## PROCEEDINGS OF SPIE

# Remote Sensing of the Atmosphere, Clouds, and Precipitation VII

Eastwood Im Song Yang Editors

24–26 September 2018 Honolulu, Hawaii, United States

Sponsored by SPIE

Cosponsored by NASA—National Aeronautics and Space Administration (United States) RADI—Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences (China) State Key Laboratory of Remote Sensing Science, Chinese Academy of Sciences (China) Ministry of Earth Sciences (India)

Cooperating Organizations University of Hawai'i at Mānoa (United States) JAXA—Japan Aerospace Exploration Agency (Japan) NICT—National Institute of Information and Communications Technology (Japan) ISRO—Indian Space Research Organization (India) ESSO—Earth System Science Organization (India)

Published by SPIE

Volume 10776

Proceedings of SPIE 0277-786X, V. 10776

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 SPIEDigitalLibrary.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 the Atmosphere, Clouds, and Precipitation VII, edited by Eastwood Im, Song Yang, Proceedings of SPIE Vol. 10776 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 0277-786X ISSN: 1996-756X (electronic)

ISBN: 9781510621275 ISBN: 9781510621282 (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 © 2018, 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 \$18.00 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/18/\$18.00.

Printed in the United States of America Vm7 i ffUb 5 ggc WUHY gž & Wži bXYf"]WY bgY Zfca 'GD-9.

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



**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

- vii Authors
- ix Symposium Committees
- xi Conference Committee

#### **REMOTE SENSING OF CLOUDS AND PRECIPITATION**

10776 02Current status of the Dual-frequency precipitation Radar on the Global Precipitation<br/>Measurement core spacecraft and scan pattern change test operations results (Invited Paper)<br/>[10776-1]

#### **REMOTE SENSING OF AEROSOLS AND DUST**

10776 07 Synergistic use of next-generation geostationary and polar orbit satellites for investigating aerosols, clouds, and radiation [10776-6]

#### EMERGING TECHNOLOGIES FOR ATMOSPHERIC REMOTE SENSING I

- 10776 0D Compact Midwave Imaging System (CMIS) for retrieval of cloud motion vectors and cloud geometric heights [10776-12]
- 10776 OEBenefits of a quadrature Mach Zehnder interferometer as demonstrated in the Optical<br/>Autocovariance Wind and Lidar (OAWL) wind and aerosol measurements [10776-13]

#### **REMOTE SENSING OF CYCLONES AND SEVERE STORMS**

10776 0G Observing fast mesoscale atmospheric processes with a geostationary microwave sounder [10776-16]

#### EMERGING TECHNOLOGIES FOR ATMOSPHERIC REMOTE SENSING II

- 10776 OI Atmospheric remote sensing with convoys of miniature radars (Invited Paper) [10776-21] 10776 OJ All-weather microwave atmospheric sensing using CubeSats and constellations (Invited Paper) [10776-22] ALGORITHM AND VALIDATION OF AEROSOLS, CLOUDS, CONVECTION, AND PRECIPITATION 10776 0Q Possible improvement of the GPM's Dual-frequency Precipitation Radar (DPR) algorithm (Invited Paper) [10776-29] 10776 OR The EarthCARE Cloud Profiling Radar (CPR) doppler measurements in deep convection: challenges, post-processing, and science applications [10776-30] 10776 OT Evaluation of the validation of TRMM data over the region of Qilianshan mountains in Northwest **China** [10776-32] **REMOTE SENSING OF EXTREME WEATHER AND EVENTS** 10776 OW Summer ozone variation derived from FY3/TOU satellite data and impacts of East Asian summer monsoon [10776-42] Climate change and its impact on drought in Eastern Gansu rainfed agricultural area in 10776 OX Northwest China in the last thirty years [10776-37] **REMOTE SENSING OF ATMOSPHERIC CHEMISTRY AND GREENHOUSE GASES** 10776 OZ Clouds effect on the atmospheric total column carbon dioxide retrieval by space orbiting Argus 1000 micro-spectrometer: introductory study [10776-39] **REGIONAL STUDIES OF AEROSOLS, CLOUDS, CONVECTION, AND PRECIPITATION**
- 10776 11 Study on vertical visibility during haze in Shanghai based on the spaceborne lidar [10776-45]

#### POSTER SESSION

- 10776 14 Impact study on the accuracy of Global Satellite Mapping of Precipitation (GSMaP) caused by future small precipitation radar constellation [10776-49]
- 10776 15 Impacts of the Kuroshio intrusion entering the Luzon Strait on the local atmosphere by satellite observations [10776-50]
- 10776 16 Discrimination and retrieval of aerosol types using multi-channels including near-UV and polarization by GCOM-C/SGLI [10776-52]
- 10776 17 The fact and causes of warm-dry and warm-wet change since 1971 in HEXI corridor area of Gansu Province, China [10776-54]
- 10776 19 Application of dust and PM2.5 detection methods using MODIS data to the Asian dust events which aggravated respiratory symptoms in Western Japan in May 2011 [10776-57]
- 10776 1A Application of atmospheric low-frequency oscillation on meteorological drought forecast in Eastern part of the Northwest China [10776-58]