PROCEEDINGS OF SPIE

Remote Sensing and Modeling of Ecosystems for Sustainability XV

Wei Gao Ni-Bin Chang Jinnian Wang Editors

22 August 2018 San Diego, California, United States

Sponsored and Published by SPIE

Volume 10767

Proceedings of SPIE 0277-786X, V. 10767

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 and Modeling of Ecosystems for Sustainability XV, edited by Wei Gao, Ni-Bin Chang, Jinnian Wang, Proceedings of SPIE Vol. 10767 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510621053

ISBN: 9781510621060 (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.

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 ix	Authors Conference Committee
	REMOTE SENSING, MODELING APPLICATION, AND GIS I
10767 02	Harnessing commercial satellite technologies to monitor our forests (Invited Paper) [10767-1]
10767 04	Characterization of canola canopies using optical and SAR imagery [10767-4]
10767 05	Green areas and urban heat island: combining remote sensed data with ground observations [10767-6]
10767 06	Synthetic aperture radar for pipeline right-of-way monitoring [10767-51]
	REMOTE SENSING, MODELING APPLICATION, AND GIS II
10767 08	The Compact Hyperspectral Prism Spectrometer: advanced imaging spectrometer for sustainable land imaging (Invited Paper) [10767-8]
10767 09	A method for quantifying the number of U.S. lakes with cyanobacterial harmful algal blooms using satellite remote sensing [10767-9]
10767 0A	The urbanization impact in China: a prospective model (1992-2025) [10767-10]
	REMOTE SENSING FOR AGRICULTURE, ECOSYSTEMS, AND HYDROLOGY
10767 OC	Spatial interpolation of surface ozone observations using deep learning (Invited Paper) [10767-12]
10767 OG	Investigation of the impact of urban vegetation on air pollutants based on remotely sensed measurements: a case study in Shenzhen, China [10767-17]
	POSTER SESSION
10767 OH	Study on spatial distribution of aerosol optical depth and particulate matter using MODIS data [10767-18]

10767 OJ	Research on crop classification in northeast China based on multi-source and multi-temporal SAR Images [10767-20]
10767 OK	Research of forest type identification based on multi-dimensional POLSAR data in northeast China [10767-21]
10767 OL	The spatial distribution characteristics and ground-level estimation of NO $_2$ and SO $_2$ over Huaihe River Basin and Shanghai based on satellite observations [10767-22]
10767 OM	Study on the extraction method of tidal flat [10767-23]
10767 ON	Thermally enhanced spectral indices to discriminate burn severity in Mediterranean forest ecosystems [10767-24]
10767 00	Correction and prediction of ultraviolet (UV-MFRSR) radiation value based on GARCH model [10767-25]
10767 OP	The variation characteristics of PM2.5 in Shanghai and its correlation with meteorological factors [10767-26]
10767 OQ	Comparative study of the spatial interpolation methods for the Shanghai regional air quality evaluation [10767-27]
10767 OR	Analysis of land use changes and driving factors in Dongying urban area from 2005 to 2015 [10767-28]
10767 OS	Simulation of land use/cover change in Shanghai based on SLEUTH model [10767-29]
10767 OU	Analysis on land use changes and their driving forces in Weihai City between 2005 and 2015 [10767-31]
10767 OV	Using remote sensing to assess sustainable development on a Chinese national-level new district [10767-32]
10767 OX	A photon-efficient method based on curve fitting for photon counting 3D imaging lidar [10767-34]
10767 OY	Estimating initial biomass of green tide algae in the South Yellow Sea with aid of UAV and S2A data [10767-35]
10767 10	Cardiovascular and respiratory diseases surveillance around Shanghai Chemical Industry Park based on remote sensing [10767-37]
10767 11	The extraction of wetland vegetation information based on UAV remote sensing images [10767-38]
10767 12	Change of sea surface temperature in the northwest Pacific Ocean over the past decade and its impacts on fisheries [10767-39]
10767 13	Monitoring of polluted water in coastal zone using unmanned aerial vehicle remote sensing [10767-40]

10767 14	Verification of mountain road hazard susceptibility maps: provincial highway routes 8 and 9 as study area $[10767-41]$
10767 15	Regional sea level change prediction based on time-frequency analysis and intelligent algorithm [10767-42]
10767 16	Simulation of methane emissions from double-rice cropping system in southern China during the past 50 years by DNDC model [10767-43]
10767 17	Spatial-temporal distribution characteristics of chlorophyll-a in offshore waters of Yantai and Weihai based on GOCI data [10767-44]
10767 18	Suitability regionalization of Chinese medicinal yam under the impact of climate change simulated by CMIP5 multi-model ensemble projections [10767-45]
10767 1A	Utility of CrIS/ATMS temperature and humidity profiles to diagnose the atmospheric duct [10767-47]

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Arellano, Blanca, 05, 0A Batlle, Enric, 05 Calvo, L., 0N Cattau, Megan, 02 Chen, Maosi, OC, OH, OL, OM, OP, OQ, OR, OS, OU, 0Y. 10. 11. 13. 15. 16. 17. 18 Coffer, Megan M. A., 09 Darling, John A., 09 Davis, John M., 0C Draper, David, 06 Fan, Dongli, 16, 18 Fan, Xintong, OJ, OK Fang, Jian, 0X Fernández-García, V., 0N Fernández-Guisuraga, J. M., 0N

Fernández-Manso, A., 0N Gao, Wei, 0C, 0O, 0R, 0U, 12

Gao, Zhiqiang, 0H, 0M, 0R, 0U, 0Y, 11, 13, 17

García-Llamas, P., 0N Gu, Guohua, 0X Gu, Lingjia, 0J, 0K Guo, Chunying, 10 Hao, Xiaojing, 1A He, Fachuan, 0J He, Lihuan, 0G He, Weiji, 0X

Homayouni, Saeid, 04 Hosseini, Mehdi, 04 Hou, Meifang, 16 Hsu, I-wen, 14 Hu, Biao, 16, 18 Ji, Yinghao, 18

Jiang, Xiaopeng, 0Y, 11, 13, 17

Jiao, Xianfeng, 04 Johnson, Brian R., 02 Joseph, Maxwell, 02 Kampe, Thomas U., 08

Lin, Jie, 0X Liu, Baorong, OR Liu, Chaoshun, 0C Liu, Yan-An, 1A Ma, Guanyu, 15 Marcos, E., 0N McGlinchy, Joseph, 02 McNairn, Heather, 04 Nari, Bilige, OV Ning, Jicai, 0H, 17 Niu, Yilong, 16

Pett, Todd, 06

Quintano, C., 0N Ren, Ruizhi, OJ, OK Roark, Shane, 06 Roca, Josep, 05, 0A Salls, Wilson B., 09 Schaeffer, Blake A., 09 Scholl, Victoria, 02

Shang, Weitao, 0Y, 11, 13, 17

Shi, Runhe, OL, OO, OP, OQ, OS, 10, 12, 16, 18

Song, Debin, 0Y, 17 Suarez-Seoane, S., ON Sun, Hong, OU

Sun, Zhibin, OC, OO, OV, 12, 1A

Tao, Zhu, 12 Tian, Zhan, 16, 18 Urquhart, Erin A., 09 Wamsley, Charles C., 06 Wan, Hua, 0V

Wang, Liming, 0G Wang, Qiuxian, OR, OU Wang, Weimin, 0G Wang, Xiangyi, 16, 18 Wu, Jee-cheng, 14 Xu, Fuxiana, 0Y Xu, Hanging, 16, 18 Yan, Lingbin, 0V Yang, Lijun, 0G Ye, Ling, 0X Yin, Wenye, 0X

Zeng, Qinghuai, 0G Zhang, Deying, OL, OP, OS, 10 Zhang, Xuanyi, OQ, OS Zhang, Yixing, 1A Zhang, Yuanyuan, 0M Zhao, Qing, 15

Zheng, Lan, OL, OP, OS Zhou, Jiayuan, 10 Zhou, Xiaohu, OK

Zhou, Yunyun, OL, OP, OS, 10

Zhuo, Wei, 0O

Conference Committee

Program Track Chair

Allen H.-L. Huang, University of Wisconsin-Madison (United States)

Conference Chairs

Wei Gao, Colorado State University (United States)
 Ni-Bin Chang, University of Central Florida (United States)
 Jinnian Wang, CHINARS SHENZHEN Institute for Satellite Applications Innovation (China)

Conference Program Committee

May Chui, The University of Hong Kong (Hong Kong, China)
E. Raymond Hunt Jr., Agricultural Research Service (United States)
Brian Robert Johnson, University of Colorado (United States)
Thomas U. Kampe, Ball Aerospace & Technologies Corporation (United States)

Xin-Zhong Liang, University of Maryland, College Park (United States)
William Parton, Colorado State University (United States)
David Riaño, University of California, Davis (United States)
Runhe Shi, East China Normal University (China)

Jiong Shu, East China Normal University (China) **Zhibin Sun**, Colorado State University (United States)

Hongjie Xie, The University of Texas at San Antonio (United States)

Xiaobing Zhou, Montana Tech (United States)

K. Raja Reddy, Mississippi State University (United States)

Session Chairs

 Remote Sensing, Modeling Application, and GIS I
 Thomas U. Kampe, Ball Aerospace & Technologies Corporation (United States)

Brian Robert Johnson, University of Colorado (United States)

2 Remote Sensing, Modeling Application, and GIS II Thomas U. Kampe, Ball Aerospace & Technologies Corporation (United States)

Brian Robert Johnson, University of Colorado (United States)

3 Remote Sensing for Agriculture, Ecosystems, and Hydrology Ni-Bin Chang, University of Central Florida (United States) Zhibin Sun, Colorado State University (United States)