Microwave Remote Sensing Active And Passive Volume Ii Radar Remote Sensing And Surface Scattering And Emission Theory | 8cc296ee0d9fc1b147a2355c8d215eca


Remote Sensing of Aerosols, Clouds, and Precipitation compiles recent advances in aerosol, cloud, and precipitation remote sensing from new satellite observations. The book examines a wide range of measurements
from microwave (both active and passive), visible, and infrared portions of the spectrum. Contributors are experts conducting state-of-the-art research in atmospheric remote sensing using space, airborne, and ground-based datasets, focusing on supporting earth observation satellite missions for aerosol, cloud, and precipitation studies. A handy reference for scientists working in remote sensing, earth science, electromagnetics, climate physics, and space engineering. Valuable for operational forecasters, meteorologists, geospatial experts, modelers, and policymakers alike. Presents new approaches in the field, along with further research opportunities, based on the latest satellite data. Focuses on how remote sensing systems can be designed/developed to solve outstanding problems in earth and atmospheric sciences. Edited by a dynamic team of editors with a mixture of highly skilled and qualified authors offering world-leading expertise in the field.

It collects the review papers of the 9th International Symposium on Physical Measurements and Signatures in Remote Sensing (ISPM SRS). It systematically summarizes the past achievements and identifies the frontier issues as the research agenda for the near future. It covers all aspects of land remote sensing, from sensor systems, physical modeling, inversion algorithms, to various applications.

Active remote sensing is the principal tool used to study and to predict short- and long-term changes in the environment of Earth - the atmosphere, the oceans and the land surfaces - as well as the near space environment of Earth. All of these measurements are essential to understanding terrestrial weather, climate change, space weather hazards, and threats from asteroids. Active remote sensing measurements are of inestimable benefit to society, as we pursue the development of a technological civilization that is economically viable, and seek to maintain the quality of our life. A Strategy for Active Remote Sensing Amid Increased Demand for Spectrum describes the threats, both current and future, to the effective use of the electromagnetic spectrum required for active remote sensing. This report offers specific recommendations for protecting and making effective use of the spectrum required for active remote sensing.

A wide variety of marginal basins, ranging from polar to equatorial regions, and a few sizeable enclosed basins, can all be included among the Asian Seas. The Arctic Ocean shelf seas off Siberia; the sheltered basins along the Pacific Ocean’s western rim; the coastal seas of the northernmost Indian Ocean, including the semi-enclosed Red Sea and Persian Gulf; the Caspian Sea, the remnants of the Aral Sea and a score of brackish or freshwater
lakes, such as Lake Balkhash and Lake Baykal; all exhibit a multiplicity of environmental features and processes. Understanding the peculiarities of such a large and varied collection of marine and coastal types requires integrated observation systems, among which orbital remote sensing must play an essential role. This volume reviews the current potential of Earth Observations in assessing the many Asian seascapes, using both passive and active techniques in diverse spectral regions, such as measuring reflected visible and near-infrared sunlight and surface emissions in the thermal infrared and microwave range, or surface reflection of transmitted radar pulses in the microwave range. An in-depth evaluation of the available spectral regions and observation techniques, as well as of novel multi-technique methods, ensures that suitable tools are indeed accessible for exploring and managing the wealth of resources that the Asian Seas have to offer.

Microwave and millimeter-wave remote sensing techniques are fast becoming a necessity in many aspects of security as detection and classification of objects or intruders becomes more difficult. This groundbreaking resource offers you expert guidance in this burgeoning area. It provides you with a thorough treatment of the principles of microwave and millimeter-wave remote sensing for security applications, as well as practical coverage of the design of radiometer, radar, and imaging systems. You learn how to design active and passive sensors for intruder detection, concealed object detection, and human activity classification. This detailed book presents the fundamental concepts practitioners need to understand, including electromagnetic wave propagation in free space and in media, antenna theory, and the principles of receiver design. You find in-depth discussions on the interactions of electromagnetic waves with human tissues, the atmosphere and various building and clothing materials. This timely volume explores recently developed detection techniques, such as micro-Doppler radar signatures and correlation radiometry. The book is supported with over 200 illustrations and 1,135 equations.

In response to the ever-increasing global threat of terrorist attacks, the personal screening industry has been growing at a rapid rate. Many methods have been developed for detecting concealed weapons and explosives on the human body. In this important new book, the authors discuss their experiences over the last decade designing and testing microwave and millimetre wave detection and screening systems. It includes examples of actual devices that they have built and tested, along with test results that were obtained in realistic scenarios. The book focuses on the development of non-imaging detection systems, which are similar to radar. These systems do not form a conventional image of the scene and the person(s) being screened. Instead, the sensors detect and analyze the effect that the body, and any concealed objects, has on a transmitted waveform.
These systems allow remote detection of both metallic and dielectric devices concealed on the human body in both indoor and outdoor environments. The book discusses a number of sensor types, including active millimetre wave sensors using the direct detection and the heterodyne approach, active microwave sensors for CNR-based object detection, passive millimetre wave sensors, and the role of shielding effects in operating non-imaging MM-wave sensors. The goal of this book is to systemize the test results obtained by the authors, helping specialists to develop improved screening systems in the future. Another goal is to show how the use of non-imaging systems can reduce the cost of the screening process.

Within the framework of Ispra Courses, a course on "Applications of Remote Sensing to Agrometeorology" was held from April 6th to 10th, 1987 at the Joint Research Centre of the European Communities, Ispra Italy. The purpose of the course was to familiarize scientists, active in Agrometeorology and related fields, with remote sensing techniques and their potential applications in their respective disciplines. Conventional ground investigations in various fields of natural sciences such as hydrology, pedology and agrometeorology can be supplemented by a range of instruments carried by airborne or earth orbiting platforms. The last few years, in particular, have seen many developments in this respect and a growing amount of information can now be derived not only from dedicated earth resources satellites such as the LANDSAT and SPOT, but also from other platforms such as METEOSAT and the series of NOAA-TIROS. Future platforms (ERS-I, Space Station, etc.) with their advanced sensors will further broaden the range of applications open to the investigators. The use of these data sources, together with field investigations, can lead, at a reduced cost, to a better characterization of the spatial and temporal properties of natural systems.

The power of microwave remote sensing for studying the oceans of the world was demonstrated conclusively by the SEASAT mission in 1978. Since then, no further satellite-flown instruments have been available to provide further data of this type. However, the proposed launch of ESA’s ERS-1 satellite will lead to a new set of active microwave instruments being flown in space in 1990. Even though similar data has been obtained from aircraft-flown instruments SAR, scatterometers, altimeters etc. - a great deal of activity has been taking place to develop the necessary expertise in handling and analysing such data when it comes on-stream from ERS-1 and from subsequent satellites. It was against this background that the scientific Affairs Division of NATO again agreed to sponsor an ASI in Dundee in 1988. Its purpose was to review existing knowledge of the extraction of marine and atmospheric geophysical parameters from satellite-gathered microwave data and to enable scientists to prepare themselves and their computing
Remote Sensing of the Terrestrial Water Cycle is an outcome of the AGU Chapman Conference held in February 2012. This is a comprehensive volume that examines the use of available remote sensing satellite data as well as data from future missions that can be used to expand our knowledge in quantifying the spatial and temporal variations in the terrestrial water cycle. Volume highlights include: - An in-depth discussion of the global water cycle - Approaches to various problems in climate, weather, hydrology, and agriculture - Applications of satellite remote sensing in measuring precipitation, surface water, snow, soil moisture, groundwater, modeling, and data assimilation - A description of the use of satellite data for accurately estimating and monitoring the components of the hydrological cycle - Discussion of the measurement of multiple geophysical variables and properties over different landscapes on a temporal and areal scale Remote Sensing of the Terrestrial Water Cycle is a valuable resource for students and research professionals in the hydrology, ecology, atmospheric sciences, geography, and geological sciences communities.

Introduction to Microwave Remote Sensing offers an extensive overview of this versatile and extremely precise technology for technically oriented undergraduates and graduate students. This textbook emphasizes an important shift in conceptualization and directs it toward students with prior knowledge of optical remote sensing: the author dispels any linkage between microwave and optical remote sensing. Instead, he constructs the concept of microwave remote sensing by comparing it to the process of audio perception, explaining the workings of the ear as a metaphor for microwave instrumentation. This volume takes an “application-driven” approach. Instead of describing the technology and then its uses, this textbook justifies the need for measurement then explains how microwave technology addresses this need. Following a brief summary of the field and a history of the use of microwaves, the book explores the physical properties of microwaves and the polarimetric properties of electromagnetic waves. It examines the interaction of microwaves with matter, analyzes passive atmospheric and passive surface measurements, and describes the operation of altimeters and scatterometers. The textbook concludes by explaining how high resolution images are created using radars, and how techniques of interferometry can be applied to both passive and active sensors.
Combines theoretical concepts with experimental results on thermal microwave radiation to increase the understanding of the complex nature of terrestrial media. Emphasizing on radiative transfer models, this book covers the terrestrial aspects, from clear to cloudy atmosphere, precipitation, ocean and land surfaces, vegetation, snow and ice.

Past research has comprehensively assessed the capabilities of satellite sensors operating at microwave frequencies, both active (SAR, scatterometers) and passive (radiometers), for the remote sensing of Earth's surface. Besides brightness temperature and backscattering coefficient, microwave indices, defined as a combination of data collected at different frequencies and polarizations, revealed a good sensitivity to hydrological cycle parameters such as surface soil moisture, vegetation water content, and snow depth and its water equivalent. The differences between microwave backscattering and emission at more frequencies and polarizations have been well established in relation to these parameters, enabling operational retrieval algorithms based on microwave indices to be developed. This Special Issue aims at providing an overview of microwave signal capabilities in estimating the main land parameters of the hydrological cycle, e.g., soil moisture, vegetation water content, and snow water equivalent, on both local and global scales, with a particular focus on the applications of microwave indices.
A rapidly growing area, remote sensing is crucial to the effort of modeling the earth's atmosphere and collecting such fundamental data as temperature, winds, pressures, water vapor distribution, clouds and other active constituents. This information enables us to test existing models of the atmosphere's energy balance, depletion of the ozone layer, climatic trends and other essential environmental data. Also discussed is the application of microwave remote sensing techniques to the atmospheres of planets other than the earth.

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.

A quantitative yet accessible introduction to remote sensing techniques, this new edition covers a broad spectrum of Earth science applications.

The use of air photographs as an aid to understanding and mapping natural resources has long been an established technique. The advent of satellite imagery was, and indeed by many still is, regarded as a very high altitude air photograph, but with the introduction of digital techniques the full analysis of imagery has become very sophisticated. Radar imagery presents the
A resource scientist with a new imaging technique that has to be understood and used, a technique which, although in many respects still in its infancy, has considerable applications potential for resources studies. Remote sensing now forms an element in study courses in the earth sciences in many major universities and a number of universities offer specialist postgraduate courses in remote sensing. Nevertheless there are a large number of earth scientists already working with imagery who have progressed from the air photograph base to satellite imagery. Such scientists may find themselves confronted with microwave or radar imagery or wish to use the imagery for surveys and find themselves hindered by a lack of understanding of the differences between radar imagery and optical imagery. Unfortunately reference to much of the literature will not be of very great help, many excellent text books on the theory and interaction of microwaves, on instrument design and construction and on the research carried out on specific target types exist, most of these are however written for specialists who are usually physicists not earth scientists.

The most comprehensive description of the physical foundations of methods and instruments in the fields of passive remote sensing applied to investigations of the Earth, Solar system bodies and space. Emphasis is placed on the physical aspects necessary to judge the possibilities and limitations of passive remote sensing methods in specific observation cases. Numerous practical applications and illustrations are given referring to airspace up-to-date experiments. Due to the lack in traditional separation on methods and instruments of remote sensing of the Earth and outerterrestrial space this book aims to supply more information in this field.