Fowler, D. 2015. **Book review: Moene, A.F. & van Dam, J.C. Transport in the atmosphere-vegetation-soil continuum. Cambridge University Press, Cambridge, 2014. xii + 436 pp. ISBN 9780521195683**. *European Journal of Soil Science*, 66 (2). 390. 10.1111/ejss.12222

Moene, A.F. & van Dam, J.C. *Transport in the atmosphere-vegetation-soil continuum*, Cambridge University Press, Cambridge CB2 8RU, 2014, xii + 436pp, £45, ISBN 9780521195683

This new 436 page text book in A5 format provides a welcome addition to the small number of specialist volumes describing in detail the physics and some relevant biology of soil- land - atmosphere exchange processes. It is based on courses in micrometeorology, soil physics and agrohydrology at Wageningen University. The book focuses on energy and water vapour flow within soils and vegetation and exchange between soil-vegetation and the atmosphere. It also covers vegetation - atmosphere CO_2 exchange and the material is applicable to the exchange of a range of trace gases using micrometeorological methods but the text refers explicitly only to CO_2.

The first half of the book covers the basics of solar, long wave and net radiation, soil heat flux, turbulence in the surface layer, soil water and solute movement in detail. These early chapters include excellent illustrative field data, mainly from the Netherlands. The very descriptive text makes the book very accessible to non specialists and works well in supporting undergraduate students. It also goes into sufficient detail and provides a thorough treatment of the equations and theoretical background to be a great help to research students and the wider research community working in environmental physics or its applications. This is a much more extensive community than in the late 20th century when the measurement of fluxes was largely restricted to campaign measurements. There is now a very extensive global network involved in measurement of continuous fluxes of CO_2 and the main components of the surface energy budget. Links to parts of this community are provided in text, for example through FLUXNET. Relative to most text books in this field, the equations are unusually well supported by text which provide critical discussion of the strengths and weaknesses of different approaches and discusses many of the practical problems that arise in the measurement and interpretation of fluxes. The authors provide sufficient up to date references to research papers, especially review papers which provide good links with the wider literature. The chapter on turbulence and the application of different approaches to measure surface - atmosphere fluxes of momentum sensible and latent heat and CO_2 is particularly well written. At each stage there are questions to help students test their grasp of the subject and there is a nicely set out section of answers to the questions at the back of the book extending to about 40 pages. Each chapter concludes with a brief summary and is purely descriptive which I found helpful.

The processes of photosynthesis and transpiration are considered from non-biochemical perspectives, concentrating on the relationships between the fluxes of water and CO_2 and the soil and aerial environment of the vegetation. I found the treatment of soil water movement much more complete than that of assimilation and felt the need for more detail on canopy scale characteristics of CO_2 exchange. To some extent this is considered in the later chapter on integrated modelling based on the SWAP (soil, water, atmosphere, plant) model and is presented in reasonable detail. This approach seems reasonable as so much of the application of knowledge in this field is achieved using models.

The treatment of methods to estimate fluxes of energy and water vapour using combination methods is excellent, both in the way the material is presented and the balance between formal presentation of the equations and the description and discussion. The main text is supported by a substantial appendix which unlike the main text is short on description and heavy on numerical detail and equations to support the earlier chapters on radiation, and thermodynamics relating to water vapour and soil water physics. This is a nice way of making the main sections of the book readable.

The book is very well written, thoughtfully presented, and is easy to use and read. The book needs to be good to succeed and find its way onto students' shelves given the ease of obtaining journal papers and easy access to on-line lecture notes. This book will be very useful to students in hydrology and environmental physics as well as to postgraduate students and researchers involved in flux measurement.

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