Contents

vii    Authors
ix     Conference Committee
xi    Introduction

NATURAL RESOURCES MONITORING

9637 02    Estimation of crop parameters using multi-temporal optical and radar polarimetric satellite
data [9637-2]

9637 03    Seasonal parameter extraction of paddy rice fields in West Java using multi-temporal
MODIS imagery datasets [9637-3]

9637 04    Using remote sensing to calculate plant available nitrogen needed by crops on swine
factory farm sprayfields in North Carolina [9637-4]

HYPER SPECTRAL, SPECTROSCOPY AND FLUORESCENCE

9637 05    A critique of field spectroscopy and the challenges and opportunities it presents for remote
sensing for agriculture, ecosystems, and hydrology (Invited Paper) [9637-5]

9637 06    Determination of pasture quality using airborne hyperspectral imaging [9637-6]

9637 07    An advanced fluorescence LIDAR system for the acquisition of interleaved active (LIF) and
passive (SIF) fluorescence measurements on vegetation [9637-7]

9637 08    Estimation of leaf chlorophyll content in winter wheat using variable importance for
projection (VIP) with hyperspectral data [9637-8]

9637 09    Disease stress detection on citrus using a leaf optical model and field spectroscopy
[9637-9]

UAV AND HIGH SPATIAL RESOLUTION IMAGERY

9637 0A    Complementing airborne laser bathymetry with UAV-based lidar for capturing alluvial
landscapes [9637-10]

9637 0D    The inversion model of soil organic matter of cultivated land based on hyperspectral
technology [9637-13]
Mangrove species mapping in Kuala Sepetang Mangrove Forest, Perak using high resolution airborne data [9637-14]

IMAGE CLASSIFICATION

RGB picture vegetation indexes for High-Throughput Phenotyping Platforms (HTPPs) [9637-22]

EVAPOTRANSPIRATION AND ENERGY BALANCE I

Water balance indicators from MODIS images and agrometeorological data in Minas Gerais state, Brazil [9637-30]

Evaluation of disaggregated thermal images for evapotranspiration estimation in Barrax test site [9637-31]

EVAPOTRANSPIRATION AND ENERGY BALANCE II

Testing two temporal upscaling schemes for the estimation of the time variability of the actual evapotranspiration [9637-34]

Modelling radiation and energy balances with Landsat 8 images under different thermohydrological conditions in the Brazilian semi-arid region [9637-37]

HYDROLOGY AND IRRIGATION

Determination of water body structures for small rivers using remote sensing data [9637-40]

Monitoring irrigation volumes using high-resolution NDVI image time series: calibration and validation in the Kairouan plain (Tunisia) [9637-45]

VEGETATION AND CARBON MONITORING

GLORI: a new airborne GNSS reflectometry instrument for land surface monitoring [9637-50]

VEGETATION MODELLING

Application of a regularized model inversion system (REGFLEC) to multi-temporal RapidEye imagery for retrieving vegetation characteristics (Invited Paper) [9637-52]

Modelling canopy radiation budget through multiple scattering approximation: a case study of coniferous forest in Mexico City valley [9637-53]
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>9637 1A</td>
<td>Algorithm developing of gross primary production from its capacity and a canopy conductance index using flux and global observing satellite data</td>
<td>9637-55</td>
</tr>
<tr>
<td>9637 1B</td>
<td>Interpreting snowpack radiometry using currently existing microwave radiative transfer models</td>
<td>9637-56</td>
</tr>
<tr>
<td>9637 1D</td>
<td>Extracting fields snow coverage information with HJ-1A/B satellites data</td>
<td>9637-58</td>
</tr>
<tr>
<td>9637 1F</td>
<td>Mapping of bare soil surface parameters from TerraSAR-X radar images over a semi-arid region</td>
<td>9637-60</td>
</tr>
<tr>
<td>9637 1G</td>
<td>A multi-scale soil moisture and temperature regularly automatic monitoring network aim at multi-satellite data validation in Tibet Plateau</td>
<td>9637-44</td>
</tr>
<tr>
<td></td>
<td><strong>SNOW AND ICE HYDROLOGY</strong></td>
<td></td>
</tr>
<tr>
<td>9637 1J</td>
<td>Analysis of principal elements of land surface temperature retrieval from AVHRR over Tibetan Plateau</td>
<td>9637-62</td>
</tr>
<tr>
<td>9637 1L</td>
<td>Winter wheat GPC estimation with fluorescence-based sensor measurements of canopy</td>
<td>9637-64</td>
</tr>
<tr>
<td>9637 1M</td>
<td>Performance of fluorescence retrieval methods and fluorescence spectrum reconstruction under various sensor spectral configurations</td>
<td>9637-65</td>
</tr>
<tr>
<td>9637 1N</td>
<td>Monitoring the ratio of leaf carbon to nitrogen in winter wheat with hyperspectral measurements</td>
<td>9637-66</td>
</tr>
<tr>
<td>9637 1O</td>
<td>Endmember identification from EO-1 Hyperion L1_R hyperspectral data to build saltmarsh spectral library in Hunter Wetland, NSW, Australia</td>
<td>9637-67</td>
</tr>
<tr>
<td>9637 1P</td>
<td>The impact of different reference panels on spectral reflectance coefficients of some biological water pollutants</td>
<td>9637-68</td>
</tr>
<tr>
<td>9637 1S</td>
<td>The applicability of FORMOSAT-2 images to coastal waters/bodies classification</td>
<td>9637-74</td>
</tr>
<tr>
<td>9637 1Z</td>
<td>Derivation from the Landsat 7 NDVI and ground truth validation of LAI and interception storage capacity for wetland ecosystems in Biebrza Valley, Poland</td>
<td>9637-81</td>
</tr>
<tr>
<td>9637 20</td>
<td>Processing of airborne laser scanning data to generate accurate DTM for floodplain wetland</td>
<td>9637-82</td>
</tr>
<tr>
<td>9637 21</td>
<td>Fire detection from hyperspectral data using neural network approach</td>
<td>9637-83</td>
</tr>
<tr>
<td>9637 23</td>
<td>Mapping areas invaded by Prosopis juliflora in Somaliland on Landsat 8 imagery</td>
<td>9637-87</td>
</tr>
<tr>
<td>9637 26</td>
<td>Dielectric properties of marsh vegetation</td>
<td>9637-90</td>
</tr>
</tbody>
</table>

Proc. of SPIE Vol. 9637 963701-5

Altimetry backscattering signatures at Ku and S bands over land and ice sheets [9637-92]

Forecasting of cereals yields in a semi-arid area using the agrometeorological model «SAFY» combined to optical SPOT/HRV images [9637-94]

Winter wheat growth spatial variation monitoring through hyperspectral remote sensing image [9637-95]

Application of agrometeorological spectral model in rice area in southern Brazil [9637-96]

Delay-tolerant mobile network protocol for rice field monitoring using wireless sensor networks [9637-100]

Mapping crop based on phenological characteristics using time-series NDVI of operational land imager data in Tadla irrigated perimeter, Morocco [9637-102]

Identification and characterization of agro-ecological infrastructures by remote sensing [9637-104]

Early pest detection in soy plantations from hyperspectral measurements: a case study for caterpillar detection [9637-105]

Investigation variation of carbon dioxide based on GOSAT data in peninsular Malaysia [9637-112]

An assessment of the impact of climate change effects on forest land cover based on satellite data [9637-113]

Estimating canopy water content of wetland vegetation using hyperspectral and multispectral remote sensing data [9637-115]
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.

Adinarayana, J., 09
Almansa, Mónica, 2I
Amici, Stefania, 21
Andrade, Ricardo G., 0O, 0U, 2B
Andrzej, José Luis, 0J
Atzberger, Clement, 23
Bachaoui, El Mostafa, 2G
Badnakhe, Mrunalini R., 09
Baghdadi, N., 1F
Barbin, Silvio E., 2E
Baup, Frédéric, 02
Bayma-Silva, Gustavo, 2B
Beh, B. C., 0E
Berezowski, Tomasz, 1Z
Betbeder, Julie, 02
Biancamaria, Sylvain, 27
Blarel, Fabien, 27
Blumstein, Denis, 27
Bolfe, Edson L., 0O, 2B
Borderies, Pierre, 27
Bouch, Naima, 2G
Boulet, G., 10
Bolte, Edson L., 0O, 2B
Borderies, Pierre, 27
Bouch, Naima, 2G
Boulet, G., 10
Calmant, Stéphane, 27
Cao, Guangzhen, 1J
Capodici, F., 0S
Cardoso, Jarbas Lopes, Jr., 2E
Caselles, V., 0P
Castiglioni, Enrique, 2I
Chahbi, Aicha, 29
Chang, Hsing-Chung, 1O
Chéret, V., 2H
Chornański, Jaroslav, 1Z
Christenson, Elizabeth, 04
Cirillo, G., 0S
Corona-Romero, Nirani, 18
d’Abzac, A., 2H
Daigo, Motomasa, 1A
da Silva, Gustavo B., 0O, 2B
de C. Teixeira, Antonio Heriberto, 0O, 0U, 2B
de C. Victoria, Daniel, 0O, 2B
Di Ninni, Paolo, 07
Dida, Adrian I., 2P
Dong, Lixin, 1G, 1J
Dong, Wenquan, 1D
Duarte, Lia, 1S
Ducrot, D., 2H
Durbha, Surya, 09
Dutchot, S., 2H
El-Haddad, George, 0J
El Harti, Abderrazak, 2G
El Moujahid, Ali, 2G
El Ouazzani, Rabil, 2G
Fanise, Pascal, 15
Fatras, Christophe, 27
Feng, Hai-kuan, 08, 1N
Fernández Flores, Germán, 2I
Fernández Liñares, Germán, 2I
Fernández Liñares, Ignacio, 2I
Ferro-Famil, Laurent, 02
Fieuzal, Remy, 02
Frappart, Frédéric, 27
Furumi, Shinobu, 1A
Gadaïn, Hussein, 23
Giola, Philippe, 0A
Gorbar, A., 1F
Grygoruk, Mateusz, 20
Gu, Xiao-he, 0D, 1L, 1N, 2A
Guitton, Alexandre, 2E
Haring, Alexander, 0A
He, Peng, 08
Henzen, Daniel, 0W
Hernandez, Fernando B. T., 0U
Hörold, Max, 0W
Houborg, Rasmus, 17
Huang, Jin, 2R
Huang, Qingni, 1J
Hunger, Sebastian, 0W
Irvin, M. E., 06
Jenerowicz, Agnieszka, 1P
Jetten, V. G., 03
Kang, Do-Hyuk, 1B
Kardel, Ignacy, 20
Karrasch, Pierre, 0W
Kawtrakul, Asane, 2E
Kefauver, Shawn C., 0J
Kereszturi, G., 06
Kim, Edward J., 1B
Kleniewska, Malgorzata, 1Z
Kochetkova, Tatiana D., 26
La Loggia, G., 0S
Legréry, Benoît, 27
Leiva, Janice F., 0O, 0U, 2B
Lema, Gabriel, 2I
Leonardi, Ugo, 23
Lhissou, Rachid, 2G
Li, Rong, 1M
Conference Committee

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

Symposium Co-chair
Klaus Schäfer, Karlsruhe Institute of Technology, Institute of Meteorology and Climate Research (Germany)

Conference Chairs
Christopher M. U. Neale, University of Nebraska Lincoln (United States)
Antonino Maltese, Università degli Studi di Palermo (Italy)

Conference Program Committee
Shahid Habib, NASA Goddard Space Flight Center (United States)
Antonino Maltese, Università degli Studi di Palermo (Italy)
Christopher M. U. Neale, University of Nebraska Lincoln (United States)

Session Chairs
Natural Resources Monitoring
Christopher M. U. Neale, University of Nebraska Lincoln (United States)

Hyperspectral, Spectroscopy and Fluorescence
Antonino Maltese, Università degli Studi di Palermo (Italy)

UAV and High Spatial Resolution Imagery
Antonino Maltese, Università degli Studi di Palermo (Italy)

Image Classification
Christopher M. U. Neale, University of Nebraska Lincoln (United States)

Agricultural Applications
Shahid Habib, NASA Goddard Space Flight Center (United States)

Evapotranspiration and Energy Balance I
Antonino Maltese, Università degli Studi di Palermo (Italy)

Evapotranspiration and Energy Balance II
Antonino Maltese, Università degli Studi di Palermo (Italy)
Hydrology and Irrigation
Christopher M. U. Neale, University of Nebraska Lincoln (United States)

Vegetation and Carbon Monitoring
Christopher M. U. Neale, University of Nebraska Lincoln (United States)

Vegetation Modelling
Christopher M. U. Neale, University of Nebraska Lincoln (United States)

Snow and Ice Hydrology
Antonino Maltese, Università degli Studi di Palermo (Italy)
Introduction

This proceedings volume includes papers presented during the conference on Remote Sensing for Agriculture, Ecosystems, and Hydrology. The conference was part of the International Symposium on Remote Sensing sponsored by SPIE. The symposium was held at the Centre de Congrès Pierre Baudis, Toulouse, France, 21-24 September 2015.

The conference is dedicated to providing rapid dissemination of scientific and technical information, and attracts scientists and professionals from throughout Europe, Africa, Asia, and the Americas. Approximately 34 oral and 25 poster presentations were given this year, covering a broad range of topics in the field of remote sensing applications in environmental science.

The program was organized according to major themes, with 10 sessions on agriculture: natural resources monitoring; hyperspectral, spectroscopy and fluorescence; UAV and high spatial resolution imagery; image classification; agricultural applications; evapotranspiration and energy balance (covered in two sessions); hydrology and irrigation; vegetation and carbon monitoring; vegetation modelling; and snow and ice hydrology.

The poster presentations also followed the above-mentioned themes, discussing both fundamental and applications-based research activities, including modelling, laboratory and field experiments, and operational applications.

We extend our gratitude to Dr. Alasdair Mac Arthur (NERC/NCEO Field Spectroscopy Facility, GeoSciences, University of Edinburgh, United Kingdom) for giving the invited presentation, A critique of field spectroscopy and the challenges and opportunities it presents for remote sensing for agriculture, ecosystems, and hydrology; and Dr. Rasmus M. Houborg (King Abdullah University of Science and Technology, Saudi Arabia) for giving the invited presentation, Application of a regularized model inversion system (REGFLEC) to multi-temporal RapidEye imagery for retrieving vegetation characteristics. Our appreciation and gratitude goes also to the presenters for their efforts and to the participants for their insightful questions and discussions. Special thanks are also due to the host city for the excellent venue and to all of the SPIE organizational staff for their support prior to, during, and after the symposium. We look forward to an even more successful conference in 2016.

Christopher M. U. Neale
Antonino Maltese