

1. Record Nr.	UNINA9910146075803321
Autore	Liang Shunlin
Titolo	Quantitative remote sensing of land surfaces [[electronic resource] /] / Shunlin Liang
Pubbl/distr/stampa	Hoboken, N.J., : Wiley-Interscience, c2004
ISBN	1-280-25291-X 9786610252916 0-470-34800-3 0-471-72371-1 0-471-72372-X
Descrizione fisica	1 online resource (562 p.)
Collana	Wiley series in remote sensing
Disciplina	550.287 550/.28/7 624.151
Soggetti	Earth sciences - Remote sensing Environmental sciences - Remote sensing Remote sensing Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	QUANTITATIVE REMOTE SENSING OF LAND SURFACES; Contents; Preface; Acronyms; CHAPTER 1 Introduction; 1.1 Quantitative Models in Optical Remote Sensing; 1.2 Basic Concepts; 1.2.1 Digital Numbers; 1.2.2 Radiance; 1.2.3 Solid Angle; 1.2.4 Irradiance; 1.2.5 Bidirectional Reflectances and Albedos; 1.2.6 Extraterrestrial Solar Irradiance; 1.3 Remote Sensing Modeling System; 1.3.1 Scene Generation; 1.3.2 Scene Radiation Modeling; 1.3.3 Atmospheric Radiative Transfer Modeling; 1.3.4 Navigation Modeling; 1.3.5 Sensor Modeling; 1.3.5.1 Spectral Response; 1.3.5.2 Spatial Response 1.3.6 Mapping and Binning1.4 Summary; References; CHAPTER 2 Atmospheric Shortwave Radiative Transfer Modeling; 2.1 Radiative Transfer Equation .; 2.2 Surface Statistical BRDF Models; 2.2.1 Minnaert Function; 2.2.2 Lommel-Seeliger Function; 2.2.3 Walthall Function; 2.2.4 Staylor-Suttles Function; 2.2.5 Rahman Function; 2.2.6 Kernel

Functions; 2.3 Atmospheric Optical Properties; 2.3.1 Rayleigh Scattering; 2.3.2 Mie Scattering; 2.3.3 Aerosol Particle Size Distributions; 2.3.4 Gas Absorption; 2.3.5 Aerosol Climatology; 2.4 Solving Radiative Transfer Equations; 2.4.1 Radiation Field Decomposition
2.4.2 Numerical Solutions
2.4.2.1 Method of Successive Orders of Scattering; 2.4.2.2 Method of Discrete Ordinates; 2.4.3 Approximate Solutions: Two-Stream Algorithms; 2.4.4 Representative Radiative Transfer Solvers (Software Packages); 2.5 Approximate Representation for Incorporating Surface BRDF; 2.6 Summary; References; CHAPTER 3 Canopy Reflectance Modeling; 3.1 Canopy Radiative Transfer Formulation; 3.1.1 Canopy Configuration; 3.1.2 One-Dimensional Radiative Transfer Formulation; 3.1.3 Boundary Conditions; 3.1.4 Hotspot Effects; 3.1.5 Formulations for Heterogeneous Canopies
3.2 Leaf Optical Models
3.2.1 "Plate" Models; 3.2.2 Needleleaf Models; 3.2.3 Ray Tracing Models; 3.2.4 Stochastic Models; 3.2.5 Turbid Medium Models; 3.3 Solving Radiative Transfer Equations; 3.3.1 Approximate Solutions; 3.3.1.1 Models Based on KM Theory; 3.3.1.2 Decomposition of the Canopy Radiation Field; 3.3.1.3 Approximation of Multiple Scattering; 3.3.2 Numerical Solutions: Gauss-Seidel Algorithm; 3.4 Geometric Optical Models; 3.5 Computer Simulation Models; 3.5.1 Monte Carlo Ray Tracing Models; 3.5.1.1 Forward and Reverse Ray Tracing; 3.5.1.2 Canopy Scene Generation
3.5.1.3 A Forest Ray Tracing Algorithm
3.5.1.4 Botanical Plant Modeling System Model; 3.5.1.5 SPRINT Model; 3.5.2 Radiosity Models; 3.5.2.1 Generating the 3D Scene; 3.5.2.2 Calculating the Emission for All Surfaces in the Scene; 3.5.2.3 Computing the View Factors; 3.5.2.4 Solving the Radiosity Equation; 3.5.2.5 Rendering the Scene for a Given Viewpoint and Calculating BRDF; 3.5.2.6 Applications; 3.6 Summary; References; CHAPTER 4 Soil and Snow Reflectance Modeling; 4.1 Single Scattering Properties of Snow and Soil; 4.1.1 Optical Properties of Snow; 4.1.2 Optical Properties of Soils
4.2 Multiple Scattering Solutions for Angular Reflectance from Snow and Soil

Sommario/riassunto

Processing the vast amounts of data on the Earth's land surface environment generated by NASA's and other international satellite programs is a significant challenge. Filling a gap between the theoretical, physically-based modelling and specific applications, this in-depth study presents practical quantitative algorithms for estimating various land surface variables from remotely sensed observations. A concise review of the basic principles of optical remote sensing as well as practical algorithms for estimating land surface variables quantitatively from remotely sensed observations. Emp
