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CITATION

Wadhams, P. 2006. Review of *Atmosphere-Ocean Interactions (Volume 2)*, edited by W. Perrie. *Oceanography* 19(4):192–193, http://dx.doi.org/10.5670/oceanog.2006.40.

portant methods for ocean study, such as sonar and satellite bathymetry systems, are not discussed, and the methods that are presented are illustrated with land and air applications rather than those for ocean science. What is missing for the present audience is a discussion of the special issues related to sensing the ocean surface and depths, including a review of the major needed observables. Readers needing to put remote sensing within the oceanographic context immediately might look for a review more centered on their specific set of problems.

One of the major strengths of the book is the plethora of example data and systems used to collect remote-sensing observations of the Earth and of other planetary bodies. While this tends to date the book and requires updates—the current text is a second edition of a text published in 1987—the descriptions are a valuable reference for historical data sets and give a sense of the progress made in the field since remote sensing first became widely used 40 years ago. Again, most of the examples are for land remote sensing and arguably many major applications of significance have been over the ocean and atmosphere.

Production values in this text are somewhat mixed. There is a nice set of color plates inserted in one section that shows off the acquired images well. It is of course difficult to quantify, but the visual appeal of remote sensing data is one of its real strengths. Examination of a color scene more often than not suggests analysis methods that might be hard to discern by staring at mathematical equations on a page. The rest of the text contains many figures that likely for cost reasons are reproduced in black and white, severely limiting their instructional value and making it more difficult to appreciate their value. But in these days of $200 textbooks, the authors have made a reasonable decision as to how much material to include in color.

In summary, this book is an excellent reference work and could easily be the primary textbook for a graduate course in remote sensing. All of the fundamental physics is here, along with a bit of chemistry. Mathematical relations coupling the physical processes to remote-sensing observables are given, even if not always fully described, and explain why existing systems are designed as they are. The full range of topics covered is beyond the needs of any specific discipline, yet the material is all relevant and very handy to have all in one place. Yet, the text gives rather scant attention to the ocean, so it may not be the first choice for ocean scientists looking to apply remote sensing to their work. Too many practical details of ocean remote sensing are omitted for this book to serve as the primary oceanographic reference. For professionals in the field and for students, where a thorough understanding of the physics and math underlying the acquisition and analysis of remote sensing data is required, this book satisfies the need well.

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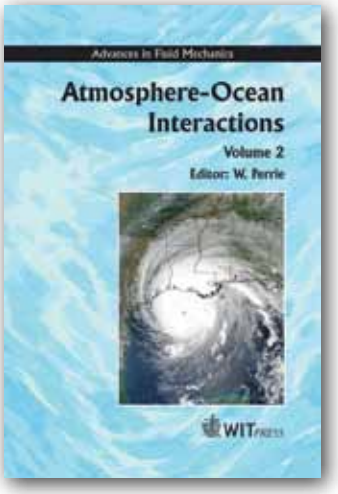
Atmosphere-Ocean Interactions (Vol. 2)

Edited by W. Perrie, WIT Press, 2006, 240 pages, ISBN 1853129291, Hardcover, $142 US

REVIEW BY PETER WADHAMS

This multi-author work is the latest (vol. 39) in an *International Series on Advances in Fluid Mechanics* published by WIT Press, the publishing arm of the Wessex Institute of Technology, near Southampton, UK. The stated objective of the series is to bring advances in the field, made by exceptional researchers, to the attention of the broad international community by means of volumes of invited contributions. Its purpose therefore seems to resemble that of *Annual Review of Fluid Mechanics*, but how does it shape up? First, *Atmosphere-Ocean Interactions (Volume 2)* is much shorter (224 pages compared with 600 or so for ARFM).



Second, *Atmosphere-Ocean Interactions (Volume 2)* is more expensive; $142 is a lot to pay for such a short book.

There are eight chapters in the series, and the editor makes it clear that the special area of interest of this volume is to review mechanisms that are important for the development of marine storms. Most chapters focus on the parameterization of atmosphere-ocean processes. Chapter 1, by W.M. Drennan, reviews the parameterizations of air-sea fluxes, using eddy-correlation fluxes drawn from eight field experiments to investigate traditional bulk flux parameterizations (wind-speed-dependent momentum coefficients, constant sensible and latent heat coefficients) and to suggest new algorithms. Chapter 2, by M.A. Bourassa, deals with satellite-based observations of surface turbulent stress during severe weather. Chapter 3, by Y. Toba and colleagues, considers the challenge of deriving a better parameterization for the CO_2 transfer between the atmosphere and the oceans, a topic of great importance when we seek to track the path of CO_2 through the global system in order to improve understanding of the take-up of anthropogenic CO_2. They consider the nonlinear coupling of waves with local wind drift and turbulence, and the use of the windsea Reynolds number, a concept introduced by Toba himself.

Chapter 4 was the chapter that I found most interesting and original. By T.D. Sikora and others, it deals with applications of synthetic aperture radar (SAR) in marine meteorology. There is a fascinating set of illustrations showing how SAR images not only ocean surface variability, but also atmospheric phenomena and their impact on the ocean. We see examples of microscale cellular convection, microscale roll vortices, microscale gravity waves, mesoscale gravity waves, mesocale convection, polar and tropical mesoscale cyclones, macroscale fronts, and extratropical cyclones. This information is a boon for all those who have gazed at a SAR image of the ocean and concluded either that it is telling us too much, or that it is showing us something that is not really there. My only complaint is that the many beautiful images would have looked better reproduced on glossy paper rather than on the standard uncoated paper chosen for the book.

Chapter 5, by L.K. Shay and S.D. Jacob, deals with the relationship between oceanic energy fluxes and surface winds during tropical cyclone passage; Chapter 6, by the editor, W. Perrie, and others, deals with mid-latitude storm impacts on air-sea CO_2 fluxes; and Chapter 7, by J.L. Evans and R.E. Hart, deals with the extratropical transition of tropical cyclones in the North Atlantic. The final chapter, by X.L. Wang and V.R. Swail, is an interesting study of the historical and possible future changes of wave heights in northern hemisphere oceans. They show how significant increases have been, and will be, occurring as one consequence of global warming.

Atmosphere-Ocean Interactions (Volume 2) is a respectable collection of worthwhile papers, of interest mainly to serious researchers in air-sea interaction. Casual readers will be put off by the price.

UPCOMING BOOK REVIEWS

The Agulhas Current
by Johann R.E. Lutjeharms, Springer, 330 pages

Lagrangian Fluid Dynamics
by Andrew Bennett, Cambridge University Press, 286 pages

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