated values used. This may be particularly relevant to some people because changes in rainfall observer or small site changes can affect the record quite dramatically.

Overall, I think this is a worthwhile and useful publication. The data are easy to read, and the concepts of average, variability and decile are clearly demonstrated by the graphs.

**Grant Beard**

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**Satellite remote sensing in climatology** by Andrew M. Carleton (*Studies in Climatology Series*, Bellhaven Press/CRC Press, 1991) ISBN 1 85293 039 X. Stg£39.50.

This is the initial publication in a new series. *Studies in Climatology*, edited by S. Gregory of the University of Sheffield. According to the editor's preface, the series is primarily concerned with present global climate, how this has fluctuated in the recent past, and the impact of these changes on society.

Carleton's book does not reflect these broad aims. It is focused, to quote the author's preface, on '... satellite-based climatology and the remote sensing techniques that are used to extract climatologically useful information'.

The series is intended to consist of reviews, rather than introductory texts: the distinction is certainly true of this publication. The book consists of an overall introduction/summary, followed by chapters on remote sensing prin-

ciples, cloud climatologies, cloud systems, atmospheric moisture, the earth radiation budget and surface variables, and concludes with an epilogue, references, glossary and index.

Clearly the work required extensive literature searching, and represents a great deal of background research. It is gratifying to note the high citation frequency of southern hemisphere publications and case histories/examples in the text. The general appearance of the work — the quality of the paper, clarity of the print, presentation of illustrations and captions — is excellent overall. The price (about \$89 at current exchange rates, if you can obtain it at the Publisher's UK price) is a little high but not outrageous.

However, I believe that this book has some serious deficiencies which would limit its appeal for a large audience.

One problem immediately encountered is the style, which is verbose and syntactically tangled. Repeated reading of the text is often needed to understand what the author is getting at. For example, what does one make of the following sentence from p. 63:

'Aside from the attenuating effects of Rayleigh scatter and ozone absorption, and of water vapor in the near IR; all of which can be modeled (sic), the optical depth (transmissivity) of the atmosphere is influenced by aerosols.'

What does this mean? That aerosols are the most significant influence? That they are equally significant as Rayleigh scatter by molecules, and absorption by ozone or water vapor? That aerosol scatter is different in that it cannot be modelled? The poor sentence structure — an unfortunate feature of the book — creates confusion and tires the reader.

Similarly, 'acromania' — an unwanted obsession with once-off acronyms instead of proper words — reduces reader patience. Take the following from p. 205:

'The deep and optically thick convective clouds of the ITCZ are characterised by low CCTs and OLR. They also correspond to the most reflective clouds in visible wavelengths (HRCs), and, accordingly, are an indicator of heavy precipitation.'

Use of abbreviations — especially those not in general use — is only partly compensated for by the short glossary.

There is a strong emphasis in the text and diagrams on 'traditional' meteorological analysis using satellite information. This reflects an imbalance in the work: only one chapter deals with land-surface parameters in relation to climate, and this chapter also has to cover the earth's radiation budget! It is rather remarkable that a book on climatology published in 1991 should make no mention of the decade-long studies of anthropogenic global change conducted in the Inter-

national Geosphere-Biosphere Program — unless the passing references to the 'Global Change initiative' are to be read in this way, rather than as a reference to NASA's planned (one could add, overly-planned) Earth Observation System. Also missing appear to be the Global Climate Observation System, the World Climate Research Program, any mention of the World Meteorological Organization, or any discussion of the all-important topic of the sources, techniques and international politics of the storage and handling of climatological data sets derived from satellites.

As an overview of satellite programs and capabilities, the book is severely skewed to a discussion of spacecraft devised and operated by the US National Aeronautics and Space Administration (NASA) or the National Oceanic and Atmospheric Administration (NOAA), and incorrectly attributes multinational missions or research programs to NASA, as in the reference to the International Satellite Land Surface Climatology Project on p. 37.

Few references are made to the extensive earth observation satellite programs of the European Space Agency, the National Space Development Agency of Japan, and of other authorities in China, the USSR, India and elsewhere. For example, Table 2 on pp.10–13 lists 'Sensors and satellite systems for monitoring weather and climate variables' but contains no mention of the European ERS-1, NASDA's MOS-1, the French SPOT, Chinese FY 1, Indian INSAT, etc. Of about 120 figures, only one is taken from a non-US satellite.

The book may appeal to synoptic meteorologists wishing to understand more about the wider applications of satellites to climatology, but it offers less to those approaching climate studies from a background in geography, social science, atmospheric chemistry or ecology.

**Jeff Kingwell**

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**Prediction and Regulation of Air Pollution** by M.E. Berlyand (Kluwer Academic Publishers, 1991) ISBN 0 7923 1000 4. 306 pp., Dfl 175.00.

M.E. Berlyand has condensed many years of research into a hard cover text book, *Prediction and Regulation of Air Pollution*. This book is part of the Kluwer Academic Publishers' Atmospheric Sciences Library.

The English edition is an expansion of an earlier Russian edition. The translation is good with only a few minor irritations with syntax but a higher number of proof-reading errors. Moreover, the original diagrams, with just one or two exceptions, are hand drawn. This sometimes produces loss of clarity which requires some effort to work out the minor details. Even complex mathematical expressions — something most personal computers can now easily handle — are displayed as hand drawn graphs.

The text itself is well detailed and presented in a logical manner. Most lines of research are presented — some with more detail than others. All of the discussions are well referenced. Sometimes the discussion appears truncated but enough references are given for the reader to follow further. The author presents a good mixture of worded essays and more detailed mathematical treatment of the subjects. While the referencing is good, the index, at three pages, is not expansive to say the least. A glossary of terms would also have been of assistance.

The Russian approach to the subject of environmental regulation also needs to be kept in perspective when looking at this subject from an Australian viewpoint. It would seem that whole industries can be halted based on adverse forecast weather conditions. This is unknown in Australia. Moreover, forecast information can be used to require industries to apply stricter emission standards. The Australian approach is to apply the highest possible standards at all times.

Chapter 1 is simply an introduction on defining criteria for when air quality is degraded to the level of polluted air. Values of 'Maximum Permissible Concentration' of pollutants are presented for a number of countries. These are short-term standards of 20 to 30 minutes in the USSR. It is not clear whether these are ambient or peak ground level standards. Australia, and in particular Victoria, has both ambient (one hour or more) and peak 'Ground Level Concentration' (three-minute average) standards.

A detailed discussion follows in Chapter 2 which looks at the physics of air pollution meteorology. The primitive prognostic equations are presented. Turbulence and boundary conditions are introduced as complications. Stability and its effects on dispersion are treated both descriptively and in a sophisticated mathematical way. Heavier than air gases and averaging times are discussed before moving on to Gaussian matters. This treatment of the standard modelling is presented very well. All of the important work of

Turner, Pasquill, Gifford and Hanna is mentioned. Complex terrain, stack height and plume rise are also included.

Chapter 3 deals with complications to the standard models. These include wind shear, inversions, chemical reactions and hygrometeors.

Chapter 4 concerns practical applications of numerical forecasting methods. These include ground sources, line sources and building effects — standard problems associated with Gaussian modelling and included in such things as the Ausplume package.

Chapters 5 and 6 deal with a statistical approach to the problem of air pollution forecasting. Correlations, spectral analysis and multiple linear regression methods in particular are mentioned.

The following two chapters deal with forecasting problems. Climate and microclimate are included as well as synoptic-scale forecasting. Problems with inversions, fog, sea breezes and low-level jets are also discussed. The use of 925 hPa charts is a standard forecasting technique applied in the USSR, while in Australia the lowest standard levels are 1000 and 850 hPa.

The Russian approach to regulation and results of forecasting experience are discussed in the final two chapters. This discussion, while briefly mentioning work in other countries, is biased towards the Russian experience. There is a committee which concerns itself with the Control of the Natural Environment. One of the considerations of this committee is industrial emissions but with due consideration to 'the importance of the enterprise to the city'. Emission reductions can be applied when the forecast is unfavourable in Russia 'without reducing output or causing any substantial changes in the industrial process'. The western approach, as applied in Australia, is to have tight emission controls continuously.

This book presents a sound summary of air pollution meteorology and how it relates to the prediction and regulation of air pollution. It would make a useful text for undergraduate courses in meteorology or environmental science. Most good tertiary libraries could afford this book at \$US108 for 306 pages. Consultants involved in environmental impact statements could also use the book as reference material.

**Barry Cook**

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