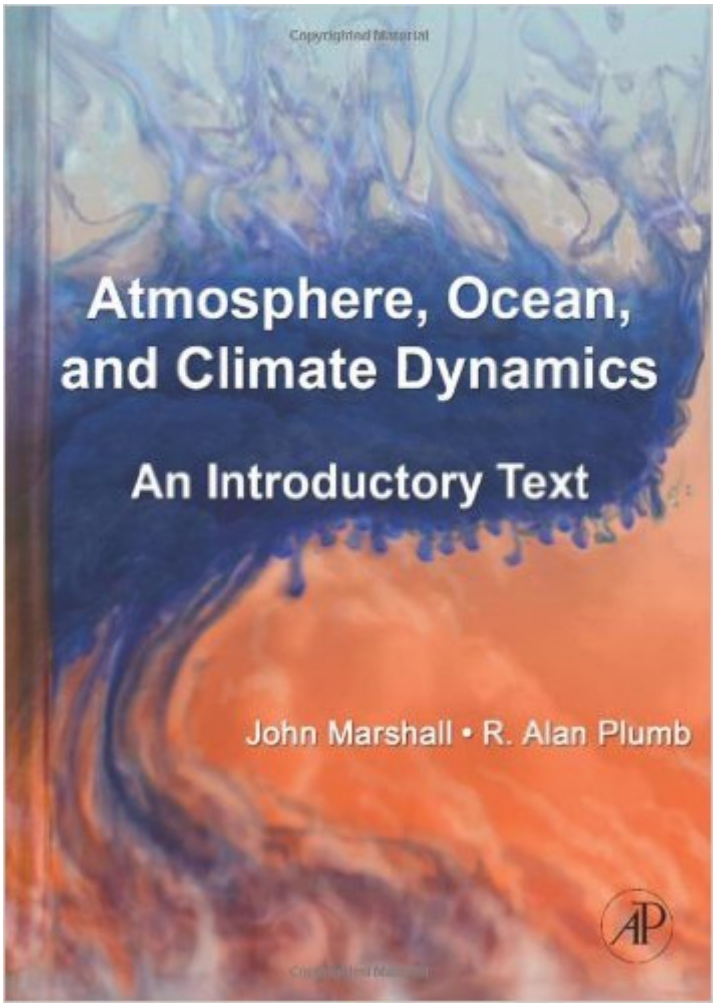
Atmosphere, Ocean And Climate Dynamics: An Introductory Text (International Geophysics (Hardcover))



Synopsis

For advanced undergraduate and beginning graduate students in atmospheric, oceanic, and climate science, Atmosphere, Ocean and Climate Dynamics is an introductory textbook on the circulations of the atmosphere and ocean and their interaction, with an emphasis on global scales. It will give students a good grasp of what the atmosphere and oceans look like on the large-scale and why they look that way. The role of the oceans in climate and paleoclimate is also discussed. The combination of observations, theory and accompanying illustrative laboratory experiments sets this text apart by making it accessible to students with no prior training in meteorology or oceanography. * Written at a mathematical level that is appealing for undergraduates andbeginning graduate students* Provides a useful educational tool through a combination of observations andlaboratory demonstrations which can be viewed over the web* Contains instructions on how to reproduce the simple but informativelaboratory experiments* Includes copious problems (with sample answers) to help students learn thematerial.

Book Information

Series: International Geophysics (Hardcover) (Book 93)
Hardcover: 344 pages
Publisher: Academic Press; 1 edition (December 20, 2007)
Language: English
ISBN-10: 0125586914
ISBN-13: 978-0125586917
Product Dimensions: 7.6 x 0.8 x 10.3 inches
Shipping Weight: 3.1 pounds (View shipping rates and policies)
Average Customer Review: 3.9 out of 5 starsÂ Â See all reviewsÂ (10 customer reviews)
Best Sellers Rank: #155,527 in Books (See Top 100 in Books) #15 inÂ Books > Science & Math > Earth Sciences > Geophysics #60 inÂ Books > Science & Math > Nature & Ecology > Oceans & Seas > Oceanography #122 inÂ Books > Science & Math > Earth Sciences > Rivers

Customer Reviews

This book is a concise, clear and holistic introduction to the subject of atmosphere, ocean and climate science. The book is written in a student-friendly manner. The authors present and develop the tools required to understand the climate system. These tools include radiation, thermodynamics and fluid dynamics. These tools are then used to understand the behaviour of the atmosphere and ocean. The interplay between atmosphere and ocean systems in giving rise to the climate system is

elucidated. The last chapter is devoted to climate dynamics. While primarily discussing the general characteristics of atmosphere and ocean, the book also elaborates on slightly more specialized topics like wind-driven circulation, thermohaline circulation and paleoclimate.This book will help undergraduate and entry-level graduate students to secure a beachhead on the fascinating new territory of atmosphere, ocean and climate science.

I purchased Marshall and Plumb's book in order to give me a bit more quantitative information on the subject than I had gotten from the IPCC and the U.S. Global Change Research Project reports, among others. It had been many years since I last had an in-depth exposure to physics and advanced math (late 1950s, earl;y 1960s), so I spent several weeks reviewing, mostly differential equations. A good grounding in physics and calculus through diff. eq. is really necessary to get the best benefit from this book, but having achieved that, the book is an oustanding introduction to the topics implied in the title. There is enough informaton, presented in an extremely readable format, that I have been driven back to my computer to develop simple models from the book's content. I would heartily recommend this book to anyone willing to put forth a modicum of effort to become much better informed about the science.

The book provides a concise and clear introduction as to how the atmosphere and ocean behave on our planet. The authors apply first principles to explain the structure and circulation of both fluids, how heat is transported and fine-scale processes like convection operate. The explanations employ clear schematics, emphasizing the controlling processes, together with brief mathematical manipulations. The book is beautifully illustrated throughout including wonderful photographs of laboratory experiments, as well as historical asides about the key scientists who made the first break through. This is a great book for anyone wishing to acquire a more profound understanding as to how the atmosphere and ocean operate.

This book comprises a great INTRODUCTION to the study of the atmosphere-ocean-climate system. I'd suggest for anyone with a sprouting interest in the subject to start off with this book and then move on to Benoit Cushman-Roisin, which in my opinion is one of the best in terms of exposition and clarity, although it requires a bit of mathematical maturity. Finally, one could begin to grasp the more intimidating texts, such as Gill or Pedlosky.The GFD labs in this book offer decent physical insight. Also, this text is good for a beginning student since it will expose them to observations of the atmosphere and ocean, in turn allowing them to gain an understanding of the

averaged large scale structure. Obtaining such a solid basis is important for one to successfully continue in the subject. However, my biggest problem with this text is it's neglect to cover material pertaining to vorticity dynamics, although I suppose one could find such material in the more advanced texts.

I own a ton of books on dynamic meteorology and geophysical fluid dynamics and this one is a breakthrough in my opinion because of how the theory (that is otherwise very difficult to grasp with traditional mathematical explanations) is linked to observations in the real atmosphere (and ocean) and particularly in rotating tank experiments. It is full of excellent diagrams and photos of the rotating tank experiments that could be reproduced in a course laboratory with the same set up. It is also clearly written and not as dry as most books on dynamics.From the perspective of an instructor, this is the book that I very much want to use for the course that I teach in dynamics at a California State University. However, my first attempt at adopting it did not go so well and I ended up reverting back to Holton & Hakim. This was entirely due to my comfort level with H&H. So, my conclusion is that using this book effectively in a course will take some extra effort on the part of the instructor to "do things differently".

I think this is a good introduction to the dynamics of the atmosphere and ocean. By studying the atmosphere and ocean together, one gains a deeper understanding of both and how they interact to form the climate system. I believe the book is intended for upper-level undergraduates majoring in the earth sciences (based on a class that Professors Marshall and Plumb taught at MIT?). So it uses calculus to explain physical principles but does not go into as much detail as graduate texts by Vallis, Pedlosky, etc.The real strength of this book is how it allows the reader to visualize phenomena through its outstanding figures, accompanying lab experiments, and web site [...]. My department bought the rotating tank so we can perform the experiments described in the book. Nothing beats seeing Ekman pumping, a Hadley cell, wind-driven gyres, etc. with your own eyes, but the book has figures showing the experiments if you don't have access to a rotating tank.

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