

PROCEEDINGS OF SPIE

Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2014

**Charles R. Bostater Jr.
Stelios P. Mertikas
Xavier Neyt**
Editors

**24–25 September 2014
Amsterdam, Netherlands**

Sponsored by
SPIE

Cooperating Organisations

European Association of Remote Sensing Companies (Belgium)
Remote Sensing and Photogrammetry Society (United Kingdom)
European Optical Society
CENSIS—Innovation Centre for Sensor & Imaging Systems
EUFAR—European Facility for Airborne Research
EARSeL—European Association of Remote Sensing Laboratories
TNO
ESA

Published by
SPIE

Volume 9240

Proceedings of SPIE 0277-786X, V. 9240

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

Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2014, edited
by Charles R. Bostater Jr., Stelios P. Mertikas, Xavier Neyt, Proc. of SPIE Vol. 9240, 924001
© 2014 SPIE · CCC code: 0277-786X/14/\$18 · doi: 10.1117/12.2177771

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 of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2014*, edited by Charles R. Bostater Jr., Stelios P. Meritkas, Xavier Neyt, Proceedings of SPIE Vol. 9240 (SPIE, Bellingham, WA, 2014) Article CID Number.

ISSN: 0277-786X

ISBN: 9781628413038

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.



SPIDigitalLibrary.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

- vii *Authors*
- ix *Conference Committee*
- xi *Remote sensing at the NASA Kennedy Space Center and the Eastern Range: a perspective from the ground up (Plenary Paper) [9241-100]*

SESSION 1 SEA ICE REMOTE SENSING AND ANALYSIS

- 9240 03 **Sea-ice distribution and variability in the East Greenland Sea, 2003–13 [9240-2]**
- 9240 04 **First year sea ice characterization from Quad-pol H-A- α classification [9240-4]**

SESSION 2 SPACE-BASED OCEAN REMOTE SENSING

- 9240 05 **The NASA CYGNSS mission: a pathfinder for GNSS scatterometry remote sensing applications [9240-5]**
- 9240 06 **Analysis of C-band spaceborne scatterometer thermal noise [9240-6]**
- 9240 07 **Analysis of the reflectance spectra of oil emulsion spilled on the sea surface [9240-7]**

SESSION 3 OCEAN SURFACE POLLUTION ASSESSMENT

- 9240 09 **Bistatic scattering from a contaminated sea surface observed in C, X, and Ku bands [9240-9]**
- 9240 0A **Measuring marine oil spill extent by Markov Random Fields [9240-10]**
- 9240 0B **Influence of satellite alerts on the efficiency of aircraft monitoring of maritime oil pollution in German waters [9240-11]**
- 9240 0C **Sea slicks classification by synthetic aperture radar [9240-12]**
- 9240 0E **Detecting biogenic pollution in Rybinsk Reservoir from satellite data and contact measurements [9240-14]**

SESSION 4 COASTAL AND INLAND WATERS REMOTE SENSING

- 9240 0G **Detection of seagrass scars using sparse coding and morphological filter [9240-16]**

- 9240 OH **Relationship between spectral reflectance and chlorophyll-a concentration in the eutrophic Lake Togo-ike** [9240-17]
- 9240 OI **Monitoring and predicting eutrophication of Sri Lankan inland waters using ASTER satellite data** [9240-18]
- 9240 OJ **Raman spectroscopy measurements of CO₂ dissolved in water and CO₂ bubbles for laser remote sensing in water** [9240-19]
- 9240 OK **Shallow water surface gravity wave imaging, spectra and their use in shallow water dredging operations** [9240-20]

SESSION 5 RADAR REMOTE SENSING I

- 9240 OL **Comparison of the spatial and radiometric resolution of ERS and Metop C-band radars** [9240-21]
- 9240 OM **Analysis of internal waves around the Korean Peninsula using RADARSAT-1 data** [9240-22]
- 9240 ON **Ship wake signatures in radar/optical images of the sea surface: observations and physical mechanisms** [9240-24]
- 9240 OO **Assessment of the swell impact on HY-2 SCAT wind products** [9240-25]

SESSION 6 RADAR REMOTE SENSING II

- 9240 OP **From ENVISAT RA-2 to CRYOSAT-2 SIRAL: validation of altimeter products near the coast (the ALCOVA Project)** [9240-28]

SESSION 7 OPTICAL REMOTE SENSING

- 9240 OQ **Design and validation of object recognition methodologies for underwater fluorescence Lidar applications (Best Student Paper Award)** [9240-30]
- 9240 OR **Retrieval of water optical properties using polarization of light underwater: Case I and II waters** [9240-31]
- 9240 OT **Remote estimation of in water constituents in coastal waters using neural networks** [9240-33]

POSTER SESSION

- 9240 OY **Influence of breaking waves on the oceanologic lidars resolution** [9240-38]
- 9240 11 **Create ensemble sea surface temperature using the Bayesian model averaging** [9240-41]

- 9240 12 **Remote sensing and GIS for the modeling of persistent organic pollutant in the marine environment** [9240-42]
- 9240 13 **Using of standard marine radar for determination of a water surface and an atmosphere near-surface layer parameters** [9240-43]
- 9240 14 **Comparisons of wind speed retrieval methods on C-band multi-polarization SAR measurements** [9240-45]
- 9240 16 **Internal waves in the Black Sea: satellite observations and in-situ measurements** [9240-47]
- 9240 18 **Radar manifestations of ship wakes in algae bloom zones** [9240-49]
- 9240 19 **Are the trends in the surface chlorophyll opposite between the South China Sea and the Bay of Bengal?** [9240-50]
- 9240 1A **On the sensitivity analysis of the Compact-Polarimetry SAR architectures for maritime targets detection** [9240-51]
- 9240 1C **See the Sea: multi-user information system for investigating processes and phenomena in coastal zones via satellite remotely sensed data, particularly hyperspectral data** [9240-53]
- 9240 1D **Investigation of near surface wind by optical images of wind-roughened water surface** [9240-54]
- 9240 1E **Study of the selection of indicator parameters in marine water quality evaluation and the evaluation methodology** [9240-55]
- 9240 1H **An adaptive PCA fusion method for remote sensing images** [9240-57]

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.

Aboitiz, Alazne, 0P
Ahmed, Samir, 0R, 0T
Bai, Yan, 19
Bakhanov, Victor V., 13, 1D
Barbré, Robert E., Jr., xi
Baschek, Björn, 0B
Bastani, Kaveh, 0T
Biamino, W., 0C
Bigi, A., 12
Bissett, W. Paul, 0G
Boccolari, Mauro, 03
Bogatov, Nikolay A., 13
Borasi, M., 0C
Bostater, Charles R., Jr., 0K
Buono, Andrea, 1A
Carrizo, Carlos, 0R
Cavagnero, M., 0C
Chen, Chuntao, 0O
Chen, Xiaoyan, 19
Cipollini, Paolo, 0P
Coca, Josep, 0P
Comblet, F., 09
Corsini, Giovanni, 0Q
Costanzini, S., 12
D'Addario, Larry, xi
Dahanayaka, D. D. G. L., 0I
Decker, Ryan K., xi
Diani, Marco, 0Q
Di Matteo, L., 0C
Dubuca, Dominique, 07
Elyouncha, Anis, 06, 0L
El-Habashi, Ahmed, 0R, 0T
Erkanli, Sertan, 0G
Ermakov, S., 0N
Ermoshkin, Aleksei V., 13
Feng, Zhongkui, 1H
Foster, Robert, 0R, 0T
Fu, Dongyang, 1E
Fujita, Masayuki, 0J
Geldzahler, Barry, xi
Ghanmi, H., 09
Ghermandi, G., 12
Gilerson, Alexander, 0R, 0T
Gleason, Scott, 05
Gómez-Enrí, J., 0P
Guerrieri, Lorenzo, 03
Guo, Qing, 1H
Hatakeyama, K., 0H
Hatsuda, A., 0H
He, Xianqiang, 19
Helmke, Peer, 0B
Hill, Victoria J., 0G
Hlaing, Soe, 0T
Hong, Dan-Bee, 0M
Huang, Xiaoqi, 0O
Huddleston, Lisa L., xi
Hudier, Eric, 04
Hunsänger, Thomas, 0B
Ibrahim, Amir, 0R
Ioannou, Ioannis, 0T
Kalashnikova, Nina A, 16
Kapustin, I., 0N
Kazakov, Vasily I., 13
Kemarskaya, Olga N., 13
Khenchaf, A., 09
Khymchenko, Ielizaveta, 16
Kim, Kwangjin, 11
Kim, Tae-Ho, 0M
Korneva, Ludmila G., 0E
Kranz, Susanne, 0B
Krayushkin, Evgeny V., 16
Kuki, T., 0H
Laiz, Irene, 0P
Lavrova, Olga Yu., 0E, 16, 18, 1C
Lazareva, T., 0N
Lee, Yang-Won, 11
Lennon, Marc, 07
Li, An, 1H
Li, Jiang, 0G
Lopez, Ludwin, 0A
Loreggia, D., 0C
Luchinin, Alexander G., 0Y, 1D
Matteoli, Stefania, 0Q
Miegebielle, Veronique, 07
Migliaccio, Maurizio, 1A
Miller, Michael J., xi
Minato, A., 0I
Mityagina, Marina I., 16, 18, 1C
Miyamoto, Y., 0H
Moctezuma, Miguel, 0A
Morabito, David D., xi
Morgan, Jennifer G., xi
Mori, A., 0H
Neyt, Xavier, 06, 0L
Nunziata, Ferdinando, 1A
Oguslu, Ender, 0G
Ondrusek, Michael, 0T
Ouchi, Kazuo, 0M

Ozawa, S., 0I
Paes, Rafael L., 1A
Pan, Delu, 19, 1E
Parmiggiani, Flavio, 03, 0A
Passaro, Marcello, 0P
Perera, B. D. C., 0I
Ren, Lin, 14
Repina, I. A., 1D
Roeder, William P., xi
Rose, Randy, 05
Ruf, Chris, 05
Sabinin, Konstantin D., 16
Sakuno, Y., 0H
Seibert, Marc. A., xi
Serebryany, Andrey N., 16
Shendrick, Victoria D., 0E
Sicot, Guillaume, 07
Soloviev, Dmitry M., 0E
Somekawa, Toshihiro, 0J
Strochkov, Alexey Ya., 0E
Takeuchi, Tomoki, 0J
Teggi, S., 12
Tejedor, Begoña, 0P
Titov, Victor I., 13, 1D
Tonooka, H., 0I
Torres, José Ramón, 0P
Trivero, P., 0C
Troitskaya, Yulia I., 13
Uvarov, Ivan A., 1C
Vignudelli, Stefano, 0P
Villares, Pilar, 0P
Wang, Difeng, 14, 1E
Wang, He, 0O
Wang, Juan, 14
Wang, Tianyu, 19
Wijeyaratne, M. J. S., 0I
Yamanaka, Chihiro, 0J
Yang, Bingyu, 0K
Yang, Chan-Su, 0M
Yang, Jingsong, 14
Zhang, Hongqun, 1H
Zhang, Ying, 1E
Zhao, Yili, 0O
Zheng, Gang, 14
Zhu, Jianhua, 0O
Zimmerman, Richard C., 0G
Zotta, Laura, 0Q

Conference Committee

Symposium Chairs

Charles R. Bostater Jr., Florida Institute of Technology (United States)

Symposium Co-chairs

Ulrich Michel, University of Education Heidelberg (Germany)

Bart Snijders, TNO (Netherlands)

Conference Chairs

Charles R. Bostater Jr., Florida Institute of Technology (United States)

Stelios P. Mertikas, Technical University of Crete (Greece)

Xavier Neyt, Royal Belgian Military Academy (Belgium)

Conference Programme Committee

Richard J. Breitlow, Agfa Corporation (United States)

Jean-Paul Bruyant, ONERA (France)

Alexander Gilerson, The City College of New York (United States)

Carlton R. Hall, Dynamac Corporation (United States)

Heinz-Detlef Kronfeldt, Technische Universität Berlin (Germany)

Frederic Lamy, ONERA (France)

Ana M. Martins, Universidade dos Açores (Portugal)

Caroline Nichol, The University of Edinburgh (United Kingdom)

Petri Pellikka, University of Helsinki (Finland)

Session Chairs

- 1 Sea Ice Remote Sensing and Analysis
Yi Luo, Environment Canada (Canada)
- 2 Space-based Ocean Remote Sensing
Xavier Neyt, Royal Belgian Military Academy (Belgium)
- 3 Ocean Surface Pollution Assessment
Peer Helmke, Bundesanstalt für Gewässerkunde (Germany)
- 4 Coastal and Inland Waters Remote Sensing
George D. Emmitt, Simpson Weather Associates, Inc. (United States)
- 5 Radar Remote Sensing I
Anis Elyouncha, Royal Belgian Military Academy (Belgium)

- 6 Radar Remote Sensing II
Antonis Daskalakis, Technical University of Crete (Greece)
- 7 Optical Remote Sensing
Alexander Gilerson, The City College of New York (United States)