Remote Sensing Of Coastal Aquatic Environments Technologies Techniques And Applications Remote Sensing And Digital Image Processing

Satellite Monitoring of Inland and Coastal Water Quality: Retrospection, Introspection, Future Directions reviews how aquatic optics models can convert remote determinations of water color into accurate assessments of water quality. This book illustrates how this conversion can generate products of value for the environmental monitoring of opticall

Optical Properties and Remote Sensing of Inland and Coastal Waters discusses the methodology and the theoretical basis of remote sensing of water. It presents physical concepts of aquatic optics relevant to remote sensing techniques and outlines the problems of remote measurements of the concentrations of organic and inorganic matter in water. It also details the mathematical formulation of the processes governing water-radiation interactions and discusses the development of bio-optical models to incorporate optically complex bodies of water into remote sensing projects. Optical Properties and Remote Sensing of Inland and Coastal Waters derives and evaluates the interrelationships among inherent optical properties of natural water, water color, water quality, primary production, volume reflectance spectra, and remote sensing. This timely and comprehensive text/reference addresses the increasing tendency toward multinational and multidisciplinary climate studies and programs.

Marine Optics

This book covers the latest developments in remote sensing theory and applications by numerous researchers, experts and collaborators of the Remote Sensing and Geo-Environment Lab of the Department of Civil Engineering and Geomatics of the Cyprus University of Technology. The main highlight of this book is combination of several techniques such as satellite remote sensing, field spectroscopy, smart sensors, ground techniques for achieving an integrated method for the systematic monitoring of the environment.

Land Surface Remote Sensing: Environment and Risks explores the use of remote sensing in applications concerning the environment, including desertification and monitoring deforestation and forest fires. The first chapter covers the characterization of aerosols and gases by passive remote sensing. The next chapter presents the correlation of optical images for quantifying the deformation of the Earth's surface and geomorphological processes. The third chapter is examines remote sensing applications in the mining environment. The fourth chapter depicts the strong potential of radar imagery for volcanology and urban and mining subsidence studies. The next two chapters deal respectively with the use of remote sensing in locust control and the contribution of remote sensing to the epidemiology of infectious diseases. In the last ten years, spatial observation of the Earth—particularly continental surfaces—has expanded considerably with the launch of increasing numbers of satellites covering various applications (hydrology, biosphere, flow of surface, snow, ice, landslide, floods). This has paved the way for an explosion in the use of remote sensing data. This book offers essential coverage of space-based observation techniques for continental surfaces. The authors explore major applications and provide a corresponding detailed chapter for the physical principles, physics of measurement, and data processing requirements for each technique, bringing you up-to-date descriptions of techniques used by leading scientists in the field of remote sensing and Earth observation. Provides clear and concise descriptions of modern remote sensing methods Explores the most current remote sensing techniques with physical aspects of the measurement (theory) and their applications Provides chapters on physical principles, measurement, and data processing for each technique described Describes optical remote sensing technology, including a description of acquisition systems and measurement corrections to be made

Written by world renowned scientists, this book provides an excellent overview of a wide array of methods and techniques for the processing and analysis of multitemporal remotely sensed images. These methods and techniques include change detection, multitemporal data fusion, coarse-resolution time series processing, and interferometric SAR multitemporal processing, among others. A broad range of multitemporal datasets are used in their methodology demonstrations and application examples, including multispectral, hyperspectral, SAR and passive microwave data. This book features a variety of application examples covering both land and aquatic environments. Land applications include urban, agriculture, habitat disturbance, vegetation dynamics, soil moisture, land surface albedo, land surface temperature, glacier and disaster recovery. Aquatic applications include monitoring water quality, water surface areas and water fluctuation in wetland areas, spatial distribution patterns and temporal fluctuation trends of global land surface water, as well as evaluation of water quality in several coastal and marine environments. This book will help scientists, practitioners, students gain a greater understanding of how multitemporal remote sensing could be effectively used to monitor our changing planet at local, regional, and global scales.

This book is a printed edition of the Special Issue "Water Optics and Water Colour Remote Sensing" that was published in Remote Sensing

Oceanography is the par excellence interdisciplinary science thanks to its peculiar setting within a fluid environment that makes connections extremely efficient. The oceans connections are well mirrored in the chapters of this book that share a quite explicit multidisciplinary and multi-environmental character. The book provides chapters on very different topics under very different settings, some with a focused angle, others with a broader approach, yet all sharing the idea that we need to understand the small pieces in order to put together the big picture for a much larger mechanism, the functioning of the ocean as a whole.

In this landmark publication, leading experts detail how remote sensing and related geospatial technologies can be used for coastal ecosystem assessment and management. This book is divided into three major parts. In the first part several conceptual and technical issues of applying remote sensing and geospatial technologies in the coastal environment are examined. The second part showcases some of the latest developments in the use of remote sensing and geospatial technologies when characterizing coastal waters, submerged aquatic vegetation, benthic habitats, shorelines, coastal wetlands and watersheds. Finally, the last part demonstrates a watershed-wide synthetic approach that links upstream stressors with downstream responses for integrated coastal ecosystem assessment and management.

Bio-optical Modeling and Remote Sensing of Inland Waters presents the latest developments, state-of-the-art, and future perspectives of bio-optical modeling for each optically active component of inland waters, providing a broad range of applications of water quality monitoring using remote sensing. Rather than discussing optical radiometry theories, the authors explore the applications of these theories to inland aquatic environments. The book not only covers applications, but also discusses new possibilities, making the bio-optical theories operational, a concept that is of great interest to both government and private sector organizations. In addition, it addresses not only the physical theory that makes bio-optical modeling possible, but also the implementation and applications of bio-optical modeling in inland waters. Early chapters introduce the concepts of bio-optical modeling and the classification of bio-optical models and satellite capabilities both in existence and in development. Later chapters target specific optically active components (OACs) for inland waters and present the current status and future direction of bio-optical modeling for the OACs. Concluding sections provide an

overview of a governance strategy for global monitoring of inland waters based on earth observation and bio-optical modeling. Presents comprehensive chapters that each target a different optically active component of inland waters Contains contributions from respected and active professionals in the field Presents applications of bio-optical modeling theories that are applicable to researchers, professionals, and government agencies

With unprecedented attention on global change, the current debate revolves around the availability and sustainability of natural resources and how to achieve equilibrium between what society demands from natural environments and what the natural resource base can provide. A full understanding of the range of issues, from the consequences of the changing resource bases to the degradation of ecological integrity and the sustainability of life, is crucial to the process of developing solutions to this complex challenge. Authored by world-class scientists and scholars, The Encyclopedia of Natural Resources provides an authoritative reference on a broad spectrum of topics such as the forcing factors and habitats of life; their histories, current status, and future trends; and their societal connections, economic values, and management. The content presents state-of-the-art science and technology development and perspectives of resource management. Written and designed with a broad audience in mind, the entries clearly elucidate the issues for readers at all levels. In Volume II, Water includes 59 entries and Air includes 31 entries. The Water entries cover topical areas such as fresh water, groundwater, water quality and watersheds, ice and snow, coastal environments, and marine resources and economics. The Air entries cover air pollutants, atmospheric oscillation, circulation patterns and atmospheric water storage, as well as agroclimatology, climate change, and extreme events. Additional topics in meteorology include acid rain, drought, ozone depletion, water storage, and more. Natural resources represent such a broad scope of complex and challenging topics that a reference book must cover a vast number of subjects in order to be titled an encyclopedia. The Encyclopedia of Natural Resources does just that. The topics covered help readers face current and future issues in the maintenance of clean air and water as well as the preservation of land resources and native biodiversity. Also Available Online This Taylor & Francis encyclopedia is also available through online subscription, offering a variety of extra benefits for researchers, students, and librarians, including: Citation tracking and alerts Active reference linking Saved searches and marked lists HTML and PDF format options Contact Taylor and Francis for more information or to inquire about subscription options and print/online combination packages. US: (Tel) 1.888.318.2367; (E-mail) e-reference@taylorandfrancis.com International: (Tel) +44 (0) 20 7017 6062; (E-mail) online.sales@tandf.co.uk

The book "Applied Studies of Coastal and Marine Environments" is a collection of a number of high-quality and comprehensive work on coastal and marine environment. This book has an Introductory Chapter, followed by 15 chapters. Chapters 2 and 3 are devoted to coastal geological sedimentation and its impacts on marine environment. Consequently, Chapter 4 investigates neo-tectonic movement in the Pearl River Delta. Different aspects of the coastal pollution and its impacts are addressed in Chapter 5 through Chapter 13. Furthermore, coastal management is also discussed in Chapter 14, and monitoring the coastal environment using remote sensing and GIS techniques is reported in Chapter 15. Finally, Chapter 16 addresses the human history of maritime exploitation and adaptation process to coastal and marine environments. It is important to investigate the history of maritime exploitation and adaptation to environment coastal zone to learn how to explore the oceans.

This book offers a unique multidisciplinary integration of the physics of turbulence and remote sensing technology. Remote Sensing of Turbulence provides a new vision on the research of turbulence and summarizes the current and future challenges of monitoring turbulence remotely. The book emphasizes sophisticated geophysical applications, detection, and recognition of complex turbulent flows in oceans and the atmosphere. Through several techniques based on microwave and optical/IR observations, the text explores the technological capabilities and tools for the detection of turbulence, their signatures, and variability. FEATURES Covers the fundamental aspects of turbulence problems with a broad geophysical scope for a wide audience of readers Provides a complete description of remote-sensing capabilities for observing turbulence in the earth’s environment Establishes the state-of-the-art remote-sensing techniques and methods of data analysis for turbulence detection Investigates and evaluates turbulence detection signatures, their properties, and variability Provides cutting-edge remote-sensing applications for space-based monitoring and forecasts of turbulence in oceans and the atmosphere This book is a great resource for applied physicists, the professional remote sensing community, ecologists, geophysicists, and earth scientists.

Remote Sensing of Coastal Aquatic EnvironmentsTechnologies, Techniques and ApplicationsSpringer Science & Business Media

This book is geared for advanced level research in the general subject area of remote sensing and modeling as they apply to the coastal marine environment. The various chapters focus on the latest scientific and technical advances in the service of better understanding coastal marine environments for their care, conservation and management. Chapters specifically deal with advances in remote sensing coastal classifications, environmental monitoring, digital ocean technological advances, geophysical methods, geoacoustics, X-band radar, risk assessment models, GIS applications, real-time modeling systems, and spatial modeling. Readers will find this book useful because it summarizes applications of new research methods in one of the world’s most dynamic and complicated environments. Chapters in this book will be of interest to specialists in the coastal marine environment who deals with aspects of environmental monitoring and assessment via remote sensing techniques and numerical modeling.

Explains how satellite remote sensing informs and helps deliver successful conservation management through case studies, which highlight practitioner experience.

Many of the pollutants discharged into the sea are directly or indirectly the result of human activities. Some of these substances are biodegradable, while others are not. This study is devoted to monitoring areas of the environment. Methods assessment is based on monitoring data and an evaluation of the impact of pollution.Surveillance provides a

scientific basis for standards development and application. The methodology of marine pollution control is governed by algorithms and models. A monitoring strategy should be put in place, coupled with an environmental assessment concept, through targeted research activities in areas identified at local and regional levels. This concept will make it possible to diagnose the state of "health" of these zones and consequently to correct any anomalies. Monitoring of the marine and coastal environment is based on recent methods and validated after experiments in the field of marine pollution.

This book provides details on of the utility of hyperspectral remote sensing – NASA/AVIRIS in nearshore water quality issues of NY/NJ. It demonstrates the use of bio optical modeling and retrieval techniques to derive the concentrations of important water quality parameters (chlorophyll, color dissolved organic matter and suspended sediments) in the study area. The case study focuses on the nearshore waters of NY/NJ considered as a valued ecological, economic and recreational resource within the New York metropolitan area. During field campaigns (1998-2001) measurements were made to establish hydrological optical properties of the NY/NJ nearshore waters with concurrent NASA/AVIRIS overflights. The field measurements included: 1) concurrent above and below surface spectral reflectance; 2) shipboard sampling for determination of inherent optical properties (IOP); and 3) concentrations of optically important water quality parameters. Understanding the relationship between reflectance, absorption and scattering is essential for developing the analytical algorithm necessary to use remote sensing as a monitoring /management tool in the nearshore environment.

At the convergence of the land and sea, coastal environments are some of the most dynamic and populated places on Earth. This book explains how the many varied forms of spatial analysis, including mapping, monitoring and modelling, can be applied to a range of coastal environments such as estuaries, mangroves, seagrass beds and coral reefs. Presenting empirical geographical approaches to modelling, which draw on recent developments in remote sensing technology, geographical information science and spatial statistics, it provides the analytical tools to map, monitor and explain or predict coastal features. With detailed case studies and accompanying online practical exercises, it is an ideal resource for undergraduate courses in spatial science. Taking a broad view of spatial analysis and covering basic and advanced analytical areas such as spatial data and geostatistics, it is also a useful reference for ecologists, geomorphologists, geographers and modellers interested in understanding coastal environments.

Remote Sensing plays a key role in monitoring the various manifestations of global climate change. It is used routinely in the assessment and mapping of biodiversity over large areas, in the monitoring of changes to the physical environment, in assessing threats to various components of natural systems, and in the identification of priority areas for conservation. This book presents the fundamentals of remote sensing technology, but rather than containing lengthy explanations of sensor specifications and operation, it concentrates instead on the application of the technology to key environmental systems. Each system forms the basis of a separate chapter, and each is illustrated by real world case studies and examples. Readership The book is intended for advanced undergraduate and graduate students in earth science, environmental science, or physical geography taking a course in environmental remote sensing. It will also be an invaluable reference for environmental scientists and managers who require an overview of the use of remote sensing in monitoring and mapping environmental change at regional and global scales. Additional resources for this book can be found at: http://www.wiley.com/go/purkis/remote.

Describing and evaluating the basic principles and methods of subsurface sensing and imaging, Introduction to Subsurface Imaging is a clear and comprehensive treatment that links theory to a wide range of real-world applications in medicine, biology, security and geophysical/environmental exploration. It integrates the different sensing techniques (acoustic, electric, electromagnetic, optical, x-ray or particle beams) by unifying the underlying physical and mathematical similarities, and computational and algorithmic methods. Time-domain, spectral and multisensor methods are also covered, whilst all the necessary mathematical, statistical and linear systems tools are given in useful appendices to make the book self-contained. Featuring a logical blend of theory and applications, a wealth of color illustrations, homework problems and numerous case studies, this is suitable for use as both a course text and as a professional reference.

For a long time, the dynamics of urban and coastal areas have been the focus of administrators and decision makers in charge of public policy in order to better take into account anthropogenic pressure and the impact of climate change. This volume presents applications of remote sensing in urban environments and coastal zones, including the use of remote sensing in city planning (urban expansion, light pollution, air quality, etc.), observation of the properties of ocean color, the study of coastal dynamics (identifying coastlines and estimating sediment balances, etc.) and analysis of the dynamics of mangroves. This book, part of a set of six volumes, has been produced by scientists who are internationally renowned in their fields. It is addressed to students (engineers, Masters, PhD), engineers and scientists, specialists in remote sensing applied to the coastal environment and urban areas. Through this pedagogical work, the authors contribute to breaking down the barriers that hinder the use of Earth observation data. Clear-and-concise descriptions of modern methods of remote sensing for a variety of applications Explores the most current remote sensing techniques, with physical aspects of their measurement (theory) Presents physical principles, measurement, and data processing chapters that are provided for each technique described

Sea level rise and coastal erosion had drawn an increasing awareness recently as the repercussion of increase of sea level and coastal erosion would reshape the earth's system and induce a tremendous loss in ecological or economics cost. Governments are dedicated to meliorate the occurrence of these phenomena, or else all creations on the earth will suffer from the catastrophe. Global warming is one of the crucial factors resulting in the increase of sea level and coastal erosion. Remote sensing and geographic information systems (GIS) technologies are thoroughly adopted and applied to monitor the dynamic change of the nature system, such as coastal land use and land cover, sea level rise, and coastal infrastructure.

Remote Sensing of Ocean and Coastal Environments advances the scientific understanding and application of technologies to address a variety of areas relating to sustainable development, including environmental systems analysis, environmental

management, clean processes, green chemistry and green engineering. Through each contributed chapter, the book covers ocean remote sensing, ocean color monitoring, modeling biomass and the carbon of oceanic ecosystems, sea surface temperature (SST) and sea surface salinity, ocean monitoring for oil spills and pollutions, coastal erosion and accretion measurement. This book is aimed at those with a common interest in oceanography techniques, sustainable development and other diverse backgrounds within earth and ocean science fields. This book is ideal for academicians, scientists, environmentalists, meteorologists, environmental consultants and computing experts working in the areas of earth and ocean sciences. Provides a comprehensive assessment of various ocean processes and their relative phenomena Includes graphical abstract and photosets in each chapter Presents literature reviews, case studies and applications

This book describes critical environmental issues that face coastal ocean and Great Lakes areas, including eutrophication, habitat modification, hydrologic and hydrodynamic disruption, exploitation of resources, toxic effects on ecosystems and humans, introduction of nonindigenous species, global climate change and variability, and shoreline erosion and hazardous storms. These issues can be approached through science activities (including research, monitoring, and modeling) discussed in this book and through coordination among federal agencies.

Effectively Manage Wetland Resources Using the Best Available Remote Sensing TechniquesUtilizing top scientists in the wetland classification and mapping field, Remote Sensing of Wetlands: Applications and Advances covers the rapidly changing landscape of wetlands and describes the latest advances in remote sensing that have taken place over the pa

Waves in Oceanic and Coastal Waters describes the observation, analysis and prediction of wind-generated waves in the open ocean, in shelf seas, and in coastal regions with islands, channels, tidal flats and inlets, estuaries, fjords and lagoons. Most of this richly illustrated book is devoted to the physical aspects of waves. After introducing observation techniques for waves, both at sea and from space, the book defines the parameters that characterise waves. Using basic statistical and physical concepts, the author discusses the prediction of waves in oceanic and coastal waters, first in terms of generalised observations, and then in terms of the more theoretical framework of the spectral energy balance. He gives the results of established theories and also the direction in which research is developing. The book ends with a description of SWAN (Simulating Waves Nearshore), the preferred computer model of the engineering community for predicting waves in coastal waters.

IN MEMORIAL: This Research Topic is dedicated to our co-editor Dr. Tiffany Moisan, a well-regarded ocean color remote sensing scientist, who unexpectedly passed away during its preparation. Dr. Moisan was a dear friend, and upbeat and enthusiastic colleague and a scientist committed to the use of remote sensing to improve our understanding of marine microbiology and phytoplankton ecology. She was a strong supporter of the development of remote sensing capabilities and applications for coastal and inland waters, and we know that she would have wanted this Research Topic to provide her colleagues an opportunity to share and promote their work in this area. A voice in our community is now quiet. Let the chorus of our shared song continue with her memory. Dr. Tiffany Moisan is survived by her loving family, including her husband, Dr. John Moisan and her two daughters.

As coastal environments around the world face unprecedented natural and anthropogenic threats, advancements in the technologies that support geospatial data acquisition, imaging, and computing have profoundly enhanced monitoring capabilities in coastal studies. Providing systematic treatment of the key developments, Remote Sensing of Coastal Environments brings together renowned scholars to supply a clear presentation of the state-of-the-art in this technically complex arena. Edited by a recipient of the prestigious PECASE award, this book provides unrivaled coverage of the issues unique to coastal environments. It presents the best available data for measuring and monitoring coastal zones and explains how decision makers and resource managers can use this data to address contemporary issues in coastal zone management. The text illustrates the latest developments in active remote sensing, hyperspectral remote sensing, high spatial resolution remote sensing, the integration of remote sensing and in situ data, and covers the effects of land-cover and land-use change on coastal environments. Complete with representative case studies, this authoritative resource provides a timely snapshot of the wide range of remote sensing applications in coastal issues to enhance the understanding of how increasing disturbances to our coastal regions are affecting the ecological dynamics, biological diversity, and ecosystem health of our coastal environments.

About 30 years ago, NASA launched the first ocean-color observing satellite: the Coastal Zone Color Scanner. CZCS had 5 bands in the visible-infrared domain with an objective to detect changes of phytoplankton (measured by concentration of chlorophyll) in the oceans. Twenty years later, for the same objective but with advanced technology, the Sea-viewing Wide Field-of-view Sensor (SeaWiFS, 7 bands), the Moderate-Resolution Imaging Spectrometer (MODIS, 8 bands), and the Medium Resolution Imaging Spectrometer (MERIS, 12 bands) were launched. The selection of the number of bands and their positions was based on experimental and theoretical results achieved before the design of these satellite sensors. Recently, Lee and Carder (2002) demonstrated that for adequate derivation of major properties (phytoplankton biomass, colored dissolved organic matter, suspended sediments, and bottom properties) in both oceanic and coastal environments from observation of water color, it is better for a sensor to have IS bands in the 400 - 800 nm range. In that study, however, it did not provide detailed analyses regarding the spectral locations of the IS bands. Here, from nearly 400 hyperspectral (3- nm resolution) measurements of remote-sensing reflectance (a measure of water color) taken in both coastal and oceanic waters covering both optically deep and optically shallow waters, first- and second-order derivatives were calculated after interpolating the measurements to I-nm resolution. From these derivatives, the frequency of zero values for each wavelength was accounted for, and the%distribution spectrum of such frequencies was obtained. Furthermore, the wavelengths that have the highest appearance of zeros were identified.

Nowadays, the innovation in space technologies creates a new trend for the Earth observation and monitoring from space. This book contains high quality and compressive work on both microwave and optical remote sensing applications. This book is divided into five sections: (i) remote sensing for biomass estimation, (ii) remote sensing-based glacier studies, (iii) remote sensing for coastal and ocean applications, (iv) sewage leaks and environment disasters, and (v) remote sensing image processing. Each chapter offers an opportunity to expand the knowledge about various remote sensing techniques and persuade researchers to deliver new research novelty for environment studies.

The inorganic and organic water constituents, often called color-producing agents (CPAs), responsible for water color are generally referred to as water quality parameters. Utilization of water color for assessment of water quality parameters can be achieved by using the established techniques in aquatic optics attained over many decades. Aquatic optics can be subdivided according to whether the natural water body is salty (marine), inland or fresh (limnological), or coastal (often brackish). The authors describe the transformation of water color under varying natural and anthropogenically-driven conditions and, for the first time in a quantitative manner, a closed circle of issues related to remote sensing of water quality in optically complex waters generally inherent to inland and marine coastal waters. Primarily, the text synthesizes the solutions of problems in remote sensing, incorporating mathematics, hydrobiology/hydochemistry, atmospheric optics and ecology.

This book provides extensive insight on remote sensing of coastal waters from aircraft and space-based platforms. The primary focus of the book is optical remote sensing using passive instruments, to measure and analyze the coastal aquatic environment. The authors have gathered information from a variety of sources, to help non-specialists grasp new techniques and technology, to quickly produce useful data

The aquatic coastal zone is one of the most challenging targets for environmental remote sensing. Properties such as bottom reflectance, spectrally diverse suspended sediments and phytoplankton communities, diverse benthic communities, and transient events that affect surface reflectance (coastal blooms, runoff, etc.) all combine to produce an optical complexity not seen in terrestrial or open ocean systems. Despite this complexity, remote sensing is proving to be an invaluable tool for "Case 2" waters. This book presents recent advances in coastal remote sensing with an emphasis on applied science and management. Case studies of the operational use of remote sensing in ecosystem studies, monitoring, and interfacing remote sensing/science/management are presented. Spectral signatures of phytoplankton and suspended sediments are discussed in detail with accompanying discussion of why blue water (Case 1) algorithms cannot be applied to Case 2 waters. Audience This book is targeted for scientists and managers interested in using remote sensing in the study or management of aquatic coastal environments. With only limited discussion of optics and theory presented in the book, such researchers might benefit from the detailed presentations of aquatic spectral signatures, and to operational management issues. While not specifically written for remote sensing scientists, it will prove to be a useful reference for this community for the current status of aquatic coastal remote sensing.