

PROCEEDINGS OF SPIE

Remote Sensing of Clouds and the Atmosphere XXV

Adolfo Comerón
Evgueni I. Kassianov
Klaus Schäfer
Richard H. Picard
Konradin Weber
Uendra N. Singh
Editors

21–25 September 2020
Online Only, United Kingdom

Sponsored by
SPIE

Cooperating Organisations
European Optical Society
KTN – Knowledge Transfer Network (United Kingdom)
Technology Scotland (United Kingdom)
Visit Scotland (United Kingdom)
BARSC – British Association of Remote Sensing (United Kingdom)
EARSeL—European Association of Remote Sensing Laboratories (Germany)
ISPRS—International Society for Photogrammetry and Remote Sensing

Published by
SPIE

Volume 11531

Proceedings of SPIE 0277-786X, V. 11531

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *Remote Sensing of Clouds and the Atmosphere XXV*, edited by Adolfo Comerón, Evgueni I. Kassianov, Klaus Schäfer, Richard H. Picard, Konradin Weber, Upendra N. Singh, Proceedings of SPIE Vol. 11531 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510638754

ISBN: 9781510638761 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time) Fax +1 360 647 1445

SPIE.org

Copyright © 2020, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$21.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/20/\$21.00.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE. DIGITAL LIBRARY

SPIDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

REMOTE SENSING OF CLOUDS, ATMOSPHERIC AEROSOLS, TRACE GASES AND METEOROLOGICAL PARAMETERS II

- 11531 07 **Simultaneous retrieval of OCS, and CO₂ from the IASI shortwave spectral band: assessment of the accuracy of the retrieval products and validation with in situ observations** [11531-5]
- 11531 09 **On validation high-detailed mapping of tropospheric NO₂ using GSA/Resurs-P observations with simulated data** [11531-7]
- 11531 0A **Modeling and simulation techniques of cloud radiation characteristics for space-based remote sensing** [11531-8]
- 11531 0B **Validation of atmospheric correction approaches for Sentinel-2 under partly-cloudy conditions in an African agricultural landscape** [11531-9]

REMOTE SENSING OF CLOUDS, ATMOSPHERIC AEROSOLS, TRACE GASES AND METEOROLOGICAL PARAMETERS III

- 11531 0D **Cloud detection from IASI hyperspectral data: a statistical approach based on neural networks** [11531-11]
- 11531 0E **Multi-scale convolutional neural networks for cloud segmentation** [11531-12]
- 11531 0H **Planetary wave activity in the equatorial Mesosphere and Lower Thermosphere (MLT) during anomalous QBO disruption in 2015-16** [11531-35]

LIDAR, RADAR, AND OTHER ACTIVE AND PASSIVE ATMOSPHERIC MEASUREMENT TECHNIQUES AND TECHNOLOGIES I

- 11531 0I **Study of tropospheric slant delay retrieved from the IRNSS** [11531-15]
- 11531 0J **VACNT versus Black Velvet: a coating analysis for the next-generation Earth Radiation Budget radiometer** [11531-16]
- 11531 0K **EarthCARE/CPR development status and performance** [11531-18]
- 11531 0L **Atmospheric boundary layer height disambiguation using synergistic remote sensing observations: case examples from VORTEX-SE** [11531-19]

**LIDAR, RADAR, AND OTHER ACTIVE AND PASSIVE ATMOSPHERIC MEASUREMENT TECHNIQUES
AND TECHNOLOGIES II**

- 11531 OM **Synergy of observations from various satellites for the fast retrieval of atmospheric carbon dioxide amounts** [11531-21]
- 11531 ON **Comparison of aerosol backscatter coefficient profiles at 1064 nm from CALIPSO and ground-based ceilometer** [11531-22]
- 11531 OO **IRNSS information for beginners** [11531-23]

POSTERS

- 11531 OP **Regional characteristics of air pollution in Japan** [11531-24]
- 11531 OQ **Effective characterization of aerosols in the severe events using multi-channel measurements including polarization with GCOM-C/SGLI** [11531-25]
- 11531 OR **Backscatter radar-lidar ratios for sizing ice crystals of cirrus clouds** [11531-26]
- 11531 OS **Calculation of backscattering matrix for ice particles of cirrus clouds for 1.55 and 2 micron lidars within the physical optics approximation** [11531-27]
- 11531 OU **On the development of a cross-platform database application for storing long-term observations of ultraviolet radiation and total ozone content obtained using Brewer spectrophotometer** [11531-29]
- 11531 OV **On estimation of atmospheric scattering characteristics from spectral measurements of solar radiation using machine learning algorithms** [11531-30]
- 11531 OW **HEAD: a robust high-resolution satellite image-based aerosol optical depth retrieval algorithm in the blue wavelength range using Kalman filters** [11531-31]
- 11531 OX **Convective boundary-layer height estimation from combined radar and Doppler lidar observations in VORTEX-SE** [11531-32]
- 11531 OY **A study of cloud vertical structure over Delhi using long-term radiosonde data** [11531-33]

Remote Sensing of Clouds, Atmospheric Aerosols, Trace Gases and Meteorological Parameters I (2). Remote Sensing of Clouds, Atmospheric Aerosols, Trace Gases and Meteorological Parameters II (5). Remote Sensing of Clouds, Atmospheric Aerosols, Trace Gases and Meteorological Parameters III (4). Lidar, Radar, and Other Active and Passive Atmospheric Measurement Techniques and Technologies I (4). Lidar, Radar, and Other Active and Passive Atmospheric Measurement Techniques and Technologies II (3).
Opening remarks by conference chairs for conference Remote Sensing of Clouds and Atmosphere XXV. Watch presentation. Save to my library. Introduction to Remote Sensing. 1. Physical Basics. Atmospheric influences. All radiation is influenced by the atmosphere in various ways. The sun's radiation is scattered, reflected or absorbed by particles in the atmosphere as is the earth's reflected radiation. Clouds are the worst interference for radiation and make it impossible for passive satellite sensors to measure the Earth's surface.
The scattering is less wavelength selective than Rayleigh scattering which explains the white colour of clouds, and the grey appearance of dust. The spectrum of electromagnetic waves and the transmittance of a clear cloud-free atmosphere. In contrast to scattering, absorption means an effective loss of radiative energy and is mostly caused by water vapour, carbon dioxide and ozone. The relationship between atmospheric conditions and cloud types in Antarctica was investigated on the basis of aerological data at Showa Station in 1979 and 1980. When a low pressure passed near Showa Station, type I clouds in which the vertical profile of temperature was nearly moist adiabatic were most popular.
Motion scenes from satellite image sequences four-dimensionally visualise atmospheric phenomena and processes as far as exhibited by the dynamics of clouds and cloud systems. They are presented as a non-conventional observational means and a new research tool. A survey is given on a variety of cinematographic manipulation procedures which are necessary to meet appropriately - in each individual Remote sensing of the planetary boundary layer refers to the utilization of ground-based, flight-based, or satellite-based remote sensing instruments to measure properties of the planetary boundary layer including boundary layer height, aerosols and clouds. Satellite remote sensing of the atmosphere has the advantage of being able to provide global coverage of atmospheric planetary boundary layer properties while simultaneously providing relatively high temporal sampling rates. Advancements in @inproceedings{Nolt1999RemoteSO, title={Remote Sensing of Clouds and Atmosphere , Sept 20-23 , 1999 , Firenze , Italy } Far infrared measurements of cirrus}, author={I. Nolt and M. Vanek and N. D. Tappan and P. Minnis and J. L. Alltop and C. Lee and P. Hamilton and K. Evans and A. H. Evans and E. E. Clothiaux and A. Baran and Westfield.Â I. G. Nolt , M. D. Vanek, N. D. Tappan, P. Minnis , J. L. Alltop, P. A. R. Ade, C. Lee , P. A. Hamilton , K. F. Evans, A. H. Evans , E. E. Clothiaux A. J. Baran, NASA Langley, Hampton, Va 23681-0001 Queen Mary and Westfield College, Mile End Road, London E1 4NS, UK University of Colorado, Boulder, Co 80309-0311 Pennsylvania.