Ocean Circulation in Three Dimensions

Barry A. Klinger and Thomas W. N. Haine

"… a *tour-de-force* discussion of the quasi-steady ocean circulation."
Carl Wunsch, Harvard University/Massachusetts Institute of Technology

"… a refreshingly innovative approach to introductory physical oceanography … explores the ocean not just in the sense of three dimensions of motion, but also in the sense of three dimensions of understanding: observations, concepts, and theory … well-honed for stand-alone physical oceanography courses or for independent study."
Sarah Gille, Scripps Institution of Oceanography, University of California, San Diego

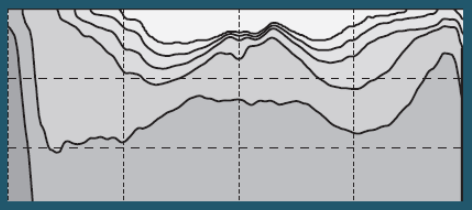
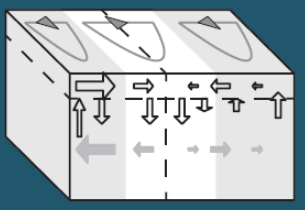
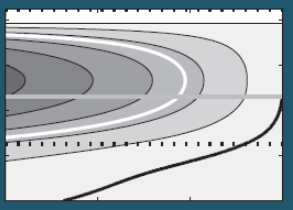
"… an expansive and thorough textbook which deserves a place on the bookshelves of all oceanographers."
Andy Hogg, Australian National University

"This book will guide young scientists entering oceanography and climate modeling and update those who learned about the oceans the old way, too."
Baylor Fox-Kemper, Brown University

Notable advances of the last quarter-century have deepened our appreciation of the three-dimensional nature of the ocean's large-scale circulation. This circulation has important implications for ocean chemistry and biology, atmospheric science, and climate. *Ocean Circulation in Three Dimensions* surveys both observations and theories of the time-mean circulation, enabling readers to see the relevance and limitations of leading theories, as well as the patterns linking the behavior of different oceans. The book covers "classical" topics of horizontal circulation, and expands them to include shallow wind-driven overturning, the deep global "conveyor belt", high latitudes, the role of eddies, and the ocean's role in heat transport. Solutions to exercises are available online for instructor use. This textbook is ideal for students of physical oceanography, chemical oceanography and climate. It is also suitable for readers from related fields as it includes a summary of introductory topics.

Online Resources
www.cambridge.org/oc3d

- Solutions to exercises in the book for instructor use
- All figures from the book available for instructor use

Cover illustration: Front: Schematic vertical section of an eddy-driven flow relaxing an anomaly in density. The photograph looks north across False Bay, Cape Peninsula, South Africa, close to where the Atlantic, Indian, and Southern Oceans meet. Photo by Thomas W. N. Haine. Back: latitude-depth observations, longitude-depth-latitude conceptual sketch, and longitude-latitude theoretical solution, representing the three divisions of each chapter and the three dimensions of the ocean.

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