

Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

This atlas offers a unique instrument dedicated to the knowledge and exploitation of the solar resources for Europe in a broad sense, from Ural to Azores and from Northern Africa to Polar Circle. It is a powerful tool for architects, engineers, meteorologists, agronomists, local authorities, tourism professionals, as well as researchers and students. It covers the period 1981-1990. It offers fundamental knowledge on the solar radiation available at groundlevel, which is of primary importance for both the life and the climate (including the ocean) since it is the primary source of energy on Earth by far. This book describes the course of the Sun across the sky as it varieties throughout the year and with the geographical location. The interactions of the solar radiation with the atmosphere and its components (haze, turbidity, clouds, etc.), and the separation of the radiation into the direct and diffuse parts are discussed. The importance of the solar radiation in

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

various domains is presented, with an emphasis on solar engineering, where solar energy is used to provide electricity in photovoltaics systems, to supply hot water or heat houses. Ground radiation measurement techniques and instruments are described. Satellite images are also used. They are combined with ground measurements to provide a synoptic view of the distribution of the solar radiation over Europe. The structure of the database and its main applications are described. 26 coloured maps (ten years average 1981-90) describe the solar radiation and its direct and diffuse parts. They also detail the changes with time. The value of the atlas can be usefully extended by using it in conjunction with the complementary volume and CD-ROM called : The European Solar Radiation Atlas - vol. 2: database and exploitation software, also published by Les Presses de l'Ecole des Mines. The database offers spatial (every 10 km approximately) and temporal knowledge for different timescales (from climatological means -more than 700 stations- to hourly values -7 stations-) on the solar resources: irradiation (global and its components), sunshine duration, as well as air temperatures, precipitation, water vapour pressure,

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

air pressure in a number of stations. The software uses the database in either a "map" or a "station" mode at user choice. Once a station been selected, the program looks for all the data available for this station. The software includes algorithms covering the following fields: solar geometry, optical properties of the atmosphere, estimation of hourly slope irradiation under cloudless skies, estimation of solar irradiation values (going from daily to hourly values, conversion from horizontal to titled surfaces), spectral irradiance, illuminance, daily mean profiles of temperature and other statistical quantities (central moments, extremes, probability, cumulative probability and utilizability curves). Graphics can be displayed in 2 or 3 dimensions. Some applications studies on solar engineering can be performed too. This Atlas has been realised on behalf of the European Commission, by a team led by the company GET (Jülich, Germany), and comprising the Deutsche Wetterdienst (Hamburg, Germany), Armines/Ecoles des Mines de Paris et de Nantes (France), Instituto Nacional de Engenharia e Tecnologia Industrial (Lisbon, Portugal), the Technical University of Lyngby

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

(Denmark), the World Radiation Data Centre (Saint-Petersburg, Russia), and Institut Royal de Météorologie (Brussels, Belgium), John Page (Sheffield, United Kingdom) and Robert Dogniaux (Brussels, Belgium) acting as advisors.

The availability of rotating shadow band radiometer measurement data at several new stations provides an opportunity to compare historical satellite-based estimates of solar resources with measurements. We compare mean monthly daily total (MMDT) solar radiation data from eight years of NSRDB and 22 years of NASA hourly global horizontal and direct beam solar estimates with measured data from three stations, collected after the end of the available resource estimates.

Preprint

Progress on an Updated National Solar Radiation Data Base

Solar Radiation and Climate Experiment

Fundamentals and Applications

Use of Environmental Satellite Data for Input to Energy Balance

Snowmelt Models

The performance of two statistical models that use satellite data to calculate the global solar radiation incident upon the earth's surface are assessed. The estimates

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

are determined for a mid latitude ten station network and represent a variety of sky cover conditions. Evaluations of the models for different sky conditions reveal the need for revised regression coefficients for the Hay and Hanson (1978) model and the Tarpley (1979) model. The Hay and Hanson (1978) model was shown to perform better for partly cloudy and overcast sky conditions while the Tarpley (1979) model performed better under clear skies. On a hourly and daily time scale, the Hay and Hanson (1978) model proved to be the better performer.

Annotation. Solar irradiance is a vital source of energy input for the Earth's climate system and its variability has the potential to mitigate or exacerbate a human-created climate. Maintaining an unbroken record of Total Solar Irradiance (TSI) is critical in resolving ongoing debates regarding the potential role of solar variability in influencing Earth's climate. Space-borne instruments have acquired TSI data since 1978. Currently, the best calibrated and lowest noise source of TSI measurements is the Total Irradiance Monitor (TIM) onboard NASA's Solar Radiation and Climate Experiment (SORCE). These TIM-era data are of higher quality than the older data in the full record. Thus, the TSI climate data record (CDR) has two components. There is the shorter, but more accurate record of the TIM era and the full (33+ year) space-based TSI measurement record. Both are important and require preservation. Review of NOAA Working Group Report on Maintaining the Continuation of Long-Term Satellite Total Irradiance Observations

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

evaluates NOAA's plan for mitigating the loss of total solar irradiance measurements from space, given the likelihood of losing this capacity from instruments currently on the SORCE satellite in coming years and the short term/experimental nature of the currently identified method of filling the data gap. This report evaluates NOAA's plan for mitigating the gap in total solar irradiance data.

Review of NOAA Working Group Report on Maintaining the Continuation of Long-Term Satellite Total Irradiance Observations

Quantifying Solar Radiation at the Earth Surface with Meteorological and Satellite Data

Determination of Solar Radiation at Ground Level from Images of the Earth Transmitted by Meteorological Satellites - An Assessment Study

The Development of a Solar Radiation Extinction Correction for Satellite Data

Infrared and Reflected Solar Radiation Measurements from the TIROS II Meteorological Satellite

This report documents the analysis and results from a year-long study of a novel approach to the problem of developing solar radiation models for GPS satellites. The approach is aiming to replace the pre-launch design phase of solar pressure and heat reradiation models by a less costly and more accurate post-launch phase. The approach is also suitable for many other Earth-orbiting satellites. In this approach we exploit the fact that a

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

collection of individual orbit solutions contains more information about the dynamics of the satellite than the information that was used to generate the individual solutions. The current GPS constellation of Block II and Block II satellites was used as a prototype for developing and validating our approach. We have used daily GPS precise ephemerides (produced routinely at JPL for the International GPS Service (IGS)) over a period of 9 months to adjust a parametrized model of the solar pressure so as to obtain best fit. The resulting model proved to be more accurate than the standard solar pressure model for GPS satellites (Fliegel et al., 1992). In a separate effort we developed from first principles a new solar pressure model for eclipsing GPS satellites. This model also represents a significant improvement over the standard model.

Solar irradiance is a vital source of energy input for the Earth's climate system and its variability has the potential to mitigate or exacerbate a human-created climate. Maintaining an unbroken record of Total Solar Irradiance (TSI) is critical in resolving ongoing debates regarding the potential role of solar variability in influencing Earth's climate. Spaceborne instruments have acquired TSI data since 1978. Currently, the best calibrated and lowest noise source of TSI measurements is the Total Irradiance Monitor (TIM) onboard NASA's Solar Radiation and Climate Experiment (SORCE). These TIM-era data are of higher quality than the older data in the full record. Thus, the TSI climate data record (CDR) has

two components. There is the shorter, but more accurate record of the TIM era and the full (33+ year) space-based TSI measurement record. Both are important and require preservation. Review of NOAA Working Group Report on Maintaining the Continuation of Long-Term Satellite Total Irradiance Observations evaluates NOAA's plan for mitigating the loss of total solar irradiance measurements from space, given the likelihood of losing this capacity from instruments currently on the SORCE satellite in coming years and the short term/experimental nature of the currently identified method of filling the data gap. This report evaluates NOAA's plan for mitigating the gap in total solar irradiance data.

Development of Computer Models to Estimate Solar Radiation Using Satellite Data

Solar Radiation Modeling and Simulation of Multispectral Satellite Data Determination of the Earth-atmosphere Radiation Budget from NOAA Satellite Data

**Comparison of Historical Satellite-Based Estimates of Solar Radiation Resources with Recent Rotating Shadowband Radiometer Measurements
Solar Radiation Maps from Satellite Data for Thailand**

Solar radiation data is important for a wide range of applications, e.g. in engineering, agriculture, health sector, and in many fields of the natural sciences. A few examples

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

showing the diversity of applications may include: architecture and building design, e.g. air conditioning and cooling systems; solar heating system design and use; solar power generation; evaporation and irrigation; calculation of water requirements for crops; monitoring plant growth and disease control; skin cancer research.

Solar Radiation Data from Satellite Images
Determination of Solar Radiation at Ground Level from Images of the Earth Transmitted by Meteorological Satellites - An Assessment Study
Springer
Solar Radiation Data from Satellite Images
Solar Radiation Data
Proceedings of the EC Contractors' Meeting held in Brussels, 18–19 October 1982
Springer Science & Business Media

The Utility of Satellite Data in Estimating the Energy Budget of the Earth's Surface
Tiros VII Radiation Data Catalog and Users' Manual

Global Monitoring of Net Solar Irradiance at the Ocean Surface Using Nimbus-7 Satellite Data

The Langley Parameterized Shortwave Algorithm (LPSA) for Surface Radiation Budget Studies

Practical Modeling for Renewable Energy Applications

The basic idea of the Course is to give a wide outline of the methodologies, the instruments and models used for Solar and Wind Applications. The subjects to be discussed in the lectures are: Terrestrial Radiation; Wind Energy and Its Application; Instrumental Sets and Methodologies of

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

Measurements; Climatological Applications from Space and Airborne Platform; Data Analysis and Management; Applications.

"Use of satellite data to study the surface and cloud properties and the solar radiation budget is very important for improving our understanding of cloud and sea-ice albedo feedback in the Arctic. Based on an accurate and comprehensive Radiative Transfer Model (RTM), algorithms were developed for using the National Oceanic and Atmospheric Administration (NOAA) Advanced Very High Resolution Radiometer (AVHRR) data for the discrimination of cloud from snow/ice surfaces, retrieval of snow surface properties and surface albedo, and retrieval of cloud optical depth and effective particle size. Through the improved estimation of solar reflectance in AVHRR channel 3 and atmospheric anisotropic correction, a threshold function was found and used for developing an automatic cloud discrimination algorithm over snow/ice surfaces. Thin cirrus was discriminated using the brightness temperature difference between AVHRR channels 4 and 5 and brightness temperatures in channel 3. Retrieval of snow grain size and mass-fraction of soot from AVHRR is difficult because of the presence of aerosol in channel 1 and the strong water vapor absorption in channel 2. Retrieval of surface albedo is more promising, but, with the melt of snow/ice, different narrow-to-broadband conversion relationships should be used to derive broadband albedo. AVHRR channels 2, 3 and 4 are used to retrieve surface albedo, top temperature simultaneously. Validation of these algorithms with in-situ aircraft measurements from NCAR C-130 and the NASA ER-2 and with surface measurements obtained during the Surface Energy Budget of the Arctic Ocean (SHEBA) experiment indicates that the retrieved albedo is close to the true value of ... but the retrieved albedo tends to be overestimated. Uncertainties of cloud retrievals with AVHRR data include cloud cover fraction, vertical inhomogeneity, multi-layer stratification and cloud phase were evaluated. Inter comparison of different satellite data demonstrates that NOAA-14 AVHRR data for SHEBA

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

overestimated by 10-20% using the calibration of Rao and Chen (1996). Finally, seasonal variation in surface albedo, cloud properties and SRB over SHEBA was derived based on 1 or 2 AVHRR observations per day from April to August, 1998"--Leaves iii-iv.

Solar Radiation Data

Solar Resources Mapping

Solar Energy Forecasting and Resource Assessment

New and Improved Solar Radiation Models for GPS Satellites Based on Flight Data

Cloud and Surface Properties and the Solar Radiation Budget Derived from Satellite Data Over the Arctic Ocean

This book gives a comprehensive overview of activities currently under way to produce, collect and compile radiation data as needed for the various types of solar energy applications in Europe. Contributions have been made by all contractors of the Commission of the European Communities, in particular the Meteorological Offices of the EC member countries. They all reported on their work at a meeting which was held in October 1982 in Brussels and of which these are the proceedings. The Commission's work in this area follows a detailed strategy which was published earlier as part of the proceedings of Volume I, Series F. Series F is especially devoted to publications on the European Communities' work on solar radiation data. Other volumes within Series F are in preparation and will deal with: - solar radiation data on tilted planes; - solar radiation data derived from meteorological satellite observations. In addition, two new atlases are being prepared, one showing - for the area of the European Community - maps for solar radiation on titled planes of various inclinations and orientations, and the other

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

showing - for the whole of Europe and the Eastern part of the Mediterranean - radiation data for horizontal planes. In the latter there will also be a statistical analysis section. Both atlases will be published in the course of 1983.

This book presents methods for optimising the spatial and network configuration of solar radiation measuring stations. Various physical and mathematical models are demonstrated, which together with high quality measurements, provide the essential tools to generate and validate solar resource estimates to improve the mapping of solar resources. Each chapter deals with a specific topic, showing its methodology, and providing examples of how to apply these techniques with reference to current projects around the world. These topics include: · Radiometric measurement campaigns; · Equipment calibration, installation, operation, and maintenance; · Data quality assurance and assessment; · Solar radiation modelling from satellite images and numerical models; · Downscaling and kriging interpolation of solar radiation; · Simulation of electric solar power plant generation; · Solar radiation forecasting; · Applications of solar energy; and · Socio-economic benefits of solar energy. The contributors present the statistical and physical models needed to derive solar radiation from satellite images and numerical models, emphasising the importance of measuring solar radiation accurately. They also show the classical models used to generate synthetic data, clear sky models and ancillary air quality and meteorological data from different input sources. Solar Resources Mapping provides industry professionals with methodologies and tools to build solar irradiance maps for different applications. The book will also benefit students and researchers as it serves as a main

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

technical reference, presenting the basic terminology and fundamentals for solar resource mapping that include methods for assessing measurement uncertainty.

Modeling Solar Radiation at the Earth's Surface

Proceedings of the EC Contractors' Meeting held in Brussels, 18–19 October 1982

Review of NOAA Working Group Report on Maintaining the Continuation of Long-term Satellite Total Solar Irradiance Observation

Final Report

Solar Radiation Reaching the Ground Determined from Meteorological Satellite Data

Written by a leading scientist with over 35 years of experience working at the National Renewable Energy Laboratory (NREL), *Solar Radiation: Practical Modeling for Renewable Energy Applications* brings together the most widely used, easily implemented concepts and models for estimating broadband and spectral solar radiation data. The author addresses various technical and practical questions about the accuracy of solar radiation measurements and modeling. While the focus is on engineering models and results, the book does review the fundamentals of solar radiation modeling and solar radiation measurements. It also examines the accuracy of solar radiation modeling and measurements. The majority of the book describes the most popular simple models for estimating broadband and spectral solar resources available to flat plate, concentrating, photovoltaic, solar thermal, and daylighting

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

engineering designs. Sufficient detail is provided for readers to implement the models in assorted development environments. Covering the nuts and bolts of practical solar radiation modeling applications, this book helps readers translate solar radiation data into viable, real-world renewable energy applications. It answers many how-to questions relating to solar energy conversion systems, solar daylighting, energy efficiency of buildings, and other solar radiation applications.

Solar Energy Forecasting and Resource Assessment is a vital text for solar energy professionals, addressing a critical gap in the core literature of the field. As major barriers to solar energy implementation, such as materials cost and low conversion efficiency, continue to fall, issues of intermittency and reliability have come to the fore. Scrutiny from solar project developers and their financiers on the accuracy of long-term resource projections and grid operators' concerns about variable short-term power generation have made the field of solar forecasting and resource assessment pivotally important. This volume provides an authoritative voice on the topic, incorporating contributions from an internationally recognized group of top authors from both industry and academia, focused on providing information from underlying scientific fundamentals to practical applications and emphasizing the latest technological developments

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

driving this discipline forward. The only reference dedicated to forecasting and assessing solar resources enables a complete understanding of the state of the art from the world's most renowned experts. Demonstrates how to derive reliable data on solar resource availability and variability at specific locations to support accurate prediction of solar plant performance and attendant financial analysis. Provides cutting-edge information on recent advances in solar forecasting through monitoring, satellite and ground remote sensing, and numerical weather prediction.

Solar Radiation

An Introduction to Atmospheric Radiation

SORCE

Physical Climatology For Solar And Wind Energy

Best Practices Handbook for the Collection and Use of Solar Resource

Data for Solar Energy Applications

Accurate solar radiation knowledge and its characterization on the Earth's surface are of high interest in many aspects of environmental and engineering sciences. Modeling of solar irradiance from satellite imagery has become the most widely used method for retrieving solar irradiance information under total sky conditions, particularly in the solar energy community. Solar radiation modeling, forecasting, and characterization continue to be broad areas of study, research,

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

and development in the scientific community. This Special Issue contains a small sample of the current activities in this field. Both the environmental and climatology community, as the solar energy world, share a great interest in improving modeling tools and capabilities for obtaining more reliable and accurate knowledge of solar irradiance components worldwide. The work presented in this Special Issue also remarks on the significant role that remote sensing technologies play in retrieving and forecasting solar radiation information.

Solar Radiation Modeling and Simulation of Multispectral Satellite Data.

Estimation of incoming solar radiation using satellite data

Methods of Albedo Determination from Explorer VII Satellite Radiation Data

The European Solar Radiation Atlas

Recent Advances

Solar Radiation Data from Satellite Images

In the TIROS II, the satellite's spin provides the scan line of the medium resolution radiometer which is then advanced by the orbital motion. The spatial resolution is about 40 miles square when the earth directly beneath the satellite is viewed. The five channels employ bolometer detectors and filters to limit the

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

spectral responses to five bands: 6 to 6.5 microns, 8 to 12 microns, 0.2 to 6 microns, 8 to 30 microns, and 0.55 to 0.75 microns. These five bands study, respectively: radiation in the water vapor absorption band; day and nighttime cloud cover; albedo thermal radiation; and visual maps for comparison with satellite vidicon pictures. The low resolution non-scanning radiometer measures the earth's blackbody temperature and albedo. This radiometer consists of two thermistors, each in the apex of a reflective cone which provides optical gain. One thermistor is black and responds to both thermal and reflected solar radiation. The second responds to thermal but reflects solar radiation. (Author).

Fundamentals of radiation for atmospheric applications -- Solar radiation at the top of the atmosphere -- Absorption and scattering of solar radiation in the atmosphere -- Thermal infrared radiation transfer in the atmosphere -- Light scattering by atmospheric particulates -- Principles of radiative transfer in planetary atmospheres -- Application of radiative transfer principles to remote sensing -- Radiation and climate.

SOLAR RADIATION: ATLAS OF AFRICA: Global and diffuse radiation fluxes at ground level derived from imaging data of the geostationary satellite METEOSAT2

Bookmark File PDF Solar Radiation Data From Satellite Images Vol 4 Determination Of Solar Radiation At Ground Level

Estimating the Solar Irradiance of an Intermountain Region Using GOES
(Geostationary Operational Environmental Satellite) Satellite Data: a Test of Two
Statistical Models

Solar Radiation, Modelling and Remote Sensing
Report