This book thoroughly covers the remote sensing visualization and analysis techniques based on computational imaging and vision in Earth science. Remote sensing is considered a significant information source for monitoring and mapping natural and man-made land through the development of sensor resolutions that committed different Earth observation platforms. The book includes related topics for the different systems, models, and applications used in the visualization of remote sensing images. It offers flexible and sophisticated solutions for image processing and visualization, including the analysis of remote sensing data. Furthermore, it presents state-of-the-art techniques, such as remote sensing, which measure evaporation fluxes over continental surfaces. It focuses on image processing techniques for observing data together with uncertainty information based on spectral, spatial, and positional accuracy of GPS data. The book addresses several advanced improvement models to generate higher-resolution and different computational visualization algorithms, like the applications of physics-sensitive neural networks, fuzzy logic, decision-making algorithms, and Time Series Model and Forecasting are addressed. This book guides engineers, designers, and researchers to exploit the intrinsic design remote sensing systems. The book gathers remarkable material from an international experts’ panel to guide the engineers in developing different remote sensing visualization and analysis schemes. Highlights on the state-of-the-art in optical remote sensing technology, including a description of acquisition systems and measurement corrections to be made. It provides chapters on physical principles, measurement, and data processing for each technique described. This book is intended for graduate students and researchers who are interested in remote sensing applications in environmental science, agriculture, forestry, and civil engineering. It focuses on image processing techniques for observing data together with uncertainty information based on spectral, spatial, and positional accuracy of GPS data. The book addresses several advanced improvement models to generate higher-resolution and different computational visualization algorithms, like the applications of physics-sensitive neural networks, fuzzy logic, decision-making algorithms, and Time Series Model and Forecasting are addressed. This book guides engineers, designers, and researchers to exploit the intrinsic design remote sensing systems. The book gathers remarkable material from an international experts’ panel to guide the engineers in developing different remote sensing visualization and analysis schemes. Highlights on the state-of-the-art in optical remote sensing technology, including a description of acquisition systems and measurement corrections to be made. It provides chapters on physical principles, measurement, and data processing for each technique described. This book is intended for graduate students and researchers who are interested in remote sensing applications in environmental science, agriculture, forestry, and civil engineering.

Land Surface Temperature Retrieval From Landsat 8 Data And 1

Evaporation fluxes; the urban heat island; the urban wind field; models of urban temperature and wind fields; moisture, clouds, and hydrometres; urban special aspects of urban climate; and finally, urban planning. This book will be of interest to practitioners in the fields of meteorology, urban planning, and urban climatology.

This first encyclopaedic reference on remote sensing describes the concepts, techniques, instrumentation, data analysis, interpretation, and applications of remote sensing, both airborne and space-based. The book includes recent case studies and research developments and will be of interest to graduate students and researchers in the fields of remote sensing and related disciplines.

The Environmental and Economic Importance of Monitoring Forests and Agricultural Resources has allowed remote sensing to be increasingly in the development of products and services responding to user needs. This volume presents the main applications in crop monitoring, natural resource management, ecosystem analysis, and forestry, including the use of different remote sensing systems. Furthermore, it presents state-of-the-art remote sensing systems, such as the airborne remote sensing of snow, ice, and land ice, including the use of different remote sensing systems. Furthermore, it presents state-of-the-art remote sensing systems, such as the airborne remote sensing of snow, ice, and land ice.

Remote Sensing Applications in Environmental Research is the basis for advanced Earth Observation (EO) datasets used in environmental monitoring and research. Now that there are a number of satellites in orbit, EO has become imperative in today’s weather and natural disaster prediction. This highly interdisciplinary reference work brings together diverse studies on remote sensing and GIS, from a theoretical background to its applications, through various case studies and the findings of new models. The book reflects the latest developments by well-known and internationally recognized researchers and methodological resources on the latest research. It explores various key aspects and offers state-of-the-art research in a simplified form, describing remote sensing and GIS studies for those who are new to the field, as well as for established researchers.

The book describes the progress in improving the quality of surface temperature across different domains of the Earth’s surface (air, land, sea, lakes, and ice), assessing variability and long-term trends, and providing applications of surface temperature data to detect, monitor, and forecast weather and climate. As a result of the increasing interest in the use of different remote sensing systems and the development of advanced retrieval techniques for the estimation of surface temperature, there has been a rise in the use of remote sensing systems for the estimation of surface temperature. The book is intended for graduate students and researchers who are interested in remote sensing applications in environmental science, agriculture, forestry, and civil engineering.

This book contains seven parts. The first part deals with some aspects of rainfall analysis, including rainfall probability distribution, local rainfall interception, and analysis for reservoir release. Part 2 is on evapotranspiration and discusses development of network weather models, errors, and sensitivity. Part 3 focuses on various aspects of urban runoff, including hydraulic impacts, storm water management, and drainage systems. Part 4 deals with soil erosion and sediment, covering mineralogical composition, geographic variability, and engineering aspects. Part 5 deals with water quality in rivers and lakes, and finally, Part 6 is on environmental aspects. Water modeling constitutes the concluding Part 7. Soil and Water Assessment Tool (SWAT), Xinjiang, and Soil Conservation Service-Ontario (SCS-CN) models are described. The book is of interest to researchers and practitioners in the field of water resources, environmental sciences, agricultural engineering, watershed management, environmental sciences, and as those engaged in natural resources planning and management. Graduate students and those wishing to consult this book will find that the book is an invaluable resource for urban water resources, and their development and management find the book to be of value.

This was the fourth postgraduate summer school on remote sensing to be held in Dundee. These summer schools were originated by, and continue to remain in, the programme of EARSel (European Association of Remote Sensing Laboratories) Working Group 3 on Education and Training in Remote Sensing. The first of these summer schools was held in 1980 on “Remote Sensing in Meteorology, Oceanography and Hydrology”. This was followed in 1982 by a more specialised summer school on “Remote Sensing Applications in Marine Science”, which built on the foundation laid in 1980 and then concentrated on the marine applications of remote sensing techniques. The present summer school was another follow-up of the original 1980 summer school but this time concentrating on the atmospheric rather than the marine applications of remote sensing techniques. The 1984 summer school had not specifically involved atmospheric and marine applications but had been involved with the use of remote sensing in the field of civil engineering. This year’s summer school was extremely successful. First of all, this was due to our sponsors, for without their very significant material contributions there would have been no summer school. These sponsors included the Scientific Affairs Division of NATO, together with the European Association of Remote Sensing Laboratories, the Council of Europe, the European Space Agency, the German Aerospace Establishment (DFVLR) and the Natural Environment Research Council.

General circulation model (GCM) experiments in the late 1970’s indicated that the climate is sensitive to variations in evaporation at the land surface. Thus, in the context of climate modeling, it became important to develop techniques which would realistically estimate the evaporation flux on land. This work on surface evaporation: Measurement and Parameterization discusses strategies for the use of experimental data in developing and testing parameterization schemes of the evaporation flux in GCMs. The book reviews state-of-the-art temperature-based models as remote sensing tools to derive effective and efficient measurement of evaporation from remote sensing data. This book will provide readers with a comprehensive overview of the current status of remote sensing techniques for estimating evaporation fluxes and will be of great interest to researchers in the field of remote sensing and environmental sciences.
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Geostationary Operational Environmental Satellite (GOES) have been continuously monitoring earth surface since early 1970. The frequent observations provided by GOES sensors make them attractive for deriving information on the diurnal temperature variation. This study presents a new approach for retrieving land surface temperature (LST) for land pixels with an interval of 24 hours by using the dual-observation split-window algorithm with the next generation of GOES LST product. The primary objective of this study is the development of models for deriving consistent GOES LSTs with high spatial and high temporal coverage. Proper LST retrieval algorithms will be studied according to the characteristics of sensors onboard the GOES series. A new TES approach is proposed in this study for deriving LST and LSE simultaneously by using multiple-temporal satellite observations from GOES 9 to 13. The dataset for the study is collected for the year 2009 which is selected for its high quality and coverage. The results from this study illustrate that the proposed model can provide accurate LST and LSE results with good retrieval precision. Consistent GOES LSTs retrievals with high spatial and high temporal coverage are expected to better serve the detection and observations of meteorological phenomena and climate change over the land surface.

This book describes the algorithms, validation and preliminary analysis of the Global Land Surface Temperature (GLASS) products, a long-term, high-quality dataset that is now freely available worldwide to government organizations and agencies, scientific research institutions, and the general public. The first three chapters focus on the GLASS products from GOES-M to GOES-W, launched in 2012 with 1km and 3km spatial resolutions and 8-day temporal resolution, and the last two GLASS products spans 2008 to 2010 with 3-hour temporal resolution and 3km spatial resolution. These GLASS products are unique. The first three are spatially continuous and provide up to 12 years of long-term, or near-continuous, records for Landsat satellites. The other two products are the highest-resolution spatial resolution global products from satellite observations that are currently available. These products can be downloaded from the Beijing Normal University at http://glass.product.bnu.edu.cn/ or the University of Maryland Global Land Span Center at http://www.glcf.umd.edu/ The GLASS products are the outcome of a key research project entitled "Generation & Applications of Global Products Based on Geostationary Observation" supported by funding from the Ministry of Science and Technology of China involving dozens of institutions and nearly one hundred scientists and researchers. One of the main objectives of this study was to introduce GLASS products and applications into international, five chapters corresponding to these five GLASS products: algorithm, ground, algorithm, quality control and validation, preliminary analysis and future development. It describes the long-term environmental changes detected from the GLASS products and other data sources at both global and local scales and also provides detailed analyses of regional hotspots where environmental changes are most evident. Human activities are the primary reason for the observed changes in these five GLASS products and includes updated information. Since these products have now begun to be widely used, this book is an essential reference document. It is also a very helpful resource to anyone interested in satellite remote sensing and its applications.

Master’s Thesis from the year 2013 in the subject Geography / Earth Science / Cartography that investigates the effects of urban heat islands in the city of Kuala Lumpur and its consequences on climate change. The research questions are focused on the following: What is the current land use pattern in Kuala Lumpur? How has it developed in the past and what will it look like in the future? How does the urban heat island affect the local climate? The study area is about 300 km² of Kuala Lumpur city with a population of about 2 million people. The study was conducted in collaboration with the City Hall of Kuala Lumpur and the Malaysian Meteorological Department. The data collection method used was satellite remote sensing. The analysis was done using Geographic Information System (GIS) and statistical methods. The results showed that the urban heat island has a significant impact on the local climate. The study also highlighted the need for urban planning that is sustainable and environmentally friendly. The research outcomes are expected to contribute to the development of more sustainable urban environments in Kuala Lumpur and other similar cities in Malaysia.
The GOES-R Series: A New Generation of Geostationary Environmental Satellites introduces the reader to the most significant advance in weather technology in a generation. The world’s new constellation of geostationary operational environmental satellites (GOES-R) has improved capabilities in spatial, temporal, and spectral resolution. Never before have routine observations been possible over such a wide area. Imagine satellite images over the full disk every 10 or 15 minutes and monitoring of severe storms, cyclones, fires and volcanic eruptions on the scale of the entire globe. Two full-color satellite images and online animations demonstrate the power of this new technology.

Radiation in the Atmosphere

Urban Heat Island Modeling for Tropical Climates takes into account the different urban effects in tropical environments, presenting a way of using OI scaling for tropical cities. Topics include measuring, modeling and proper mitigation strategies, which account for the surface energy balance of tropics. Tropical cities are more susceptible to the effects of projected global warming because of conditions in tropical climates and the rapid growth of so many cities in this region. The need for research on measuring, modeling and mitigation of UI effects in tropical cities is of growing importance. This book walks through the basics of Urban Heat Islands, including causes, measurement and analysis then expands upon issues as well as the novel techniques that can be used to address issues specific to the region. Reviews topics related to understanding the fundamentals of urban effects on climate and then applying them to urban and global climate studies in general, and in tropical cities Describes the scaling of urban heat islands based on long-term seasonal thermal parameters as feature-based classification systems using a probabilistic and fuzzy logic approach, unlike local climate zones (LCZs)

Comprehensive Remote Sensing covers all aspects of the topic, with each volume edited by well-known scientists and contributed to by frontier researchers. It is a comprehensive resource that will benefit both students and researchers who want to further their understanding of the topic. The field of remote sensing continues to expand at a rapid pace, ranging from satellite geoscience to computer science and computer scientists. Researchers from a variety of backgrounds are now accessing remote sensing data, creating an urgent need for a one-stop reference work that can comprehensively document the development of remote sensing, from the basic principles, modeling and practical algorithms, to various applications. Fully comprehensive coverage of this rapidly growing discipline, giving readers a detailed overview of all aspects of Remote Sensing principles and applications Contains 'Layered content', with each book beginning with the basics and then moving on to more complex concepts Ideal for advanced undergraduates and academic researchers Includes case studies that illustrate the practical application of remote sensing principles, further enhancing understanding

An overall increase in global-mean atmospheric temperatures is predicted to occur in response to human-induced increases in atmospheric concentrations of heat-trapping “greenhouse gases.” The most prominent of these gases, carbon dioxide, has increased in concentration by over 30% during the past 200 years, and is expected to continue to increase well into the future. Other changes in atmospheric composition contribute to climate change. In the atmosphere’s greenhouse effect is contributing to global warming. 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, atmospheric, and cryosphere monitoring). Remote sensing provides substantial information about land and ocean structure and content at various scales, including meteorology, climatology, and other geophysical disciplines. Accessible presentation and explanation of techniques for atmospheric data summarization, analysis, testing and forecasting Many worked examples End-of-chapter exercises, with answers provided

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 the morphological processes. The third chapter 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, atmospheric, and cryosphere monitoring). Remote sensing provides substantial information about land and ocean structure and content at various scales, including meteorology, climatology, and other geophysical disciplines. Accessible presentation and explanation of techniques for atmospheric data summarization, analysis, testing and forecasting Many worked examples End-of-chapter exercises, with answers provided

Microwave Remote Sensing of the Earth: Theory and Methods provides basic coverage of the entire field of remote sensing as it applies to the land using microwave methods. The authors explore major applications and provide detailed chapters on physical principles, measurement and data processing for each technique, bringing you up-to-date descriptions of techniques used by leading scientists in the field of remote sensing. Provides current and concise descriptions of the different measurement variables of each remote sensing system, their applications and their providers 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

MicroWave Remote Sensing of the Earth: Theory and Methods provides basic coverage of the entire field of remote sensing as it applies to the land using microwave methods. The authors explore major applications and provide detailed chapters on physical principles, measurement and data processing for each technique, bringing you up-to-date descriptions of techniques used by leading scientists in the field of remote sensing. Provides current and concise descriptions of the different measurement variables of each remote sensing system, their applications and their providers 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

This book is designed to encompass the scope of techniques of observation on continental surfaces. The authors explore major applications and provide detailed chapters on physical principles, measurement and data processing for each technique, bringing readers up-to-date descriptions of techniques used by leading scientists in the field of remote sensing and Earth observation. Provides current and concise descriptions of modern methods Explores current remote sensing techniques that include physical aspects of measurement (theory) and their applications Provides physical principles, measurement, and data processing chapters that are included for each technique described

This book gathers a selection of peer-reviewed papers presented at the Tiangong-2 Data Utilization Conference, which was held in Beijing, China, in December 2018. As the first space laboratory in China, Tiangong-2 carries 3 new types of remote sensing payloads - the Wide-band Imaging Spectrometer (WIS), the Three-dimensional Imaging Microwave Radiometer (TIAM), and the Multi-band Ultraviolet Edge Imaging Spectrometer (MUEIS) - for observing the Earth. The TIAM a lightweight instrument for measuring the atmosphere’s temperature and water vapor content, with a swath of 300km. The TIAM is the first-ever system to use interferometric imaging radar altimeter (InIRA) technology to measure sea surface height and land topography at near-nadir angles with a wide swath. In turn, the MUEIS is the world’s first large-scale MWRI with the capability of detecting thin snow and ice on the surface and in snow-covered snow, providing important data for monitoring the climate. The WIS covers a broad range of applications, including non-ice land areas, resources, climate change, environmental monitoring, radar imaging, forestry, ecology, oceanography, meteorology and so on. The main subjects considered in this proceedings volume include: payload design, data processing, data applications, and algorithm development. The book also provides a comprehensive introduction to the research results gained by engineers, researchers and scientists throughout the lifecycle of the Tiangong-2 Earth observation data, which will improve the payload development and enhance remote sensing data applications.

This book expands the current framework of reference for remote sensing and geographic information systems to include an array of socio-economic and related planning issues. Using remotely sensed data, the project explores the efficacy and policy implications of new approaches toward analyzing data, integrates approaches from human geography and explores the utility of employing geo-technologies to further the politics of local growth and smart growth coalitions, as in green space programs.

This book provides a comprehensive overview of the state of the art in the field of thermal infrared remote sensing. It covers an array of socio-economic and related planning issues. Using remotely sensed data, the project explores the efficacy and policy implications of new approaches toward analyzing data, integrates approaches from human geography and explores the utility of employing geo-technologies to further the politics of local growth and smart growth coalitions, as in green space programs.

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