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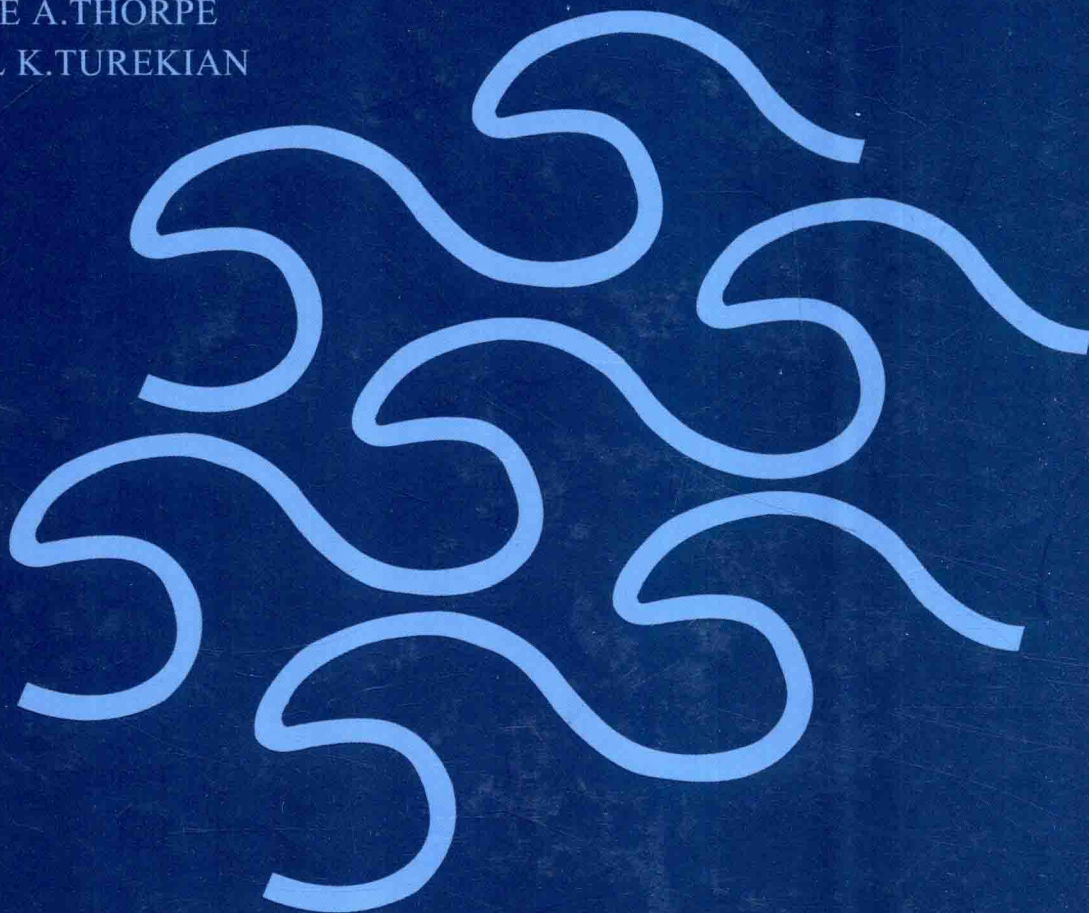
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SECOND EDITION

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第四卷

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John Steele, Steve Thorpe, Karl Turekian

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内容提要

《海洋科学百科全书》来自国际著名出版机构—爱思唯尔集团（ELSEVIER）。该套全书为一套六卷，收录了世界海洋科学领域顶尖研究人员撰写的 402 篇原创文章，每篇文章约 3000~4000 字，针对某一特定主题，并附有进一步阅读的书单以及大量可以相互参考的文献。

该套全书是国际海洋科学研究领域最新、最权威、最全面的巨著，涵盖世界顶尖科学家在海洋物理演变过程、化学、生物学以及地质学领域的研究成果，并将经典科学理论与最新发现、技术和应用结合起来，通过直观的格式和完整的索引使信息易于查找。

该套全书适用于从事海洋科学研究的科技工作者，也是相关高等院校师生的重要参考文献。

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出版说明

《海洋科学百科全书（英文版）》（第二版）（共6卷）是由上海交通大学出版社从爱思唯尔出版集团（Elsevier）原版引进，以影印版形式在国内出版。本套丛书收录了世界海洋科学领域顶尖研究人员撰写的402篇原创文章，可谓国际海洋科学研究领域权威巨著，内容涵盖海洋工程、海洋生物学、海洋生态学、海洋生态系统、海洋事务与政策、渔业学、污染与气候变化的影响、海洋食物、海洋能源、地质学等众多领域，并将经典科学理论与最新发现、技术和应用相结合，对我国从事相关领域研究的工作者极具参考价值。

《海洋科学百科全书（英文版）》（第二版）延续了前一版的经典，原版在欧美国家持续畅销。此次收入的新论文更侧重于气候、遥感、数据建模和海洋研究的新进展和新成果，是海洋学科方面必不可少的参考资料。丛书主编约翰·H. 斯蒂尔担任美国伍兹霍尔海洋研究所所长12年，是国际海洋科学界的学术领袖。他以定量方法研究海洋生态系统，领导了相关领域的重大研究项目，其最突出的成就是将海洋生物学科从一个描述性学科发展成为以数学方法为基础的定量研究。

本套丛书还针对特定主题，附有进一步阅读的书单以及大量可以相互参考的文献。书中所收录的文章仅代表原作者个人观点，不代表上海交通大学出版社立场。

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Preface to Second Print Edition

The first edition of the *Encyclopedia of Ocean Sciences*, published in print form in 2001, has proven to be a valuable asset for the marine science community – and more generally. The continuing rapid increase in electronic access to academic material led us initially to publish the second edition electronically. We have now added this print version of the second edition because of a demonstrated need for such a product. The encyclopedia can now be accessed in print or electronic format according to the preferences and needs of individuals and institutions.

In this edition there are 54 new articles, 67 revisions of previous articles, and a completely revised and improved index. We are grateful to the members of the Editorial Advisory Board, nearly all of whom have stayed with us during the lengthy process of going electronic.

The transition from Academic Press to Elsevier occurred between the two editions. We thank Dr. Debbie Tranter of Elsevier for her efforts to see this edition through its final stages.

Preface to First Edition

In 1942, a monumental volume was published on The Oceans by H. U. Sverdrup, M. W. Johnson, and R. H. Fleming. It was comprehensive and covered the knowledge at that time of the scientific study of the oceans. This seminal book helped to initiate the tremendous burgeoning of marine research that occurred during the following decades. The *Encyclopedia of Ocean Sciences* aims to embody the great growth of knowledge in a major new reference work.

There have been remarkable new approaches to the study of the oceans that blur the distinctions between the physical, chemical, biological, and geological disciplines. New theories and technologies have expanded our knowledge of ocean processes. For example, plate tectonics has revolutionized our view not only of the geology and geophysics of the seafloor but also of ocean chemistry and biology. Satellite remote sensing provides a global vision as well as detailed understanding of the close coupling of ocean physics and biology at local and regional scales.

Exploration, fishing, warfare, and the impact of storms have driven the past study of the seas, but we now have a great public awareness of and concern with broader social and economic issues affecting the oceans. For this reason, we have invited articles explicitly on marine policy and environmental topics, as well as encouraged authors to address these aspects of their particular subjects. We believe the encyclopedia should be of use to those involved with policy and management as well as to students and researchers.

Over 400 scientists have contributed to this description of what we now know about the oceans. They are distinguished researchers who have generously shared their knowledge of this ever-growing body of science. We are extremely grateful to all these authors, whose ability to write concisely on complex subjects has generated a perspective on our science that we, as editors, believe will enhance the appreciation of the oceans, their uses, and the research ahead.

It has been a major challenge for the members of the Editorial Advisory Board to cover such a heterogeneous subject. Their knowledge of the diverse areas of research has guaranteed comprehensive coverage of the ocean sciences. The Board contributed significantly by suggesting topics, persuading authors to contribute, and reviewing drafts. Many of them wrote Overviews that give broad descriptions of major parts of the ocean sciences. Clearly, it was the dedicated involvement of the Editorial Advisory Board that made this venture successful.

Such a massive enterprise as a multivolume encyclopedia would not be possible without the long-term commitment of the staff of the Major Reference Works team at Academic Press. In particular, we are very grateful for the consistent support of our Senior Developmental Editor, Colin McNeil, who has worked so well with us throughout the whole process. Also, we are very pleased that new technology permits enhanced search and retrieval through the Internet. We believe this will make the encyclopedia much more accessible to individual researchers and students.

In Memoriam

During the creation of the *Encyclopedia of Ocean Sciences* and also in several cases prior to the publication of the electronic Second Edition, several Associate Editors or designated Associate Editors died. We specifically acknowledge their role in making this work an effective publication. They are Mike Fasham, John S. Gray, Lindsay Laird, Michael Mullin and Yoshiyuki Nozaki.

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