PROCEEDINGS OF SPIE

Remote Sensing and Modeling of the Atmosphere, Oceans, and Interactions V

Tiruvalam N. Krishnamurti
Guosheng Liu
Editors

15–16 October 2014
Beijing, China

Sponsored by
SPIE

Cosponsored by
State Key Laboratory of Remote Sensing Science (China) • NASA—National Aeronautics and Space Administration (United States) • Ministry of Earth Sciences (India)

Cooperating Organizations
Institute of Remote Sensing and Digital Earth (China) • JAXA—Japan Aerospace Exploration Agency (Japan) • NICT—National Institute of Information and Communications Technology (Japan) • ISRO—Indian Space Research Organization (India) • National Satellite Meteorological Center (China) • State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing (China) • State Key Laboratory of Resources and Environmental Information System (China) • Center For Earth System Science, Tsinghua University (China) • College of Global Change and Earth System Science, Beijing Normal University (China) • Key Laboratory of Digital Earth Science (China)

Published by
SPIE

Volume 9265

Proceedings of SPIE 0277-786X, V. 9265

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

Remote Sensing and Modeling of the Atmosphere, Oceans, and Interactions V, edited by Tiruvalam N. Krishnamurti, Guosheng Liu, Proc. of SPIE Vol. 9265, 926501
© 2014 SPIE · CCC code: 0277-786X/14/$18 · doi: 10.1117/12.2181929

The papers included 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. The papers published in these proceedings 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 this book:
Author(s), "Title of Paper," in *Remote Sensing and Modeling of the Atmosphere, Oceans, and Interactions V*, edited by Tiruvalam N. Krishnamurti, Guosheng Liu, Proceedings of SPIE Vol. 9265 (SPIE, Bellingham, WA, 2014) Article CID Number.

ISSN: 0277-786X
ISBN: 9781628413328

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 © 2014, 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/14/$18.00.

Printed in the United States of America.

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

SPIE Digital Library
SPIEDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first 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, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four 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. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID Number.

Contents

v *Authors*

vii *Symposium Committees*

ix Conference *Committee*

xi *An application of Universal Kriging Algorithm to the identification of mesoscale eddies in the Northwestern Pacific Ocean (Keynote Paper Summary)* [9265-13]

SESSION 1 REMOTE SENSING/MODELING I

9265 03 **Satellite data assimilation in global forecast system in India (Invited Paper)** [9265-2]

9265 04 **Derivation of regional aerodynamic roughness length by combining optical remote sensing and ground measurements over agricultural land in Heihe River Basin** [9265-3]

9265 07 **Assimilating scatterometer observations of tropical cyclones into an Ensemble Kalman Filter system with a robust observation operator based on canonical-correlation analysis** [9265-6]

9265 08 **Observing system simulation experiments with multiple methods** [9265-7]

9265 09 **Improving accuracy of Eutrophication State Index estimation in Chaohu Lake by moderate resolution remote sensing data driven method** [9265-9]

SESSION 2 REMOTE SENSING/MODELING II

9265 0B **Processes and mechanisms of persistent extreme precipitation events in East China (Invited Paper)** [9265-26]

POSTER SESSION

9265 0E **Numerical simulation of suspended sediment transport merging with satellite derived data in coastal waters** [9265-8]

9265 0F **Regression modeling of finite field and anti-electromagnetic design for the ocean surface wind speed measurements of the FY-3C microwave imager** [9265-15]

9265 0G **Spaceborne imaging simulation of ship based on Monte Carlo ray tracing method** [9265-16]

9265 0N **Spatial and temporal distribution characteristics of near-surface CO_2 concentration over China based on GOSAT data** [9265-23]

9265 0O **Reliability evaluation of soil moisture and land surface temperature simulated by Global Land Data Assimilation System (GLDAS) using AMSR-E data** [9265-24]

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four 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.

An, Dawei, 0F
Basu, Swati, 03
Bi, Jingwu, xi
Chen, Qiting, 04
Chen, Yang, 0B
Cui, Weihong, 0N
Dong, Qing, xi
Dou, Fangli, 0F
Fu, Xiu-li, 0O
Gao, Rui, 09
Haddad, Ziad S., 07
He, Hong-fei, 0G
Hristova-Veleva, Svetla, 07
Huang, Haiqing, 0E
Hutjes, Ronald, 04
Ishibashi, Toshiyuki, 08
Jia, Li, 04
Lin, Jia-xuan, 0G
Liu, Dong, 0E
Lu, Feng, 0F
Mao, Zhihua, 0E
Song, Jing-Wei, 09
Steward, Jeffrey L., 07
Sun, Yunhua, 0N
Vukicevic, Tomislava, 07
Wang, Biao, 0G
Wang, Bo, 0O
Wang, Tianyu, 0E
Wang, Xin-Yuan, 09
Xiang, Bo, 09
Xu, Yuetong, xi
Xue, Cunjin, xi
Yang, Xuefei, 0E
Zhai, Panmao, 0B
Zhang, Peng, 0F
Zhao, Jing, 0N
Zhen, Jing, 09

Symposium Committees

Symposium Chairs

Upendra Singh, NASA Langley Research Center (United States)
Jiancheng Shi, Institute of Remote Sensing Applications and Digital Earth (China)

Honorary Symposium Chairs

George Komar, NASA Headquarters (United States)
Toru Fukuda, Japan Aerospace Exploration Agency (Japan)
Deren Li, Wuhan University (China)
Shailesh R. Nayak, Ministry of Earth Sciences (India)
Guanhua Xu, Former Minister of Science and Technology Department of China (China)

Symposium Co-chairs

Toshio Iguchi, National Institute of Information and Communications Technology (Japan)
A. S. Kiran Kumar, Space Applications Center (India)

International Organizing and Technical Program Committee

Akimasa Sumi, The University of Tokyo (Japan)
Allen M. Larar, NASA Langley Research Center (United States)
Delu Pan, The Second Institute of Oceanography, SOA (China)
Haruhisa Shimoda, Tokai University (Japan)
Huadong Guo, Institute of Remote Sensing and Digital Earth (China)
Jiancheng Shi, Institute of Remote Sensing and Digital Earth (China)
Jing Ming Chen, Nanjing University (China) and University of Toronto (Canada)
Kazuhiro Asai, Tohoku Institute of Technology (Japan)
Kohei Mizutani, National Institute of Information and Communications Technology (Japan)
Peng Gong, Tsinghua University (China)
Peng Zhang, China Meteorological Administration (China)
Robert J. Frouin, Scripps Institution of Oceanography (United States) and University of California, San Diego (United States)
Shunlin Liang, Beijing Normal University (China) and University of Maryland (United States)
Thomas J. Jackson, U. S. Department of Agriculture (United States)

Tiruvalam N. Krishnamurti, Florida State University (United States)
Toru Fukuda, Japan Aerospace Exploration Agency (Japan)
Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)
Upendra N. Singh, NASA Langley Research Center (United States)
Xiaoxiong Xiong, NASA Goddard Space Flight Center (United States)
Zhanqing Li, Beijing Normal University (China) and University of Maryland, College Park (United States)
Guoqing Zhou, Guilin University of Technology (China)

Local Organizing Committee

Liangfu Chen, Institute of Remote Sensing and Digital Earth (China)
Zifeng Wang, Institute of Remote Sensing and Digital Earth (China)
Mingmei Chen, Institute of Remote Sensing and Digital Earth (China)
Dandan Li, Institute of Remote Sensing and Digital Earth (China)
Tianxing Wang, Institute of Remote Sensing and Digital Earth (China)
Xiliang Ni, Institute of Remote Sensing and Digital Earth (China)
Xiaofeng Yang, Institute of Remote Sensing and Digital Earth (China)
Ying Zhang, Institute of Remote Sensing and Digital Earth (China)
Tiantian Wang, Institute of Remote Sensing and Digital Earth (China)
Xiaoying Ouyang, Institute of Remote Sensing and Digital Earth (China)
Le Yang, Institute of Remote Sensing and Digital Earth (China)
Man Peng, Institute of Remote Sensing and Digital Earth (China)

Conference Committee

Conference Chairs

Tiruvalam N. Krishnamurti, Florida State University (United States)
Guosheng Liu, Florida State University (United States)

Conference Co-chairs

Shailesh R. Nayak, Ministry of Earth Sciences (India)
Riko Oki, Japan Aerospace Exploration Agency (Japan)
Yihui Ding, China Meteorological Administration (China)

Conference Program Committee

Ziad S. Haddad, Jet Propulsion Laboratory (United States)
Chandra Mohan Kishtawal, Indian Space Research Organisation (India)

Session Chairs

1 Remote Sensing/Modeling I
Swati Basu, Ministry of Earth Sciences (India)
Qiting Chen, Institute of Remote Sensing and Digital Earth (China)

2 Remote Sensing/Modeling II
Guosheng Liu, Florida State University (United States)
Toshiyuki Ishibashi, Meteorological Research Institute (Japan)

An application of Universal Kriging Algorithm to the identification of mesoscale eddies in the Northwestern Pacific Ocean

Jingwu Bi[*ab], Qing Dong[b], Cunjin Xue[b], Yuetong Xu[a]
a School of Population, Resources and Environment, Shandong Normal University, No. 88 Wenhua
East Road, Lixia District, Jinan, 250014, P.R.China, 86-531-86187293
b Key Laboratory of Digital Earth, Institute of Remote Sensing and Digital Earth, Chinese Academy
of Sciences, No. 9 Dengzhuang South Road, Haidian District, Beijing, 100094, P.R.China, 86-10-
82178138

Summary

Owing to the inevitable drawbacks of prevailing eddy identification methods, we proposed a new Universal Kriging Algorithm with a simplified set of criteria and higher speed. Signal fields were computed on the Sea Level Anomaly data. An optimization is acquired after removing trends and noises in the signal fields by interpolation. Amplitudes and vari-values are correlative, making it possible to extract locations and extents of vortices by few characteristic isolines. The success/excess of detection rate is around 90% /less than 20% respectively. It shows a high accuracy and flexibility in detecting mesoscale eddies comparing to the prevailing algorithms.

*Email: bijw@radi.ac.cn; cellphone +86 182 0168 0299