

BOOK REVIEW

Radiation in the Atmosphere edited by H.-J. Bolle (Science Press: New Jersey, 1977) US\$45.00, 660 pages, ISBN 0 89500 002 4.

The results of the Radiation Symposium, held in Garmisch-Partenkirchen in August 1976, are published in the proceedings in the form of extended abstracts. The Symposium, for the first time, brought together atmospheric physicists and chemists concerned with the interaction of atmospheric radiation with both cloud and aerosol. This resulted in a lengthy symposium that saw nearly 300 contributing scientists.

The first section of the book lists the papers of those scientists interested in describing the nature of atmospheric aerosol and their optical properties. For a general description of tropospheric aerosol, the abstracts of Junge and Jaenicke are well worth reading. Cadle presents a reasonable summary of stratospheric aerosol. It is clear from the nature of the abstracts that no scientist is prepared to provide a standard aerosol or ensemble of aerosol types that could be used for estimating the radiation fluxes in polluted atmospheres for use in circulation or climate models.

The list of abstracts concerned with the radiation-cloud interaction well summarises the present state of the art. Most of the research deals with the static problem 'given a cloud what does it do to atmospheric radiation?'. This problem seems to be well in hand. A great number of methods can be used for solving the radiation transfer problem in plane parallel and horizontally homogeneous atmospheres. These are well summarised in the review abstract of Leonoble. It is clear, however, that the solutions for finite cloud geometry are not as advanced and only time consuming methods (e.g., Monte Carlo method) are available (see the abstracts by Aida, and McKee and Klehr). Such methods are prohibitive for full spectral calculations and the need for simpler and more economical techniques is well highlighted in this review.

The observational studies reported in the proceedings largely involve remote sensing techniques. Few papers report *in situ* measurements. This is indicative of the great difficulties involved with such observations. Indeed, most of the observational studies described in the proceedings illustrate the potential and versatility of the lidar as a remote sensing instrument.

In summary, the papers included in the proceedings give a reasonable account of the advances in our knowledge of the interaction between atmospheric composition and radiative transfer in the atmosphere. These advances are primarily in our ability to manipulate radiative transfer calculations. Observations and theoretical studies of real clouds - the role radiation plays in cloud formation, dissipation and character - are very few indeed. One example in the present proceedings is the paper by Cox, where he reported observational evidence of cloud cluster response to diurnal radiation forcing.

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