PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 9644

, "Front Matter: Volume 9644," Proc. SPIE 9644, Earth Resources and Environmental Remote Sensing/GIS Applications VI, 964401 (4 November 2015); doi: 10.1117/12.2227954

Event: SPIE Remote Sensing, 2015, Toulouse, France

PROCEEDINGS OF SPIE

Earth Resources and Environmental Remote Sensing/GIS Applications VI

**Ulrich Michel
Karsten Schulz
Manfred Ehlers
Konstantinos G. Nikolakopoulos
Daniel Civco**
Editors

**22–24 September 2015
Toulouse, France**

Sponsored by
SPIE

Cooperating Organisations
European Association of Remote Sensing Companies (Belgium)
European Optical Society
CENSIS—Innovation Centre for Sensor & Imaging Systems (United Kingdom)
EARSeL—European Association of Remote Sensing Laboratories
Optitec (France)
Route des Lasers (France)

Published by
SPIE

Volume 9644

Proceedings of SPIE 0277-786X, V. 9644

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

Earth Resources and Environmental Remote Sensing/GIS Applications VI, edited by Ulrich Michel, Karsten Schulz, Manfred Ehlers, Konstantinos G. Nikolakopoulos, Daniel Civco, Proc. of SPIE Vol. 9644, 964401
© 2015 SPIE · CCC code: 0277-786X/15/\$18 · doi: 10.1117/12.2227954

Proc. of SPIE Vol. 9644 964401-1

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 *Earth Resources and Environmental Remote Sensing/GIS Applications VI*, edited by Ulrich Michel, Karsten Schulz, Manfred Ehlers, Konstantinos G. Nikolakopoulos, Daniel Civco, Proceedings of SPIE Vol. 9644 (SPIE, Bellingham, WA, 2015) Six-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781628418545

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 © 2015, 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/15/\$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**

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 six-digit CID article numbering system structured as follows:

- 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.

Contents

vii	<i>Authors</i>
ix	<i>Conference Committee</i>
xi	<i>Introduction</i>

SESSION 1 SENSORS AND PLATFORMS

9644 02	Solar diffusers in Earth observation instruments with an illumination angle of up to 70°: design and verification of performance in BRDF [9644-1]
---------	--

SESSION 2 ENVIRONMENTAL MONITORING CONCEPTS I

9644 05	Flood mapping from Sentinel-1 and Landsat-8 data: a case study from river Evros, Greece [9644-4]
9644 06	Seasonal effects on the estimation of height of boreal and deciduous forests from interferometric TanDEM-X coherence data [9644-5]

SESSION 3 REMOTE SENSING FOR ARCHAEOLOGY, CULTURAL AND NATURAL HERITAGE

9644 0B	Modelling prehistoric terrain Models using LiDAR-data: a geomorphological approach [9644-11]
9644 0C	An integrated multi-medial approach to cultural heritage conservation and documentation: from remotely-sensed lidar imaging to historical archive data [9644-12]

SESSION 4 HAZARD MITIGATION GEOLOGIC APPLICATIONS I

9644 0E	Active landslide monitoring using remote sensing data, GPS measurements and cameras on board UAV [9644-14]
---------	---

SESSION 5 HAZARD MITIGATION GEOLOGIC APPLICATIONS II

9644 0H	Concept of an advanced hyperspectral remote sensing system for pipeline monitoring [9644-18]
9644 0I	Hydrocarbon microseepage mapping using signature based target detection techniques [9644-19]

- 9644 OJ **Quarry monitoring using GPS measurements and UAV photogrammetry** [9644-20]
- 9644 OK **Soil volume estimation in debris flow areas using lidar data in the 2014 Hiroshima, Japan rainstorm** [9644-21]
- 9644 OL **Lithological mapping using Landsat 8 and ASTER multispectral data in the Bas Drâa inlier, Moroccan Anti Atlas** [9644-23]

SESSION 6 ENVIRONMENTAL MONITORING CONCEPTS II

- 9644 OM **Introducing a rain-adjusted vegetation index (RAVI) for improvement of long-term trend analyses in vegetation dynamics** [9644-24]
- 9644 ON **The use of UAV to document sloping landscapes to produce digital elevation models to examine environmental degradation** [9644-25]
- 9644 OQ **Developing a sustainable satellite-based environmental monitoring system In Nigeria** [9644-28]

SESSION 7 PROCESSING METHODOLOGIES I

- 9644 OT **The use of UAVs for remote sensing applications: case studies in Cyprus** [9644-30]
- 9644 OU **An integrated and open source GIS environmental management system for a protected area in the south of Portugal** [9644-31]
- 9644 OV **Estimation of regional-scale forest resources using ICESat/GLAS spaceborne lidar** [9644-32]

SESSION 8 PROCESSING METHODOLOGIES II

- 9644 OW **Quality evaluation of different fusion techniques applied on Worldview-2 data** [9644-33]
- 9644 OY **Karst features detection and mapping using airphotos, DSMs and GIS techniques (Best Student Paper Award)** [9644-35]
- 9644 OZ **High-spatial resolution multispectral and panchromatic satellite imagery for mapping perennial desert plants** [9644-36]

SESSION 9 INFRASTRUCTURE AND URBAN AREAS

- 9644 10 **Feature extraction for change analysis in SAR time series** [9644-37]
- 9644 11 **Updating road databases from shape-files using aerial images** [9644-38]
- 9644 13 **Effect of land cover and green space on land surface temperature of a fast growing economic region in Malaysia** [9644-41]

POSTER SESSION

- 9644 17 **A scale-up method for reference data for validation of global land cover maps using ALOS/AVNIR-2 satellite data** [9644-44]
- 9644 19 **Development of the Philippine Hydrologic Dataset (PHD) from LiDAR and other remotely-sensed data** [9644-46]
- 9644 1B **Headward erosion and deep erosion estimations in the wider area of Nemea, Greece, using GIS and freely available DSM** [9644-48]
- 9644 1D **Diachronic analysis of salt-affected areas using remote sensing techniques: the case study of Biskra area (Algeria)** [9644-50]
- 9644 1G **A disparity between erosional hazard and accretion of the sundarbans with its adjacent east coast, Bangladesh: a remote sensing and GIS approach** [9644-53]
- 9644 1H **Spatio-temporal pattern of eco-environmental parameters in Jharia coalfield, India** [9644-54]
- 9644 1J **Automatic landslide and mudflow detection method via multichannel sparse representation** [9644-57]
- 9644 1K **Continuum removed band depth analysis for waste detection in the north of Tunisia** [9644-58]
- 9644 1N **Ground truth and mapping capability of urban areas in large scale using GE images** [9644-61]
- 9644 1O **Assessing coastline exploitation from multitemporal medium-high resolution images: Jintang Island, China** [9644-62]
- 9644 1Q **Urban green spatio- temporal changes assessment through time-series satellite data** [9644-65]
- 9644 1R **An Integrated Geospatial System for earthquake precursors assessment in Vrancea tectonic active zone in Romania** [9644-66]
- 9644 1S **Impact of climate and anthropogenic changes on urban surface albedo assessed from time-series MODIS satellite data** [9644-67]
- 9644 1T **Radiometric cross-calibration of KOMPSAT-3 with Landsat-8** [9644-68]
- 9644 1W **Slope adjustment of runoff curve number (CN) using Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Global Digital Elevation Model (GDEM) for Kuantan River Basin** [9644-71]

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.

Abdeljaouad, S., 1K	dos Santos Beja, N. M. R., 0U
Adepoju, K. A., 0Q	Duarte, L., 0U
Adiri, Zakaria, 0L	El Harti, Abderrazak, 0L
Afrasinei, Gabriela M., 1D	Fenelli, Laura, 0C
Agapiou, A., 0N, 0T	Fonte, J., 0U
Ahn, Hoyong, 1T	Galeotti, Monica, 0C
Akbari, Abolghasem, 1W	Gaspa, M. C., 19
Akinluyi, F. O., 0Q	Ge, Fengxiang, 1J
Akinyede, J. O., 0Q	Ghiglieri, Giorgio, 1D
Alayet, F., 1K	Gonçalves, J. A., 0U
Aloc, D. S., 19	Gonçalves-Seco, L., 0U
Alsharrah, Saad A., 0Z	Gonzalez, K. A. C., 19
Andreotti, Alessia, 0C	Gupta, R. P., 1H
Anifowose, A. Y. B., 0Q	Gür, Bilgehan, 02
Argyropoulos, Nikolaos, 0E, 0J	Hadjimitsis, D. G., 0N, 0T
Arora, M. K., 1H	Hao, Zhuo, 1J
Arras, Claudio, 1D	Häufel, Gisela, 1I
Aydin Alatan, A., 0I	Hayashi, Masato, 0V
Bachaoui, El Mostafa, 0L	He, Jun, 1J
Bartolozzi, Giovanni, 0C	Hinz, Stefan, 10
Baschir, Laurentiu V., 1Q	Hirano, Takashi, 0V
Bini, Marco, 0C	Ho, C. H., 13
Blanco, A. C., 19	Höfler, Veit, 0B
Bol, Hans, 02	Hossain, A.T.M. S., 1G
Boldt, Markus, 10	Ichii, Kazuhito, 0V
Bonaduce, Ilaria, 0C	Jellouli, Amine, 0L
Borjigin, Habura, 0V	Jia, Shifeng, 1O
Borlongan, N. J. B., 19	Jin, Cheonggil, 1T
Bouabid, Rachid, 0Z	Kakavas, M. P., 0Y
Bracci, Susanna, 0C	Kanniah, K. D., 13
Bradd, John M., 1D	Karrasch, Pierre, 0B, 0M
Bruce, David A., 0Z	Kavoura, Katerina, 0E
Bulatov, Dimitri, 1I	Keskin, Göksu, 0H
Buttau, Cristina, 1D	Koukouvelas, Ioannis, 0E, 0J
Cantisani, Emma, 0C	Koz, Alper, 0I
Chao, Chen, 1J	Kyriou, Aggeliki, 05
Chen, Jianyu, 1O	Lenz, Andreas, 0H
Chen, Qi, 1O	Li, Bicen, 02
Chimenti, Massimo, 0C	Lysandrou, V., 0T
Choi, Chulung, 1T	Maacha, Lhou, 0L
Christoforou, M., 0N	Mahor, M. A. P., 19
Colombini, M. Perla, 0C	Malesci, Irene, 0C
Corcoran, Paul A., 0Z	Malquori, Alessandra, 0C
Cucci, Costanza, 0C	Massa, Emmanuela, 0C
Daigo, Motomasa, 17	Megalooikonomou, Vasileios, 0J
De La Cruz, R. M., 19	Mellis, Maria T., 1D
Depountis, Nikolaos, 0E	Mexia, Konstantina, 1B
Dercks, Ute, 0C	Mezned, N., 1K
Dida, Adrian I., 1S	Middelmann, Wolfgang, 0H

Miura, H., 0K	Zagana, E., 0Y
Montanelli, Marco, 0C	Zhang, Xiaoping, 1O
Morelli, Annalisa, 0C	Zhou, Jianjun, 1J
Muramatsu, Kanako, 17	Zoran, Liviu Florin V., 1S
Nasahara, Kenlo, 17	Zoran, Maria A., 1Q, 1R, 1S
Nikolakopoulos, Konstantinos G., 05, 0E, 0J, 0W, 0Y	
Noorma, Mart, 06	
Ochiai, Fumio, 17	
Ohashi, Itsuko, 17	
Olesk, Aire, 06	
Olfindo, N. T. Jr., 19	
Olmi, Roberto, 0C	
Osunmadewa, Babatunde, 0M	
Pahlowan, E. U., 1G	
Palombi, Lorenzo, 0C	
Pan, Delu, 1O	
Papadavid, G., 0N	
Penoni, Sara, 0C	
Perez, A. M. C., 19	
Piccolo, Marcello, 0C	
Pierelli, Louis D., 0C	
Pinheiro da Luz, L. M., 0U	
Pinna, Daniela, 0C	
Pohl, Melanie, 11	
Praks, Jaan, 06	
Raimondi, Valentina, 0C	
Ramzi, Ahmed Ibrahim, 1N	
Riminesi, Cristiano, 0C	
Rutigliano, Sara, 0C	
Sabatakakis, Nikolaos, 0E	
Sacchi, Barbara, 0C	
Saigusa, Nobuko, 0V	
Saini, V., 1H	
Savastru, Dan M., 1Q, 1R	
Savastru, Roxana S., 1Q, 1R	
Sawada, Yoshito, 0V	
Schulz, Karsten, 10	
Şebnem Düzgün, H., 0I	
Sheikhi, A., 13	
Shin, Dongyoon, 1T	
Sillero, N., 0U	
Somenahalli, Sekhar, 0Z	
Soyama, Noriko, 17	
Soydan, Hilal, 0I	
Stella, Sergio, 0C	
Sun, Bo, 1J	
Tadono, Takeo, 17	
Tamm, Tanel, 06	
Tautan, Marina N., 1Q	
Teodoro, A., 0U	
Teutsch, Caroline D., 0H	
Themistocleous, K., 0N, 0T	
Thiele, Antje, 10	
Tonini, Gabriella, 0C	
Vaiopoulos, Aristides, 0W	
Voormansik, Kaupo, 06	
Wessollek, Christine, 0B, 0M	
Xu, Pengmei, 02	
Yamagata, Yoshiki, 0V	

Conference Committee

Symposium Chair

Charles R. Bostater, Florida Institute of Technology, Marine-
Environmental Optics Laboratory and Remote Sensing Center
(United States)

Symposium Co-chair

Klaus Schäfer, Karlsruher Institut für Technologie, Institute of
Meteorology and Climate Research (Germany)

Conference Chairs

Ulrich Michel, MU Consulting (Germany)
Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und
Bildauswertung (Germany)

Conference Co-chairs

Manfred Ehlers, Universität Osnabrück (Germany)
Konstantinos G. Nikolakopoulos, University of Patras (Greece)
Daniel Civco, University of Connecticut (United States)

Conference Program Committee

Thomas Blaschke, Universität Salzburg (Austria)
Markus Boldt, Fraunhofer-Institut für Optronik, Systemtechnik und
Bildauswertung (Germany)
Tilman U. Bucher, Deutsches Zentrum für Luft- und Raumfahrt e.V.
(Germany)
Dimitri Bulatov, Fraunhofer-Institut für Optronik, Systemtechnik und
Bildauswertung (Germany)
Ni-Bin Chang, University of Central Florida (United States)
Garik Gutman, NASA Headquarters (United States)
Marguerite M. Madden, The University of Georgia (United States)
Derya Maktav, İstanbul Teknik Üniversitesi (Turkey)
Matthias S. Moeller, Österreichische Akademie der Wissenschaften
(Austria)
Pablo H. Rosso, RapidEye AG (Germany)
Florian Savopol, Natural Resources Canada (Canada)
Jochen Schiewe, HafenCity Universität Hamburg (Germany)
Wenzhong Shi, The Hong Kong Polytechnic University
(Hong Kong, China)
Alexander Siegmund, University of Education Heidelberg (Germany)

Karl Staenz, University of Lethbridge (Canada)
Kerstin Voss, University of Education Heidelberg (Germany)
Christiane H. Weber, Ecole Nationale Supérieure de Physique de
Strasbourg (France)

Session Chairs

- 1 Sensors and Platforms
Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und
Bildauswertung (Germany)
- 2 Environmental Monitoring Concepts I
Markus Boldt, Fraunhofer-Institut für Optronik, Systemtechnik und
Bildauswertung (Germany)
- 3 Remote Sensing for Archaeology, Cultural and Natural Heritage
Valentina Raimondi, Istituto di Fisica Applicata Nello Carrara (Italy)
- 4 Hazard Mitigation Geologic Applications I
Konstantinos G. Nikolakopoulos, University of Patras (Greece)
- 5 Hazard Mitigation Geologic Applications II
Konstantinos G. Nikolakopoulos, University of Patras (Greece)
- 6 Environmental Monitoring Concepts II
Christine Wessollek, TU Dresden (Germany)
- 7 Processing Methodologies I
Kyriacos Themistocleous, Cyprus University of Technology (Cyprus)
- 8 Processing Methodologies II
Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und
Bildauswertung (Germany)
- 9 Infrastructure and Urban Areas
Dimitri Bulatov, Fraunhofer-Institut für Optronik, Systemtechnik und
Bildauswertung (Germany)

Introduction

These proceedings contain 38 papers that were presented at the SPIE Conference "Earth Resources and Environmental Remote Sensing/GIS Applications" (Conference 9644) formerly known under the title 'Remote Sensing for Environmental Monitoring, GIS Applications, and Geology'. The Conference took place in Toulouse, France from 22 September to 24 September 2015. It was the fifteenth Conference with this topic after its inauguration in Toulouse, France, in 2001.

The Conference sessions with presented papers and interactive posters were grouped into the following themes: Sensors and Platforms, Environmental Monitoring Concepts, Remote Sensing for Archaeology, Cultural and Natural Heritage, Hazard Mitigation Geologic Applications, Processing Methodologies, and Infrastructure and Urban Areas. Lively discussions often continued into the coffee breaks. Although the session topics seemed rather diverse, the multidisciplinary community of this Conference allowed discussion of important topics from several interesting point of views. E.g. actual space borne sensors allows long term monitoring of oil pollution in an extraordinary precision and with really concerning results leading to an intensive and interesting discussion between experts of several disciplines. After all there was a strong support from the audience to continue these themes for future conferences and following the suggestions we will try to organize a special session dealing with methods and assessment of actual data fusion techniques.

The paper submission and review processes were again perfectly organized by the SPIE staff. We like to thank the on-site SPIE staff for their responsiveness and support. We are also grateful to our Program Committee for their help in the reviewing and session compilation process.

Ulrich Michel
Karsten Schulz
Manfred Ehlers
Konstantinos G. Nikolakopoulos
Daniel Civco