

Book Reviews

Nowcasting ed. K. A. Browning (Academic Press, 1982), 247 pages, numerous diagrams and tables, \$45.00.

This book is an edited selection of 17 papers arising out of the Nowcasting Symposium held in Hamburg on 25-28 August 1981 as part of the Third Scientific Assembly of the International Association of Meteorology and Atmospheric Physics. The term 'Nowcasting' first gained prominence in the mid 1970s and is strictly defined as a detailed description of the current weather based largely on extrapolation. However, the scope of this book is extended to cover short-range forecasting up to 12 hours ahead. The editor is a pioneer in the development of integrated systems for short-term forecasting purposes in the United Kingdom. The book is structured into four parts in a natural sequence; design of nowcasting systems, new forms of observational data, simple forecasting methods and finally, the use of numerical models.

Part 1 deals with system design. The first chapter (User requirements for very short-range weather forecasts) lists the many areas affected by these forecasts, but the authors admit that there have been few soundly based economic studies of their value. The remaining chapters of this part deal with meteorological systems that are specially tailored for short-term forecasting purposes, e.g. PROFS (in USA), PROMIS-90 (in Sweden), AMEDAS (in Japan) and FRONTIERS (in UK). These countries are virtually totally covered by weather watch radar. This part of the book is of value to system designers as it presents different approaches various countries have adopted towards establishing short-term forecasting systems.

Part 2 (New forms of observational data) deals with mesoscale observational techniques which are becoming available or may be available for operational use in the coming decade. These include ground-based remote sensing techniques (e.g. laser, sodar, VHF/UHF Doppler radar, microwave radiometers, microwave Doppler radar) and the satellite-borne sounders to observe the three-dimensional temperature and humidity structure of the atmosphere with mesoscale spatial resolution (e.g. direct read-out from polar orbiting and geostationary satellites, and ozone measurements to reveal features of upper tropospheric jet streams). I found the chapter on mesoscale observations from a polar orbiting vertical sounder particularly interesting. Greater detail is obtained in upper air analyses and vertical temperature derived profiles allow the hydrostatic stability of the atmosphere to be better monitored. This facility would be of inestimable value where the conventional radiosonde network is sparse or the intervals between successive soundings infrequent.

Part 3 is devoted to four papers (Simple forecasting methods). While the subject matter of these papers is not related to the types of observational data discussed in Part 2, the papers contain excellent material. From a forecaster's viewpoint I found the first chapter of this part (Subjective interpretation of geostationary satellite data for Nowcasting) extremely valuable. The paper illustrates well how subjective interpretation cloud imagery from geostationary satellite enables the forecaster to diagnose the dynamic and thermodynamic processes taking place on the mesoscale. Other papers in this part deal with precipitation forecasting from extrapolation of radar and satellite data (which ignores development and decay) and the use of the natural life cycle of a mesoscale convective system to assist with forecasting the event.

While Part 3 deals with the use of detailed current weather patterns as the basis for short-range forecasting using conceptually simple models, Part 4 discusses these patterns as input into a numerical-dynamical model. This approach is attractive as a longer term objective, but practical difficulties will delay its widespread implementation. The most rapid progress is likely to be when the predominant forcing is by terrain-induced features, and this theme is developed in the first chapter of this part. This whole area still requires considerable research, and consequently this part of the book is smaller than the other parts. This part holds appeal to numerical modellers.

Overall the balance of the book and its theme development is generally good. The quality of presentation is excellent with diagrams well labelled and self-explanatory. Only the occasional reference is omitted. As indicated, it is of interest to a wide variety of people. The contents go beyond that implied by the title, which could have been more informatively called 'Short-Range Forecasting: Systems, Data and Methods'.

B. W. Shanahan

Atmosphere, Weather and Climate (Fourth edition) by Roger G. Barry and Richard J. Chorley (Methuen, London, 1982), 407 pages, £6.50.

The latest edition of *Atmosphere, Weather and Climate* maintains the standard of the previous editions. Although originally published in 1968, the authors have managed to successfully update and expand the text through successive editions. This edition incorporates extensive rewriting of the sections on local climates and climatic change as well as the introduction of short summaries at the end of each chapter.

The text follows the successful theme of earlier editions in that the first three chapters are devoted to the nature of the atmosphere, its composition, energy budget, moisture balance and motion. The fourth chapter discusses air masses and development of frontal and other depressions. Chapters five and six apply these concepts to northern hemisphere temperate and tropical climates with particular emphasis on Europe and North America. The remaining chapters discuss local climates and climatic change. These are followed by several appendixes and a set of problems oriented to each chapter.

In keeping with previous editions the text is well written and concentrates on a descriptive understanding of meteorological processes. The summaries at the end of each chapter are particularly useful in summarising the major concepts developed and should prove popular with students as an aid in revising material. The general bibliography provides a useful source of references although texts originally listed in the first edition would no longer be readily available or necessarily appropriate. The references for each chapter have been updated by the inclusion of more recent work although many of the original references are still listed.

The text is clearly geared to the northern hemisphere with an extensive discussion of the climate of Europe and North America followed by less than a paragraph devoted to Australian air

masses. This emphasis is further highlighted by the coriolis parameter being defined as positive for all latitudes between 0° and 90° and no allowance made for the change of sign in the southern hemisphere.

Throughout the text the authors employ extensive cross-referencing between the various sections in a chapter and between chapters. Although in some instances this is useful, it tends on the whole to be confusing. The adoption of SI units has been attempted throughout the text although many of the non-metric units remain, especially for the global distribution of meteorological variables. From a student's point of view the mix of units would be particularly confusing, especially in countries such as Australia that have completely adopted the metric system.

Atmosphere, Weather and Climate provides a sound authoritative description of the physical processes within the atmosphere and their interaction with man. Unfortunately, its concentration on the northern hemisphere, with only token references to the climates of the southern hemisphere, limits its usefulness as a text in this country. Nevertheless, it should serve as a highly useful reference source for undergraduates wanting a descriptive introduction to the atmosphere and is a worthy successor of the previous editions.

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