

THE OFFICIAL MAGAZINE OF THE OCEANOGRAPHY SOCIETY

Oceanography

CITATION

O'Brien, J.J. 2006. Review of *Computer Modelling in Atmospheric and Oceanic Sciences: Building Knowledge*, by P. Müller and H. von Storch. *Oceanography* 19(1):197–198, <http://dx.doi.org/10.5670/oceanog.2006.108>.

DOI

<http://dx.doi.org/10.5670/oceanog.2006.108>

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the horizontal scale of the topography. Nevertheless, this table represents in a nutshell most of what we know about the generation and evolution of baroclinic tides and what we use as conceptual models when we must analyze more complex situations, where the topography is not two-dimensional and the oceanic environment is more variable. This can be seen in the special issue of

the *Journal of Physical Oceanography* on the Hawaiian Ocean Mixing Experiment (HOME), which will appear at about the same time that this book review will appear. HOME is a multi-faceted study of tidal energy conversion and related processes along the Hawaiian Ridge. In their articles, the HOME investigators make abundant use of the concepts in the table in order to understand what exactly is

happening at the Hawaiian Ridge.

In summary, I would like to congratulate the authors on putting together this book at this time. It will be of great value to researchers in this new and exciting field.

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Computer Modelling in Atmospheric and Oceanic Sciences

Building Knowledge

By Peter Müller and Hans von Storch, Springer-Verlag, 2004, 304 pages, ISBN 3540404783, \$89.95 US

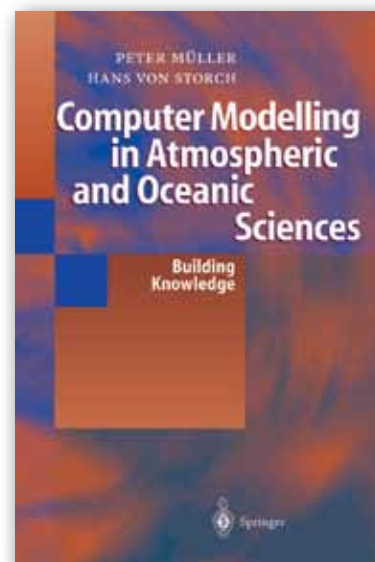
REVIEWED BY JAMES J. O'BRIEN

This book is sewed together into seven chapters of 200 pages and another 100 pages of appendices. Because this reviewer knows both of these eminent oceanographers, it is straightforward to assign an author to each section. *Computer Modelling* contains much useful information, but it would not work well as a textbook in an Earth system modeling class either for the atmosphere or the ocean. Experienced numerical modelers will find some nice discussion of old and modern concepts. The text contains lengthy discussions of the authors' philosophies with regard to models. It is unusual to find such opinions in a text.

The seven chapters are: (1) Introduction, (2) Computer Models, (3) Models

and Data, (4) The Dynamics of Tides and Climate, (5) Modeling in Applied Environmental Sciences, (6) Modeling in Fundamental Environmental Sciences, and (7) Issues and Conclusions.

The Introduction sets the tone for the book with a review of tide and climate modeling. Chapter 2 reviews the fundamental laws and the classical closure problem for a turbulent fluid. Unless the readers have studied these concepts before, they will have a difficult job of understanding this section. In addition, this chapter includes a short discussion of models as dynamical systems and stochastic systems as well as limits to predictability. Chapter 3, Models and Data, contains a useful discussion of validation and assimilation. These concepts are difficult for the new scientist to grasp and they will need additional material. Chapter 4 reviews the tidal problem and modeling the complex climate system. Here we really begin to see



some shortcomings of the text. Already in the previous chapters, many concepts are introduced without definitions (e.g., isentropic coordinate system). It seems as if the authors have not decided who their readers are to be. They explain many concepts from fundamental principles, but often skip over “new” words. In discussing tides, the authors reduce the discussion to a very simple problem to show computer details. Then, they include incorrect finite difference equations. An expert who knows this will not be harmed, but a novice will be lost. In

Chapter 4, they introduce the so-called “primitive equations,” using height (z) as a vertical coordinate. This is never done in climate models. The material needed for you to understand climate models is covered much better in several other monographs. Chapter 5 discusses several operational forecasts plus a strange set of miscellaneous topics, ranging from reanalysis, to transport of lead, to altimeters and tides, to climate scenarios. Chapter 6 explores the concepts of hypothesis testing and reduced models. Chapter 7 returns to philosophy.

The appendices are quick reviews of

Fluid Dynamics (A), Numerics (B), Statistical Analysis (C), and Data Assimilation (D). Appendix A looks at several aspects of fluid dynamics, including boundary layers. Appendix B is a primer for numerical methods. Appendix C is an excellent, but short, explanation of advanced statistical methods. Appendix D on data assimilation is too brief to help newcomers with the complex subject. The two examples used in this last appendix are tides and climate. Tidal models are straightforward because tides are deterministic; decent climate models are extremely complex and demanding

because few data are available for validation. The experienced climate modeler will find little to help improve Earth system models.

I will enjoy owning the book and comparing my approach to the authors’ approach. Most libraries should invest in this book for completeness.

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Ocean Sciences: Bridging the Millennia

A Spectrum of Historical Accounts

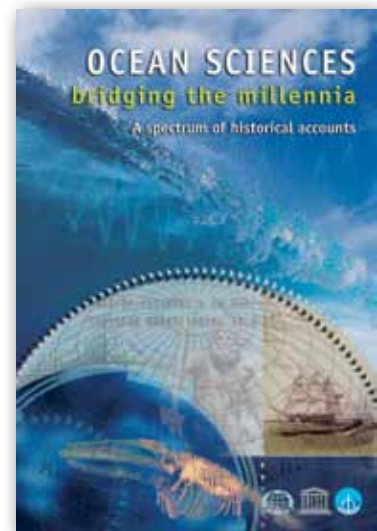
Edited by S. Morcos, M. Zhu, R. Charlier, M. Gerges, G. Kullenberg, W. Lenz, M. Lu, and E. Zou and English editor G. Wright, UNESCO Publishing, Paris, and China Ocean Press, Beijing, 2004, 508 pages, ISBN 9231039369 and ISBN 7502761195, Hardcover, \$80.95 US

REVIEWED BY PETER WADHAMS

This book is based on papers selected and edited from those presented at the Sixth International Congress on the History of Oceanography (ICHO VI), held at Qingdao, People’s Republic of China, from August 15–20, 1998. The manuscript was produced as a result of a three-year joint project between the First Institute of Oceanography (FIO, Qingdao) of

China’s State Oceanographic Administration (SOA), and the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO).

By publishing the volume, IOC and FIO seek to inform scientists and the general public about the development of our knowledge of the sea and its resources. The ICHO VI Editorial Panel, a wide-ranging group of senior scientists led by Selim Morcos, struggled hard to organize a manuscript in which the rather disparate contributions from the conference were given shape and continuity, and in particular, the English-language technical editor and coordinator, Gary Wright of UNESCO Publishing, did a fine job in achieving an acceptable English style to many of the contributions and in add-



ing explanatory and connecting material. The result is a book which is worth dipping into, which in places is fascinating, illuminating many interesting byways of oceanographic science, but which inevitably reflects the rather specialized set of interests of those who attended the meeting in Qingdao.

The book begins with six biographical chapters on famous oceanographers,