An Introduction To Ocean Remote Sensing

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An Introduction To Ocean Remote Sensing ***2024-05-28***

TIANA KALEIGH

Breaking and Dissipation of Ocean Surface Waves Elsevier
Fully updated, with significant new coverage of advances in satellite oceanography and results from new satellite missions, the second edition of this popular textbook introduces students to how remote sensing works, how to understand observations from Earth-observing systems, and the observations' importance to physical and biological oceanography. It provides full explanations of radiative transfer, ocean surface properties, satellite orbits, instruments and methods, visible remote sensing of biogeochemical properties, infrared and microwave retrieval of sea surface temperature, sea surface salinity retrieval, passive microwave measurements, scatterometer wind retrieval, altimetry and SAR. Also included are descriptions of the online archives where data can be obtained, and readers can obtain online tools for working with the data - enabling hands-on engagement with real-world observations. This is an ideal textbook for graduate and advanced undergraduate students in oceanography, remote sensing and environmental science, and a practical resource for researchers and

professionals working with oceanographic satellite data.

Encyclopedia of Ocean Sciences

Academic Press

This book is intended as a handbook for professionals and researchers in the areas of Physical Oceanography, Ocean and Coastal Engineering and as a text for graduate students in these fields. It presents a comprehensive study on surface ocean waves induced by wind, including basic mathematical principles, physical description of the observed phenomena, practical forecasting techniques of various wave parameters and applications in ocean and coastal engineering, all from the probabilistic and spectral points of view. The book commences with a description of mechanisms of surface wave generation by wind and its modern modeling techniques. The stochastic and probabilistic terminology is introduced and the basic statistical and spectral properties of ocean waves are developed and discussed in detail. The bulk of material deals with the prediction techniques for waves in deep and coastal waters for simple and complex ocean basins and complex bathymetry. The various prediction methods, currently used in oceanography and ocean engineering, are described and the examples of practical calculations illustrate the basic text. An appendix provides a description of the modern methods of wave measurement, including the remote sensing techniques. Also the wave simulation methods and random data analysis techniques are

discussed. In the book a lot of discoveries of the Russian and East European scientists, largely unknown in the Western literature due to the language barrier, are referred to.
An Introduction to Ocean Remote Sensing John Wiley & Sons
Introduction to Satellite Remote Sensing: Atmosphere, Ocean and Land Applications is the first reference book to cover ocean applications, atmospheric applications, and land applications of remote sensing. Applications of remote sensing data are finding increasing application in fields as diverse as wildlife ecology and coastal recreation management. The technology engages electromagnetic sensors to measure and monitor changes in the earth's surface and atmosphere. The book opens with an introduction to the history of remote sensing, starting from when the phrase was first coined. It goes on to discuss the basic concepts of the various systems, including atmospheric and ocean, then closes with a detailed section on land applications. Due to the cross disciplinary nature of the authors' experience and the content covered, this is a must have reference book for all practitioners and students requiring an introduction to the field of remote sensing. - Provides study questions at the end of each chapter to aid learning - Covers all satellite remote sensing technologies, allowing readers to use the text as instructional material - Includes the most recent technologies and their applications, allowing the reader to stay up-to-date - Delves into laser sensing

(LIDAR) and commercial satellites (DigitalGlobe) - Presents examples of specific satellite missions, including those in which new technology has been introduced

Cloud Computing in Ocean and Atmospheric Sciences Cambridge University Press

Satelli te oceanography, as the term is used in this book, is a generic term that means application of the technology of aerospace electromagnetic remote sensing to the study of the oceans. The key words here are "application of technology ••. to the study of the oceans." The goal is to learn more about our planet's hydrosphere. As such, remote sensing technology is another tool in the oceanographer's sea bag, just like a bathythermograph or a plankton net. But is a whole book necessary if remote sensing is just another tool? While it is true that no one has written a whole book on plankton nets, volumes have been written about what is found in those nets. Today's state-of-the-art measurements from spacecraft or aircraft first must be interpreted in terms of their physics; then the interpretations must be understood in terms of oceanic processes. This is not materially different from the analogy to li plankton net; marine biolo gists still argue about what didn't get caught in the net.

Introductory Dynamical Oceanography Cambridge University Press

The science and engineering of remote sensing--theory and applications The Second Edition of this authoritative book offers readers the essential science and

engineering foundation needed to understand remote sensing and apply it in real-world situations. Thoroughly updated to reflect the tremendous technological leaps made since the publication of the first edition, this book covers the gamut of knowledge and skills needed to work in this dynamic field, including: * Physics involved in wave-matter interaction, the building blocks for interpreting data * Techniques used to collect data * Remote sensing applications The authors have carefully structured and organized the book to introduce readers to the basics, and then move on to more advanced applications. Following an introduction, Chapter 2 sets forth the basic properties of electromagnetic waves and their interactions with matter. Chapters 3 through 7 cover the use of remote sensing in solid surface studies, including oceans. Each chapter covers one major part of the electromagnetic spectrum (e.g., visible/near infrared, thermal infrared, passive microwave, and active microwave). Chapters 8 through 12 then cover remote sensing in the study of atmospheres and ionospheres. Each chapter first presents the basic interaction mechanism, followed by techniques to acquire, measure, and study the information, or waves, emanating from the medium under investigation. In most cases, a specific advanced sensor is used for illustration. The book is generously illustrated with fifty percent new figures. Numerous illustrations are reproduced in a separate section of color plates.

Examples of data acquired from spaceborne sensors are included throughout. Finally, a set of exercises, along with a solutions manual, is provided. This book is based on an upper-level undergraduate and first-year graduate course taught by the authors at the California Institute of Technology. Because of the multidisciplinary nature of the field and its applications, it is appropriate for students in electrical engineering, applied physics, geology, planetary science, astronomy, and aeronautics. It is also recommended for any engineer or scientist interested in working in this exciting field.

Ocean Circulation and Climate
Elsevier
This updated edition provides a foundation of theoretical and practical aspects of radiative transfer for students and researchers in atmospheric, oceanic and environmental sciences.

The Ocean Basins: Their Structure and Evolution Academic Press
The goals of wind wave research are relatively well defined: to be able to predict the wind wave field and its effect on the environment. That environment could be natural (beaches, the atmosphere etc.) or imposed by human endeavour (ports, harbours, coastal settlements etc.). Although the goals are similar, the specific requirements of these various fields differ considerably.This book attempts to summarise the current state of this knowledge and to place this understanding into a common frame work. It attempts to take a balanced

approach between the pragmatic engineering view of requiring a short term result and the scientific quest for detailed understanding. Thus, it attempts to provide a rigorous description of the physical processes involved as well as practical predictive tools.

Radar Imaging of the Ocean Waves John Wiley & Sons

Our oceans are hugely important, as a source of food and mineral wealth, as an environment for a vast variety of wildlife, for the role they play in climate regulation, and as part of the biogeochemical cycles of carbon, nitrogen, and other elements critical to life. Dorrik Stow explores what we know about how oceans originate and are maintained.

Discovering the Ocean from Space Academic Press

An account of some aspects of marine geology and marine geophysics, comprehensible to those at an early stage in their study of geology and to scientists who are not specialists in these fields. There are many biologists, chemists, mathematicians or physicists who work in the laboratory or on board ship with geologists and geophysicists and this book will help them to understand the aims of their colleages' experiments. Wherever possible, without a loss of necessary precision, terminology is deliberately simplified.

An Introduction to Ocean Turbulence Elsevier

'Introductory Dynamical Oceanography' 2nd ed provides an introduction to

Dynamical Physical Oceanography at a level suitable for senior year undergraduate students in the sciences and for graduate students entering oceanography. It aims to present the basic objectives, procedures and successes and to state some of the present limitations of dynamical oceanography and its relations to descriptive physical oceanography. The first edition has been thoroughly revised and updated and the new work includes reference to the Practical Salinity Scale 1978, the International Equation of State 1980 and the beta-spiral technique for calculating absolute currents from the density distribution. In addition the description of mixed-layer models has been updated and the chapters on Waves and on Tides have been substantially revised and enlarged, with emphasis on internal waves in the Waves chapter. While the text is self-contained readers are recommended to acquaint themselves with the general aspects of descriptive (synoptic) oceanography in order to be aware of the character of the ocean which the dynamical oceanographer is attempting to explain by referring to Pickard and Emery's 'Descriptive Physical Oceanography' 4th edition.

Encyclopedia of Ocean Sciences

Springer Science & Business Media

Coastal Ocean Observing Systems provides state-of-the-art scientific and technological knowledge in coastal ocean observing systems, along with guidance on establishing, restructuring, and improving similar systems. The book

is intended to help oceanographers understand, identify, and recognize how oceanographic research feeds into the various designs of ocean observing systems. In addition, readers will learn how ocean observing systems are defined and how each system operates in relation to its geographical, environmental, and political region. The book provides further insights into all of these problem areas, offering lessons learned and results from the types of research sponsored and utilized by ocean observing systems and the types of research design and experiments conducted by professionals specializing in ocean research and affiliated with observing systems.

Introduction to satellite oceanography
Elsevier
A graduate-level 2004 textbook describing the use of satellites to study oceanic physical and biological properties.

YOUMARES 8 – Oceans Across Boundaries: Learning from each other
CRC Press
This is an invaluable textbook, prepared by the Open University team and designed so that it can be read on its own or as part of the OU course. This second edition has been fully revised and updated including new colour illustrations increasing the striking spread of full colour diagrams throughout the book. The clarity of the text has been improved, providing comprehensive coverage of the evolution of ocean basins and their structure in a clear, concise manner

aimed specifically at the student market.In this second edition the technological advances in fields as diverse as:- deep-towed instruments for `sniffing' hydrothermal plumes- mapping the sea-floor by sophisticated sonar techniques - three-dimensional imaging of crustal structure by seismic tomography- the use of satellites for navigation, and for making precise measurements of the height of the sea-surfaceThe first chapters describe the processes that shape the ocean basins, determine the structure and composition of oceanic crust and control the major features of continental margins. How the 'hot springs' of the oceanic ridges cycle chemical elements between seawater and oceanic crust is then explored. Sediment distributions are examined next, to demonstrate how sediments can preserve a record of past climatic and sea-level changes. Finally, the role of the oceans as an integral part of global chemical changes is reviewed. - High quality full colour diagrams - Substantial chapter summaries ideal for revision - Answers, hints and notes for questions at back of the book

An Introduction to Atmospheric Radiation John Wiley & Sons

Marine Optics

Biogeochemistry of Marine Dissolved Organic Matter Oxford University Press

Until the 1980s, a tacit agreement among many physical oceanographers was that nothing deserving attention could be found in the upper few meters of the ocean. The lack of adequete knowledge about the near-surface layer

of the ocean was mainly due to the fact that the widely used oceanographic instruments (such as bathythermographs, CTDs, current meters, etc.) were practically useless in the upper few meters of the ocean. Interest in the ne- surface layer of the ocean rapidly increased along with the development of remote sensing techniques. The interpretation of ocean surface signals sensed from satellites demanded thorough knowledge of upper ocean processes and their connection to the ocean interior. Despite its accessibility to the investigator, the near-surface layer of the ocean is not a simple subject of experimental study. Random, sometimes huge, vertical motions of the ocean surface due to surface waves are a serious complication for collecting quality data close to the ocean surface. The supposedly minor problem of avoiding disturbances from ships' wakes has frustrated several generations of oceanographers attempting to take reliable data from the upper few meters of the ocean. Important practical applications nevertheless demanded action, and as a result several pioneering works in the 1970s and 1980s laid the foundation for the new subject of oceanography – the near-surface layer of the ocean.

Ocean Surface Waves Elsevier

Ocean Mixing: Drivers, Mechanisms and Impacts presents a broad panorama of one of the most rapidly-developing areas of marine science. It highlights the state-of-the-art concerning knowledge of the causes of ocean mixing, and a

perspective on the implications for ocean circulation, climate, biogeochemistry and the marine ecosystem. This edited volume places a particular emphasis on elucidating the key future questions relating to ocean mixing, and emerging ideas and activities to address them, including innovative technology developments and advances in methodology. Ocean Mixing is a key reference for those entering the field, and for those seeking a comprehensive overview of how the key current issues are being addressed and what the priorities for future research are. Each chapter is written by established leaders in ocean mixing research; the volume is thus suitable for those seeking specific detailed information on sub-topics, as well as those seeking a broad synopsis of current understanding. It provides useful ammunition for those pursuing funding for specific future research campaigns, by being an authoritative source concerning key scientific goals in the short, medium and long term. Additionally, the chapters contain bespoke and informative graphics that can be used in teaching and science communication to convey the complex concepts and phenomena in easily accessible ways. - Presents a coherent overview of the state-of-the-art research concerning ocean mixing - Provides an in-depth discussion of how ocean mixing impacts all scales of the planetary system - Includes elucidation of the grand challenges in ocean mixing, and how they might be addressed

Remote Sensing and Global Environmental Change Cambridge University Press
This book is dedicated to studying the ocean with radar tools, in particular, with space radars. Being intended mainly for the scientists preoccupied with the problem (as well as senior course students), it concentrates and generalizes the knowledge scattered over specialized journals. The significant part of the book contains the results obtained by the author. - Systematically collects and describes the approaches used by different laboratories and institutions - Deals with the physics of radar imagery and specifically with ocean surface imagery - Useful for students and researchers specializing in the area of ocean remote sensing using airborne or space-borne radars, both SAR and RAR
Optical Remote Sensing of Ocean Hydrodynamics National Academies Press
This book offers a survey of the contribution of satellite data to the study of the ocean, focusing on the special insights that only satellite data can bring to oceanography. Topics range from ocean waves to ocean biology, spanning scales from basins to estuaries. Some chapters cover applications to pure research while others show how satellite data can be used operationally for tasks such as pollution monitoring or oil-spill detection.
Introduction to Satellite Remote Sensing Academic Press
Encyclopedia of Ocean Sciences, Second

Edition is a new 6-volume online reference work, pulling together all the key information in one source from the leading publisher in the field. This second edition is online, offering the user greater flexibility, accessibility, and most importantly, usability with 24 hour access, multi-user access, remote access and excellent search functionality. Structured for success, each article contains a glossary, an introduction, a reference section and a wealth of cross-referenced links to premium and related material all accessible in a mouse-click, making complicated, time consuming research a thing of the past. Approximately 500 articles covering the breadth and depth of the field with over 30% new and updated content reflecting the latest research in the field Greater coverage of climate, remote sensing, and data modeling, with greater consideration of economic and political aspects provides a broad view of the field Online availability facilitates easier research and increased productivity

Marine Optics Springer

The subject of ocean turbulence is in a state of discovery and development with many intellectual challenges. This book describes the principal dynamic processes that control the distribution of turbulence, its dissipation of kinetic energy and its effects on the dispersion of properties such as heat, salinity, and dissolved or suspended matter in the deep ocean, the shallow coastal and the continental shelf seas. It focuses on the measurement of turbulence, and the consequences of turbulent motion in the

oceanic boundary layers at the sea surface and near the seabed. Processes are illustrated by examples of laboratory experiments and field observations. The Turbulent Ocean provides an excellent resource for senior undergraduate and graduate courses, as well as an introduction and general overview for researchers. It will be of interest to all those involved in the study of fluid motion, in particular geophysical fluid mechanics, meteorology and the dynamics of lakes.