# [MOBI] Hyperspectral Remote Sensing Of Vegetation

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Hyperspectral Remote Sensing of Vegetation-Prasad S. Thenkabail 2016-04-19 Hyperspectral narrow-band (or imaging spectroscopy) spectral data are fast emerging as practical solutions in modeling and mapping vegetation. Recent research has demonstrated the advances in and merit of hyperspectral data in a range of applications including quantifying agricultural crops, modeling forest canopy biochemical properties, detecting crop stress and disease, mapping leaf chlorophyll content as it influences crop production, identifying plants affected by contaminants such as arsenic, demonstrating sensitivity to plant nitrogen content, classifying vegetation species and type, characterizing wetlands, and mapping invasive species. The need for significant improvements in quantifying, modeling, and mapping plant chemical, physical, and water properties is more critical than ever before to reduce uncertainties in our understanding of the Earth and to better sustain it. There is also a need for a synthesis of the vast knowledge spread throughout the literature from more than 40 years of research. Hyperspectral Remote Sensing of Vegetation integrates this knowledge, guiding readers to harness the capabilities of the most recent advances in applying hyperspectral remote sensing technology to the study of terrestrial vegetation. Taking a practical approach to a complex subject, the book demonstrates the experience, utility, methods and models used in studying vegetation using hyperspectral data. Written by leading experts, including pioneers in the field, each chapter presents specific applications, reviews existing state-of-the-art knowledge, highlights the advances made, and provides guidance for the appropriate use of hyperspectral data in the study of vegetation as well as its numerous applications, such as crop yield modeling, crop and vegetation biophysical and biochemical property characterization, and crop moisture assessment. This comprehensive book brings together the best global expertise on hyperspectral remote sensing of agriculture, crop water use, plant species detection, vegetation classification, biophysical and biochemical modeling, crop productivity and water productivity mapping, and modeling. It provides the pertinent facts, synthesizing findings so that readers can get the correct picture on issues such as the best wavebands for their practical applications, methods of analysis using whole spectra, hyperspectral vegetation indices targeted to study specific biophysical and biochemical quantities, and methods for detecting parameters such as crop moisture variability, chlorophyll content, and stress levels. A collective "knowledge bank," it guides professionals to adopt the best practices for their own work.

Hyperspectral Remote Sensing-Prem Chandra Pandey 2020-08-05 Hyperspectral Remote Sensing: Theory and Applications offers the latest information on the techniques, advances and wide-ranging applications of hyperspectral remote sensing, such as forestry, agriculture, water resources, soil and geology, among others. The book also presents hyperspectral data integration with other sources, such as LiDAR, Multi-spectral data, and other remote sensing techniques. Researchers who use this resource will be able to understand and implement the technology and data in their respective fields. As such, it is a valuable reference for researchers and data analysts in remote sensing and Earth Observation fields and those in ecology, agriculture, hydrology and geology. Includes the theory of hyperspectral remote sensing, along with techniques and applications across a variety of disciplines Presents the processing, methods and techniques utilized for hyperspectral remote sensing and in-situ data collection Provides an overview of the state-of-the-art, including algorithms, techniques and case studies

Hyperspectral Remote Sensing-Ruiliang Pu 2017-08-16 Advanced imaging spectral technology and hyperspectral analysis techniques for multiple applications are the key features of the book. This book will present in one volume complete solutions from concepts, fundamentals, and methods of acquisition of hyperspectral data to analyses and applications of the data in a very coherent manner. It will help readers to fully understand basic theories of HRS, how to utilize various field spectrometers and bioinstruments, the importance of radiometric correction and atmospheric correction, the use of analysis, tools and software, and determine what to do with HRS technology and data.

Hyperspectral Indices and Image Classifications for Agriculture and Vegetation-Prasad S. Thenkabail 2018-12-07 Written by leading global experts, including pioneers in the field, the four-volume set on Hyperspectral Remote Sensing of Vegetation, Second Edition, reviews existing state-of- the-art knowledge, highlights advances made in different areas, and provides guidance for the appropriate use of hyperspectral data in the study and management of agricultural crops and natural vegetation. Volume II, Hyperspectral Indices and Image Classifications for Agriculture and Vegetation evaluates the performance of hyperspectral narrowband or imaging spectroscopy data with specific emphasis on the uses and applications of hyperspectral narrowband vegetation indices in characterizing, modeling, mapping, and monitoring agricultural crops and vegetation. This volume presents and discusses topics such as the non-invasive quantification of foliar pigments, leaf nitrogen concentration of cereal crop, the estimation of nitrogen content in crops and pastures, and forest leaf chlorophyll content, among others. The concluding chapter provides readers with useful guidance on the highlights and essence of Volume II through the editors' perspective. Key Features of Volume II: Provides the fundamentals of hyperspectral narrowband vegetation indices and hyperspectral derivative vegetation indices and their applications in agriculture and vegetation studies. Discusses the latest advances in hyperspectral image classification methods and their applications. Explains the massively big hyperspectral sensing data processing on cloud computing architectures. Highlights the state-of-the-art methods in the field of hyperspectral narrowband vegetation indices for monitoring agriculture, vegetation, and their properties such as plant water content, nitrogen, chlorophyll, and others at leaf, canopy, field, and landscape scales. Includes best global expertise on hyperspectral remote sensing of agriculture, crop water use, plant species detection, crop productivity and water productivity mapping, and modeling.

Fundamentals, Sensor Systems, Spectral Libraries, and Data Mining for Vegetation-Prasad S. Thenkabail 2018-12-07 Written by leading global experts, including pioneers in the field, the four-volume set on Hyperspectral Remote Sensing of Vegetation, Second Edition, reviews existing state-of-the-art knowledge, highlights advances made in different areas, and provides guidance for the appropriate use of hyperspectral data in the study and management of agricultural crops and natural vegetation. Volume I, Fundamentals, Sensor Systems, Spectral Libraries, and Data Mining for Vegetation introduces the fundamentals of hyperspectral or imaging spectroscopy data, including hyperspectral data processes, sensor systems, spectral libraries, and data mining and analysis, covering both the strengths and limitations of these topics. This book also presents and discusses hyperspectral narrowband data acquired in numerous unique spectral bands in the entire length of the spectrum from various ground-based, airborne, and spaceborne platforms. The concluding chapter provides readers with useful guidance on the highlights and essence of Volume I through the editors' perspective. Key Features of Volume I: Provides the fundamentals of hyperspectral remote sensing used in agricultural crops and vegetation studies. Discusses the latest advances in hyperspectral remote sensing of ecosystems and croplands. Develops online hyperspectral libraries, proximal sensing and phenotyping for understanding, modeling, mapping, and monitoring crop and vegetation traits. Implements reflectance spectroscopy of soils and vegetation. Enumerates hyperspectral data mining and data processing methods, approaches, and machine learning algorithms. Explores methods and approaches for data mining and overcoming data redundancy; Highlights the advanced methods for hyperspectral data processing steps by developing or implementing appropriate algorithms and coding the same for processing on a cloud computing platform like the Google Earth Engine. Integrates hyperspectral with other data, such as the LiDAR data, in the study of vegetation. Includes best global expertise on hyperspectral remote sensing of agriculture, crop water use, plant species detection, crop productivity and water productivity mapping, and modeling.

Advanced Applications in Remote Sensing of Agricultural Crops and Natural Vegetation-Prasad S. Thenkabail 2018-12-07 Written by leading global experts, including pioneers in the field, the four-volume set on Hyperspectral Remote Sensing of Vegetation, Second Edition, reviews existing state-of-the-art knowledge, highlights advances made in different areas, and provides guidance for the appropriate use of hyperspectral data in the study and management of agricultural crops and natural vegetation. Volume IV, Advanced Applications in Remote Sensing of Agricultural Crops and Natural Vegetation discusses the use of hyperspectral or imaging spectroscopy data in numerous specific and advanced applications, such as forest management, precision farming, managing invasive species, and local to global land cover change detection. It emphasizes the importance of hyperspectral remote sensing tools for studying vegetation processes and functions as well as the appropriate use of hyperspectral data for vegetation management practices. The concluding chapter provides readers with useful guidance on the highlights and essence of Volume IV through the editors' perspective. Key Features of Volume IV: Guides readers to harness the capabilities of the most recent advances in applying hyperspectral remote sensing technology to the study of terrestrial vegetation. Includes specific applications on agriculture, crop management practices, study of crop stress and diseases, crop characteristics based on inputs (e.g., nitrogen, irrigation), study of vegetation impacted by heavy metals, gross and net primary productivity studies, light use efficiency studies, crop water use and actual evapotranspiration studies,

phenology monitoring, land use and land cover studies, global change studies, plant species detection, wetland and forest characterization and mapping, crop productivity and crop water productivity mapping, and modeling. Encompasses hyperspectral or imaging spectroscopy data in narrow wavebands used across visible, red-edge, near-infrared, far-infrared, shortwave infrared, and thermal portions of the spectrum. Explains the implementation of hyperspectral remote sensing data processing mechanisms in a standard, fast, and efficient manner for their applications. Discusses cloud computing to overcome hyperspectral remote sensing massive big data challenges. Provides hyperspectral analysis of rocky surfaces on the earth and other planetary systems.

Biophysical and Biochemical Characterization and Plant Species Studies-Prasad S. Thenkabail 2018-12-07 Written by leading global experts, including pioneers in the field, the four-volume set on Hyperspectral Remote Sensing of Vegetation, Second Edition, reviews existing stateof- the-art knowledge, highlights advances made in different areas, and provides guidance for the appropriate use of hyperspectral data in the study and management of agricultural crops and natural vegetation. Hyperspectral remote sensing or imaging spectroscopy data has been increasingly used in studying and assessing the biophysical and biochemical properties of agricultural crops and natural vegetation. Volume III, Biophysical and Biochemical Characterization and Plant Species Studies demonstrates the methods that are developed and used to study terrestrial vegetation using hyperspectral data. This volume includes extensive discussions on hyperspectral data processing and how to implement data processing mechanisms for specific biophysical and biochemical applications such as crop yield modeling, crop biophysical and biochemical property characterization, and crop moisture assessments. The concluding chapter provides readers with useful guidance on the highlights and essence of Volume III through the editors' perspective. Key Features of Volume III: Covers recent abilities to better quantify, model, and map plant biophysical, biochemical water, and structural properties. Demonstrates characteristic hyperspectral properties through plant diagnostics or throughput phenotyping of plant biophysical, biochemical, water, and structural properties. Establishes plant traits through hyperspectral imaging spectroscopy data as well as its integration with other data, such as LiDAR, using data from various platforms (ground-based, UAVs, and earth-observing satellites). Studies photosynthetic efficiency and plant health and stress through hyperspectral narrowband vegetation indices. Uses hyperspectral data to discriminate plant species and\or their types as well as their characteristics, such as growth stages. Compares studies of plant species of agriculture, forests, and other land use\land cover as established by hyperspectral narrowband data versus multispectral broadband data. Discusses complete solutions from methods to applications, inventory, and modeling considering various platform (e.g., earth-observing satellites, UAVs, handheld spectroradiometers) from where the data is gathered. Dwells on specific applications to detect and map invasive species by using hyperspectral data.

Hyperspectral Remote Sensing-Michael Theodore Eismann 2012-01-01 Hyperspectral remote sensing is an emerging, multidisciplinary field with diverse applications that builds on the principles of material spectroscopy, radiative transfer, imaging spectrometry, and hyperspectral data processing. While there are many resources that suitably cover these areas individually and focus on specific aspects of the hyperspectral remote sensing field, this book provides a holistic treatment that thoroughly captures its multidisciplinary nature. The content is oriented toward the physical principles of hyperspectral remote sensing as opposed to applications of hyperspectral technology. Readers can expect to finish the book armed with the required knowledge to understand the immense literature available in this technology area and apply their knowledge to the understanding of material spectral properties, the design of hyperspectral systems, the analysis of hyperspectral imagery, and the application of the technology to specific problems.

Hyperspectral Remote Sensing and Spectral Signature Applications-S. Rajendran 2009 Contributed papers presented at the National Seminar on "Hyperspectral Remote Sensing and Spectral Signature Databse Management System," held on February 14-15, 2008 at Annamalai University.

The SAGE Handbook of Remote Sensing-Timothy A Warner 2009-06-18 'A magnificent achievement. A who's who of contemporary remote sensing have produced an engaging, wide-ranging and scholarly review of the field in just one volume' - Professor Paul Curran, Vice-Chancellor, Bournemouth University Remote Sensing acquires and interprets small or large-scale data about the Earth from a distance. Using a wide range of spatial, spectral, temporal, and radiometric scales Remote Sensing is a large and diverse field for which this Handbook will be the key research reference. Organized in four key sections: • Interactions of Electromagnetic Radiation with the Terrestrial Environment: chapters on Visible, Near-IR and Shortwave IR; Middle IR (3-5 micrometers); Thermal IR ; Microwave • Digital sensors and Image Characteristics: chapters on Sensor Technology; Coarse Spatial Resolution Optical Sensors ; Medium Spatial Resolution Optical Sensors; Fine Spatial Resolution Optical Sensors; Video Imaging and Multispectral Digital Photography; Hyperspectral Sensors; Radar and Passive Microwave Sensors; Lidar • Remote Sensing Analysis - Design and Implementation: chapters on Image Pre-Processing; Ground Data Collection; Integration with GIS; Quantitative Models in Remote Sensing; Validation and accuracy assessment; • Remote Sensing Analysis - Applications: LITHOSPHERIC SCIENCES: chapters on Topography; Geology; Soils; PLANT SCIENCES: Vegetation; Agriculture; HYDROSPHERIC and CRYSOPHERIC SCIENCES: Hydrosphere: Fresh and Ocean Water; Cryosphere; GLOBAL CHANGE AND HUMAN ENVIRONMENTS: Earth Systems; Human Environments & Links to the Social Sciences; Real Time Monitoring Systems and Disaster Management; Land Cover Change Illustrated throughout, an essential resource for the analysis of remotely sensed data, the SAGE Handbook of Remote Sensing provides researchers with a definitive statement of the core concepts and methodologies in the discipline.

Advances in Environmental Remote Sensing-Qihao Weng 2011-02-16 Generating a satisfactory classification image from remote sensing data is not a straightforward task. Many factors contribute to this difficulty including the characteristics of a study area, availability of suitable remote sensing data, ancillary and ground reference data, proper use of variables and classification algorithms, and the analyst's e

Remote Sensing of Vegetation-Hamlyn G Jones 2010-07-15 An accessible yet rigorous introduction to remote sensing and its application to the study of vegetation for advanced undergraduate and graduate students. The underlying physical and mathematical principles of the techniques disucussed are explained in a way readily understood by those without a strong mathematical background.

Hyperspectral Imaging Remote Sensing-Dimitris G. Manolakis 2016-10-20 A practical and self-contained guide to the principles, techniques, models and tools of imaging spectroscopy. Bringing together material from essential physics and digital signal processing, it covers key topics such as sensor design and calibration, atmospheric inversion and model techniques, and processing and exploitation algorithms. Readers will learn how to apply the main algorithms to practical problems, how to choose the best algorithm for a particular application, and how to process and interpret hyperspectral imaging data. A wealth of additional materials accompany the book online, including example projects and data for students, and problem solutions and viewgraphs for instructors. This is an essential text for senior undergraduate and graduate students looking to learn the fundamentals of imaging spectroscopy, and an invaluable reference for scientists and engineers working in the field.

Hyperspectral Imaging- 2019-09-29 Hyperspectral Imaging, Volume 32, presents a comprehensive exploration of the different analytical methodologies applied on hyperspectral imaging and a state-of-the-art analysis of applications in different scientific and industrial areas. This book presents, for the first time, a comprehensive collection of the main multivariate algorithms used for hyperspectral image analysis in different fields of application. The benefits, drawbacks and suitability of each are fully discussed, along with examples of their application. Users will find state-of-the art information on the machinery for hyperspectral image acquisition, along with a critical assessment of the usage of hyperspectral imaging in diverse scientific fields. Provides a comprehensive roadmap of hyperspectral image analysis, with benefits and considerations for each method discussed Covers state-of-the-art applications in different scientific fields Discusses the implementation of hyperspectral devices in different environments

Remote Sensing Handbook - Three Volume Set-Prasad Thenkabail 2018-10-03 A volume in the three-volume Remote Sensing Handbook series, Remote Sensing of Water Resources, Disasters, and Urban Studies documents the scientific and methodological advances that have taken place during the last 50 years. The other two volumes in the series are Remotely Sensed Data Characterization, Classification, and Accuracies, and Land Reso

Hyperspectral Remote Sensing-Marcus Borengasser 2007-12-13 Land management issues, such as mapping tree species, recognizing invasive plants, and identifying key geologic features, require an understanding of complex technical issues before the best decisions can be made. Hyperspectral remote sensing is one the technologies that can help with reliable detection and identification. Presenting the fundamentals of remote sensing at an introductory level, Hyperspectral Remote Sensing: Principles and Applications explores all major aspects of hyperspectral image acquisition, exploitation, interpretation, and applications. The book begins with several chapters on the basic concepts and underlying principles of remote sensing images. It introduces spectral radiometry concepts, such as radiance, irradiance, flux, and blackbody radiation; covers imaging spectrometers, examining spectral range, full width half maximum (FWHM), resolution, sampling, signal-to-noise ratio (SNR), and multispectral and hyperspectral sensor systems; and addresses atmospheric interactions. The book then discusses information extraction, with chapters covering the underlying physics principles that lead to the creation of an image and the interpretation of the image's information. The final chapters describe case studies that illustrate the use of hyperspectral remote sensing in agriculture, environmental monitoring, forestry, and geology. After reading this book, you will have a better understanding of how to evaluate different approaches to hyperspectral analyses and to determine which approaches will work for your applications.

Imaging Spectrometry-Freek D. van der Meer 2011-03-29 A significant step forward in the world of earth observation was made with the development of imaging spectrometry. Imaging spectrometers measure reflected solar radiance from the earth in many narrow spectral bands. Such a spectroscopical imaging system is capable of detecting subtle absorption bands in the reflectance spectra and measure the reflectance spectra of various objects with a very high

accuracy. As a result, imaging spectrometry enables a better identification of objects at the earth surface and a better quantification of the object properties than can be achieved by traditional earth observation sensors such as Landsat TM and SPOT. The various chapters in the book present the concepts of imaging spectrometry by discussing the underlying physics and the analytical image processing techniques. The second part of the book presents in detail a wide variety of applications of these new techniques ranging from mineral identification, mapping of expansive soils, land degradation, agricultural crops, natural vegetation and surface water quality. Additional information on extras.springer.com Sample hyperspectral remote sensing data sets and ENVI viewing software (Freelook) are available on http://extras.springer.com

Remote Sensing of Global Croplands for Food Security-Prasad Thenkabail 2009-06-24 Increases in populations have created an increasing demand for food crops while increases in demand for biofuels have created an increase in demand for fuel crops. What has not increased is the amount of croplands and their productivity. These and many other factors such as decreasing water resources in a changing climate have created a crisis like situation in global food security. Decision makers in these situations need accurate information based on science. Remote Sensing of Global Croplands for Food Security provides a comprehensive knowledge base in use of satellite sensor-based maps and statistics that can be used to develop strategies for croplands (irrigated and rainfed) and their water use for food security. Over 50 Multi-disciplinary Global Experts Give Insight and Provide Practical Approaches Emphasizing practical mapping technologies based on advanced remote sensing data and methods, this book provides approaches for estimating irrigated and rainfed cropland areas and their water use on a national, continental, or global basis. Written by 50+ leading experts working at the forefront of this critical area, it offers case studies from a variety of continents highlighting the subtle requirements of each. In a very practical way it demonstrates the experience, utility, and models for determining water resources used and resulting yields of irrigated and rainfed croplands. The authors discuss: (a) innovative methods used for mapping croplands, (b) approaches adopted to collect cropland data in different countries by traditional and non-traditional means, (c) accuracies, uncertainties, and errors involved in producing cropland products, (d) surface energy balance models used to assess crop water use, and (e) extensive results and outcomes pertaining to global croplands and their water use. Develop Strategies for an Enhanced Green Revolution and an Accelerated Blue Revolution Linking croplands to water use and food security, the book provides a global perspective on this sensitive issue. It gives insight into the extent of cropland usage, their spatial distribution, their cropping intensities, and their water use patterns. The editors collect the experience, methods, models, and results that show the way forward and help in decision-making on water resources and food security. All of this is required for developing strategies for an enhanced green revolution and for an accelerated blue revolution.

Thermal Infrared Remote Sensing-Claudia Kuenzer 2013-06-17 This book provides a comprehensive overview of the state of the art in the field of thermal infrared remote sensing. Temperature is one of the most important physical environmental variables monitored by earth observing remote sensing systems. Temperature ranges define the boundaries of habitats on our planet. Thermal hazards endanger our resources and well-being. In this book renowned international experts have contributed chapters on currently available thermal sensors as well as innovative plans for future missions. Further chapters discuss the underlying physics and image processing techniques for analyzing thermal data. Ground-breaking chapters on applications present a wide variety of case studies leading to a deepened understanding of land and sea surface temperature dynamics, urban heat island effects, forest fires, volcanic eruption precursors, underground coal fires, geothermal systems, soil moisture variability, and temperature-based mineral discrimination. 'Thermal Infrared Remote Sensing: Sensors, Methods, Applications' is unique because of the large field it spans, the potentials it reveals, and the detail it provides. This book is an indispensable volume for scientists, lecturers, and decision makers interested in thermal infrared technology, methods, and applications.

Vegetation Dynamics-Derek Eamus 2016-03-31 Understanding ecosystem structure and function requires familiarity with the techniques, knowledge and concepts of the three disciplines of plant physiology, remote sensing and modelling. This is the first textbook to provide the fundamentals of these three domains in a single volume. It then applies cross-disciplinary insights to multiple case studies in vegetation and landscape science. A key feature of these case studies is an examination of relationships among climate, vegetation structure and vegetation function, to address fundamental research questions. This book is for advanced students and researchers who need to understand and apply knowledge from the disciplines of plant physiology, remote sensing and modelling. It allows readers to integrate and synthesise knowledge to produce a holistic understanding of the structure, function and behaviour of forests, woodlands and grasslands.

Hyperspectral Satellites and System Design-Shen-En Qian 2020-04-22 Hyperspectral Satellites and System Design is the first book on this subject. It provides a systematic analysis and detailed design of the entire development process of hyperspectral satellites. Derived from the author's 25-year firsthand experience as a technical lead of space missions at the Canadian Space Agency, the book offers engineers, scientists, and decision-makers detailed knowledge and guidelines on hyperspectral satellite system design, trade-offs, performance modeling and simulation, optimization from component to system level, subsystem design, and implementation strategies. This information will help reduce the risk, shorten the development period, and lower the cost of hyperspectral satellite missions. This book is a must-have reference for professionals in developing hyperspectral satellites and data applications. It is also an excellent introductory book for early practitioners and students who want to learn more about hyperspectral satellites and their applications.

Hyperspectral Image Processing-Liguo Wang 2015-07-15 Based on the authors' research, this book introduces the main processing techniques in hyperspectral imaging. In this context, SVM-based classification, distance comparison-based endmember extraction, SVM-based spectral unmixing, spatial attraction model-based sub-pixel mapping and MAP/POCS-based super-resolution reconstruction are discussed in depth. Readers will gain a comprehensive understanding of these cutting-edge hyperspectral imaging techniques. Researchers and graduate students in fields such as remote sensing, surveying and mapping, geosciences and information systems will benefit from this valuable resource.

Earth Observation for Land and Emergency Monitoring-Heiko Balzter 2017-03-14 Earth Observation Science (EOS) is the study of the global Earth land-ocean-atmosphere system through observations. The principal tools for such studies are measurements from space since these provide the coverage of the planet that is necessary to capture the behaviour of the entire coupled system. In addition, surface observations, and measurements from aircraft, balloons and sounding rockets provide valuable contributors to what are now termed "integrated, global observing systems." Coupled with models, the EOS measurement suites provide powerful tools for research into the factors controlling and changing the Earth system in which we live. The objectives of this book are to describe new methods and applications of satellite technology in the fields of land and emergency monitoring. It draws on new research outcomes from the European FP7 project GIONET (European Centre of Excellence in Earth Observation Research Training). GIONET combines industrial partners with universities and research institutes, and this book provides a perspective on Earth Observation applications that is motivated by the cross-fertilisation of both sectors. Hence, this book will find readers in both industry and academia. This book highlights a broad range of innovative uses of Earth Observation technology to support environmental management, decision making, crisis management and climate policies. It uses advanced concepts of multi-sensor image integration, multi-temporal analysis and synergies between data and models. This is a truly interdisciplinary subject that encompasses a range of applications in various fields which are discussed in detail throughout the text. If you are interested in remote sensing applications and looking for inspiration, this is the book for you.

Land Resources Monitoring, Modeling, and Mapping with Remote Sensing-Ph.D., Prasad S. Thenkabail 2015-10-02 A volume in the three-volume Remote Sensing Handbook series, Land Resources Monitoring, Modeling, and Mapping with Remote Sensing documents the scientific and methodological advances that have taken place during the last 50 years. The other two volumes in the series are Remotely Sensed Data Characterization, Classification, and Accuracies, and Remo

Water Quality-Hlanganani Tutu 2017-01-18 As concerns increase over the scarcity of water resources and the role of anthropogenic activities, water quality is evermore important. Activities ranging from agriculture to mining have had a bearing on the quality of water that they impact. Several studies assessing such impacts have been conducted at local and global scales over the years. This book, consisting of contributions by authors in various water-related fields, delves into some approaches that are used to understand and/or to improve water quality, and these include assessment of water chemistry, biomonitoring, modelling and water treatment. This book will be useful to environmental scientists, water professionals, researchers, academics and students.

Airborne Measurements for Environmental Research-Manfred Wendisch 2013-03-22 This first comprehensive review of airborne measurement principles covers all atmospheric components and surface parameters. It describes the common techniques to characterize aerosol particles and cloud/precipitation elements, while also explaining radiation quantities and pertinent hyperspectral and active remote sensing measurement techniques along the way. As a result, the major principles of operation are introduced and exemplified using specific instruments, treating both classic and emerging measurement techniques. The two editors head an international community of eminent scientists, all of them accepted and experienced specialists in their field, who help readers to understand specific problems related to airborne research, such as immanent uncertainties and limitations. They also provide guidance on the suitability of instruments to measure certain parameters and to select the correct type of device. While primarily intended for climate, geophysical and atmospheric researchers, its relevance to solar system objects makes this work equally appealing to astronomers studying atmospheres of solar system bodies with telescopes and space probes.

Hyperspectral Image Analysis-Saurabh Prasad 2020-04-27 This book reviews the state of the art in algorithmic approaches addressing the practical challenges that arise with hyperspectral image analysis tasks, with a focus on emerging trends in machine learning and image processing/understanding. It presents

advances in deep learning, multiple instance learning, sparse representation based learning, low-dimensional manifold models, anomalous change detection, target recognition, sensor fusion and super-resolution for robust multispectral and hyperspectral image understanding. It presents research from leading international experts who have made foundational contributions in these areas. The book covers a diverse array of applications of multispectral/hyperspectral imagery in the context of these algorithms, including remote sensing, face recognition and biomedicine. This book would be particularly beneficial to graduate students and researchers who are taking advanced courses in (or are working in) the areas of image analysis, machine learning and remote sensing with multi-channel optical imagery. Researchers and professionals in academia and industry working in areas such as electrical engineering, civil and environmental engineering, geosciences and biomedical image processing, who work with multi-channel optical data will find this book useful.

Remote Sensing of Environment-Diofantos Hadjimitsis 2013-07-10 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.

Plant Physiological Ecology-Hans Lambers 2008-10-08 Box 9E. 1 Continued FIGURE 2. The C–S–R triangle model (Grime 1979). The strategies at the three corners are C, competiti- winning species; S, stress-tolerating s- cies; R,ruderalspecies. Particular species can engage in any mixture of these three primary strategies, and the m- ture is described by their position within the triangle. comment briefly on some other dimensions that Grime's (1977) triangle (Fig. 2) (see also Sects. 6. 1 are not yet so well understood. and 6. 3 of Chapter 7 on growth and allocation) is a two-dimensional scheme. A C—S axis (Com- tition-winning species to Stress-tolerating spe- Leaf Economics Spectrum cies) reflects adaptation to favorable vs. unfavorable sites for plant growth, and an R- Five traits that are coordinated across species are axis (Ruderal species) reflects adaptation to leaf mass per area (LMA), leaf life-span, leaf N disturbance. concentration, and potential photosynthesis and dark respiration on a mass basis. In the five-trait Trait-Dimensions space,79%ofallvariation worldwideliesalonga single main axis (Fig. 33 of Chapter 2A on photo- A recent trend in plant strategy thinking has synthesis; Wright et al. 2004). Species with low been trait-dimensions, that is, spectra of varia- LMA tend to have short leaf life-spans, high leaf tion with respect to measurable traits. Compared nutrient concentrations, and high potential rates of mass-based photosynthesis. These species with category schemes, such as Raunkiaer's, trait occur at the ''quick-return'' end of the leaf e- dimensions have the merit of capturing cont- nomics spectrum.

The GEO Handbook on Biodiversity Observation Networks-Michele Walters 2016-11-25 Biodiversity observation systems are almost everywhere inadequate to meet local, national and international (treaty) obligations. As a result of alarmingly rapid declines in biodiversity in the modern era, there is a strong, worldwide desire to upgrade our monitoring systems, but little clarity on what is actually needed and how it can be assembled from the elements which are already present. This book intends to provide practical guidance to broadly-defined biodiversity observation networks at all scales, but predominantly the national scale and higher. This is a practical how-to book with substantial policy relevance. It will mostly be used by technical specialists with a responsibility for biodiversity monitoring to establish and refine their systems. It is written at a technical level, but one that is not discipline-bound: it should be intelligible to anyone in the broad field with a tertiary education.

Remote Sensing Handbook - Three Volume Set-Prasad Thenkabail 2018-10-03 A volume in the three-volume Remote Sensing Handbook series, Remote Sensing of Water Resources, Disasters, and Urban Studies documents the scientific and methodological advances that have taken place during the last 50 years. The other two volumes in the series are Remotely Sensed Data Characterization, Classification, and Accuracies, and Land Reso

Land Resources Monitoring, Modeling, and Mapping with Remote Sensing-Ph.D., Prasad S. Thenkabail 2015-10-02 A volume in the three-volume Remote Sensing Handbook series, Land Resources Monitoring, Modeling, and Mapping with Remote Sensing documents the scientific and methodological advances that have taken place during the last 50 years. The other two volumes in the series are Remotely Sensed Data Characterization, Classification, and Accuracies, and Remo

Hyperspectral Remote Sensing of Vegetation Parameters Using Statistical and Physical Models-Roshanak Darvishzadeh 2008

Resource Ecology-Herbert H.T. Prins 2008-01-21 This multi-author book deals with 'resource ecology', which is the ecology of trophic interactions between consumers and their resources. All the chapters were subjected to intense group discussions; comments and critiques were subsequently used for writing new versions, which were peer-reviewed. Each chapter is followed by a comment. This makes the book ideal for teaching and course work, because it highlights the fact that ecology is a living and active research field.

Multi-purposeful Application of Geospatial Data-Rustam B. Rustamov 2018-05-09 This book is dedicated toward space technology application in Earth studies based on the use of a variety of methods for satellite information classification and interpretation. Advantages of geospatial data use in a large-scale area of observation and monitoring as a source of decision-making stage have been demonstrated. The book describes navigation systems providing data estimation method and review of existing data in the literature relevant to remote sensing sensors delivering main information electromagnetic spectrum and a variety of sensor applications. This aspect is important when combining/integrating satellite data processing into the field measurements. Satellites and satellite data application for the study of Earth features have been demonstrated as the next step of geospatial data application. The use of different purposeful processing technology applications of satellite data is one of the vital aspects of space technology advances. The use of GNSS GPS technology in industry and MODIS images and data interpretation for agriculture purposes has been presented. It was the aim of the book to create an attractive environment by presenting space technology application in the wide areas of Earth study. For this purpose, some of the book chapters are dedicated toward space technology advances in climate monitoring, natural disaster factor detection, satellite data processing optimization, and GIS technology for meteorology information with the aim of agriculture developments.

Canopy Photosynthesis: From Basics to Applications-Kouki Hikosaka 2015-12-17 The last 30 years has seen the development of increasingly sophisticated models that quantify canopy carbon exchange. These models are now essential parts of larger models for prediction and simulation of crop production, climate change, and regional and global carbon dynamics. There is thus an urgent need for increasing expertise in developing, use and understanding of these models. This in turn calls for an advanced, yet easily accessible textbook that summarizes the "canopy science" and introduces the present and the future scientists to the theoretical background of the current canopy models. This book presents current knowledge of functioning of plant canopies, models and strategies employed to simulate canopy function, and the significance of canopy architecture, physiology and dynamics in ecosystems, landscape and biosphere.

Challenges Towards Ecological Sustainability in China-Xiaojun Yang 2018-12-15 This book includes a selection of the best papers presented at the Jinan Forum on Geography and Ecological Sustainability held in Guangzhou, China, from 17 to 19 February 2017, as well as several invited papers. It discusses concepts, methods, and applications in geography and ecology with an emphasis on various issues challenging ecological sustainability in China. Chapters are written by leading scholars and researchers from a variety of disciplines including geography, ecology, environmental science and policy, and economics. Case studies are predominantly drawn from Southern China, where nearly four decades of dramatic urbanization has caused economic and ecological strains on land and people. This book will appeal to a wide readership including researchers, upper-division undergraduate and graduate students, and professionals in the fields of sustainability science, geography, ecology, and environmental science and policy.

Digital Soil Mapping-Janis L. Boettinger 2010-06-28 Digital Soil Mapping is the creation and the population of a geographically referenced soil database. It is generated at a given resolution by using field and laboratory observation methods coupled with environmental data through quantitative relationships. Digital soil mapping is advancing on different fronts at different rates all across the world. This book presents the state-of-the art and explores strategies for bridging research, production, and environmental application of digital soil mapping.It includes examples from North America, South America, Europe, Asia, and Australia. The chapters address the following topics: - evaluating and using legacy soil data - exploring new environmental covariates and sampling schemes - using integrated sensors to infer soil properties or status - innovative inference systems predicting soil classes, properties, and estimating their uncertainties - using digital soil mapping and techniques for soil assessment and environmental application - protocol and capacity building for making digital soil mapping operational around the globe.

Hyperspectral Remote Sensing-Prem Chandra Pandey 2020-08-05 Hyperspectral Remote Sensing: Theory and Applications offers the latest information on the techniques, advances and wide-ranging applications of hyperspectral remote sensing, such as forestry, agriculture, water resources, soil and geology, among others. The book also presents hyperspectral data integration with other sources, such as LiDAR, Multi-spectral data, and other remote sensing techniques. Researchers who use this resource will be able to understand and implement the technology and data in their respective fields. As such, it is a valuable reference for researchers and data analysts in remote sensing and Earth Observation fields and those in ecology, agriculture, hydrology and geology. Includes the theory of hyperspectral remote sensing, along with techniques and applications across a variety of disciplines Presents the processing, methods and techniques utilized for hyperspectral remote sensing and in-situ data collection Provides an overview of the state-of-the-art, including algorithms, techniques and case studies

Hyperspectral Imaging in Agriculture, Food and Environment-Alejandro Isabel Luna Maldonado 2018-08-01 This book is about the novel aspects and future

trends of the hyperspectral imaging in agriculture, food, and environment. The topics covered by this book are hyperspectral imaging and their applications in the nondestructive quality assessment of fruits and vegetables, hyperspectral imaging for assessing quality and safety of meat, multimode hyperspectral imaging for food quality and safety, models fitting to pattern recognition in hyperspectral images, sequential classification of hyperspectral images, graph construction for hyperspectral data unmixing, target visualization method to process hyperspectral image, and soil contamination mapping with hyperspectral imagery. This book is a general reference work for students, professional engineers, and readers with interest in the subject.

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