Turbulence and Diffusion in the Atmosphere, Lectures in Environmental Sciences, by **A. K. Blackadar** (Springer-Verlag GmbH & Co. KG, Heidelberg, 1997, 185 pp.) DM 88.00 ÖS 642.40 sFr 77.50 GB£ 38.00 hc ISBN 3 540 61406 0.

Blackadar's Turbulence and Diffusion in the Atmosphere' grew out of a series of lectures in environmental sciences, he, a Professor Emeritus of Pennsylvania State University, gave at the University of Kiel in 1995/96. Accordingly, the book is divided up into ten clearly arranged 'lectures' with an average chapter length of 15 pages, each ending with well posed problems.

In his lectures, Blackadar introduces the nature of turbulence and its mathematical and statistical representation. Half the chapters deal with the structure of the planetary boundary layer (PBL) and basic tools for modelling turbulent diffusion from discrete sources in the atmosphere. All lectures are given in a vivid language (e.g.'A vector cannot equal a scalar any more than apples can equal oranges.') and the lecturer draws instructive physical examples from everyday life, giving insights into processes going on both in the atmosphere and in everyone's kitchen (e.g. "Turkey eggs, anybody?"). Reading the text, I could imagine the fun he had presenting the material to his students.

The content of the lectures is mainly related to Blackadar's own scientific research. Thus it is not astonishing to find only 14 of 86 references later than 1980. Also, the content of some chapters (8 and 9) overlaps existing text books, e.g. by Lumley & Panofsky and Stull. However, the aim of this book is to emphasize the methods of PBL research and 'the history of their development' and for this reason it is mainly adressed to students in meteorology at graduate level. Altough the book could be read by mathematicians, physicists or engineers with some background in turbulence, it is definitely not a general introduction to turbulence, being narrowly focussed on the techniques used for atmospheric boundary layer studies.

Five short appendices (altogether 30 pages) cover two subjects. The first group resembles a lesson on the mathematical details of boundary layer equations and concepts of PBL dynamics, whereas the second group describes the physical content of two simple numerical models written by the author: a one-dimensional, non-stationary PBL model and a Monte-Carlo method of smoke plume simulation for different stability classes of the atmospheric boundary layer. The PBL model (which can also be used for real-time prediction) treats most of the important processes that occur in the boundary layer: turbulent transfer, convection, surface interfacial transfer of scalar quantities including deposition: soil, heat, and moisture transports; moisture storage in and transport through vegetation; and transfer of short- and long-wave radiation in the atmosphere. Both models run on a PC using the supplementary computer programs on the diskettes accompanying the book.

The attraction and charm of the book lie in the possibility of studying turbulence and diffusion in the atmosphere by running the illustrative computer models, with numerous examples illustrating various classes of boundary layer dynamics.

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