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# 海洋科学百科全书

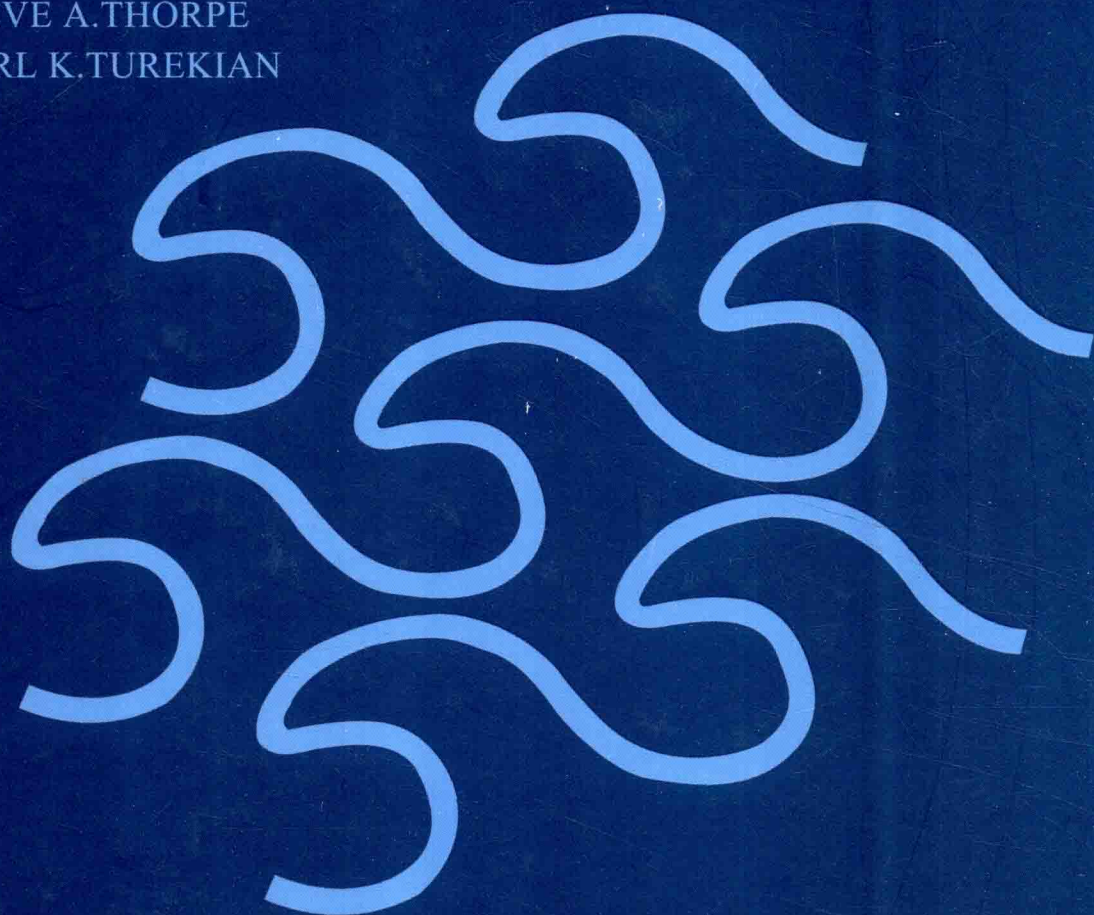
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JOHN H. STEELE

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第2版



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# **ENCYCLOPEDIA OF OCEAN SCIENCES**

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**SECOND EDITION**

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# 海洋科学百科全书

(英文版)

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第 2 版

第五卷

中国海洋工程学会 主办  
上海研途船舶海事技术有限公司 策划



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John Steele, Steve Thorpe, Karl Turekian

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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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近五年，实验室承担各类科研项目513项，其中：“973”首席1项，“973”子课题5项，“863”计划子课题3项，国家科技重大专项4项，国家科技支撑计划11项，“十一五”国家重点基础研究发展计划2项，国家创新团队基金2项，国家自然科学基金95项，省部委及行业专项等73项，国际合作项目32项。近五年，实验室获得国家科技进步二等奖4项、获得省部级科技进步一等奖14项，二等奖17项。发表学术专著17部，学术论文1574篇，其中国际期刊论文365篇。SCI-E收录399篇，EI收录1317篇，CPCI-S收录104篇。发明专利授权43项，实用新型专利授权27项。软件著作权21项。



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《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.