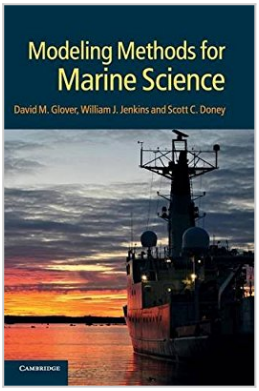

Modeling Methods for Marine Science

By David M. Glover, William J. Jenkins, Scott C. Doney

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This advanced textbook on modeling, data analysis and numerical techniques for marine science has been developed from a course taught by the authors for many years at the Woods Hole Oceanographic Institute. The first part covers statistics: singular value decomposition, error propagation, least squares regression, principal component analysis, time series analysis and objective interpolation. The second part deals with modeling techniques: finite differences, stability analysis and optimization. The third part describes case studies of actual ocean models of ever increasing dimensionality and complexity, starting with zero-dimensional models and finishing with three-dimensional general circulation models. Throughout the book the general principles and goals of scientific visualization are emphasized through technique and application. Ideal as a textbook for advanced students of oceanography on courses in data analysis and numerical modeling, the book is also an invaluable resource for a broad range of scientists undertaking modeling in chemical, biological, geological and physical oceanography.

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Editorial Review

Review
"This textbook can be considered as a reference in data analysis and numerical modeling. For readers who are interested in the numerical side of marine science, this book presents lots of methods and provides numerous useful tools...Its readability makes it an excellent manual that I would definitely recommend around me, both for students and for researchers" - Virginie Raybaud, Limnology and Oceanography Bulletin

"I learned some new things from this book, especially about geochemistry..I believe that no other book covers the same topics as this book does, so in that sense it is unique...I very highly recommend this book for use in courses that cover modeling methods in oceanography or geophysics, and to researches." - Peter Gent, Bulletin of the American Meteorological Society, July 2012

About the Author
David Glover is a Senior Research Specialist in the Department of Marine Chemistry and Geochemistry at Woods Hole Oceanographic Institution. He is the author or co-author of 67 published articles, book chapters and abstracts. Dr Glover's research uses satellite data, model results and shipboard data to elucidate the mechanisms and processes by which the oceans play a major role in the maintenance of the global climate.

William J. Jenkins is a Senior Scientist in the Department of Marine Chemistry and Geochemistry at Woods Hole Oceanographic Institution. He has published 84 peer-reviewed journal and book articles. Dr Jenkins is the Director of the National Ocean Sciences Accelerator Mass Spectrometry Facility (NOSAMS). In 1983 he received the Rosenstiel Award in Oceanographic Science from the University of Miami and in 1997 he received the Henry Bryant Bigelow Award in Oceanography from the Woods Hole Oceanographic Institution. Dr Jenkins' interests include studying tracers as applied to oceanic physical, chemical, biological and geological processes; air-sea and ice-water exchange of gases; ocean biological productivity and its controls; radiogenic and primordial noble gas isotopes in the sea, atmosphere, lakes, ground waters, sediments and rocks; climatic changes in the ocean and its effects on biogeochemical systems; and radiocarbon and the global carbon cycle in the last 60,000 years.

Scott C. Doney is a Senior Scientist in the Department of Marine Chemistry and Geochemistry at Woods Hole Oceanographic Institution. He has authored or co-authored more than 160 peer-reviewed journal and book articles. He was awarded the James B. Macelwane Medal from the American Geophysical Union in 2000 and an Aldo Leopold Leadership Program Fellowship in 2004. He has travelled extensively, lending his expertise to a number of national and international science programs, most recently as inaugural chair of the Ocean Carbon and Biogeochemistry (OCB) program. He has also testified before both the US House of Representatives and the US Senate. His research interests include marine biogeochemistry and ecosystem dynamics, ocean acidification, the global carbon cycle, climate change, and the intersection of science and policy.

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