



Introduction to the Physical and Biological Oceanography of Shelf Seas

By John H. Simpson, Professor Jonathan Sharples

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In this exciting and innovative textbook, two leading oceanographers bring together the fundamental physics and biology of the coastal ocean in a quantitative but accessible way for undergraduate and graduate students. Shelf sea processes are comprehensively explained from first principles using an integrated approach to oceanography that helps build a clear understanding of how shelf sea physics underpins key biological processes in these environmentally sensitive regions. Using many observational and model examples, worked problems and software tools, the authors explain the range of physical controls on primary biological production and shelf sea ecosystems. Boxes throughout the book present extra detail for each topic and non-mathematical summary points are provided for physics sections, allowing students to develop an intuitive understanding. The book is fully supported by extensive online materials, including worked solutions to end-of-chapter exercises, additional homework/exam problems with solutions and simple MATLAB and FORTRAN models for running simulations.

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Editorial Review

Review

"This comprehensive and up-to-date book will be an ideal resource for both undergraduate and postgraduate students in pursuit of an all-round appreciation and understanding of the shelf seas. It really bridges a gap in the literature and the authors themselves pioneered much of the multidisciplinary research that has revealed a delicate interplay between the physical environment and life in the shelf seas." - Dr Robert Marsh, University of Southampton

"Simpson and Sharples have combined courses in coastal physical dynamics and coastal biological oceanography to produce a textbook that is much greater than the sum of the individual disciplinary parts. Students and scientists alike will find the discussions of sampling gear and deployment techniques an unusual and particularly useful aspect of this book. The authors are leaders in the study of the physics and biology of shelf seas and their experience and expertise is abundantly clear." - Professor Peter J. S. Franks, Scripps Institution of Oceanography

"This text is [a] straightforward one-stop shop for students and professionals with a biological background who want to understand the basics of physical oceanography. It is very interesting and readable, and a great introduction [to] the theoretical background a biologist needs to understand the large-scale physical dynamics of the world their organisms are inhabiting." - Professor Katherine Richardson, Copenhagen University

"This book will prove to be a masterpiece with enduring value and fills a significant gap in physical oceanography textbooks by focusing on shallow seas. It reads well, is accessible to the intelligent, scientifically trained non specialist and provides a solid foundation by which ecologists can learn much about the physical control of many ecological processes on shelf seas." - Malcolm Bowman, Distinguished Professor, State University of New York, Stony Brook

About the Author

John Simpson leads a research group in the School of Ocean Sciences at Bangor University in Wales, which is developing new methods to observe and model turbulence and the mixing that plays a crucial role in biological production. He is a seagoing physical oceanographer with a broad interest in shelf seas and estuaries and his research has focussed on the physical mechanisms which control the environment of the shelf seas. He has taught Physics of the Ocean at Bangor and other universities worldwide for more than 40 years and was responsible for establishing the first Masters-level course in Physical Oceanography within the UK. In 2008 Professor Simpson was awarded the Fridtjof Nansen Medal of the European Geosciences Union for his outstanding contribution to understanding the physical processes of the shelf seas and the Challenger Medal of the Challenger Society for his exceptional contribution to Marine Science.

Jonathan Sharples holds a joint chair at the University of Liverpool and the UK Natural Environment Research Council's National Oceanography Centre and has taught courses in coastal and shelf oceanography at the universities of Southampton and Liverpool. He is an oceanographer whose research concentrates on the interface between shelf sea physics and biology. His work is primarily based upon observational studies at sea, combined with development of simple numerical models of coupled physics and biology. Professor Sharples has extensive seagoing experience off the NW European shelf and off New Zealand, having led several major interdisciplinary research cruises. His research has pioneered the use of fundamental

measurements of turbulence in understanding limits to phytoplankton growth and controls on phytoplankton communities.

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