

# **IGARSS 2018 – 2018 IEEE International Geoscience and Remote Sensing Symposium**

**Valencia, Spain  
22-27 July 2018**

**Pages 1-660**



**IEEE Catalog Number: CFP18IGA-POD  
ISBN: 978-1-5386-7151-1**

**Copyright © 2018 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP18IGA-POD
ISBN (Print-On-Demand):	978-1-5386-7151-1
ISBN (Online):	978-1-5386-7150-4
ISSN:	2153-6996

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# TABLE OF CONTENTS

## MO3-R1: DATA FUSION AND MULTIMODALITY I

### MO3-R1.1: GABOR WAVELET BASED FEATURE EXTRACTION AND FUSION FOR ..... 1 HYPERSPSCTRAL AND LIDAR REMOTE SENSING DATA

*Sen Jia, Meng Zhang, Jiasong Zhu, College of Computer Science and Software Engineering, Shenzhen University, China*

### MO3-R1.2: MULTI-FEATURE-BASED DECISION FUSION FRAMEWORK FOR ..... 5 HYPERSPSCTRAL IMAGERY CLASSIFICATION

*Sen Jia, Junjian Xian, Shenzhen University, China*

### MO3-R1.3: COMBINE REFLECTANCE WITH SHADING COMPONENT FOR ..... 9 HYPERSPSCTRAL IMAGE CLASSIFICATION

*Xudong Jin, Yanfeng Gu, Harbin Institute of Technology, China*

### MO3-R1.4: OBJECT DETECTION FOR HIGH-RESOLUTION SAR IMAGES UNDER THE ..... 13 SPATIAL CONSTRAINTS OF OPTICAL IMAGES

*Qi Li, Ye Zhang, Hao Chen, Guangjiao Zhou, Harbin Institute of Technology, China*

### MO3-R1.5: AUTOMATIC ASSOCIATION BETWEEN SAR AND OPTICAL IMAGES BASED ON ..... 17 ZERO-SHOT LEARNING

*Takahiro Toizumi, Kazutoshi Sagi, Yuzo Senda, NEC Corporation, Japan*

## MO4-R1: TARGET DETECTION IN SAR IMAGES

### MO4-R1.1: ROLLABLE LATENT SPACE FOR AZIMUTH INVARIANT SAR TARGET ..... 21 RECOGNITION

*Kazutoshi Sagi, Takahiro Toizumi, Yuzo Senda, NEC Corporation, Japan*

### MO4-R1.2: INSHORE SHIP DETECTION IN SAR IMAGES BASED ON DEEP NEURAL ..... 25 NETWORKS

*Lei Liu, Guowei Chen, Zongxu Pan, Bin Lei, Quanzhi An, Institute of Electronics, Chinese Academy of Sciences, China*

### MO4-R1.3: ACHIEVING SAR TARGET CONFIGURATION RECOGNITION BY COMBINING ..... 29 SPARSE GRAPH AND LOCALITY PRESERVING PROJECTIONS

*Ming Liu, Shaanxi Normal University, China; Shichao Chen, Fugang Lu, Jun Wang, Xi'an Modern Control Technology Research Institute, China; Jie Wu, Shaanxi Normal University, China; Taoli Yang, University of Electronic Science and Technology of China, China*

### MO4-R1.4: THE INFLUENCE OF SAR IMAGE QUANTIZATION METHOD ON DETECTION ..... 33 PRECISION

*Bing Sun, Zhixiong Zuo, Pengbo Wang, Beihang University, China*

### MO4-R1.5: IDENTITY REGULARIZED SPARSE REPRESENTATION FOR AUTOMATIC ..... 37 TARGET RECOGNITION IN SAR IMAGES

*Zongxu Pan, Lei Liu, Bin Lei, Institute of Electronics, Chinese Academy of Sciences, China*

## MO3-R2: MICROWAVE BACKSCATTERING MODELS FOR SEA SURFACE

### MO3-R2.1: INVESTIGATION OF DOPPLER SPECTRA OF SEA BACKSCATTER THROUGH ..... 41 LARGE-SCALE MONTE CARLO SIMULATIONS: DIRECT NUMERICAL SOLUTION AND APPROXIMATE MODELS

*Jakov Toporkov, Mark Sletten, U.S. Naval Research Laboratory, United States*

<b>MO3-R2.2: PHYSICAL MODELING OF OIL AT SEA: APPLICATION FOR MICROWAVE CO-POLARIZED RADAR IMAGERY</b>	<b>45</b>
<i>Olivier Boisot, Sébastien Angelliaume, Office National d'Etudes et de Recherches Aérospatiales (ONERA), France; Charles-Antoine Guérin, Mediterranean Institute of Oceanography (MIO), France</i>	
<b>MO3-R2.3: SEA OIL SEEP MONITORING USING A TIME SERIES OF CO-POLARIZED COHERENT SAR MEASUREMENTS</b>	<b>49</b>
<i>Carina R. de Macedo, Andrea Buono, Ferdinando Nunziata, Università di Napoli Parthenope, Italy; Domenico Velotto, German Aerospace Center (DLR), Germany; Maurizio Migliaccio, Università di Napoli Parthenope, Italy</i>	
<b>MO3-R2.4: NORMALIZED RADAR CROSS SECTIONS OF SEA SURFACE ESTIMATED USING ASYMPTOTIC AND SEMI-EMPIRICAL METHODS IN C BAND</b>	<b>53</b>
<i>Honglei Zheng, Ali Khenchaf, Ghanmi Helmi, ENSTA Bretagne, France; Yunhua Wang, Chaofang Zhao, Ocean University of China, China</i>	
<b>MO3-R2.5: A STUDY OF CROSS-POLARIZED SEA CLUTTER USING THE SSA2 HIGH FREQUENCY APPROXIMATION AND THE TWO-SCALE MODEL</b>	<b>57</b>
<i>Shanka Wijesundara, Joel Johnson, The Ohio State University, United States</i>	
<b>MO4-R2: SAR INTERFEROMETRY: ALONG AND ACROSS I</b>	
<b>MO4-R2.2: COHERENCE CHANGE DETECTION FOR SENTINEL-1 SAR: METHODS AND APPLICATIONS</b>	<b>64</b>
<i>Andrea Monti-Guarnieri, Maria Antonia Brovelli, Mauro Mariotti d'Alessandro, Marco Manzoni, Monia Elisa Molinari, Daniele Oxoli, Politecnico di Milano, Italy</i>	
<b>MO4-R2.3: INSAR MISSION-LEVEL PRODUCTS ON DEMAND – DO WE NEED RANGE-DOPPLER?</b>	<b>68</b>
<i>Howard Zebker, Stanford University, United States</i>	
<b>MO4-R2.4: THE 2-LOOKS TOPS MODE: ENHANCED SENSITIVITY TO GROUND DISPLACEMENT IN AZIMUTH DIRECTION WITH BURST-MODE SAR SYSTEMS. DEMONSTRATION WITH TERRASAR-X</b>	<b>72</b>
<i>Nestor Yague-Martinez, Pau Prats-Iraola, Steffen Wollstadt, DLR - German Aerospace Center, Germany</i>	
<b>MO4-R2.5: TWO-DIMENSIONAL DISPLACEMENT ANALYSIS WITH SAR IMAGES BASED ON PERSISTENT SCATTERER CLUSTERING</b>	<b>76</b>
<i>Daisuke Ikefuji, Taichi Tanaka, Osamu Hoshuyama, NEC Corporation, Japan</i>	
<b>MO3-R3: SOIL MOISTURE VALIDATION</b>	
<b>MO3-R3.1: SURFACE SOIL MOISTURE ESTIMATION FROM MODIS APPARENT THERMAL INERTIA: A COMPARISON WITH SMOS AND SMAP SOIL MOISTURE PRODUCTS</b>	<b>80</b>
<i>Miriam Pablos, Ángel González-Zamora, Nilda Sánchez, University of Salamanca, Spain; Gerard Portal, Mercè Vall-llossera, Universitat Politècnica de Catalunya, Spain; José Martínez-Fernández, University of Salamanca, Spain</i>	
<b>MO3-R3.2: VALIDATION OF SOIL MOISTURE IN THE BRAZILIAN SEMIARID, USING SMOS SATELLITE PRODUCT AND SIMAGRI MODEL</b>	<b>84</b>
<i>Luciana Rossato, Mercè Vall-llossera, Adriano Camps, Gerard Portal, Universitat Politècnica de Catalunya, IEEC/UPC and SMOS Barcelona Expert Centre, Spain; Joghly Sakuragi, Carlos Frederico Angelis, Marcelo Zeri, National Centre for Monitoring and Early Warning of Natural Disasters, Brazil; Humberto Barbosa, Franklin Paredes, Federal University of Alagoas, Brazil</i>	
<b>MO3-R3.3: INTERCALIBRATION OF LOW FREQUENCY BRIGHTNESS TEMPERATURE MEASUREMENTS FOR LONG-TERM SOIL MOISTURE RECORD</b>	<b>88</b>
<i>Emmanuel Dinnat, Chapman University &amp; NASA/GSFC, United States; Mariko S Burgin, Andreas Colliander, Chunsik Chae, Jet Propulsion Laboratory, California Institute of Technology, United States; Michael H. Cosh, USDA-ARS Hydrology and Remote Sensing Laboratory, United States; Ying Gao, Monash University, Australia</i>	

<b>MO3-R3.4: EVALUATION OF LAND SURFACE MODEL AGAINST SMAP AND IN-SITU OBSERVATIONS FOR INDIAN REGION</b>	<b>92</b>
<i>Kamal Das, Jitendra Singh, RSM, IBM Research, India; Jagabondhu Hazra, Manager, IBM Research, India, India; Shivkumar Kalyanaraman, Sr Manager, IBM Research, India, India</i>	
<b>MO3-R3.5: DETERMINATION OF BEST LOW-FREQUENCY MICROWAVE ANTENNA APPROACH FOR FUTURE HIGH RESOLUTION MEASUREMENTS FROM SPACE</b>	<b>96</b>
<i>Peggy O'Neill, Rajat Bindlish, Jeffrey Piepmeier; David Le Vine, Derek Hudson, Lihua Li, Gerado Cruz-Ortiz, David Olney, NASA Goddard Space Flight Center, United States</i>	
 <b>MO4-R3: SOIL PARAMETERS FROM MICROWAVE AND OTHER FREQUENCIES I</b>	
<b>MO4-R3.1: A FIRST-ORDER RADIATIVE TRANSFER MODEL FOR GLOBAL SOIL MOISTURE RETRIEVALS UNDER VEGETATION CANOPIES</b>	<b>100</b>
<i>Andrew Feldman, Ruzbeh Akbar, Dara Entekhabi, Massachusetts Institute of Technology, United States</i>	
<b>MO4-R3.2: IDENTIFYING SMOS AND SMAP PIXELS THAT EXHIBIT DISTINCT ROUGHNESS-VEGETATION PATTERNS IN LEVEL 2 OPTICAL THICKNESS RETRIEVALS</b>	<b>104</b>
<i>Victoria Walker, Brian K. Hornbuckle, Brian Gelder, Iowa State University, United States</i>	
<b>MO4-R3.3: UNCERTAINTY OF EFFECTIVE ROUGHNESS PARAMETERS CALIBRATED ON BARE AGRICULTURAL LAND USING SENTINEL-1 SAR</b>	<b>108</b>
<i>Harm-Jan F. Benninga, Rogier van der Velde, Zhongbo Su, University of Twente, Netherlands</i>	
<b>MO4-R3.4: IRRIGATION MAPPING USING STATISTICS OF SENTINEL-1 TIME SERIES</b>	<b>112</b>
<i>Qi Gao, isardSAT, Spain; Mehrez Zribi, CESBIO, France; Maria Jose Escorihuela, isardSAT, Spain; Nicolas Baghdadi, IRSTEA, France; Pere Quintana-Segui, Observatori de l'Ebre, Spain</i>	
 <b>MO3-R4: OCEAN BIOLOGY AND WATER QUALITY I</b>	
<b>MO3-R4.1: LINKING WEATHER PATTERNS, WATER QUALITY AND INVASIVE MUSSEL DISTRIBUTIONS IN THE DEVELOPMENT AND APPLICATION OF A WATER CLARITY INDEX FOR THE GREAT LAKES</b>	<b>120</b>
<i>Varis Ransibrahmanakul, U.S. National Oceanic &amp; Atmospheric Administration, United States; Simon Pittman, Plymouth University, United Kingdom; Douglas Pirhalla, U.S. National Oceanic &amp; Atmospheric Administration, United States; Scott Sheridan, Cameron Lee, Kent State University, United States; Brian Barnes, Chuanmin Hu, University of South Florida, United States; Karsten Shein, U.S. National Oceanic &amp; Atmospheric Administration, United States</i>	
<b>MO3-R4.2: RETRIEVAL OF CASE 2 WATER QUALITY PARAMETERS WITH MACHINE LEARNING</b>	<b>124</b>
<i>Ana Belen Ruescas, Gonzalo Mateo-García, Gustau Camps-Valls, University of Valencia, Spain; Martin Hieronymi, Helmholtz-Zentrum Geesthacht, Germany</i>	
<b>MO3-R4.3: EFFECTS OF NONUNIFORM VERTICAL PROFILES OF SUSPENDED PARTICLES ON REMOTE SENSING REFLECTANCE OF TURBID WATER</b>	<b>128</b>
<i>Jue Huang, Tao Jiang, Shandong University of Science and Technology, China</i>	
<b>MO3-R4.4: EVALUATION OF TIDAL EFFECT ON WATER CONSTITUENT VARIATIONS USING OPTICAL OBSERVATIONS AND TIDE GAUGE RECORDS IN THE DUTCH WADDEN SEA</b>	<b>132</b>
<i>Behnaz Arabi, Mhd.Suhyb Salama, Wouter Verhoef, University of Twente, Netherlands</i>	
<b>MO3-R4.5: SHALLOW WATER OCEAN COLOR OBSERVATIONS INVERSION USING PARTICLE SWARM OPTIMIZATION AND GENETIC ALGORITHM</b>	<b>136</b>
<i>Srinivas Kolluru, Shirish S. Gedam, Inamdar A B, Indian Institute of Technology Bombay, India</i>	

## **MO4-R4: OCEAN SURFACE WINDS AND CURRENTS I**

### **MO4-R4.1: NON-SUN-SYNCHRONOUS OCEAN SURFACE WIND MEASUREMENT UNDER HEAVY RAIN BY CYGNSS ..... 140**

*W Timothy Liu, Xiaosu Xie, California Institute of Technology, United States*

### **MO4-R4.2: HOW FAST ARE FAST SCATTERERS ASSOCIATED WITH BREAKING WIND WAVES? ..... 142**

*Yury Yurovsky, Vladimir Kudryavtsev, Russian State Hydrometeorological University, Russian Federation; Bertrand Chapron, Institut Francais de Recherche pour l'Exploitation de la Mer, France; Semyon Grodsky, University of Maryland, France*

### **MO4-R4.3: A NEW TECHNIQUE FOR PHASE-RESOLVING OCEAN WAVE OBSERVATIONS BY SPACEBORNE SPOTLIGHT-MODE SYNTHETIC APERTURE RADAR ..... 146**

*Roland Romeiser, Hans Graber, University of Miami RSMAS, United States*

### **MO4-R4.4: HURRICANE HUNTER OBSERVATIONS OF WIND AND WAVE SPECTRAL PROPERTIES: IMPLICATIONS ON TROPICAL CYCLONE REMOTE SENSING ..... 149**

*Paul Hwang, Yalin Fan, NRL, United States; Edward Walsh, NOAA, United States*

### **MO4-R4.5: ADVANCES IN SURFACE CURRENT OBSERVATIONS FROM SPACE: THE GLOBCURRENT CASE ..... 153**

*Johmy A. Johannessen, Nansen Environmental and Remote Sensing Center, Norway; Bertrand Chapron, IFREMER, France; Fabrice Collard, OceanDataLab, France; Marie-Helene Rio, Collecte Localisation Satellite, France; Graham Quartly, Plymouth Marine Laboratory, United Kingdom; Craig Donlon, European Space Agency, Netherlands*

## **MO3-R5: INTERNATIONAL SPACEBORNE IMAGING SPECTROSCOPY MISSIONS: UPDATES AND NEWS I**

### **MO3-R5.1: TOWARDS THE COPERNICUS HYPERSPECTRAL IMAGING MISSION FOR THE ENVIRONMENT (CHIME) ..... 157**

*Jens Nieve, European Space Agency/ESTEC, Netherlands; Michael Rast, European Space Agency/ESRIN, Italy*

### **MO3-R5.2: HISUI STATUS TOWARD FY2019 LAUNCH ..... 160**

*Tsuneo Matsunaga, National Institute for Environmental Studies, Japan; Akira Iwasaki, University of the Tokyo, Japan; Satoshi Tsuchida, Koki Iwao, National Institute of Advanced Industrial Science and Technology, Japan; Jun Tanii, Osamu Kashimura, Japan Space Systems, Japan; Ryosuke Nakamura, Hirokazu Yamamoto, Soushi Kato, Kenta Obata, National Institute of Advanced Industrial Science and Technology, Japan; Koichiro Mouri, Tetsushi Tachikawa, Japan Space Systems, Japan*

### **MO3-R5.3: A STUDY ON THE AEROSOL OPTICAL PROPERTY OVER VALIDATION SITES IN JAPAN FOR HISUI ATMOSPHERICALLY CORRECTED SURFACE REFLECTANCE ..... 164**

*Hirokazu Yamamoto, Satoshi Tsuchida, AIST, Japan; Masao Moriyama, Nagasaki University, Japan*

### **MO3-R5.4: THE ENMAP GERMAN IMAGING SPECTROSCOPY MISSION: STATUS AND SUMMARY OF PREPARATORY ACTIVITIES ..... 168**

*Luis Guanter, Karl Segl, Saskia Foerster, Sabine Chabrillat, Helmholtz Center Potsdam, GFZ German Research Center for Geosciences, Germany; Sebastian Fischer, Benjamin Gentz, Godela Rossner, Stefanie Schrader, Space Administration, German Aerospace Center (DLR), Germany; Tobias Storch, Earth Observation Center (EOC), German Aerospace Center (DLR), Germany*

### **MO3-R5.5: STATUS REPORT OF THE ENMAP GROUND SEGMENT: PRESENTATION OF THE DESIGN AND THE CHANGES RECENTLY ACCOMPLISHED ..... 171**

*Martin Habermeyer, Martin Bachmann, Emiliano Carmona, Heiko Damerow, Sabine Engelbrecht, Thomas Fruth, Uta Heiden, Klaus-Dieter Missling, Helmut Mühle, Andreas Ohndorf, Gintautas Palubinskas, Tobias Storch, Steffen Zimmermann, DLR - German Aerospace Center, Germany*

## **MO4-R5: INTERNATIONAL SPACEBORNE IMAGING SPECTROSCOPY MISSIONS: UPDATES AND NEWS II**

**MO4-R5.1: PRISMA: THE ITALIAN HYPERSPECTRAL MISSION ..... 175**  
*Rosa Loizzo, Rocchina Guarini, Francesco Longo, Tiziana Scopa, Roberto Formaro, Claudia Facchinetti, Giancarlo Varacalli, Italian Space Agency, Italy*

**MO4-R5.2: PRISMA HYPERSPECTRAL MISSION PRODUCTS ..... 179**  
*Rocchina Guarini, Rosa Loizzo, Claudia Facchinetti, Francesco Longo, Italian Space Agency, Italy; Beatrice Ponticelli, Marco Faraci, Michele Dami, Massimo Cosi, Leonardo S.p.a., Italy; Leonardo Amoroso, Vito De Pasquale, Nicolò Taggio, Francesca Santoro, Planetek Italia srl, Italy; Paolo Colandrea, Efer Miotti, Walter Di Nicolantonio, OHB Italia SpA, Italy*

**MO4-R5.3: GLOBAL VSWIR IMAGING SPECTROSCOPY AND THE 2017 DECADAL SURVEY ..... 183**  
*Robert Green, Jet Propulsion Laboratory, California Institute of Technology, United States*

**MO4-R5.4: INTERCOMPARISON OF FIELD METHODS FOR ACQUIRING GROUND REFLECTANCE AT RAILROAD VALLEY PLAYA FOR SPECTRAL CALIBRATION OF SATELLITE DATA ..... 186**  
*Ian Lau, Cindy Ong, CSIRO, Australia; Kurtis Thome, NASA Goddard Space Flight Center, United States; Andreas Mueller, Uta Heiden, German Aerospace Center (DLR), Germany; Jeffrey Czaplá-Myers, Stuart Biggar, Nikolaus Anderson, University of Arizona, United States; Lorcan McGonigle, William Thomas, Spaceflight Industries, United States; Carolina Barrientos, Aerial Photogrammetric Service (SAF), Chile; Yuki Itoh, University of Massachusetts Amherst, United States; Brian Wenny, NASA Goddard Space Flight Center, United States*

**MO4-R5.5: PROCESSING, VALIDATION AND QUALITY CONTROL OF SPACEBORNE IMAGING SPECTROSCOPY DATA FROM DESIS MISSION ON THE ISS ..... 189**  
*Rupert Mueller, Martin Bachmann, Kevin Alonso, Emiliano Carmona, Daniele Cerra, Raquel De los Reyes, Birgit Gerasch, Harald Krawczyk, Valentin Ziel, Uta Heiden, David Krutz, German Aerospace Center (DLR), Germany*

## **MO3-R6: LAND COVER DYNAMICS I**

**MO3-R6.1: A NOVEL APPROACH TO MONITOR DEFORESTATION IN THE AMAZON RAINFOREST BY MEANS OF SENTINEL-1 AND TANDEM-X DATA ..... 192**  
*Paola Rizzoli, José Luis Bueso Bello, Andrea Pulella, Francescopaolo Sica, Manfred Zink, German Aerospace Center (DLR), Germany*

**MO3-R6.2: TIMELY MAPPING OF CROP STAGE AND WATERING EVENTS THROUGH SENTINEL-1 TIME-SERIES ..... 196**  
*Lorenzo Iannini, Ramses Molijn, Silvia Alfieri, Susan Steele-Dunne, Massimo Menenti, Delft University of Technology, Netherlands*

**MO3-R6.3: SPATIALLY PRECISE CONTEXTUAL FEATURES BASED ON SUPERPIXEL NEIGHBORHOODS FOR LAND COVER MAPPING WITH HIGH RESOLUTION SATELLITE IMAGE TIME SERIES ..... 200**  
*Dawa Derksen, Jordi Inglada, CESBIO, France; Julien Michel, Centre National d'Etudes Spatiales, France*

**MO3-R6.4: INTRODUCING EUROSAT: A NOVEL DATASET AND DEEP LEARNING BENCHMARK FOR LAND USE AND LAND COVER CLASSIFICATION ..... 204**  
*Patrick Helber, Benjamin Bischke, Andreas Dengel, Damian Borth, German Research Center for Artificial Intelligence, Germany*

## **MO4-R6: LAND SURFACE MAPPING AND MONITORING**

**MO4-R6.1: SQUEESAR ANALYSIS BASED ON SENTINEL-1 DATA IN THE SEISMIC ACTIVE AREA OF PATRAS GULF (W. GREECE) ..... 208**  
*Vassilis Sakkas, National & Kapodistrian University of Athens, Greece; Maite Garcia, Marco Bianchi, TRE ALTAMIRA SLU, Spain; Evangelos Lagios, National & Kapodistrian University of Athens, Greece*

<b>MO4-R6.2: INSAR MONITORING OF PIPELINE ROUTES .....</b>	<b>212</b>
<i>Vernon Singhroy, Junhua Li, Canada Centre for Remote Sensing, Canada; Andree Blais-Stevens, Geological Survey of Canada, Canada; Mary-Anne Fobert, Planetary and Space Science Centre, Canada</i>	
<b>MO4-R6.3: ADVANCES IN MAPPING ICE-FREE SURFACES WITHIN THE NORTHERN ANTARCTIC PENINSULA REGION USING POLARIMETRIC RADARSAT-2 DATA .....</b>	<b>216</b>
<i>Thomas Schmid, CIEMAT, Spain; Stéphane Guillaso, GFZ German Research Center for Geosciences, Germany; Jerónimo López-Martínez, Ana Nieto, Universidad Autónoma de Madrid, Spain; Sandra Mink, Instituto Geológico y Minero de España, Spain; Magaly Koch, Boston University, United States</i>	
<b>MO4-R6.4: GEOLOGICAL MAPPING OF HYDROTHERMAL ALTERATION ON VOLCANOES FROM MULTI-SENSOR PLATFORMS .....</b>	<b>220</b>
<i>Gabor Kereszturi, Reddy Pullanagari, Stuart Mead, Massey University, New Zealand; Lauren Schaefer, University of Canterbury, New Zealand; Jonathan Procter, Massey University, New Zealand; William Kirk Schleiffarth, Northern Arizona University, United States; Ben Kennedy, University of Canterbury, New Zealand</i>	
<b>MO4-R6.5: EVALUATING THE EFFECTS OF VEGETATION HEIGHT AND SLOPE ON THE VERTICAL ACCURACY OF THE TANDEM-X WORLDDEM RAPID CITY SAMPLE TILE .....</b>	<b>224</b>
<i>Juan Carlos Fernandez-Diaz, Hyongki Lee, Ramesh L. Shrestha, University of Houston / NCALM, United States</i>	
<b>MO3-R7: PHYSICAL MODELING IN MICROWAVE REMOTE SENSING I</b>	
<b>MO3-R7.1: PHYSICAL MODELING OF THE UPWIND-DOWNWIND ASYMMETRY IN MICROWAVE RETURN FROM THE SEA SURFACE .....</b>	<b>228</b>
<i>Zaynab Guerraou, Sébastien Angelliaume, ONERA, France; Charles-Antoine Guérin, Université de Toulon, France</i>	
<b>MO3-R7.2: AN ANALYSIS OF BISTATIC SEA CLUTTER STATISTICS .....</b>	<b>232</b>
<i>Ahmed M. Balakhder, Joel Johnson, Hongkun Li, ElectroScience Laboratory, The Ohio State University, United States</i>	
<b>MO3-R7.3: MODELING SIGNALS OF OPPORTUNITY SCATTERING FROM EARTH'S SURFACE WITH AN IMPROVED BISTATIC RADAR EQUATION .....</b>	<b>235</b>
<i>Valery Zavorotny, Alexander Voronovich, NOAA Earth System Research Laboratory, United States</i>	
<b>MO3-R7.4: BISTATIC SCATTERING MODELING FOR DYNAMIC MAPPING OF TROPICAL WETLANDS WITH CYGNSS .....</b>	<b>239</b>
<i>Marco Lavallo, Mary Morris, Rashmi Shah, Cinzia Zuffada, Son V. Nghiem, NASA Jet Propulsion Laboratory, United States; Clara Chew, University Corporation for Atmospheric Research, United States; Valery Zavorotny, NOAA, United States</i>	
<b>MO3-R7.5: BISTATIC SCATTERING FROM INHOMOGENEOUS ROUGH SURFACE WITH CONTINUOUS DIELECTRIC PROFILE .....</b>	<b>243</b>
<i>Ying Yang, Chinese Academy of Sciences/University of Chinese Academy of Sciences, China; Kun-Shan Chen, Chinese Academy of Sciences, China</i>	
<b>MO4-R7: PHYSICAL MODELING IN MICROWAVE REMOTE SENSING II</b>	
<b>MO4-R7.1: MODELING L-BAND SYNTHETIC APERTURE RADAR OBSERVATIONS THROUGH DIELECTRIC CHANGES IN SOIL MOISTURE AND VEGETATION OVER SHRUBLANDS .....</b>	<b>247</b>
<i>Seungbum Kim, Jet Propulsion Laboratory, United States; Motofumi Ariei, Mitsubishi Electric Corporation, Japan; Thomas Jackson, USDA, United States</i>	
<b>MO4-R7.2: PHYSICS-BASED MODELING OF ACTIVE-PASSIVE MICROWAVE COVARIATIONS FOR GEOPHYSICAL RETRIEVALS .....</b>	<b>250</b>
<i>Thomas Jagdhuber, German Aerospace Center (DLR), Germany; Dara Entekhabi, Massachusetts Institute of Technology, United States; Narendra N. Das, California Institute of Technology, United States; Moritz Link, German Aerospace Center (DLR), Germany; Martin Baur, University of Bayreuth, Germany; Ruzbeh Akbar, Massachusetts Institute of Technology, United States; Carsten Montzka, Research Centre Jülich, Germany; SeungBum Kim, Simon Yueh, California Institute of Technology, United States; Ismail Baris, Friedrich-Schiller University Jena, Germany</i>	



<b>MO4-R7.3: FIRST-ORDER SSA MODELING OF THE ANISOTROPIC ROUGH-SOIL BISTATIC SCATTERING</b>	254
<i>Davide Comite, Nazzareno Pierdicca, Sapienza Università di Roma, Italy</i>	
<b>MO4-R7.4: ROUGH SURFACE EFFECTS IN BACKSCATTER RETURNS FROM FORESTS</b>	258
<i>Roger Lang, Can Suer, George Washington University, United States</i>	
<b>MO4-R7.5: NMM3D FULL WAVE SIMULATIONS OF VEGETATION AND FOREST EFFECTS IN MICROWAVE REMOTE SENSING</b>	260
<i>Huanting Huang, Leung Tsang, University of Michigan, Ann Arbor, United States; Andreas Colliander, Rashmi Shah, Simon Yueh, NASA Jet Propulsion Laboratory, California Institute of Technology, United States</i>	
 <b>MO3-R8: DISTRIBUTED SPACECRAFT MISSIONS: NEW REMOTE SENSING CAPABILITIES FOR EARTH SCIENCE I</b>	
<b>MO3-R8.1: SENSOR WEBS OF EARTH SCIENCE INSTRUMENTS TO IMPROVE OUR UNDERSTANDING OF NATURAL PHENOMENA AND PHYSICAL PROCESSES</b>	264
<i>Michael Little, Michael Seabloom, NASA, United States; Brandi Quam, NASA Langley Research Center, United States; Jacqueline LeMoigne-Stewart, NASA, United States; Dan Crichton, Jet Propulsion Laboratory, United States; Marge Cole, SGT, Inc., United States</i>	
<b>MO3-R8.2: DESIGNING FUTURE SPACE SYSTEMS</b>	267
<i>Olivier de Weck, Massachusetts Institute of Technology, United States</i>	
<b>MO3-R8.4: IS THERE A FUTURE FOR GEO-BASED WEATHER MONITORING? THE COVERAGE-COST ARGUMENT</b>	273
<i>Daniel Selva, Prachi Dutta, Cornell University, United States</i>	
 <b>MO4-R8: DISTRIBUTED SPACECRAFT MISSIONS: NEW REMOTE SENSING CAPABILITIES FOR EARTH SCIENCE II</b>	
<b>MO4-R8.1: ENABLING SAMPLING PROPERTIES OF THE CYGNSS SATELLITE CONSTELLATION</b>	277
<i>Christopher Ruf, Charles Bussy-Virat, Darren McKague, Aaron Ridley, University of Michigan, United States; Mary Morris, Jet Propulsion Laboratory, United States</i>	
<b>MO4-R8.2: TROPICS: A DISTRIBUTED SPACECRAFT MISSION FOR STUDYING TROPICAL STORMS</b>	281
<i>William Blackwell, MIT Lincoln Laboratory, United States</i>	
<b>MO4-R8.3: MAGNETOSPHERIC CONSTELLATION: LEVERAGING SPACE 2.0 FOR BIG SCIENCE</b>	285
<i>Larry Kepko, NASA Goddard Space Flight Center, United States</i>	
<b>MO4-R8.4: EVALUATING EXPECTED PERFORMANCE AND GRACEFUL DEGRADATION IN DISTRIBUTED SPACECRAFT MISSIONS</b>	289
<i>Afreen Siddiqi, Massachusetts Institute of Technology, United States; Jacqueline Le Moigne, NASA Goddard Space Flight Center, United States</i>	
<b>MO4-R8.5: DISTRIBUTED SPACECRAFT MISSIONS (DSM) TECHNOLOGY DEVELOPMENT AT NASA GODDARD SPACE FLIGHT CENTER</b>	293
<i>Jacqueline Le Moigne, NASA Goddard Space Flight Center, United States</i>	

## **MO3-R9: RADIO FREQUENCY INTERFERENCE (RFI) IN MICROWAVE REMOTE SENSING I**

### **MO3-R9.1: TESTING AND OPERATION PLANNING OF THE CUBESAT RADIOMETER RADIO ..... 297 FREQUENCY INTERFERENCE TECHNOLOGY VALIDATION (CUBERT) SYSTEM**

*Christa McKelvey, Christopher Ball, Chi-Chih Chen, Andrew O'Brien, Graeme Smith, Mark Andrews, J. Landon Garry, Joel Johnson, The Ohio State University, United States; Sidharth Misra, Shannon Brown, Robert Jarnot, Rudi Bendig, Carl Felten, NASA, United States; Jonathan Kocz, California Institute of Technology, United States; Kevin Horgan, Jared Lucey, Carlos Duran-Aviles, Michael Solly, Jinzheng Peng, Jeffrey Piepmeier, NASA, United States; Doug Laczkowski, David Hall, Ervin Krauss, Blue Canyon Technologies, United States*

### **MO3-R9.2: RADIO FREQUENCY INTERFERENCE TRENDS FOR THE AMSR-E AND AMSR2 ..... 301 RADIOMETERS**

*David Draper, Ball Aerospace, United States; Paolo de Mattheais, NASA Goddard Space Flight Center, United States*

### **MO3-R9.3: BENEFITS OF APPLYING NODAL SAMPLING TO SMOS DATA OVER ..... 305 SEMI-ENCLOSED SEAS AND STRONGLY RFI-CONTAMINATED REGIONS**

*Verónica González-Gambau, Estrella Olmedo, Justino Martínez, Antonio Turiel, Barcelona Expert Centre, Consejo Superior de Investigaciones Científicas, Spain; Ignasi Corbella, Universitat Politècnica de Catalunya, Spain; Roger Oliva, Manuel Martin-Neira, European Space Agency, Spain*

### **MO3-R9.4: MITIGATION OF SMOS RFI CONTAMINATION BASED ON BT FREQUENCY ..... 309 EXTRAPOLATION**

*Roger Oliva, Zenithal Blue Technologies, Spain*

### **MO3-R9.6: RECENT ADVANCES IN SMAP RFI PROCESSING..... 313**

*Yan Soldo, NASA Goddard Space Flight Center / USRA, United States; David Le Vine, NASA Goddard Space Flight Center, United States; Alexandra Bringer, Ohio State University, United States; Priscilla Mohammed, NASA Goddard Space Flight Center / Morgan State University, United States; Paolo de Mattheais, NASA Goddard Space Flight Center / USRA, United States; Jeffrey Piepmeier, NASA Goddard Space Flight Center, United States; Joel Johnson, Ohio State University, United States*

## **MO4-R9: RADIO FREQUENCY INTERFERENCE (RFI) IN MICROWAVE REMOTE SENSING III**

### **MO4-R9.1: SPECTRUM MANAGEMENT FOR SCIENTIFIC USES IN US AND EUROPE ..... 316**

*Jasmeet Judge, University of Florida, United States; Elena Daganzo, European Space Agency, ESA-ESTEC, Netherlands*

### **MO4-R9.2: PROFILES OF RFI IN ALOS-2 IMAGES - A CASE STUDY IN TOKYO BAY, JAPAN..... 319**

*Ryo Natsuaki, Akira Hirose, The University of Tokyo, Japan*

### **MO4-R9.3: DIGITAL BEAMFORMING BASED RFI MITIGATION FOR SYNTHETIC APERTURE ..... 323 RADAR**

*Tobias Bollian, USRA/NASA, United States; Batuhan Osmanoglu, Rafael Rincon, NASA, United States; SeungKuk Lee, UMD/ NASA, United States; Temilola Fatoyinbo, NASA, United States*

### **MO4-R9.4: MITIGATION OF ULTRA WIDE-BAND INTERFERENCE FOR SAR USING ..... 326 NONNEGATIVE MATRIX FACTORIZATION WITH PRIOR CONSTRAINTS**

*Mingliang Tao, Northwestern Polytechnical University, China; Xinyu Zhang, Lanzhou University, China; Jia Su, Northwestern Polytechnical University, China; Zijing Zhang, Xidian University, China*

## **MO3-R10: MULTI-SENSOR DATA INTEGRATION FOR ENHANCED RETRIEVALS OF EARTH SYSTEM PARAMETERS I**

### **MO3-R10.1: STATISTICAL MERGING OF ACTIVE AND PASSIVE MICROWAVE OBSERVATIONS INTO LONG-TERM SOIL MOISTURE CLIMATE DATA RECORDS ..... 333**

*Wouter Dorigo, Vienna University of Technology, Austria; Alexander Gruber, KU Leuven (University of Leuven), Austria; Robin van der Schalie, Christoph Paulik, VanderSat B.V., Netherlands; Tracy Scanlon, Vienna University of Technology, Austria; Christoph Reimer, Richard Kidd, EODC GmbH, Austria; Richard de Jeu, VanderSat B.V., Netherlands; Wolfgang Wagner, Vienna University of Technology, Austria*

### **MO3-R10.2: PHYSICS-BASED RETRIEVAL OF SURFACE ROUGHNESS PARAMETERS FOR BARE SOILS FROM COMBINED ACTIVE-PASSIVE MICROWAVE SIGNATURES ..... 337**

*Anke Fluhrer, Thomas Jagdhuber, German Aerospace Center (DLR), Germany; Dara Entekhabi, Massachusetts Institute of Technology, United States; Michael H. Cosh, United States Department of Agriculture/Agricultural Research Service, United States; Peggy O'Neill, NASA Goddard Space Flight Center, United States; Roger Lang, George Washington University, United States; Ismail Baris, German Aerospace Center (DLR), Germany*

### **MO3-R10.3: MICROWAVE AND OPTICAL DATA FUSION FOR GLOBAL MAPPING OF SOIL MOISTURE AT HIGH RESOLUTION ..... 341**

*Gerard Portal, Mercè Vall-llossera, Universitat Politècnica de Catalunya / Institut d'Estudis Espacials de Catalunya (IEEC), Spain; María Piles, Image Processing Laboratory / Universitat de València, Spain; Adriano Camps, David Chaparro, Universitat Politècnica de Catalunya / Institut d'Estudis Espacials de Catalunya (IEEC), Spain; Miriam Pablos, Instituto Hispano-Luso de Investigaciones Agrarias (CIALE) and the University of Salamanca (USAL), Spain; Luciana Rossato, Khalid Aabouch, Universitat Politècnica de Catalunya, Spain*

### **MO3-R10.4: SEMI-PHYSICAL INTEGRATION OF SCATTERING MODELS FOR MICROWAVES AND OPTICAL WAVELENGTHS ..... 345**

*Ismail Baris, Thomas Jagdhuber, Harald Anglberger, German Aerospace Center (DLR), Germany; Stefan Erasmi, Georg-August-University Göttingen, Germany; François Jonard, Université catholique de Louvain, Belgium*

## **MO4-R10: MULTI-SENSOR DATA INTEGRATION FOR ENHANCED RETRIEVALS OF EARTH SYSTEM PARAMETERS II**

### **MO4-R10.1: INTERPOLATION AND GAP FILLING OF LANDSAT REFLECTANCE TIME SERIES ..... 349**

*Alvaro Moreno, Marco Maneta, University of Montana, United States; Gustau Camps-Valls, University of Valencia, Spain; Luca Martino, Universidad Carlos III de Madrid, Spain; Nathaniel Robinson, Brady Allred, Steven W Running, University of Montana, United States*

### **MO4-R10.2: ESTIMATING GRAVIMETRIC MOISTURE OF VEGETATION USING AN ATTENUATION-BASED MULTI-SENSOR APPROACH ..... 353**

*Anita Fink, University of Augsburg, German Aerospace Center, Germany; Thomas Jagdhuber, German Aerospace Center (DLR), Germany; María Piles, University of Valencia, Spain; Jennifer Grant, Netherlands Space Office, Netherlands; Martin Baur, University of Bayreuth, Germany; Moritz Link, Ludwig-Maximilian University of Munich, Germany; Dara Entekhabi, Massachusetts Institute of Technology, United States*

### **MO4-R10.3: VEGETATION EFFECTS ON COVARIATIONS OF L-BAND RADIOMETER AND C-BAND/L-BAND RADAR OBSERVATIONS ..... 357**

*Moritz Link, German Aerospace Center (DLR), Germany; Dara Entekhabi, Massachusetts Institute of Technology, United States; Thomas Jagdhuber, German Aerospace Center (DLR), Germany; Paolo Ferrazzoli, Leila Guerriero, Tor Vergata University of Rome, Italy; Martin Baur, University of Bayreuth, Germany; Ralf Ludwig, Ludwig-Maximilian University of Munich, Germany*

### **MO4-R10.4: MULTI-SENSOR SAR DATA FOR IMPROVED MODELING OF MICROWAVE BRIGHTNESS TEMPERATURE OVER BOREAL FOREST ..... 361**

*Oleg Antropov, Jaakko Seppänen, Aalto University, Finland; Thomas Jagdhuber, DLR - German Aerospace Center, Germany; Martti Hallikainen, Jaan Praks, Aalto University, Finland*

<b>MO4-R10.5: MULTI-FREQUENCY ESTIMATION OF CANOPY PENETRATION DEPTHS</b> .....	<b>365</b>
<b>FROM SMAP/AMSR2 RADIOMETER AND ICESAT LIDAR DATA</b>	
<i>Martin Baur, University of Bayreuth, Germany; Thomas Jagdhuber, German Aerospace Center (DLR), Germany; Moritz Link, Ludwig-Maximilian University of Munich, Germany; María Piles, Universitat de València, Spain; Ruzbeh Akbar, Dara Entekhabi, Massachusetts Institute of Technology, United States</i>	
 <b>MO3-R11: TANDEM-X MISSION I</b>	
<b>MO3-R11.1: TANDEM-X: SCIENCE ACTIVITIES</b> .....	<b>369</b>
<i>Irena Hajnsek, ETH / DLR, Germany; Thomas Busche, DLR - German Aerospace Center, Germany</i>	
<b>MO3-R11.2: SEVEN YEARS OF TANDEM-X: VOLUME LOSS OF GROSSER</b> .....	<b>372</b>
<b>ALETSCHEGLETSCHER, SWITZERLAND</b>	
<i>Silvan Leinss, ETH Zurich, Switzerland; Irena Hajnsek, German Aerospace Center (DLR), Germany</i>	
<b>MO3-R11.3: QUANTIFICATION OF HORIZONTAL FOREST STRUCTURE FROM HIGH</b> .....	<b>376</b>
<b>RESOLUTION TANDEM-X INTERFEROMETRIC COHERENCES</b>	
<i>Changhyun Choi, Matteo Pardini, Konstantinos Papathanassiou, German Aerospace Center (DLR), Germany</i>	
<b>MO3-R11.4: GEDI AND TANDEM-X FUSION FOR 3D FOREST STRUCTURE PARAMETER</b> .....	<b>380</b>
<b>RETRIEVAL</b>	
<i>Seung-Kuk Lee, Temilola Fatoyinbo, NASA, United States; Wenlu Qi, Steven Hancock, John Armston, Ralph Dubayah, University of Maryland, United States</i>	
<b>MO3-R11.5: UNVEILING THE COMPLEX STRUCTURE OF TASMANIAN TEMPERATE</b> .....	<b>383</b>
<b>FORESTS WITH MODEL-BASED TANDEM-X TOMOGRAPHY</b>	
<i>Maciej Soja, Susan Baker, Gregory Jordan, Arko Lucieer, University of Tasmania, Australia; Robert Musk, Sustainable Timber Tasmania, Australia; Lars M. H. Ulander, Chalmers University of Technology, Sweden; Mark Williams, Horizon Geoscience Consulting, Australia; Richard White, University of Tasmania, Australia</i>	
 <b>MO4-R11: TANDEM-X MISSION II</b>	
<b>MO4-R11.1: EFFECT OF THE DOUBLE-BOUNCE CONTRIBUTION IN POLINSAR-BASED</b> .....	<b>387</b>
<b>HEIGHT ESTIMATES OF RICE CROPS USING TANDEM-X BISTATIC DATA</b>	
<i>Noelia Romero-Puig, Juan M. Lopez-Sanchez, J. David Ballester-Berman, University of Alicante, Spain</i>	
<b>MO4-R11.3: A STUDY ON THE INFORMATION CONTENT OF ALONG-TRACK</b> .....	<b>395</b>
<b>INTERFEROMETRIC COHERENCE USING DUAL CO-POLARIZED TANDEM-X DATA</b>	
<i>Paco Lopez-Dekker, Ehsan Karimi Shahmarvandi, Delft University of Technology, Netherlands; Pau Prats-Iraola, German Aerospace Center (DLR), Germany</i>	
<b>MO4-R11.4: HIGH-RESOLUTION DEMS OF ACTIVE VOLCANOES FROM TANDEM-X DATA:</b> .....	<b>399</b>
<b>IMPLICATIONS FOR FLOW MODELING AND HAZARD ASSESSMENT</b>	
<i>Sylvain Charbonnier, Fanghui Deng, Timothy Dixon, Rocco Malservisi, University of South Florida, United States</i>	
<b>MO4-R11.5: TERRESTRIAL IMPACT CRATERS – THE TANDEM-X VIEW</b> .....	<b>403</b>
<i>Manfred Gottwald, Thomas Fritz, Helko Breit, Birgit Schättler, Remote Sensing Technology Institute, German Aerospace Center, Germany</i>	
 <b>MO3-R12: BIG DATA IN DISTRIBUTED CLOUDS: DATA INTEGRATION &amp; PROCESSING CHALLENGES I</b>	
<b>MO3-R12.1: ONTOLOGY-BASED DATA ACCESS AND VISUALIZATION OF BIG VECTOR AND</b> .....	<b>407</b>
<b>RASTER DATA</b>	
<i>Konstantina Bereta, George Stamoulis, Manolis Koubarakis, National and Kapodistrian University of Athens, Greece</i>	

<b>MO3-R12.2: DISCOVERING AND LINKING SPATIO-TEMPORAL BIG LINKED DATA</b> .....	<b>411</b>
<i>Christian Zinke, InfAI e.V., Germany; Axel-Cyrille Ngonga Ngomo, University of Paderborn, Germany</i>	
<b>MO3-R12.3: ADVANCED VISUALISATION OF BIG DATA FOR AGRICULTURE AS PART OF DATABIO DEVELOPMENT</b> .....	<b>415</b>
<i>Karel Charvat, Lesprojekt služby, Czech Republic; Tomas Reznik, Masaryk University, Czech Republic; Vojtech Lukas, Mendel University, Czech Republic; Karel Charvat, Lesprojekt služby, Czech Republic; Karel Jedlicka, University of West Bohemia, Czech Republic; Raul Palma, PSNC, Poland; Raitis Berzins, Baltic Open Solution Centre, Latvia</i>	
<b>MO3-R12.4: GEOSPATIAL BIG DATA PROCESSING IN HYBRID CLOUD ENVIRONMENTS</b> .....	<b>419</b>
<i>Ingo Simonis, OGC, Germany</i>	
<b>MO3-R12.5: GENERALIZING A DATA ANALYSIS PIPELINE IN THE CLOUD TO HANDLE DIVERSE USE CASES IN NASA'S EOSDIS</b> .....	<b>422</b>
<i>Christopher Lynnes, Rahul Ramachandran, NASA, United States</i>	
 <b>MO4-R12: BIG DATA IN DISTRIBUTED CLOUDS: DATA INTEGRATION &amp; PROCESSING CHALLENGES II</b>	
<b>MO4-R12.1: BRIDGING CLIMATE AND EARTH OBSERVATION DATA ANALYTICS IN A FEDERATED CLOUD INFRASTRUCTURE USING INTEROPERABLE MULTIDISCIPLINARY WORKFLOWS</b> .....	<b>426</b>
<i>Tom Landry, Samuel Foucher, David Byrns, Kevin Heffner, Computer Research Institute of Montreal, Canada; David Huard, Blaise Gauvin St-Denis, Diane Chaumont, Ouranos, Canada; Nils Hempelmann, Deutsche Gesellschaft für internationale Zusammenarbeit, Germany; Stephen Kindermann, German Climate Computing Center, Germany; Brian Low, Natural Resources Canada, Canada</i>	
<b>MO4-R12.2: DATACUBES: A TECHNOLOGY SURVEY</b> .....	<b>430</b>
<i>Peter Baumann, Dimitar Misev, Vlad Merticariu, Bang Pham Huu, Brennan Bell, Jacobs University, Germany</i>	
<b>MO4-R12.3: ANALYSIS-READY EARTH OBSERVATION DATA AND THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS</b> .....	<b>434</b>
<i>Argyro Kavvada, NASA / Booz Allen Hamilton, United States; Alex Held, Commonwealth Scientific and Industrial Research Organization, Australia</i>	
<b>MO4-R12.4: WATER ACROSS SYNTHETIC APERTURE RADAR DATA (WASARD): SAR WATER BODY CLASSIFICATION FOR THE OPEN DATA CUBE</b> .....	<b>437</b>
<i>Zachary Kreiser, Analytical Mechanics Associates, United States; Brian Killough, NASA Langley Research Center, United States; Syed R Rizvi, Analytical Mechanics Associates, United States</i>	
<b>MO4-R12.5: SCALING THE COLOMBIAN DATA CUBE USING A DISTRIBUTED ARCHITECTURE</b> .....	<b>441</b>
<i>Mario Villamizar, Harold Castro, Christian Ariza-Porras, María Paula Mancipe, Santiago Cabrera, Los Andes University, Colombia; Indira Pachón, Salomón Ramírez, Diana Fonseca, Pilar Lozano-Rivera, Edersson Cabrera, María Teresa Becerra, Institute of Meteorological, Hydrological and Environmental Studies (IDEAM), Colombia</i>	
 <b>MOP2-PA: MICROWAVE MODELS FOR NATURAL MEDIA</b>	
<b>MOP2-PA.3: A GPS-REFLECTOMETRY SIMULATOR FOR TARGET DETECTION OVER OCEANS</b> .....	<b>450</b>
<i>Maria Paola Clarizia, Deimos Space UK Ltd, United Kingdom; Nicholas Chotiros, Office of Naval Research Global London, United Kingdom; Michael Vaccaro, Office of Naval Research, United States</i>	

<b>MOP2-PA.4: ELECTROMAGNETIC MODELING OF SHIPS IN MARITIME SCENARIOS: GEOMETRICAL OPTICS APPROXIMATION</b>	<b>452</b>
<i>Walter Fuscaldò, Sapienza Università di Roma, Italy; Alessio Di Simone, University of Naples Federico II, Italy; Leonardo Millefiori, NATO Science and Technology Organization Centre for Maritime Research and Experimentation, Italy; Daniele Riccio, Giuseppe Ruello, University of Naples Federico II, Italy; Paolo Braca, NATO Science and Technology Organization Centre for Maritime Research and Experimentation, Italy; Peter Willett, University of Connecticut, United States</i>	
<b>MOP2-PA.5: ELECTROMAGNETIC FIELDS INDUCED BY THE WAKE OF A MOVING SLENDER BODY IN THE OCEAN OF FINITE DEPTH</b>	<b>456</b>
<i>Zhihua Xu, Changping Du, Mingyao Xia, Peking University, China</i>	
<b>MOP2-PA.6: A NEW TECHNIQUE FOR SIMULATING RADAR ECHOES FROM LAYERED SUBSURFACE TARGETS</b>	<b>459</b>
<i>Christopher Gerekos, Alessandro Tamponi, Leonardo Carrer, Davide Castelletti, Massimo Santoni, Lorenzo Bruzzone, University of Trento, Italy</i>	
<b>MOP2-PA.7: IMPROVED FARADAY ROTATION ESTIMATOR IN LINEARLY POLARIZED SAR DATA</b>	<b>463</b>
<i>Jinhui Li, Yifei Ji, Yongsheng Zhang, Qilei Zhang, Haifeng Huang, Zhen Dong, National University of Defense Technology, China</i>	
<b>MOP2-PA.8: CALCULATION OF LONG-TERM TROPOSPHERIC ATTENUATION STATISTICS USING WEATHER CUBES</b>	<b>467</b>
<i>Bertus Shelters, Brannon Elmore, James Ethridge, Jaclyn Schmidt, Jarred Burley, Steven Fiorino, Joseph Sugrue, Andrew Terzuoli, IEEE, United States</i>	
<b>MOP2-PA.9: FULL-WAVE SCATTERING COMPUTATION FOR SNOWPACKS USING SSWAP-SD METHOD WITH THE DISCRETE-DIPOLE APPROXIMATION</b>	<b>471</b>
<i>Mostafa Zaky, Kamal Sarabandi, University of Michigan, United States</i>	
<b>MOP2-PA.10: EFFECTIVE PERMITTIVITY AND SCATTERING OF BICONTINUOUS RANDOM MEDIUM WITH STRONG PERMITTIVITY FLUCTUATION THEORY</b>	<b>474</b>
<i>Jiyue Zhu, Shurun Tan, Leung Tsang, University of Michigan, United States</i>	
 <b>MOP2-PB: DIFFERENTIAL SAR INTERFEROMETRY IV</b>	
<b>MOP2-PB.1: MONITORING THREE DIMENSIONAL DISPLACEMENTS OF THE SHUPING LANDSLIDE, THREE GORGES AREA WITH MULTI-TEMPORAL TERRASAR-X SAR IMAGES</b>	<b>478</b>
<i>Xuguo Shi, China University of Geosciences Wuhan, China; Lu Zhang, Mingsheng Liao, Shuo Shi, Wuhan University, China</i>	
<b>MOP2-PB.3: COSMO-SKYMED AND SENTINEL-1 DINSAR PROCESSING FOR GROUND INSTABILITY MONITORING IN INDONESIA</b>	<b>486</b>
<i>Fabio Bovenga, Alberto Refice, Antonella Belmonte, National Research Council of Italy (CNR), Italy; Raffaele Nutricato, Davide Oscar Nitti, GAP srl, Italy; Maria Teresa Chiaradia, University of Bari, Italy; Sotirios Valkaniotis, Sofia Gkioni, Chrysanthi Kosma, Athanassis Ganas, National Observatory of Athens, Greece; Paolo Manunta, Collaborative Space Ltd, Ireland; Elizar Elizar, Darusman Darusman, Syiah Kuala University, Indonesia; Philippe Bally, European Space Agency, Italy</i>	
<b>MOP2-PB.4: MAPPING VULNERABLE TOURISM INFRASTRUCTURE IN KARST ENVIRONMENT WITH AN INTEGRATED REMOTE SENSING APPROACH. THE DEAD SEA, JORDAN, CASE STUDY.</b>	<b>490</b>
<i>Simone Fiaschi, University College Dublin, Ireland; Damien Closson, GIM - Geographic Information Management NV, Belgium; Killian Paenen, Brussels Free University, Belgium; Najib Abou Karaki, The University of Jordan, Jordan</i>	
<b>MOP2-PB.5: REGULARIZED DIFFERENTIATION FOR INSAR PHASE UNWRAPPING</b>	<b>494</b>
<i>Rick Chartrand, Descartes Labs, United States</i>	
<b>MOP2-PB.7: LAND SUBSIDENCE MONITORING BY INTEGRATING PSI AND GEODETIC DEFORMATION MEASUREMENTS</b>	<b>498</b>
<i>Hiroki Ito, Junichi Susaki, Kyoto University, Japan</i>	

<b>MOP2-PB.8: A NEW AUTOMATIC SELECTION OF OPTIMUM INTERFEROMETRIC IMAGE PAIRS IN TIME SERIES SAR INTERFEROMETRY</b>	<b>502</b>
<i>Hong'an Wu, Yonghong Zhang, Yonghui Kang, Chinese Academy of Surveying and Mapping, China</i>	
<b>MOP2-PB.9: LANDSLIDE OBSERVATION FROM ALOS-2/PALSAR-2 DATA (IMAGE CORRELATION TECHNIQUES AND SAR INTERFEROMETRY). APPLICATION TO SALAZIE CIRCLE LANDSLIDES (LA RÉUNION ISLAND)</b>	<b>506</b>
<i>Daniel Raucoules, BRGM, France; Fabrizio Tomaro, University of Salerno, Italy; Michael Fournelis, Caterina Negulescu, Marcello de Michele, Bertrand Aunay, BRGM, France</i>	
 <b>MOP2-PC: DIFFERENTIAL SAR INTERFEROMETRY VII</b>	
<b>MOP2-PC.2: DEFORMATION OF BHUJ EARTHQUAKE AREA OBTAINED WITH PERSISTENT SCATTERER INTERFEROMETRIC ANALYSIS OF ALOS L-BAND SAR DATA</b>	<b>513</b>
<i>Divya Sekhar Vaka, Y. S. Rao, Indian Institute of Technology Bombay, India</i>	
<b>MOP2-PC.3: AN ASYMMETRIC SPLIT-SPECTRUM METHOD FOR ESTIMATING THE IONOSPHERIC ARTIFACTS IN INSAR DATA</b>	<b>517</b>
<i>Bochen Zhang, Xiaoli Ding, The Hong Kong Polytechnic University, Hong Kong SAR of China; Wu Zhu, Chang'an University, China</i>	
<b>MOP2-PC.4: POST-FLOOD SOIL DEFORMATION MONITORING USING MULTI-TEMPORAL SENTINEL1 DATA</b>	<b>521</b>
<i>Chayma Chaabani, Riadh Abdelfattah, University of Carthage, Higher School of Communications of Tunis COSIM Lab, Tunisia</i>	
<b>MOP2-PC.5: LAND SUBSIDENCE MONITORING IN THE KATHMANDU BASIN, BEFORE AND AFTER MW 7.8 GORKHA EARTHQUAKE, NEPAL BY SBAS-DINSAR TECHNIQUE</b>	<b>525</b>
<i>Suresh Krishnan P.V., Duk-jin Kim, Jungkyo Jung, Seoul National University, Republic of Korea</i>	
<b>MOP2-PC.8: MOUNTAIN TOPOGRAPHIC DEFORMATION EXTRACATION BASED ON PS-INSAR</b>	<b>533</b>
<i>Li Tang, Yuxia Li, Yan Chen, Yunping Chen, Ling Tong, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PC.9: SURFACE DEFORMATION OF THE SHANGHAI COASTAL AREA REVEALED BY A MULTI-SATELLITE DINSAR INVESTIGATION</b>	<b>537</b>
<i>Qing Zhao, Yu Lei, Guanyu Ma, East China Normal University, China; Antonio Pepe, Diego Reale, Institute for Electromagnetic Sensing of the Environment (IREA), Italian National Research Council, Italy; Julia Kubanek, Earth &amp; Planetary Sciences Department, McGill University, Canada; Min Liu, East China Normal University, Canada; Tianliang Yang, Key Laboratory of Land Subsidence Monitoring and Prevention, Ministry of Land and Resources, Canada</i>	
<b>MOP2-PC.10: USING MULTI-FREQUENCY INSAR DATA TO CONSTRAIN GROUND DEFORMATION OF ISCHIA EARTHQUAKE</b>	<b>541</b>
<i>Antonio Montuori, Matteo Albano, Marco Polcari, Simone Atzori, Christian Bignami, Cristiano Tolomei, Giuseppe Pezzo, Marco Moro, Istituto Nazionale di Geofisica e Vulcanologia, Italy; Michele Saroli, Università degli Studi di Cassino e del Lazio Meridionale, Italy; Salvatore Stramondo, Stefano Salvi, Istituto Nazionale di Geofisica e Vulcanologia, Italy</i>	
 <b>MOP2-PD: BISTATIC &amp; OTHER SAR SYSTEMS</b>	
<b>MOP2-PD.1: NON-STOP-AND-GO ECHO MODEL FOR HYPERSONIC-VEHICLE-BORNE BISTATIC FORWARD-LOOKING SAR</b>	<b>545</b>
<i>Qianghui Zhang, Junjie Wu, Jianyu Yang, Yulin Huang, Haiguang Yang, Xiaobo Yang, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PD.4: STUDY OF THE EFFECTS OF NON-SQUARE RESOLUTIONS OF BISTATIC SAR ON TEMPLATE MATCHING PERFORMANCE</b>	<b>557</b>
<i>Qianghui Zhang, Junjie Wu, Chuyang Li, Jianyu Yang, Yulin Huang, Haiguang Yang, Xiaobo Yang, University of Electronic Science and Technology of China, China</i>	

<b>MOP2-PD.5: EFFICIENT RAW DATA GENERATION FOR BISTATIC SAR BASED ON 2-D INVERSE WAVENUMBER MAPPING</b>	<b>561</b>
<i>Yuxuan Miao, Junjie Wu, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PD.6: ANNULAR ARRAY 3-D SAR: RESOLUTION ANALYSIS AND DATA PROCESSING</b>	<b>565</b>
<i>Ling Pu, Xiaoling Zhang, Jun Shi, Shunjun Wei, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PD.7: DOWN-LOOKING SPARSE LINEAR ARRAY 3-D SAR IMAGING BASED ON MOTION COMPENSATION</b>	<b>569</b>
<i>Qi-yong Liu, Kai-ming Li, Air Force Engineering University, Institute of Information and Navigation, China; Wen-jun Huo, Xijing University, China; Zhi-qiang Ma, Air Force Engineering University, Institute of Information and Navigation, China; Fu-fei Gu, China Satellite Maritime Tracking and Control Department, China</i>	
<b>MOP2-PD.8: A NOVEL HIGH-ORDER IMAGE FORMATION ALGORITHM FOR GNSS-BASED BISTATIC SAR</b>	<b>573</b>
<i>Xinkai Zhou, Pengbo Wang, Kai-Qi Hu, Hong-Cheng Zeng, Yue Fang, Jie Chen, School of Electronics and Information Engineering, Beihang University, China</i>	
<b>MOP2-PD.9: A NOVEL IMAGING FORMATION OF ELECTROMAGNETIC VORTEX SAR WITH TIME-VARIANT ORBITAL-ANGULAR-MOMENTUM</b>	<b>577</b>
<i>Yue Fang, Jie Chen, Pengbo Wang, Zhirong Men, Xinkai Zhou, Kaiqi Hu, Beihang University, China</i>	
 <b>MOP2-PE: SAR IMAGE CORRECTIONS AND JAMMING</b>	
<b>MOP2-PE.1: COMPARISON OF SAR IMAGE GEOMETRIC CORRECTION BASED ON MULTI-RESOLUTION DEMS</b>	<b>581</b>
<i>Kaili Han, Qiming Zeng, Hui Wang, Jian Jiao, Peking University, China</i>	
<b>MOP2-PE.2: SPACE VARIANT-BASED MAXIMUM A POSTERIORI ANGULAR SUPER-RESOLUTION ALGORITHM FOR REAL-BEAM SCANNING RADAR</b>	<b>585</b>
<i>Ke Tan, Wenchao Li, Yongchao Zhang, Yulin Huang, Jianyu Yang, Xiaobo Yang, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PE.3: A FAST DOPPLER PARAMETERS ESTIMATION METHOD FOR MOVING TARGET IMAGING BASED ON 2D-FFT</b>	<b>589</b>
<i>Yi Lan, Zhongyu Li, Jingyi Qu, Junjie Wu, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PE.4: ENHANCED AZIMUTH RESOLUTION FOR SPACEBORNE INTERRUPTED FMCW SAR THROUGH SPECTRAL ANALYSIS</b>	<b>593</b>
<i>Naveed Ahmed, Bing Sun, Jie Chen, Beihang University, China</i>	
<b>MOP2-PE.5: IMAGING OF MOVING TARGET FOR COOPERATIVE SAR BETWEEN HIGH-ORBIT AND LOW-ORBIT SATELLITES</b>	<b>597</b>
<i>Huihui Ding, Shunsheng Zhang, Fukang Gong, Wen-Qin Wang, Haoyu Tian, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PE.7: FAST DECEPTIVE JAMMING AGAINST TOPSAR</b>	<b>601</b>
<i>Tian Tian, Feng Zhou, xidian University, China; Bo Zhao, Shenzhen University, China</i>	
<b>MOP2-PE.8: DECEPTIVE JAMMING ON SPACE-BORNE SAR USING FREQUENCY DIVERSE ARRAY</b>	<b>605</b>
<i>Yu Zhu, Beijing Institute of Spacecraft System Engineering, China; Hui Wang, Shunsheng Zhang, Zhi Zheng, Wen-Qin Wang, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PE.9: MICRO-DOPPLER DECEPTION JAMMING FOR TRACKED VEHICLES</b>	<b>609</b>
<i>Xiaoran Shi, Feng Zhou, Lei Liu, Xidian University, China</i>	



<b>MOP2-PE.10: PR-BASED SAR RECONSTRUCTION AUTOFOCUS ALGORITHM FOR PERSISTENT SURVEILLANCE CHANGE DETECTION</b> .....	<b>613</b>
<i>Yue Yang, Qing Zhang, Xuejing Zhang, University of Electronic Science and Technology of China, China; Keyu Long, The Second Research Institute of CAAC, China; Xunchao Cong, The 10th Research Institute of CETC, China; Qun Wan, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PF: POLSAR FILTERING &amp; IMAGE ANALYSIS</b>	
<b>MOP2-PF.1: A COMPARISON OF STATISTICAL MODELS FOR POLARIMETRIC SAR DATA</b> .....	<b>617</b>
<i>Xinping Deng, Jinsong Chen, Shenzhen Institute of Advanced Technology, China; Carlos López-Martínez, Luxembourg Institute of Science and Technology, Luxembourg</i>	
<b>MOP2-PF.2: FULLY CONVOLUTIONAL SEMI-SUPERVISED GAN FOR POLSAR CLASSIFICATION</b> .....	<b>621</b>
<i>Mengchen Liu, Yue Hu, Shuang Wang, Yanhe Guo, Biao Hou, Licheng Jiao, Xiaojin Hou, Xidian University, China</i>	
<b>MOP2-PF.3: SPECKLE NOISE REDUCTION OF TIME SERIES SAR IMAGES BASED ON WAVELET TRANSFORM AND KALMAN FILTER</b> .....	<b>625</b>
<i>Amir Aghabalaei, Yazdan Amerian, Hamid Ebadi, Yasser Maghsoudi, K. N. Toosi University of Technology, Iran</i>	
<b>MOP2-PF.4: A WEIGHTED ACCELERATION ALGORITHM BASED ON NON-LOCAL FILTER FOR SAR IMAGES WITH THE POLARIZATION SIMILARITY</b> .....	<b>629</b>
<i>Chongjing Ran, Yan Chen, Yunping Chen, Ling Tong, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PF.6: POLSAR SPECKLE FILTERING USING ITERATIVE MMSE</b> .....	<b>637</b>
<i>Tej Albaha Alhamrouni, Higher School of Communications of Tunis, Tunisia; Mohamed Yahia, National School of Engineers of Tunis, Tunisia; Riadh Abdelfattah, Higher School of Communications of Tunis, Tunisia</i>	
<b>MOP2-PF.7: FOREST HEIGHT ESTIMATION USING ADAPTIVE DECOMPOSITION METHOD OF POLINSAR DATA</b> .....	<b>641</b>
<i>Houda Latrache, Boularbah Souissi, Mounira Ouarzeddine, University of Sciences and Technology Houari Boumediene, Algeria</i>	
<b>MOP2-PF.8: EDGE DETECTION OF POLSAR IMAGES USING STATISTICAL DISTANCE BETWEEN AUTOMATICALLY REFINED SAMPLES</b> .....	<b>645</b>
<i>Xianxiang Qin, Tao Hu, Information and Navigation College, Air Force Engineering University, China; Huanxin Zou, College of Electronic Science, National University of Defense Technology, China; Wangsheng Yu, Peng Wang, Jun Li, Information and Navigation College, Air Force Engineering University, China</i>	
<b>MOP2-PF.10: ADDED VALUE OF MULTITEMPORAL POLARIMETRIC UAVSAR DATA FOR PERMANENT SCATTERERS DETECTION</b> .....	<b>653</b>
<i>Tina Nikaein, University of Tehran, Iran; Vahid Akbari, UiT The Arctic University of Norway, Norway; Hossein Arefi, University of Tehran, Iran</i>	
<b>MOP2-PG: APPLICATIONS OF DEEP LEARNING</b>	
<b>MOP2-PG.1: OIL-PALM TREE DETECTION IN AERIAL IMAGES COMBINING DEEP LEARNING CLASSIFIERS</b> .....	<b>657</b>
<i>Maciel Zortea, Marcelo Nery, Bernardo Ruga, IBM Research, Brazil; Lara Bispo Carvalho, Adriano Chaves Bastos, Agropalma, Brazil</i>	
<b>MOP2-PG.2: SPECTRAL-SPATIAL TOPOGRAPHIC SHADOW DETECTION FROM SENTINEL-2A MSI IMAGERY VIA CONVOLUTIONAL NEURAL NETWORKS</b> .....	<b>661</b>
<i>Hui Huang, Genyun Sun, China University of Petroleum (East China), China; Jinchang Ren, University of Strathclyde, United Kingdom; Jun Rong, Aizhu Zhang, Yanling Hao, China University of Petroleum (East China), China</i>	
<b>MOP2-PG.3: AGGREGATING DEEP CONVOLUTIONAL NEURAL NETWORK SCANS OF BROAD-AREA HIGH-RESOLUTION REMOTE SENSING IMAGERY</b> .....	<b>665</b>
<i>Grant Scott, Alex Hurt, Richard Marcum, Derek Anderson, Curt Davis, University of Missouri, United States</i>	

<b>MOP2-PG.4: AN ADAPTATION OF CNN FOR SMALL TARGET DETECTION IN THE INFRARED</b>	<b>669</b>
<i>Dong Zhao, Huixin Zhou, Shenghui Rong, Xidian University, China; Xiuping Jia, University of New South Wales, Australia</i>	
<b>MOP2-PG.5: ROTATED REGION BASED FULLY CONVOLUTIONAL NETWORK FOR SHIP DETECTION</b>	<b>673</b>
<i>Mingjie Li, Weiwei Guo, Zenghui Zhang, Wenxian Yu, Tao Zhang, Shanghai Jiao Tong University, China</i>	
<b>MOP2-PG.6: A TRANSLATIONAL INVARIANT SAR-ATR METHOD BASED ON CONVOLUTIONAL NEURAL NETWORKS</b>	<b>677</b>
<i>Zongyong Cui, Sifei Wang, Sihang Dang, Zongjie Cao, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PG.7: SHIP DETECTION BASED ON DEEP CONVOLUTIONAL NEURAL NETWORKS FOR POLSAR IMAGES</b>	<b>681</b>
<i>Feng Zhou, Weiwei Fan, Qiangqiang Sheng, Xidian University, China; Mingliang Tao, Northwestern Polytechnical University, China</i>	
<b>MOP2-PG.8: NARROW ROAD EXTRACTION FROM REMOTE SENSING IMAGES BASED ON SUPER-RESOLUTION CONVOLUTIONAL NEURAL NETWORK</b>	<b>685</b>
<i>Xinyu Zhou, Harbin Institute of Technology, China; Xi Chen, Key Laboratory of Geographic Information Science (Ministry of Education), China; Ye Zhang, Harbin Institute of Technology, China</i>	
<b>MOP2-PG.9: DATA AUGMENTATION WITH GABOR FILTER IN DEEP CONVOLUTIONAL NEURAL NETWORKS FOR SAR TARGET RECOGNITION</b>	<b>689</b>
<i>Ting Jiang, Zongyong Cui, Zhi Zhou, Zongjie Cao, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PG.10: INSHORE SHIP DETECTION BASED ON MASK R-CNN</b>	<b>693</b>
<i>Shanlan Nie, Zhiguo Jiang, Haopeng Zhang, Bowen Cai, Yuan Yao, Beihang University, China</i>	
 <b>MOP2-PH: SHIP DETECTION</b>	
<b>MOP2-PH.1: A LOCAL CFAR DETECTOR BASED ON GRAY INTENSITY CORRELATION IN SAR IMAGERY</b>	<b>697</b>
<i>Jiaqiu Ai, Hefei University of Technology, China; Xuezhi Yang, Hefei Univeristy of Technology, China; He Yan, Nanjing University of Aeronautics and Astronautics, China</i>	
<b>MOP2-PH.2: A PRIORI-KNOWLEDGE BASED SHIP CFAR DETECTION AND DETERMINATION ALGORITHM IN SAR IMAGERY</b>	<b>701</b>
<i>Jiaqiu Ai, Xuezhi Yang, Hefei University of Technology, China; Zhihuo Xu, Nantong Univeristy, China; Ruitian Tian, Hefei Univeristy of Technology, China</i>	
<b>MOP2-PH.4: A SHIP DETECTOR BASED ON THE IMPROVED POLARIMETRIC COVARIANCE DIFFERENCE MATRIX</b>	<b>709</b>
<i>Tao Zhang, Shanghai Jiao Tong University, KTH Royal Institute of Technology, China; Yifang Ban, KTH Royal Institute of Technology, Sweden; Huilin Xiong, Wenxian Yu, Shanghai Jiao Tong University, China</i>	
<b>MOP2-PH.5: LAND MASKING METHOD FOR SAR-BASED SHIP DETECTION IN COASTAL WATERS OF MANY ISLANDS</b>	<b>713</b>
<i>Chan-Su Yang, Ju-Han Park, Ahmed Harun-Al-Rashid, Korea Institute of Ocean Science and Technology, Republic of Korea</i>	
<b>MOP2-PH.6: SHIP DETECTION WITHOUT SEA-LAND SEGMENTATION FOR LARGE-SCALE HIGH-RESOLUTION OPTICAL SATELLITE IMAGES</b>	<b>717</b>
<i>Yiqun He, University of Chinese Academy of Sciences, China; Xu Sun, Lianru Gao, Bing Zhang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>MOP2-PH.7: A NEW SAR IMAGE SIMULATION METHOD FOR SEA-SHIP SCENE</b>	<b>721</b>
<i>Weibo Huo, Yulin Huang, Jifang Pei, Yin Zhang, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	

<b>MOP2-PH.8: SYNTHETIC APERTURE RADAR SHIP DETECTION USING CAPSULE NETWORKS</b>	725
<i>Colin Schwegmann, Waldo Kleynhans, Council For Scientific and Industrial Research, South Africa; Brian Salmon, University of Tasmania, Australia; Lizwe Mdakane, Rory Meyer, Council For Scientific and Industrial Research, South Africa</i>	
<b>MOP2-PH.10: COMPREHENSIVE STRUCTURE VOTING DOCKED SHIP DETECTION FROM HIGH-RESOLUTION OPTICAL SATELLITE IMAGES BASED ON COMBINED MULTI-ORIENTATION SPARSE REPRESENTATION</b>	733
<i>Yin Zhuang, He Chen, Haotian Zhou, Liang Chen, Beijing Institute of Technology, China; Fukun Bi, North China University of Technology, China</i>	
 <b>MOP2-PI: GEOGRAPHIC INFORMATION SCIENCE I</b>	
<b>MOP2-PI.2: SHAPE SIMILARITY MEASURE METHOD BASED ON PRINCIPAL CURVATURE ENHANCEMENT DISTANCE TRANSFORMATION</b>	741
<i>Feng Wang, YuMing Xiang, Xinghui Yao, JiaYin Liu, Institute of Electronics, Chinese Academy of Sciences, China</i>	
<b>MOP2-PI.3: ANALYZING THE CONTRIBUTION OF HIGH RESOLUTION WATER RANGE IN DIVIDING CATCHMENT BASED ON D8 ALGORITHM</b>	745
<i>Hongping Zhang, Xinwen Cheng, Dong Zhao, China University of Geosciences, China; Hairong Ma, Wuhan University of Engineering Science, China</i>	
<b>MOP2-PI.4: STUDY ON THEORETICAL RESERVES OF WATER ENERGY AND ITS DISTRIBUTION BASED ON HYDRO30 DIGITAL DRAINAGE NETWORK</b>	749
<i>Shuxu Gao, Binbin He, Yuwei Guan, Yan Yan, University of Electronic Science and Technology of China, China; Shujun Song, Chengdu Engineering Corporation Limited, China; Xiaofang Liu, Sichuan University of Science and Engineering, China</i>	
<b>MOP2-PI.5: AN IMPROVED ROAM ALGORITHM AND ITS APPLICATION IN TERRAIN MODELING</b>	753
<i>Chaokui Li, Ning Wang, Jun Fang, Baiyan Wu, Wentao Yang, Hunan University of Science and Technology, China</i>	
<b>MOP2-PI.7: CALIBRATION METHOD OF LINEAR-ARRAY CCD WITH ASYNCHRONOUS IMAGE FOR OPTICAL SATELLITE</b>	760
<i>Yuanyuan Ma, Tao Sun, Bin Lei, Institute of Electronics, Chinese Academy of Sciences, China</i>	
<b>MOP2-PI.8: RESEARCH AND IMPLEMENTATION OF OBLIQUE PHOTOGRAPHY PRODUCTIONS ON THE WEB3D VISUALIZATION OF DIGITAL EARTH</b>	764
<i>Long He, Long He, Xiaoming Zeng, Chenglei Wang, Yi Lian, Tiejun Cui, Tianjin Normal University, China</i>	
<b>MOP2-PI.9: TERRESTRIAL WATER STORAGE (TWS) PATTERNS MONITORING IN THE AMAZON BASIN USING GRACE OBSERVED: ITS TRENDS AND CHARACTERISTICS</b>	768
<i>Stephen Dankwa, Wenfeng Zheng, Bin Gao, Xiaolu Li, University of Electronic Science and Technology of China, China</i>	
 <b>MOP2-PJ: DATA MANAGEMENT AND EDUCATION</b>	
<b>MOP2-PJ.1: USING MSG-SEVIRI DATA TO MONITOR THE PLANET IN NEAR REAL TIME</b>	776
<i>Yves Julien, José Antonio Sobrino, Juan-Carlos Jiménez-Muñoz, Guillem Sòria, Drazen Skokovic, José Gomis-Cebolla, Susana García-Monteiro, Global Change Unit, Spain</i>	
<b>MOP2-PJ.2: APPLICATION OF 3D MODEL FROM UAV PHOTOGRAMMETRY IN VIRTUAL FIELD EDUCATION</b>	780
<i>Xuejia Sang, Linfu Xue, Jilin University, China</i>	
<b>MOP2-PJ.3: DEVELOPING A SANDBOX ENVIRONMENT FOR PROSAIL, SUITABLE FOR EDUCATION AND RESEARCH</b>	783
<i>Martin Danner, Matthias Woher, Katja Berger, Wolfram Mauser, Tobias Hank, Ludwig-Maximilian University of Munich, Germany</i>	

<b>MOP2-PJ.4: THE COASTAL WATERS RESEARCH SYNERGY FRAMEWORK, FOR UNLOCKING OUR POTENTIAL FOR COASTAL INNOVATION GROWTH</b>	<b>787</b>
<i>Miguel Homem, Nuno Grosso, Nuno Catarino, Elecnor Deimos, Portugal; Rory Scarrott, Eirini Politi, Abigail Cronin, University College Cork, Ireland</i>	
<b>MOP2-PJ.5: ESTIMATION OF ANNUAL AVERAGED EVAPOTRANSPIRATION BY USING PASSIVE MICROWAVE OBSERVATIONS</b>	<b>791</b>
<i>Meng Liu, Ronglin Tang, Zhao-Liang Li, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China; Huarui Mao, Chongqing Municipal Bureau of Land, Resources and Housing, China; Fangcheng Zhou, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China; Guangjian Yan, Beijing Normal University, China</i>	
 <b>MOP2-PK: LAND COVER DYNAMICS II</b>	
<b>MOP2-PK.2: STUDY ON LAND USE CHANGE IN THE WATER SUPPLYING CORE AREA OF MIDDLE ROUTE OF SOUTH-TO-NORTH WATER TRANSFER PROJECT</b>	<b>802</b>
<i>Ke Liu, Yuhang Gan, Tao Zhang, Zhengyu Luo, Jingjing Wang, Satellite Surveying and Mapping Application Center, NASG, China; Xiaoming Gao, Qingxing Yue, Satellite Surveying and Mapping Application Center, National Administration of Surveying, Mapping and Geoinformation, China</i>	
<b>MOP2-PK.3: INTRODUCTION OF THE GERMAN LANDSCAPE CHANGE DETECTION SERVICE</b>	<b>806</b>
<i>Patrick Knoefel, Michael Hovenbitzer, Federal Agency for Cartography and Geodesy, Germany</i>	
<b>MOP2-PK.4: EVALUATION OF HETEROGENEOUS LANDSCAPE ENVIRONMENTS BASED ON INFORMATION CAPACITY</b>	<b>810</b>
<i>Zhenyu Yang, Peking University, China; Fei Li, Xiuwan Chen, Xinlong Zhang, Institute of Remote Sensing and GIS, Peking University, China</i>	
<b>MOP2-PK.5: DYNAMICS OF BUILT-UP AREAS OVER THE PAST 30 YEARS ACCORDING TO REMOTE SENSING DATA IN THE CITY OF VALDIVIA, CHILE</b>	<b>814</b>
<i>Konstantin Verichev, Austral University of Chile, Chile; Polina Mikhaylyukova, Lomonosov Moscow State University, Russian Federation; Cristian Salazar, Austral University of Chile, Chile; Manuel Carpio, Pontificia Universidad Católica de Chile, Chile</i>	
<b>MOP2-PK.6: NEAR REAL TIME MULTISENSOR ALGORITHM FOR DEFORESTATION ALERT OVER THE DRY CHACO FOREST</b>	<b>818</b>
<i>Esteban Roitberg, Verónica Barraza, Francisco Grings, Mercedes Salvia, Pablo Perna, Matias Barber, University of Buenos Aires - CONICET, Argentina</i>	
<b>MOP2-PK.7: DEVELOPMENT OF AN AUTOMATIC DYNAMIC GLOBAL WATER MASK USING LANDSAT-8 IMAGES</b>	<b>822</b>
<i>Vinayaraj Poliyapram, Oishi Yu, Ryosuke Nakamura, National Institute of Advanced Industrial Science and Technology, Japan</i>	
<b>MOP2-PK.8: TEXTURE AND INTENSITY BASED LAND COVER CLASSIFICATION IN GERMANY FROM MULTI-ORBIT &amp; MULTI-TEMPORAL SENTINEL-1 IMAGES</b>	<b>826</b>
<i>Gopika Suresh, Michael Hovenbitzer, Federal Agency for Cartography and Geodesy, Germany</i>	
<b>MOP2-PK.9: USE OF LAND COVER MAPS AS INDICATORS FOR ACHIEVING SUSTAINABLE DEVELOPMENT GOALS</b>	<b>830</b>
<i>Leonid Shumilo, Andrii Kolotii, Mykola Lavreniuk, Bohdan Yailymov, Space Research Institute NASU-SSAU, Ukraine</i>	
<b>MOP2-PK.10: SPATIAL-TEMPORAL VARIATION OF LUCC IN ZHOUSHAN FROM 1985 TO 2015 USING REMOTE SENSING IMAGES</b>	<b>834</b>
<i>Xu Lu, Chao Chen, Jiaoqi Fu, Zhejiang Ocean University, China</i>	

## **MOP2-PL: URBAN AND BUILT ENVIRONMENT I**

### **MOP2-PL.1: MODELING THE HEAT ISLAND INTENSITY (HII) BASED ON DISTANCE ..... 838 DIFFUSION AND TYPICAL GROUND FEATURE TYPES IN BEIJING DOWNTOWN**

*Chen Yu, Deyong Hu, Capital Normal University, China*

### **MOP2-PL.2: OIL STORAGE ESTIMATION WITH TIME-SERIES L-BAND SAR IMAGERY ..... 842**

*Takuma Anahara, Japan Aerospace Exploration Agency, Japan; Masanobu Shimada, Tokyo Denki University, Japan*

### **MOP2-PL.3: PREDICTING URBAN GROWTH AND IMPLICATION ON URBAN THERMAL ..... 846 CHARACTERISTICS IN HARARE, ZIMBABWE**

*Terence Darlington Mushore, John Odindi, Onesimo Mutanga, Timothy Dube, University of KwaZulu-Natal, South Africa*

### **MOP2-PL.4: MAPPING DEVELOPMENT PATTERN IN CHINA USING DMSP/OLS ..... 850 NIGHTTIME LIGHT DATA**

*Yi'na Hu, Kun Qi, Peking University, China; Tao Hu, Huazhong Agricultural University, China*

### **MOP2-PL.5: MAPPING URBANIZATION IN THE UNITED STATES FOR 2020 ..... 854**

*Lahouari Bounoua, Joseph Nigro, Kurtis Thome, Ping Zhang, NASA Goddard Space Flight Center, United States; Asia Lachir, Faculty of Sciences Semlalia, Morocco*

### **MOP2-PL.6: ECO-ENVIRONMENTAL EVALUATION TO SUPPORT ENVIRONMENTAL ..... 858 PROTECTION FOR TWIN TAIPEI CITIES BY LANDSAT DATA**

*Yuei-An Liou, National Central University, Taiwan; Anh Kim Nguyen, Postdoctoral Fellow/National Central University, Taiwan*

### **MOP2-PL.7: DAMAGE ASSESSMENT OF BRIDGES USING POST-EVENT ..... 862 HIGH-RESOLUTION SAR IMAGES**

*Wen Liu, Haruya Hirano, Fumio Yamazaki, Chiba University, Japan*

### **MOP2-PL.8: USING INSAR STACKING TECHNIQUES TO PREDICT BRIDGE COLLAPSE ..... 866 DUE TO SCOUR**

*Sivasakthy Selvakumaran, University of Cambridge, United Kingdom; Simon Plank, German Aerospace Center (DLR), Germany; Cristian Rossi, Satellite Applications Catapult, United Kingdom; Christian Geiß, German Aerospace Center (DLR), Germany*

### **MOP2-PL.9: DAMAGE MAPPING AFTER THE 2017 PUEBLA EARTHQUAKE IN MEXICO USING ..... 870 HIGH-RESOLUTION ALOS2 PALSAR2 DATA**

*Bruno Adriano, RIKEN Center for Advanced Intelligence Project, Japan; Shunichi Koshimura, Tohoku University, Japan; Sadra Karimzadeh, Masashi Matsuoka, Tokyo Institute of Technology, Japan; Magaly Koch, Boston University, United States*

### **MOP2-PL.10: ON THE MODELLING OF URBAN INFRASTRUCTURE DEFORMATION ..... 874 PROFILES USING THE APPLIED ELEMENT METHOD AND MULTIPLE HYPOTHESIS TESTING**

*Bogdan Sebacher, Military Technical Academy, Romania; Stefan-Adrian Toma, Terrasigna, Romania; Marin Lupoea, Mihai Lica Pura, Military Technical Academy, Romania*

## **MOP2-PM: CLOUDS AND PRECIPITATION: RADAR TECHNIQUES AND DATA**

### **MOP2-PM.1: A DEMONSTRATOR FOR THE DOPPLER RADAR CLOUD PROFILER (DRCP) ..... 878**

*Dirk Klugmann, S&AO Ltd, United Kingdom; Matthew SurrIDGE, National Instruments Corporation (U.K.) Ltd., United Kingdom*

### **MOP2-PM.4: A PRELIMINARY STUDY TO QUANTIFY THE WIND VELOCITY FROM ..... 890 DOPPLER SPECTRA ACQUIRED BY VERTICALLY POINTING MICROWAVE RADARS**

*Mario Montopoli, Luca Baldini, Elisa Adirosi, Nicoletta Roberto, National Research Council of Italy (CNR), Italy; Errico Picciotti, Himet s.r.l. company, Italy*

### **MOP2-PM.5: THE STUDY ON RETRIEVAL ALGORITHM OF SPACEBORNE ..... 894 DUAL-FREQUENCY CLOUD RADAR**

*Qiong Wu, Feng Lu, Jian Shang, FangLi Dou, DaWei An, National Satellite Meteorological Center, China*

<b>MOP2-PM.6: COMPACT AIRBORNE KA-BAND RADAR: A NEW ADDITION TO THE UNIVERSITY OF WYOMING AIRCRAFT FOR ATMOSPHERIC RESEARCH</b>	<b>897</b>
<i>Samuel Haimov, University of Wyoming, United States; Andrew Pazmany, ProSensing, Inc., United States; Jeffrey French, Bart Geerts, Zhien Wang, Min Deng, Alfred Rodi, University of Wyoming, United States</i>	
<b>MOP2-PM.7: WIVERN: A NEW SATELLITE CONCEPT TO PROVIDE GLOBAL IN-CLOUD WINDS, PRECIPITATION AND CLOUD PROPERTIES</b>	<b>901</b>
<i>Alessandro Battaglia, University of Leicester, United Kingdom; Anthony Illingworth, Mengistu Wolde, University of Reading, United Kingdom</i>	
<b>MOP2-PN: CLOUDS AND PRECIPITATION: IR AND GPS DATA TECHNIQUES</b>	
<b>MOP2-PN.1: A POTENTIAL LOW COST REMOTE SENSING USING GPS DERIVED PWV</b>	<b>903</b>
<i>Shilpa Manandhar, Yee Hui Lee, Nanyang Technological University, Singapore; Yu Song Meng, National Metrology Centre, Agency for Science, Technology and Research (ASTAR), Singapore; Feng Yuan, Nanyang Technological University, Singapore; Soumyabrata Dev, The ADAPT Centre, Trinity College, Ireland</i>	
<b>MOP2-PN.4: USING INDEPENDENT COMPONENT ANALYSIS AND ESTIMATED THIN-CLOUD REFLECTANCE TO REMOVE CLOUD EFFECT ON LANDSAT-8 OLI BAND DATA</b>	<b>915</b>
<i>Haitao Lv, University of Electronic Science and Technology of China, China; Yong Wang, East Carolina University, Greenville, Armenia; Yue Gao, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PN.5: CLOUD DETECTION OF OPTICAL REMOTE SENSING IMAGE TIME SERIES USING P-NORM BASED REGRESSION MODEL</b>	<b>919</b>
<i>Jiang Qian, University of Electronic Science and Technology of China, China; Lu Wang, Northwestern Polytechnical University, China; Lixiang Ma, CETC 14, China; Yong Wang, Xiaobo Yang, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PN.6: GLOBAL PRECIPITATION DETECTION BASED ON MWHS-II FROM CHINA FY-3C METEOROLOGICAL SATELLITE</b>	<b>923</b>
<i>Na Li, Jieying He, Shengwei Zhang, Chinese Academy of Sciences, China; Naimeng Lu, National Satellite Meteorological Center, China</i>	
<b>MOP2-PN.7: EXTENDIBILITY OF A THIN-CLOUD REMOVAL ALGORITHM TO HI-RESOLUTION VISIBLE BANDS OF SENTINEL-2 DATA</b>	<b>927</b>
<i>Yue Gao, University of Electronic Science and Technology of China, China; Yong Wang, East Carolina University, United States; Haitao Lv, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PN.8: ANALYSIS OF HEAVY RAINFALL EVENTS OCCURRED IN ITALY BY USING NUMERICAL WEATHER PREDICTION, MICROWAVE AND INFRARED TECHNIQUE</b>	<b>931</b>
<i>Elisabetta Ricciardelli, Angela Cersosimo, Institute of Methodologies for Environmental Analysis - National Research Council, Italy; Domenico Cimini, Institute of Methodologies for Environmental Analysis - National Research Council / Centro di Eccellenza per l'integrazione di Tecniche di di Telerilevamento e Modellistica Numerica per la Previsione di Eventi Meteorologici Severi, Department of Physics, University of L'Aquila, Italy; Francesco Di Paola, Donatello Gallucci, Institute of Methodologies for Environmental Analysis - National Research Council, Italy; Sabrina Gentile, Institute of Methodologies for Environmental Analysis - National Research Council / Centro di Eccellenza per l'integrazione di Tecniche di di Telerilevamento e Modellistica Numerica per la Previsione di Eventi Meteorologici Severi, Department of Physics, University of L'Aquila, Italy; Edoardo Gerdaldi, Saverio Teodosio Nilo, Filomena Romano, Mariassunta Viggiano, Institute of Methodologies for Environmental Analysis - National Research Council, Italy</i>	
<b>MOP2-PN.9: POLARIMETRIC GNSS RADIO-OCCULTATIONS ABOARD PAZ: COMMISSIONING PHASE AND PRELIMINARY RESULTS</b>	<b>935</b>
<i>Estel Cardellach, Sergio Tomas, Antonio Rius, Institute of Space Sciences (ICE, CSIC). Institut d'Estudis Espacials de Catalunya (IEEC), Spain; Chi O. Ao, Manuel de la Torre-Juárez, Ramon Padullés, Francis Joseph Turk, Jet Propulsion Laboratory, California Institute of Technology, United States; Bill Schreiner, University Corporation for Atmospheric Research, United States</i>	

## **MOP2-PO: OCEAN BIOLOGY AND WATER QUALITY II**

### **MOP2-PO.1: DETECTING MICROPLASTICS POLLUTION IN WORLD OCEANS USING SAR ..... 938 REMOTE SENSING**

*Narangerel Davaasuren, The Open University, United Kingdom; Armando Marino, The University of Stirling, United Kingdom; Carl P. Boardman, The Open University, United Kingdom; Matteo Alparone, Ferdinando Nunziata, The Parthenope University of Naples, Italy; Nicolas Ackermann, Swiss Federal Railways SBB, Switzerland; Irena Hajnsek, Swiss Federal Institute of Technology, Switzerland; The German Aerospace Center, Germany, Germany*

### **MOP2-PO.4: WIND-WAVE-POOL EXPERIMENTAL DATA OF CONTAMINATED SEA WATER ..... 949 SURFACES: STATISTICAL SURFACES AND RADAR BACKSCATTERED FIELD**

*Aymeric Mainvis, Vincent Fabbro, Henri-José Mametsa, ONERA, France; Christophe Bourlier, IETR, France; Pierre Borderies, ONERA, France; Véronique Miegbielle, TOTAL SA, France*

### **MOP2-PO.5: OPERATIONAL DERIVATION OF WATER QUALITY, WATER DEPTH AND SEA ..... 953 BOTTOM TYPE FROM REMOTE SENSING SATELLITE DATA**

*Elizabeth Wong, Joel Wong, Soo Chin Liew, National University of Singapore, Singapore*

### **MOP2-PO.6: PREDICTING WINTER POTENTIAL FISHING ZONES OF ALBACORE TUNA ..... 957 (THUNNUS ALALUNGA) USING MAXIMUM ENTROPY MODELS AND REMOTELY SENSED DATA IN THE SOUTH INDIAN OCEAN**

*Ming-An Lee, Wan-Chen Yang, I-Cheng Hung, Sheng-Yuan Teng, National Taiwan Ocean University, Taiwan*

### **MOP2-PO.8: SPATIO-TEMPORAL VARIABILITY OF PHYTOPLANKTON FUNCTIONAL TYPES ..... 963 IN ALBORAN SEA FROM REMOTE SENSING IMAGES**

*Gabriel Navarro, Pablo Almaraz, Isabel Caballero, ICMAN-CSIC, Spain; Agueda Vazquez, University of Cadiz, Spain; I. Emma Huertas, ICMAN-CSIC, Spain*

### **MOP2-PO.9: THE DIFFERENCE OF RRS PRODUCT DERIVED FROM MODIS MERIS AND ..... 967 SEAWIFS IN SOUTH CHINA SEA**

*Jun Li, Jianhua Zhu, Tongji Li, Bing Han, Chuntao Chen, Anan Yang, Hongli Zhou, Fei Gao, National Ocean Technology Center, China*

## **MOP2-PP: OCEAN SURFACE WINDS AND CURRENTS I**

### **MOP2-PP.1: GEOPHYSICAL TURBULENT CHARACTERISTICS INFERRED FROM ..... 971 OBSERVATIONS OF SUBMESOSCALE SURFACE CURRENTS AND CHLOROPHYLL CONCENTRATION MAPS**

*Sung Yong Kim, Eun Ae Lee, Korea Advanced Institute of Science and Technology, Republic of Korea*

### **MOP2-PP.2: THE SWIM INSTRUMENT, TOWARDS THE LAUNCH ..... 975**

*Raquel Rodriguez Suquet, Cédric Tourain, Céline Tison, Centre National d'Etudes Spatiales, France; Lauriane Delaye, ACRI-ST, France; Danièle Hauser, Patricia Schippers, LATMOS, France; Flavien Gouillon, Laura Hermozo, Thierry Amiot, Emmanuelle Riviere, Patrick Castillan, Centre National d'Etudes Spatiales, France*

### **MOP2-PP.3: THE DOPPLER SPECTRUM OF THE MICROWAVE RADAR SIGNAL ..... 979 BACKSCATTERED BY THE SEA SURFACE AT LOW INCIDENCE ANGLES**

*Vladimir Karaev, Maria Ryabkova, Mariya Panfilova, Yuriy Titchenko, Eugeny Meshkov, Institute of Applied Physics, Russian Academy of Sciences, Russian Federation*

### **MOP2-PP.4: ANOMALOUS SCATTEROMETER WINDS IN THE MEDITERRANEAN SEA DUE ..... 983 TO THE PRESENCE OF SHIPS**

*Stefano Zecchetto, National Research Council of Italy (CNR), Italy*

### **MOP2-PP.5: IMPROVING WIND FORCING WITH SCATTEROMETER OBSERVATIONS FOR ..... 986 OPERATIONAL STORM SURGE FORECASTING IN THE ADRIATIC SEA**

*Francesco De Biasio, Stefano Zecchetto, National Research Council of Italy (CNR), Italy*

<b>MOP2-PP.6: BIG DATA MANAGEMENT OF SEA SURFACE WIND DATA.....</b>	<b>990</b>
<i>Félix R. Rodríguez, Daniel Teomiro Villa, Jaime Pina Cambero, Diego J. Merino Fernández, University of Extremadura, Spain</i>	
<b>MOP2-PP.7: LOW-TO-MODERATE WIND SPEED RETRIEVAL FROM SENTENEL-1 ..... 994</b>	
<b>DUAL-POLARIZED SAR IMAGES</b>	
<i>Chao Yang, Dongxiang Zhang, Kaijun Ren, Jia Liu, Chaoxiong Ke, National University of Defense Technology, China</i>	
<b>MOP2-PP.8: WIND DIRECTION FROM SENTINEL-1 SAR IMAGES IN REGIONAL SEAS.....</b>	<b>998</b>
<i>Stefano Zecchetto, National Research Council of Italy (CNR), Italy</i>	
<b>MOP2-PP.9: MULTI-APERTURE ALONG-TRACK INTERFEROMETRIC SAR FOR ..... 1001</b>	
<b>ESTIMATING VELOCITY VECTOR OF OCEAN CURRENTS</b>	
<i>Kazuo Ouchi, IHI Corporation, Japan; Takero Yoshida, The University of Tokyo, Japan; Chan-Su Yang, Korea Institute of Ocean Science and Technology, Japan</i>	
<b>MOP2-PP.10: THE WIND SPEED INVERSION AND IN-ORBIT ASSESSMENT OF IMAGING ..... 1005</b>	
<b>ALTIMETER ON TIANGONG-2 SPACE STATION</b>	
<i>Qingliu Bao, Xiaobin Yin, Beijing Piesat Information Technology Co., Ltd, China; Juhong Zou, Mingsen Lin, Youguang Zhang, National Satellite Ocean Application Service, China; Yunhua Zhang, National Space Science Center, Chinese Academy of Sciences, China</i>	
<b>MOP2-PQ: MICROWAVE RADIOMETERS: SENSOR DESIGN AND DEVELOPMENT</b>	
<b>MOP2-PQ.1: QUANTITATIVE EVALUATION OF LINEAR FEED ARRAY OF ..... 1009</b>	
<b>INTERFEROMETRIC SYNTHETIC APERTURE MICROWAVE IMAGER ON WCOM</b>	
<i>Aili Zhang, Hao Liu, Ji Wu, Lin Wu, National Space Science Center, Chinese Academy of Sciences, China; Xue Chen, National Space Science Center, the Chinese Academy of Sciences, China</i>	
<b>MOP2-PQ.2: MAS-V: EXPERIMENTAL SYSTEM OF MIRRORED APERTURE SYNTHESIS AT ..... 1013</b>	
<b>V BAND</b>	
<i>Qingxia Li, Haofeng Dou, Liangqi Gui, Huazhong University of Science and Technology, China; Liangbing Chen, Nanchang University, China; Ke Chen, Yuanchao Wu, Zhenyu Lei, Yufang Li, Liang Lang, Wei Guo, Huazhong University of Science and Technology, China</i>	
<b>MOP2-PQ.3: IMAGING COMPARISON BETWEEN THE REAL APERTURE AND SYNTHETIC ..... 1017</b>	
<b>APERTURE MICROWAVE RADIOMETERS: A CASE STUDY FOR GEO SOUNDER</b>	
<i>Cheng Zhang, Hao Liu, Ji Wu, Chinese Academy of Sciences, China</i>	
<b>MOP2-PQ.4: FPIR: DEMONSTRATOR INTEGRATION AND GROUND-BASED SALINITY ..... 1021</b>	
<b>OBSERVATION EXPERIMENT</b>	
<i>Lin Wu, Jingye Yan, Fei Zhao, Ailan Lan, Ji Wu, National Space Science Center, China</i>	
<b>MOP2-PQ.5: DESIGN AND PERFORMANCE OF THE TROPICS RADIOMETER ..... 1024</b>	
<b>COMPONENTS</b>	
<i>William Blackwell, MIT Lincoln Laboratory, United States</i>	
<b>MOP2-PQ.6: MULTI-FREQUENCY MICROWAVE RESONANCE CAVITY FOR ..... 1028</b>	
<b>NONDESTRUCTIVE CORE PLUG MEASUREMENTS</b>	
<i>Jose Oliverio Alvarez, Aramco Services Company - Aramco Research Center - Houston, United States; Felipe Peñaranda-Foix, Instituto ITACA, Universidad Politécnica de Valencia, Spain</i>	
<b>MOP2-PQ.7: SPATIAL RESOLUTION ENHANCEMENT OF MICROWAVE DATA USING A ..... 1032</b>	
<b>L<sup>∧</sup>P-PENALIZATION APPROACH WITH VARIABLE P</b>	
<i>Matteo Alparone, Ferdinando Nunziata, Università degli Studi di Napoli Parthenope, Italy; Claudio Estatico, Università degli Studi di Genova, Italy; Flavia Lenti, CLC Space GmbH, Germany; Maurizio Migliaccio, Università degli Studi di Napoli Parthenope, Italy</i>	



<b>MOP2-PQ.8: COMPARISON OF INSTRUMENT CALIBRATION PERFORMANCE FOR THE SNPP ATMS AND JPSS1 ATMS</b>	<b>1036</b>
<i>James Fuentes, Joel Amato, Mark Hernquist, Kent Anderson, Northrop Grumman Corporation, United States</i>	
<b>MOP2-PQ.9: ON-ORBIT SPECIAL TESTING OF NOAA-20/JPSS-1 ATMS</b>	<b>1040</b>
<i>Edward Kim, NASA Goddard Space Flight Center, United States; Vince Leslie, MIT Lincoln Laboratory, United States; Joseph Lyu, NASA Goddard Space Flight Center and GESTAR, United States; Lisa McCormick, NASA and Fibertek, United States; Craig Smith, NASA and SGT, United States; Idahosa Osaretin, MIT Lincoln Laboratory, United States; Quanhua (Mark) Liu, Ninghai Sun, Hu Yang, Lin Lin, NOAA/STAR, United States; Kent Anderson, Mark Hernquist, James Fuentes, Elliot Stiglic, Michael Replan, Northrop Grumman Corporation, United States</i>	
<b>MOP2-PQ.10: A STUDY ON IN-ORBIT CALIBRATION FOR A SPACEBORNE DISTRIBUTED INTERFEROMETER</b>	<b>1043</b>
<i>Ailan Lan, Jingye Yan, Lin Wu, Fei Zhao, Ji Wu, National Space Science Center, Chinese Academy of Sciences, China</i>	
<b>MOP2-PR: GNSS-R I: SIGNAL PROCESSING</b>	
<b>MOP2-PR.1: SPECULAR POINT CALCULATION BASED ON MODIFIED GRADIENT DESCENT ALGORITHM</b>	<b>1047</b>
<i>Yusen Tian, Xianyi Wang, Yueqiang Sun, Dongwei Wang, Chunjun Wu, Weihua Bai, Junming Xia, Qifei Du, National Space Science Center, Chinese Academy of Sciences/University of Chinese Academy of Sciences, China</i>	
<b>MOP2-PR.2: IMPACT OF THE ELEVATION ANGLE ON CYGNSS GNSS-R REFLECTIVITY OVER DIFFERENT SCATTERING MEDIA OVER LAND AND OCEAN</b>	<b>1051</b>
<i>Hugo Carreno-Luengo, Guido Luzi, Michele Crosetto, Centre Tecnològic de Telecomunicacions de Catalunya, Spain</i>	
<b>MOP2-PR.3: OPTIMIZING WAVEFORM MAXIMUM DETERMINATION FOR SPECULAR POINT TRACKING IN AIRBORNE GNSS-R</b>	<b>1055</b>
<i>Erwan Motte, Mehrez Zribi, CNRS, France; Pascal Fanise, IRD, France</i>	
<b>MOP2-PR.4: SATELLITE PITCH ESTIMATION USING DELAY DOPPLER MAPS</b>	<b>1059</b>
<i>Benjamin Southwell, Andrew Dempster, University of New South Wales, Sydney, Australia</i>	
<b>MOP2-PR.5: 3CAT-4: COMBINED GNSS-R, L-BAND RADIOMETER WITH RFI MITIGATION, AND AIS RECEIVER FOR A 1-UNIT CUBESAT BASED ON SOFTWARE DEFINED RADIO</b>	<b>1063</b>
<i>Joan Francesc Munoz-Martín, Noemí Miguélez, Ricard Castellà, Lara Fernández-Capón, Arnau Solanellas, Pol Via, Adriano Camps, Universitat Politècnica de Catalunya, Spain</i>	
<b>MOP2-PR.6: EFFECT OF LHCP ANTENNA'S CENTRAL BEAM DIRECTION ON DDM'S SNR AROUND SPECULAR</b>	<b>1067</b>
<i>Junming Xia, Weihua Bai, National Space Science Center, China; Xuerui Wu, Shanghai Astronomical Observatory, Chinese Academy of Sciences, China; Yueqiang Sun, Qifei Du, Xianyi Wang, Xiangguang Meng, Congliang Liu, Danyang Zhao, National Space Science Center, China; Yingqiang Wang, College of Meteorology and Oceanology, National university of Defense Technology, China; Dongwei Wang, Chunjun Wu, Yuerong Cai, Cheng Liu, National Space Science Center, China</i>	
<b>MOP2-PR.7: SPACEBORNE GNSS-REFLECTOMETRY FOR SHIP-DETECTION APPLICATIONS: IMPACT OF ACQUISITION GEOMETRY AND POLARIZATION</b>	<b>1071</b>
<i>Alessio Di Simone, University of Naples, Federico, Italy; Leonardo Millefiori, NATO Science and Technology Organization Centre for Maritime Research and Experimentation, Italy; Gerardo Di Martino, Antonio Iodice, Daniele Riccio, Giuseppe Ruello, University of Naples Federico II, Italy; Paolo Braca, NATO Science and Technology Organization Centre for Maritime Research and Experimentation, Italy; Peter Willett, University of Connecticut, United States</i>	
<b>MOP2-PR.8: SOFTWARE DESIGN OF GNOS-2'S GNSS-R MODULE</b>	<b>1075</b>
<i>Xianyi Wang, National Space Science Center, Chinese Academy of Sciences, China; Yusen Tian, National Space Science Center, Chinese Academy of Sciences/ National Space Science Center, Chinese Academy of Sciences, China; Yueqiang Sun, National Space Science Center, Chinese Academy of Sciences, China; Dongwei Wang, Chunjun Wu, National Space Science Center, Chinese Academy of Sciences/ National Space Science Center, Chinese Academy of Sciences, China; Qifei Du, Yuerong Cai, Weihua Bai, Junming Xia, Wei Li, Fu Li, National Space Science Center, Chinese Academy of Sciences, China</i>	

<b>MOP2-PR.9: A MMW SEEKER PERFORMANCE EVALUATION METHOD FOR MOVING TARGETS VIA RTK TECHNOLOGY</b>	<b>1078</b>
<i>Fugang Lu, Shichao Chen, Xi'an Modern Control Technology Research Institute, China; Ming Liu, Shaanxi Normal University, China; Jun Wang, Xi'an Modern Control Technology Research Institute, China; Taoli Yang, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PR.10: A MULTI-FREQUENCY ACQUISITION ALGORITHM FOR A GNSS SOFTWARE RECEIVER</b>	<b>1082</b>
<i>Shaolong Cui, Dacheng Wang, Bernhard Holtkamp, Xiaojing Yao, The Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Tianhe Chi, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Jinyun Fang, Institute of Computing Technology, Chinese Academy of Sciences, China</i>	
<b>MOP2-PS: OPTICAL CALIBRATION I</b>	
<b>MOP2-PS.1: AN IMPROVED INDEX FOR DESATURATION OF DMSP NIGHTTIME LIGHT DATA</b>	<b>1086</b>
<i>Xiaolong Ma, Chinese Academy of Surveying and Mapping, China; Xiaohua Tong, Sicong Liu, Tongji University, China; Zhaoting Ma, Chinese Academy of Surveying and Mapping, China; Shouzhu Zheng, Tongji University, China</i>	
<b>MOP2-PS.4: SENTINEL-3 A AND B OPTICAL PAYLOAD: EARLY RESULTS FROM COMMISSIONING AND TANDEM FLIGHT ACTIVITIES</b>	<b>1098</b>
<i>Jens Nieke, European Space Agency/ESTEC, Netherlands; Steffen Dransfeld, European Space Agency/ESRIN, Netherlands; Craig Donlon, Bruno Berruti, European Space Agency/ESTEC, Netherlands; Susanne Mecklenburg, European Space Agency/ESRIN, Netherlands</i>	
<b>MOP2-PS.6: THE EFFECTS OF VIIRS SPECTRAL RESPONSE DIFFERENCES BETWEEN SUOMI NPP AND NOAA-20 FOR THE THERMAL EMISSIVE BANDS</b>	<b>1104</b>
<i>Lin Lin, University of Maryland, United States; Changyong Cao, NOAA/NESDIS/STAR, United States</i>	
<b>MOP2-PS.7: LINKING SNPP AND NOAA-20 CRIS TOWARD MEASUREMENT CONSISTENCY AND CLIMATE DATA RECORDS</b>	<b>1108</b>
<i>Likun Wang, Yong Chen, University of Maryland, United States; Changyong Cao, NOAA/NESDIS/STAR, United States</i>	
<b>MOP2-PS.8: EARLY RESULTS FROM NOAA-20 (JPSS-1) VIIRS ON-ORBIT CALIBRATION AND CHARACTERIZATION</b>	<b>1112</b>
<i>Xiaoxiong Xiong, NASA Goddard Space Flight Center, United States; Changyong Cao, NOAA/NESDIS, United States; Ning Lei, Vincent Chiang, Amit Angal, Yonghong Li, SSAI, United States; Slawomir Blonski, Wenhui Wang, Taeyoung Choi, ERT, United States</i>	
<b>MOP2-PT: BIG MACHINE LEARNING II</b>	
<b>MOP2-PT.1: DEEP LEARNING – A NEW APPROACH FOR MULTI-LABEL SCENE CLASSIFICATION IN PLANETSCOPE AND SENTINEL-2 IMAGERY</b>	<b>1116</b>
<i>Iurii Shendryk, Yannik Rist, Rob Lucas, Catherine Ticehurst, Peter Thorburn, The Commonwealth Scientific and Industrial Research Organisation, Australia</i>	
<b>MOP2-PT.2: PATTERN STRENGTHENED DEEP MODEL FOR SAR IMAGE CLASSIFICATION</b>	<b>1120</b>
<i>Xinlong Liu, Yan Wang, Gong Han, Electronic Information School, Wuhan University, China; Mingxia Tu, Wuhan University, China; Chu He, Electronic Information School, Wuhan University, China</i>	
<b>MOP2-PT.3: DEEP SEMANTIC HASHING RETRIEVAL OF REMOTE SENSING IMAGES</b>	<b>1124</b>
<i>Cheng Chen, Huanxin Zou, Ningyuan Shao, Jiachi Sun, National University of Defense Technology, China; Xianxiang Qin, Air Force Engineering University, China</i>	
<b>MOP2-PT.4: AUTOMATED ANALYSIS OF REMOTELY SENSED IMAGES USING THE UNICORE WORKFLOW MANAGEMENT SYSTEM</b>	<b>1128</b>
<i>Shahbaz Memon, Gabriele Cavallaro, Björn Hagemeier, Morris Riedel, Forschungszentrum Jülich, Germany; Helmut Neukirchen, University of Iceland, Iceland</i>	

<b>MOP2-PT.5: POTENTIAL ANALYSIS OF FEATURE EXTRACTION BASED QUICK RESPONSE FOR ENVIRONMENTAL CHANGE WITH SOCIAL MEDIA PHOTOS</b>	<b>1132</b>
<i>Yuanfeng Wu, Lianru Gao, Key Laboratory of Digital Earth Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Wenzhi Liao, Ghent University-TELIN-IPI-IMEC, Belgium, Belgium; Paolo Gamba, Dipartimento di Ingegneria Industriale e dell'Informazione, Università degli Studi di Pavia, Italy; Bing Zhang, Key Laboratory of Digital Earth Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>MOP2-PT.6: TIME-SCALE TRANSFERRING DEEP CONVOLUTIONAL NEURAL NETWORK FOR MAPPING EARLY RICE</b>	<b>1136</b>
<i>Yaming Duan, Jinshui Zhang, College of Resources Science and Technology/Skate Key Laboratory of Earth Surface Processes and Resource Ecology, Beijing Normal University, China; Guanyuan Shuai, Department of Earth and Environment Science, Michigan State University, United States; Shuang Zhu, Beijing Polytechnic College, Beijing 100042, China, China; Xiaohe Gu, Beijing Polytechnic College / ChinaBeijing Polytechnic College, China</i>	
<b>MOP2-PT.8: COMBINING FOURIER ANALYSIS AND MACHINE LEARNING TO ESTIMATE THE SHALLOW-GROUND THERMAL DIFFUSIVITY IN SWITZERLAND</b>	<b>1144</b>
<i>Dan Assouline, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland; Nahid Mohajeri, University of Oxford, United Kingdom; Agust Gudmundsson, Royal Holloway University of London, United Kingdom; Jean-Louis Scartezzini, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland</i>	
<b>MOP2-PT.9: SUPER-RESOLUTION OF REMOTE SENSING IMAGES BASED ON TRANSFERRED GENERATIVE ADVERSARIAL NETWORK</b>	<b>1148</b>
<i>Wen Ma, University of Chinese Academy of Sciences; Institute of Electronics, Chinese Academy of Sciences; Key Laboratory of Technology in Geo-spatial Information Processing and Application System, Chinese Academy of Sciences, China; Zongxu Pan, Institute of Electronics, Chinese Academy of Sciences; Key Laboratory of Technology in Geo-spatial Information Processing and Application System, Chinese Academy of Sciences, China; Jiayi Guo, University of Chinese Academy of Sciences; Institute of Electronics, Chinese Academy of Sciences; Key Laboratory of Technology in Geo-spatial Information Processing and Application System, Chinese Academy of Sciences, China; Bin Lei, Institute of Electronics, Chinese Academy of Sciences; Key Laboratory of Technology in Geo-spatial Information Processing and Application System, Chinese Academy of Sciences, China</i>	
<b>MOP2-PU: GLOBAL ESSENTIAL VARIABLES I</b>	
<b>MOP2-PU.1: A INTEGRATED INVERSION METHOD FOR ESTIMATING GLOBAL LEAF AREA INDEX FROM CHINESE FY-3A MERSI DATA</b>	<b>1152</b>
<i>Jing Zhao, Jing Li, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Qinhuo Liu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences / College of Resources and Environment, University of Chinese Academy of Sciences / Joint Center for Global Change Studies, China; Baodong Xu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences / College of Resources and Environment, University of Chinese Academy of Sciences, China; Chen Chen, National Administration of Surveying mapping and Geo-information of China, China; Li Li, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>MOP2-PU.2: EVALUATION OF AMSR2 AND MODIS LAND SURFACE TEMPERATURE USING GROUND MEASUREMENTS IN HEIHE RIVER BASIN</b>	<b>1156</b>
<i>Jin Ma, Ji Zhou, Yingjun Zhang, Xiaodong Zhang, University of Electronic Science and Technology of China, China</i>	
<b>MOP2-PU.3: MODELING SURFACE THERMAL ANISOTROPY USING BRIGHTNESS TEMPERATURE OVER COMPLEX TERRAINS</b>	<b>1160</b>
<i>Zhong-Hu Jiao, Institute of Geology, China Earthquake Administration; Beijing Normal University, China; Guangjian Yan, Beijing Normal University, China; Tianxing Wang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Xihan Mu, Beijing Normal University, China; Jing Zhao, Harbin Institute of Technology Shenzhen Graduate School, China</i>	
<b>MOP2-PU.4: AN APPROACH FOR RISK MAPS OF VECTOR-BORNE INFECTIOUS DISEASES: ECOLOGICAL AND ADAPTIVE CAPACITY INDICATORS</b>	<b>1164</b>
<i>Anh Kim Nguyen, Postdoctoral Fellow/National Central University, Taiwan; Yuei-An Liou, National Central University, Taiwan</i>	
<b>MOP2-PU.6: VALIDATION OF GLOBAL LAND SURFACE SATELLITE PHASE-2 SURFACE BROADBAND ALBEDO PRODUCT</b>	<b>1168</b>
<i>Xijia Li, Hongbo Yan, Xianlei Fan, Yanling Ding, Ying Qu, Northeast Normal University, China</i>	

<b>MOP2-PU.7: RETRIEVAL OF TYPHOON AND HURRICANE SURFACE BAROMETRIC PRESSURE BY PASSIVE MICROWAVE MEASUREMENTS</b>	1172
<i>Zijin Zhang, Xiaolong Dong, CAS Key Laboratory of Microwave Remote Sensing, National Space Science Center, Chinese Academy of Sciences, China</i>	
<b>MOP2-PU.8: VALIDATION OF ATMOSPHERIC WATER VAPOR FROM SEVERAL SATELLITE INSTRUMENTS USING GPS MEASUREMENTS AT SPANISH STATIONS UNDER CLOUD-FREE CONDITIONS</b>	1176
<i>Javier Vaquero-Martinez, Manuel Antón, Universidad de Extremadura, Badajoz (Spain), Spain; José Pablo Ortiz de Galisteo, AEMET (Valladolid), Spain; Victoria Cachorro, Pablo Álvarez Zapatero, Universidad de Valladolid, Spain; Roberto Román, Universidad de Granada, Spain; Diego Loyola, German Aerospace Center (DLR), Germany; Maria Joao Costa, Universidade de Evora, Portugal; Huiquin Wang, Gonzalo Gonzalez Abad, Smithsonian Astrophysical Observatory, United States; Stefan Noel, University of Bremen, United States</i>	
<b>MOP2-PU.9: ASSESSMENT OF TWO SATELLITE-BASED LAND SURFACE SHORTWAVE DOWNWARD RADIATION DATASETS OVER THE TIBETAN PLATEAU</b>	1180
<i>Yuechi Yu, Tianxing Wang, Jiancheng Shi, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>MOP2-PV: NEW REMOTE SENSING TECHNIQUES AND METHODS I</b>	
<b>MOP2-PV.1: EXPERIMENTAL VERIFICATION OF ONE-DIMENSIONAL MIRRORED APERTURE SYNTHESIS</b>	1187
<i>Liangbing Chen, Yuhao Wang, Huilin Zhou, Chaoqun Zhang, Nanchang University, China; Haofeng Dou, Qingxia Li, Liangqi Gui, Yuanchao Wu, Zhenyu Lei, Huazhong University of Science and Technology, China</i>	
<b>MOP2-PV.2: ENERGY MINIMIZATION FOR CIRRUS AND CUMULUS CLOUD SEPARATION IN ATMOSPHERIC IMAGES</b>	1191
<i>Charles Marshak, University of California, Los Angeles, United States; Igor Yanovsky, Jet Propulsion Laboratory, United States; Luminita Vese, University of California, Los Angeles, United States</i>	
<b>MOP2-PV.3: MULTITASK CLASSIFICATION OF REMOTE SENSING SCENES USING DEEP NEURAL NETWORKS</b>	1195
<i>Haikel Alhichri, King Saud University, Saudi Arabia</i>	
<b>MOP2-PV.4: COMPARATIVE VALIDATION OF CLEAR SKY IRRADIANCE MODELS OVER FINLAND</b>	1199
<i>Viivi Kallio, Aku Riihelä, Finnish Meteorological Institute, Finland</i>	
<b>MOP2-PV.5: HOMOGENEITY TEST FOR CONFUSION MATRICES: A METHOD AND AN EXAMPLE</b>	1203
<i>José L. García-Balboa, María V. Alba-Fernández, Francisco Javier Ariza-López, José Rodríguez-Avi, Universidad de Jaén, Spain</i>	
<b>MOP2-PV.6: RESEARCH ON DETECTION OIL SPILL INFORMATION BASED ON POLARIZATION DECOMPOSITION</b>	1206
<i>Yarong Zou, National Satellite Ocean Application Service, China; Shengli Zhang, Beijing International Studies University, China; Chao Liang, Wentao An, National Satellite Ocean Application Service, China</i>	
<b>MOP2-PV.7: ESTIMATION OF LAND SURFACE TEMPERATURE FROM UNMANNED AERIAL VEHICLE LOADED THERMAL IMAGER DATA</b>	1210
<i>Menglin Si, Bo-Hui Tang, State Key Laboratory of Resources and Environment Information System, China; Zhao-Liang Li, Key Laboratory of Agricultural Remote Sensing, China</i>	
<b>MOP2-PV.10: COMPLETE CONTROL OF AN OBSERVED CONFUSION MATRIX</b>	1222
<i>Francisco Javier Ariza-López, José Rodríguez-Avi, Virtudes Alba-Fernández, University of Jaén, Spain</i>	

## **MOP2-PW: RADIO FREQUENCY INTERFERENCE (RFI) IN MICROWAVE REMOTE SENSING II**

### **MOP2-PW.1: EVOLUTION OF THE RADIO FREQUENCY INTERFERENCE ..... 1226 ENVIRONMENT FACED BY EARTH OBSERVING MICROWAVE RADIOMETERS IN C AND X BANDS OVER EUROPE**

*Mustafa Aksoy, University at Albany, State University of New York, United States*

### **MOP2-PW.2: RADIO FREQUENCY INTERFERENCE (RFI) PRODUCTS ON THE AQUARIUS ..... 1230 WEBSITE**

*Paolo de Matthaëis, Yan Soldo, David Le Vine, NASA Goddard Space Flight Center, United States; Vardis Tsontos, NASA Jet Propulsion Laboratory, United States*

### **MOP2-PW.3: INTERFERENCE SUPPRESSION FOR SAR BASE ON AMBIGUITY FUNCTION ..... 1233 ITERATION DECOMPOSITION**

*Jia Su, Mingliang Tao, Jian Xie, Ling Wang, Northwestern Polytechnical University, China*

### **MOP2-PW.4: RFI ANALYSIS AND MITIGATION IN AIRBORNE GNSS-R CAMPAIGN ..... 1237**

*Jorge Querol, Raul Onrubia, Daniel Pascual, Jordi Castellvi-Esturi, Hyuk Park, Adriano Camps, UPC-BarcelonaTech, Spain*

### **MOP2-PW.5: MONITORING OF SMOS RFI SOURCES IN THE 1400–1427MHZ PASSIVE BAND ..... 1241**

*Ekhi Uranga, Alvaro Llorente, Antonio de la Fuente, Elena Daganzo, Roger Oliva, European Space Agency, Spain; Yann Kerr, CESBIO, France*

### **MOP2-PW.6: SNOW DENSITY AND GROUND PERMITTIVITY RETRIEVED FROM L-BAND ..... 1245 RADIOMETRY: MELTING EFFECTS**

*Mike Schwank, GAMMA Remote Sensing Research and Consulting AG, Switzerland; Reza Naderpour, Swiss Federal Research Institute WSL, Switzerland*

## **TU1-R1: OBJECT DETECTION IN OPTICAL IMAGES I**

### **TU1-R1.1: CNN BASED RENORMALIZATION METHOD FOR SHIP DETECTION IN VHR ..... 1252 REMOTE SENSING IMAGES**

*Tengfei Wang, Yanfeng Gu, Harbin Institute of Technology, China*

### **TU1-R1.2: A NOVEL TECHNIQUE FOR BUILDING ROOF MAPPING IN ..... 1256 VERY-HIGH-RESOLUTION MULTISPECTRAL SATELLITE DATA**

*Alessandro Andreoni, Fabio Dell'Acqua, University of Pavia, Italy; Riccardo Freddi, OHB Italia SpA, Italy*

### **TU1-R1.3: FUSING INFORMATION FROM SUBPIXEL TO SUPERPIXEL FOR ..... 1260 HYPER SPECTRAL ANOMALY DETECTION**

*Zhihong Huang, Shutao Li, Leyuan Fang, Hunan University, China*

### **TU1-R1.4: GAN-BASED DOMAIN ADAPTATION FOR OBJECT CLASSIFICATION ..... 1264**

*Mesay Belete Bejiga, Farid Melgani, University of Trento, Italy*

### **TU1-R1.5: OBJECT DETECTION IN SATELLITE IMAGERY USING 2-STEP ..... 1268 CONVOLUTIONAL NEURAL NETWORKS**

*Hiroki Miyamoto, Kazuki Uehara, Masahiro Murakawa, Hidenori Sakanashi, Hirokazu Nosato, Toru Kouyama, Ryosuke Nakamura, National Institute of Advanced Industrial Science and Technology, Japan*

## **TU2-R1: BUILDING DETECTION**

### **TU2-R1.1: A NOVEL BUILDING DETECTION METHOD USING ZY-3 MULTI-ANGLE ..... 1272 IMAGERY OVER URBAN AREAS**

*Huijun Chen, Xin Huang, Chun Liu, Jiayi Li, Jianya Gong, Wuhan University, China*

<b>TU2-R1.2: RANSAC-BASED SEGMENTATION FOR BUILDING ROOF FACE DETECTION IN LIDAR POINT CLOUD</b>	1276
<i>Aluir Porfirio Dal Poz, Michelle Sayuri Yano, São Paulo State University, Brazil</i>	
<b>TU2-R1.3: DETECTING BUILDINGS OF ANY SIZE USING INTEGRATION OF CNN MODELS</b>	1280
<i>Ryuhei Hamaguchi, Keisuke Nemoto, Tomoyuki Imaizumi, Shuhei Hikosaka, PASCO CORPORATION, Japan</i>	
<b>TU2-R1.4: CORRECTING MISALIGNED RURAL BUILDING ANNOTATIONS IN OPEN STREET MAP USING CONVOLUTIONAL NEURAL NETWORKS EVIDENCE</b>	1284
<i>John Edgar Vargas Muñoz, University of Campinas, Brazil; Diego Marcos, Sylvain Lobry, Wageningen University &amp; Research, Netherlands; Jefersson Alex dos Santos, Universidade Federal de Minas Gerais, Brazil; Alexandre Xavier Falcão, University of Campinas, Brazil; Devis Tuia, Wageningen University &amp; Research, Netherlands</i>	
<b>TU2-R1.5: EFFECTIVE BUILDING EXTRACTION BY LEARNING TO DETECT AND CORRECT ERRONEOUS LABELS IN SEGMENTATION MASK</b>	1288
<i>Praveer Singh, Nikos Komodakis, Ecole des Ponts ParisTech, France</i>	
 <b>TU3-R1: OBJECT DETECTION WITH RADAR/LIDAR</b>	
<b>TU3-R1.1: INFLUENCE OF HALF-SPACE BACKGROUND ON RADAR SIGNATURES OF SMALL DRONES</b>	1292
<i>Xin Qi, Zaiping Nie, Xiaofeng Que, Yue Wang, Jun Hu, University of Electronic Science and Technology of China, China</i>	
<b>TU3-R1.3: DYNAMIC PROGRAMMING TRACK BEFORE DETECT ALGORITHM FOR MULTISTATIC MIMO STAP RADAR</b>	1300
<i>Shusen Wang, Ze Yu, Yukun Guo, Liwei Sun, Yanan Yu, Beihang University, China</i>	
<b>TU3-R1.4: A TERRAIN INFORMATION CONSTRAINED SEMIDEFINITE RELAXATION METHOD FOR DOPPLER SHIFT BASED SOURCE LOCALIZATION</b>	1304
<i>Lijuan Deng, Ping Wei, Zhan Zhang, Ningkang Chen, Hongshu Liao, Wen Sun, University of Electronic Science and Technology of China, China</i>	
<b>TU3-R1.5: INFLUENCE OF DIFFERENT FORMATION PARAMETERS ON ELECTROMAGNETIC RESPONSE OF MICRO-CYLINDRICALLY FOCUSED LOGGING</b>	1308
<i>Peng Hao, Xiangyang Sun, Zaiping Nie, School of Electronic Engineering, University of Electronic Science and Technology of China (UESTC), China</i>	
 <b>TU4-R1: MAPPING AND MOSAICKING</b>	
<b>TU4-R1.1: VERY HIGH RESOLUTION OPTICAL IMAGE CLASSIFICATION USING WATERSHED SEGMENTATION AND A REGION-BASED KERNEL</b>	1312
<i>Andrea De Giorgi, Gabriele Moser, University of Genoa, Italy; Giovanni Poggi, Giuseppe Scarpa, University of Naples, Italy; Sebastiano Serpico, University of Genoa, Italy</i>	
<b>TU4-R1.2: SPARSITY-DRIVEN DIGITAL TERRAIN MODEL EXTRACTION</b>	1316
<i>Fatih Nar, Konya Food and Agriculture University, Turkey; Erdal Yilmaz, Zibumi Studios, Turkey; Gustau Camps-Valls, University of Valencia, Spain</i>	
<b>TU4-R1.3: AN IMPROVED ADAPTIVE ANT COLONY ALGORITHM FOR INTELLIGENT SEAMLINE DETECTION OF ORTHOIMAGE MOSAICKING</b>	1320
<i>Guoqing Zhou, Qingyang Wang, Bin Jia, Qiuyu Pan, Hongjun Sha, Xiaofan Liu, Shengxin Huang, Haoyu Wang, Guilin University of Technology, China</i>	
<b>TU4-R1.4: BUILDING RECONSTRUCION USING THREE-DIMENSIONAL ZERNIKE MOMENTS IN DIGITAL SURFACE MODEL</b>	1324
<i>Bing Ma, Ye Zhang, Shu Tian, Harbin Institute of Technology, China</i>	

**TU4-R1.5: SUPERPIXEL PARTITIONING OF VERY HIGH RESOLUTION SATELLITE IMAGES FOR LARGE-SCALE CLASSIFICATION PERSPECTIVES WITH DEEP CONVOLUTIONAL NEURAL NETWORKS** ..... 1328

*Tristan Postadjian, Arnaud Le Bris, Univ. Paris Est, LASTIG MATIS, IGN, ENSG, France; Hichem Sahbi, CNRS, LIP6 UPMC Sorbonne Universités, Paris, France; Clément Mallet, Univ. Paris Est, LASTIG MATIS, IGN, ENSG, France*

**TU1-R2: SAR INTERFEROMETRY: ALONG AND ACROSS II**

**TU1-R2.1: ON THE CHARACTERIZATION OF FREQUENCY-PERSISTENT SCATTERERS IN SPLIT-BAND INTERFEROMETRY** ..... 1332

*Ludivine Libert, Dominique Derauw, Université de Liège, Belgium; Nicolas d'Oreye, European Center for Geodynamics and Seismology, Luxembourg; Anne Orban, Christian Barbier, Université de Liège, Belgium*

**TU1-R2.2: INVESTIGATION OF TANDEM-X PENETRATION DEPTH OVER THE GREENLAND ICE SHEET** ..... 1336

*Sahra Abdullahi, Birgit Wessel, Tobias Leichtle, Martin Huber, Christian Wohlfart, Achim Roth, German Aerospace Center (DLR), Germany*

**TU1-R2.3: FIRST RESULTS OF EXPERIMENTAL POLARIMETRIC SAR-GMTI MODES ON RADARSAT-2** ..... 1340

*Shen Chiu, Christoph Gierull, Mamoon Rashid, Defence R&D Canada - Ottawa, Canada*

**TU1-R2.4: STRONG CLUTTER SUPPRESSION FOR SPACEBORNE DUAL-CHANNEL SAR/GMTI** ..... 1344

*Mingjie Zheng, Weidong Yu, Lei Zhang, Robert Wang, Institute of Electronics, Chinese Academy of Sciences, China*

**TU1-R2.5: IBIS-ARCSAR: AN INNOVATIVE GROUND-BASED SAR SYSTEM FOR SLOPE MONITORING** ..... 1348

*Federico Viviani, Alberto Michellini, Lorenzo Mayer, Francesco Coppi, IDS GeoRadar Srl, Italy*

**TU2-R2: DIFFERENTIAL SAR INTERFEROMETRY I**

**TU2-R2.1: PRELIMINARY RESULTS OF TEMPORAL DEFORMATION ANALYSIS IN ISTANBUL USING MULTI-TEMPORAL INSAR WITH SENTINEL-1 SAR DATA** ..... 1352

*Mumin Imamoglu, TUBITAK-BILGEM, Turkey; Saygin Abdikan, Bulent Ecevit University, Turkey; Fatih Kahraman, TUBITAK-BILGEM, Turkey*

**TU2-R2.2: PERSISTENT SCATTERER STATISTICS AND THEIR DETECTION** ..... 1356

*Howard Zebker, Stacey Huang, Stanford University, United States*

**TU2-R2.3: A NON-STATIONARY PERIODIC TEMPORAL DECORRELATION MODEL FOR INSAR STACKS OVER PASTURE AREAS** ..... 1360

*Sami Samiei-Esfahany, University of Tehran, Netherlands; Ramon F. Hanssen, Delft University of Technology, Netherlands*

**TU2-R2.4: ESA SNAP – STAMPS INTEGRATED PROCESSING FOR SENTINEL-1 PERSISTENT SCATTERER INTERFEROMETRY** ..... 1364

*Michael Foumelis, BRGM - French Geological Survey, France; Jose Manuel Delgado Blasco, ESA Research and Service Support, Italy; Yves-Louis Desnos, Marcus Engdahl, Diego Fernández, European Space Agency, Italy; Luis Veci, Jun Lu, Cecilia Wong, Array Systems Computing Inc., Canada*

**TU3-R2: DIFFERENTIAL SAR INTERFEROMETRY II**

**TU3-R2.1: COSEISMIC SURFACE DEFORMATIONS OF GLOBAL LARGE EARTHQUAKES IN 2014-2016 DETECTED BY ALOS-2 INSAR** ..... 1368

*Yu Morishita, Geospatial Information Authority of Japan, Japan*

<b>TU3-R2.2: A DATA-ADAPTIVE EOF BASED METHOD FOR DISPLACEMENT SIGNAL EXTRACTION FROM INTERFEROGRAM TIME SERIES</b> .....	<b>1372</b>
<i>Rémi Prébet, Yajing Yan, Matthias Jauvin, Emmanuel Trouvé, Université Savoie Mont Blanc, France</i>	
<b>TU3-R2.3: EXPLOITATION OF MULTI-FREQUENCY DATA FOR DINSAR PROCESSING</b> .....	<b>1376</b>
<i>Matteo Nannini, German Aerospace Center (DLR), Germany; Takuma Anahara, Japan Aerospace Exploration Agency, Japan; Muriel Pinheiro, Pau Prats-Iraola, German Aerospace Center (DLR), Germany</i>	
<b>TU3-R2.4: ITERATIVE FILTERING BASED ON ADAPTIVE CHEBYSHEV KERNEL FUNCTIONS FOR NOISE SUPPRESSION IN DIFFERENTIAL SAR INTERFEROGRAMS</b> .....	<b>1380</b>
<i>Alejandro Mestre-Quereda, Juan M. Lopez-Sanchez, Jesus Selva, University of Alicante, Spain; Pablo J. Gonzalez, University of Liverpool, United Kingdom</i>	
<b>TU3-R2.5: THREE-DIMENSIONAL DEFORMATION MONITORING AND STRUCTURAL RISK ASSESSMENT OF BRIDGES BY INTEGRATING OBSERVATIONS FROM MULTIPLE SAR SENSORS</b> .....	<b>1384</b>
<i>Xiaoqiong Qin, The Hong Kong Polytechnic Univeristy / Wuhan University, China; Xiaoli Ding, The Hong Kong Polytechnic Univeristy, China; Mingsheng Liao, Wuhan University, China</i>	
 <b>TU4-R2: DIFFERENTIAL SAR INTERFEROMETRY III</b>	
<b>TU4-R2.1: THE DEVELOPMENT OF A HIGH PRECISION TROPOSPHERE EFFECT MITIGATION PROCESSOR FOR SAR INTERFEROMETRY</b> .....	<b>1388</b>
<i>Nico Adam, German Aerospace Center (DLR), Germany</i>	
<b>TU4-R2.3: THREE-DIMENSIONAL SURFACE DEFORMATION RELATED TO THE 2017 NORTH KOREA NUCLEAR TEST OBSERVED BY SAR OFFSET-TRACKING APPROACH</b> .....	<b>1392</b>
<i>Won-Kyung Baek, University of Seoul, Republic of Korea; Min-Jeong Jo, USRA, United States; Hyung-Sup Jung, University of Seoul, Republic of Korea</i>	
<b>TU4-R2.4: MEASUREMENT OF VERTICAL DEFORMATION IN KARACHI USING MULTI-TEMPORAL INSAR</b> .....	<b>1395</b>
<i>Shamsa Kanwal, Xiaoli Ding, Lei Zhang, The Hong Kong Polytechnic University, Hong Kong SAR of China</i>	
<b>TU4-R2.5: FIRST ANALYSIS OF C-BAND ECR TRANSPONDERS FOR INSAR GEODESY</b> .....	<b>1399</b>
<i>Hans van der Marel, Freek van Leijen, Ramon F. Hanssen, Delft University of Technology, Netherlands</i>	
 <b>TU1-R3: GNSS-R AND OTHER SIGNALS OF OPPORTUNITY FOR SOIL MOISTURE</b>	
<b>TU1-R3.1: P-BAND SIGNALS OF OPPORTUNITY FOR REMOTE SENSING OF ROOT ZONE SOIL MOISTURE</b> .....	<b>1403</b>
<i>Simon Yueh, Xiaolan Xu, Rashmi Shah, California Institute of Technology, United States; Steve Margulis, University of California, Los Angeles, United States; Kelly Elder, US Department of Agriculture, United States</i>	
<b>TU1-R3.2: TOWARDS SOIL MOISTURE RETRIEVAL USING TOWER-BASED P-BAND RADIOMETER OBSERVATIONS</b> .....	<b>1407</b>
<i>Nithyapriya Boopathi, IITB-Monash Research Academy, Australia; Nan Ye, Xioling Wu, Jeffrey Walker, Monash university, Australia; Rao Y.S., Indian Institute of Technology Bombay, India; Thomas Jackson, USDA-ARS Hydrology and Remote Sensing Laboratory, United States; Yann Kerr, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France; Edward Kim, NASA Goddard Space Flight Center, United States; Andrew McGrath, Airborne Research Australia, Australia; In-Young Yeo, University of Newcastle, Australia</i>	
<b>TU1-R3.3: ANALYSIS OF CYGNSS DATA FOR SOIL MOISTURE APPLICATIONS</b> .....	<b>1411</b>
<i>Maria Paola Clarizia, Deimos Space UK Ltd, United Kingdom; Nazzareno Pierdicca, University of La Sapienza, Italy; Fabiano Costantini, Deimos Space UK Ltd, United Kingdom</i>	



**TU1-R3.4: 3CAT-3/MOTS, AN EXPERIMENTAL NANOSATELLITE FOR MULTISPECTRAL AND GNSS-R EARTH OBSERVATION: AIRBORNE OPTICAL AND GNSS-R CAMPAIGN ..... 1414**

*Jordi Castellvi-Esturi, Universitat Politècnica de Catalunya / Institut Cartogràfic i Geològic de Catalunya (ICGC), Spain; Adriano Camps, Universitat Politècnica de Catalunya, Spain; Jordi Corbera Simó, Institut Cartogràfic i Geològic de Catalunya, Spain; Raul Onrubia, Universitat Politècnica de Catalunya, Spain; Ramon Alamús, Institut Cartogràfic i Geològic de Catalunya, Spain; Daniel Pascual, Jorge Querol, Hyuk Park, Universitat Politècnica de Catalunya, Spain*

**TU2-R3: MICROWAVE ALGORITHMS FOR SOIL MOISTURE I**

**TU2-R3.1: SOIL MOISTURE RETRIEVAL USING FULL WAVE SIMULATIONS OF 3-D MAXWELL EQUATIONS FOR COMPENSATING VEGETATION EFFECTS ..... 1418**

*Andreas Colliander, Eni Njoku, Jet Propulsion Laboratory, California Institute of Technology, United States; Huanting Huang, Leung Tsang, University of Michigan, United States*

**TU2-R3.2: MODELLING OF NEAR-SURFACE SOIL MOISTURE USING MACHINE LEARNING AND MULTI-TEMPORAL SENTINEL 1 IMAGES IN NEW ZEALAND ..... 1422**

*Istvan Hajdu, Ian Yule, Massey University, New Zealand; Mohammad Hossain Dehghan-Shoar, School of Engineering and Advanced Technology, Massey University, Palmerston North, New Zealand*

**TU2-R3.3: ESTIMATING SOIL MOISTURE FROM C AND X BAND SAR USING MACHINE LEARNING ALGORITHMS AND COMPACT POLARIMETRY ..... 1426**

*Emanuele Santi, Simone Pettinato, Simonetta Paloscia, IFAC-CNR, Italy; Mohammed Dabboor, Environment Canada, Canada; Claudia Notarnicola, Antonio Padovano, Felix Greifeneder, Giovanni Cuozzo, EURAC, Italy*

**TU2-R3.4: SENTINEL-1 SENSITIVITY TO SOIL MOISTURE AT HIGH INCIDENCE ANGLE AND ITS IMPACT ON RETRIEVAL ..... 1430**

*Davide Palmisano, La Sapienza, University of Rome, Italy; Anna Balenzano, Giuseppe Satalino, Francesco Mattia, Consiglio Nazionale delle Ricerche (CNR), Italy; Nazzareno Pierdicca, La Sapienza, University of Rome, Italy; Andrea Monti-Guarnieri, Politecnico di Milano, Italy*

**TU2-R3.5: L-, C- AND X-BAND PASSIVE MICROWAVE SOIL MOISTURE RETRIEVAL ALGORITHM PARAMETERIZATION USING IN SITU VALIDATION SITES ..... 1434**

*Ying Gao, JIFRESSE, UCLA, United States; Andreas Colliander, Mariko S Burgin, NASA Jet Propulsion Laboratory, United States; Jeffrey Walker, Monash University, Australia; Chunsik Chae, NASA Jet Propulsion Laboratory, United States; Emmanuel Dinnat, NASA Goddard Space Flight Center, United States; Michael H. Cosh, USDA-ARS, United States; Todd Caldwell, The University of Texas at Austin, United States; Aaron Berg, University of Guelph, Canada; José Martínez-Fernández, University of Salamanca, Spain*

**TU3-R3: SMOS OVER LAND AND CRYOSPHERE: 8 YEARS OF ACHIEVEMENTS I**

**TU3-R3.1: SMOS INSTRUMENT PERFORMANCE AFTER MORE THAN 8 YEARS IN ORBIT AND LESSONS LEARNT FOR FUTURE L-BAND MISSIONS ..... 1438**

*Manuel Martín-Neira, Roger Oliva, European Space Agency, Netherlands; Ignasi Corbella, Francesc Torres, Nuria Duffo, Israel Duran, Polytechnic University of Catalonia, Spain; Juha Kainulainen, Harp Technologies Ltd, Finland; Josep Closa, Alberto Zurita, Airbus Defence and Space, Spain; François Cabot, Ali Khazaal, Eric Anterrieu, CESBIO, France; Jose Barbosa, RDA, Switzerland; Gonçalo Lopes, Deimos Engenharia S.A, Portugal; Joe Tenerelli, OceanDataLab, France; Raúl Díez-García, IDEAS, Spain; Jorge Fauste, European Space Agency, Spain; Antonio Turiel, Verónica González-Gambau, SMOS Barcelona Expert Centre, Spain; Raffaele Crapolicchio, Martin Suess, European Space Agency, Italy*

**TU3-R3.3: HOW DOES THE SPATIAL SCALE MISMATCH BETWEEN IN SITU AND SMOS SOIL MOISTURE EVOLVE THROUGH TIMESCALES? ..... 1443**

*Beatriz Molero-Rodenas, Philippe Richaume, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France; Delphine J. Leroux, Centre National de la Recherche Météorologique (CNRM), Météo-France, CNRS, France; Yann Kerr, Olivier Merlin, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France; Michael H. Cosh, USDA-ARS Hydrology and Remote Sensing Laboratory, United States; Rajat Bindlish, NASA Goddard Space Flight Center, United States*

<b>TU3-R3.4: SMOS DATA ASSIMILATION FOR NUMERICAL WEATHER PREDICTION.....</b>	<b>1447</b>
<i>Patricia de Rosnay, ECMWF, United Kingdom; Nemesio Rodríguez-Fernández, CESBIO/CNRS, France; Joaquín Muñoz-Sabater, ECMWF, United Kingdom; Clément Albergel, Météo-France/CNRS, France; David Fairbairn, Heather Lawrence, Stephen English, ECMWF, United Kingdom; Matthias Drusch, European Space Agency, Netherlands; Yann Kerr, CESBIO/CNES, France</i>	
<b>TU3-R3.5: SMOS-IC: CURRENT STATUS AND OVERVIEW OF SOIL MOISTURE AND VOD ..... APPLICATIONS</b>	<b>1451</b>
<i>Jean-Pierre Wigneron, INRA, France; Arnaud Mialon, CESBIO, France; Gabrielle De Lannoy, KU Leuven (University of Leuven), France; Roberto Fernandez-Moran, Amen Al-Yaari, INRA, France; Mohsen Ebrahimi, University of Tehran, Iran; Nemesio Rodríguez-Fernández, Yann Kerr, CESBIO, France; Jan Quets, KU Leuven (University of Leuven), France; Thierry Pellarin, IGE, France; Lei Fan, INRA, France; Feng Tian, Rasmus Fensholt, Martin Brandt, University of Copenhagen, Denmark</i>	
<b>TU4-R3: SMOS OVER LAND AND CRYOSPHERE: 8 YEARS OF ACHIEVEMENTS II</b>	
<b>TU4-R3.1: CONSTRAINING TERRESTRIAL CARBON FLUXES THROUGH ASSIMILATION OF ..... SMOS PRODUCTS</b>	<b>1455</b>
<i>Thomas Kaminski, The Inversion Lab, Germany; Marko Scholze, Wolfgang Knorr, Lund University, Sweden; Michael Voßbeck, The Inversion Lab, Germany; Mousong Wu, Lund University, Sweden; Paolo Ferrazzoli, Tor Vergata University, Italy; Yann Kerr, Arnaud Mialon, Philippe Richaume, Nemesio Rodríguez-Fernández, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France; Cristina Vittucci, Tor Vergata University, Italy; Jean-Pierre Wigneron, Institut National de la Recherche Agronomique, France; Matthias Drusch, European Space Agency, Netherlands</i>	
<b>TU4-R3.2: MODELLING FOREST DECLINE USING SMOS SOIL MOISTURE AND ..... VEGETATION OPTICAL DEPTH</b>	<b>1459</b>
<i>David Chaparro, Universitat Politècnica de Catalunya, Spain; María Piles, Universitat de València, Spain; Jordi Martínez-Vilalta, Centre for Ecological Research and Forestry Applications (CREAF) &amp; Universitat Autònoma de Barcelona (UAB), Spain; Mercè Vall-Ilossera, Universitat Politècnica de Catalunya, Spain; Jordi Vayreda, Mireia Banqué-Casanovas, Centre for Ecological Research and Forestry Applications (CREAF), Spain; Adriano Camps, Universitat Politècnica de Catalunya, Spain</i>	
<b>TU4-R3.3: SMOS RETRIEVALS OF SOIL FREEZING AND THAWING AND ITS APPLICATIONS .....</b>	<b>1463</b>
<i>Kimmo Rautiainen, Juha Lemmetyinen, Tuula Aalto, Aki Tsuruta, Vilma Kangasaho, Jaakko Ikonen, Juval Cohen, Anna Kontu, Juho Vehviläinen, Jouni Pulliainen, Finnish Meteorological Institute, Finland</i>	
<b>TU4-R3.4: SNOW WETNESS RETRIEVED FROM L-BAND RADIOMETRY.....</b>	<b>1466</b>
<i>Reza Naderpour, Mike Schwank, Swiss Federal Research Institute WSL, Switzerland</i>	
<b>TU4-R3.5: SMOS IN ANTARCTICA FOR THE SNOWMELT MONITORING .....</b>	<b>1470</b>
<i>Marion Leduc-Leballeur, IFAC-CNR, Italy; Ghislain Picard, UGA - CNRS, IGE (UMR5001), France; Giovanni Macelloni, IFAC-CNR, Italy; Arnaud Mialon, Yann Kerr, CESBIO (CNES, CNRS, IRD, UPS), France</i>	
<b>TU1-R4: OCEAN SURFACE WINDS AND CURRENTS II</b>	
<b>TU1-R4.1: OCEAN SURFACE CURRENTS AND WINDS USING DOPPLERSCAT.....</b>	<b>1474</b>
<i>Ernesto Rodriguez, Alexander Wineteer, Dragana Perkovic-Martin, Tamas Gal, Bryan Stiles, Noppasin Niamsuwan, Raquel Rodriguez Monje, Jet Propulsion Laboratory, California Institute of Technology, United States</i>	
<b>TU1-R4.2: SYNTHETIC APERTURE RADAR OBSERVATIONS OF INTERANNUAL ..... OCEAN-ATMOSPHERE COUPLING OVER THE SOMALI CURRENT</b>	<b>1477</b>
<i>Michael Caruso, Hans Graber, University of Miami, United States</i>	
<b>TU1-R4.3: STATISTICAL ANALYSIS OF EDDIES IN THE WESTERN MEDITERRANEAN BASED ..... ON MULTIPLE SAR IMAGERY</b>	<b>1481</b>
<i>Martin Gade, Universität Hamburg, Germany; Svetlana Karimova, Université de Liège, Belgium; Annika Buck, Universität Hamburg, Germany</i>	
<b>TU1-R4.4: QUANTIFYING OF THE EFFECT OF RAIN-INDUCED SUB-FOOTPRINT SCALE ..... WIND VARIABILITY ON THE RAPIDSCAT KU-BAND NRCS</b>	<b>1485</b>
<i>David Weissman, Hofstra University, United States</i>	

## TU2-R4: OCEAN SURFACE WINDS AND CURRENTS III

### TU2-R4.1: PERFORMANCES OF THE ROTATING FANBEAM SCATTEROMETER ON CFOSAT..... 1489

Wenming Lin, Nanjing University of Information Science and Technology, China; Xiaolong Dong, Xing-Ou Xu, Di Zhu, The CAS Key Laboratory of Microwave Remote Sensing, National Space Science Center, Chinese Academy of Sciences, China; Zhixiong Wang, Yijun He, Nanjing University of Information Science and Technology, China

### TU2-R4.2: A NEW APPROACH TO DETECT SURFACE CURRENTS OF COMPLEX FLOWS ..... 1493 USING DOPPLER MARINE RADAR

Lisa Nyman, Björn Lund, Roland Romeiser, Hans Graber, University of Miami: Rosenstiel School of Marine and Atmospheric Science, United States; Jochen Horstmann, Helmholtz-Zentrum Geesthacht, Germany

### TU2-R4.3: THE SIMULATION OF OCEAN SURFACE WIND MEASURED BY POLARIMETRIC ..... 1497 SCATTEROMETER

Juhong Zou, Shuyan Lang, Yarong Zou, Mingsen Lin, Youguang Zhang, National Satellite Ocean Application Service, China; Xiaobin Yin, Qingliu Bao, Beijing Piesat Information Technology Co., Ltd, China

### TU2-R4.4: WIND FIELD RETRIEVING UNDER RAINY CONDITIONS BASED ON SUPPORT ..... 1501 VECTOR MACHINE FOR COMBINED ACTIVE/PASSIVE OBSERVATIONS OF HY-2A

Xingou Xu, Xiaolong Dong, The CAS Key Laboratory of Microwave Remote Sensing, National Space Science Center, Chinese Academy of Sciences, China

### TU2-R4.5: AIR-SEA INTERACTION AND ECOSYSTEM RESPONSE TO WIND FORCING ..... 1504 USING HIGH-RESOLUTION SAR WINDS

Kyung-Ae Park, Seoul National University, Republic of Korea; Jae-Cheol Jang, Jae-Jin Park, Student/Seoul National University, Republic of Korea

## TU3-R4: OCEAN TEMPERATURE AND SALINITY I

### TU3-R4.1: AN END-TO-END SIMULATION OF OCEAN SALINITY USING L/S/C ..... 1508 TRI-FREQUENCY RADIOMETER FOR WATER CYCLE OBSERVATION MISSION (WCOM)

Li Yan, Liu Hao, National Space Science Center, Chinese Academy of Sciences, China

### TU3-R4.2: USING 0.5-2 GHZ MICROWAVE RADIOMETRY TO DERIVE OCEAN SALINITY ..... 1512

Oguz Demir, Alexandra Bringer, Joel Johnson, Mark Andrews, Ethan Raines, ElectroScience Laboratory, The Ohio State University, United States; Kenneth Jezek, Byrd Polar Research Center, The Ohio State University, United States; Giovanni Macelloni, Marco Brogioni, Institute of Applied Physics, Italy

### TU3-R4.3: EMPIRICAL CHARACTERIZATION OF THE SMOS BRIGHTNESS TEMPERATURE ..... 1515 BIAS AND UNCERTAINTY FOR IMPROVING SEA SURFACE SALINITY

Estrella Olmedo, Verónica González-Gambau, Antonio Turiel, Justino Martínez, Carolina Gabarró, Joaquim Ballabrera-Poy, Marcos Portabella, Insitute of Marine Science, CSIC, Spain; Manuel Arias, ARGANS, United Kingdom; Roberto Sabia, European Space Agency, Italy

### TU3-R4.4: SMOS SATELLITE INFERENCE OF ALKALINITY OVER MEDITERRANEAN BASIN ..... 1519

Roberto Sabia, Telespazio-Vega for ESA, Italy; Estrella Olmedo, Antonio Turiel, Justino Martínez, BEC, Spain; Aida Alvera Azcarate, AGO-GHER Université de Liège, Belgium

### TU3-R4.5: SALINITY RAIN IMPACT MODEL (RIM) STRATIFICATION ANALYSIS UNDER ..... 1523 SEVERAL WIND SPEED CONDITIONS

Maria Jacob, Universidad Nacional de Cordoba, Argentina; Kyla Drushka, William Asher, University of Washington, United States; W. Linwood Jones, Andrea Santos-Garcia, University of Central Florida, United States; Carlos Marcelo Scavuzzo, Universidad Nacional de Cordoba, Argentina

## **TU4-R4: COASTAL ZONES**

### **TU4-R4.1: MONITORING TOPOGRAPHY OF COASTAL LAGOONS USING SATELLITE RADAR ..... 1527 ALTIMETRY**

*Edward Salameh, LEGOS/M2C, France; Frédéric Frappart, OMP, France; Vincent Marieu, EPOC, France; Alexandra Spodar, LOG, France; Jean-Paul Parisot, Vincent Hanquiez, EPOC, France; Imen Turki, Benoit Laignel, M2C, France*

### **TU4-R4.2: ANALYSIS OF MARLENE RADAR DATA : FOCUS ON DOPPLER SPECTRA AND ..... 1531 GROUP LINES**

*Florestan Platzer, ONERA, France; Saillard Marc, MIO - University of Toulon, France; Vincent Fabbro, ONERA, France*

### **TU4-R4.3: BENTHIC MAPPING USING HIGH RESOLUTION MULTISPECTRAL AND ..... 1535 HYPER SPECTRAL IMAGERY**

*Javier Marcello, Francisco Eugenio, Universidad de Las Palmas de Gran Canaria, Spain; Ferran Marques, Universitat Politècnica de Catalunya - BarcelonaTech, Spain*

### **TU4-R4.4: SHALLOW WATER BATHYMETRY MAPPING USING HYPER SPECTRAL DATA..... 1539**

*Satomi Kakuta, Emiko Ariyasu, Asia Air Survey Co., Ltd., Japan; Tomomi Takeda, Japan Space Systems, Japan*

### **TU4-R4.5: MAPPING MULTIDECADAL MORPHOLOGICAL VARIABILITY VIA SATELLITE ..... 1543 DERIVED BATHYMETRIES**

*Annette Burke, Hsing-Chung Chang, Macquarie University, Australia; Hannah E Power, University of Newcastle, Australia*

## **TU1-R5: COPERNICUS SENTINEL-1 MISSION: OPERATIONAL STATUS, EVOLUTION AND SCIENTIFIC APPLICATIONS RESULTS I**

### **TU1-R5.1: SENTINEL-1 CONSTELLATION MISSION OPERATIONS STATUS..... 1547**

*Pierre Potin, Betlem Rosich, Nuno Miranda, Patrick Grimont, Ian Shurmer, Alistair O'Connell, Mike Krassenburg, Jean-Baptiste Gratadour, European Space Agency, Italy*

### **TU1-R5.3: S-1 INSTRUMENT AND PRODUCT PERFORMANCE STATUS: 2018 UPDATE..... 1551**

*Nuno Miranda, European Space Agency, Italy; Riccardo Piantanida, Andrea Recchia, Niccolo Franceschi, Aresys s.r.l, Italy; David Small, Adrian Schubert, University of Zürich, Switzerland; Peter Meadows, BAE Systems Applied Intelligence Laboratories, United Kingdom*

### **TU1-R5.4: SENTINEL-1 SATELLITE EVOLUTION ..... 1555**

*Ramón Torres, Dirk Geudtner, Svein Lokas, David Bibby, Paul Snoeij, Ignacio Navas Traver, Francisco Ceba Vega, Jelle Poupaert, Steve Osborne, European Space Agency, Netherlands*

### **TU1-R5.5: SENTINEL-1 C&D SAR PERFORMANCE ..... 1559**

*Mathias von Alberti, Eberhard Schied, Siegmund Idler, Airbus Defence and Space, Germany; Ignacio Navas-Traver, Francisco Ceba Vega, Paul Snoeij, David Bibby, European Space Agency/ESTEC, Netherlands*

## **TU2-R5: COPERNICUS SENTINEL-1 MISSION: OPERATIONAL STATUS, EVOLUTION AND SCIENTIFIC APPLICATIONS RESULTS II**

### **TU2-R5.1: SENTINEL-1 MISSION SCIENTIFIC EXPLOITATION..... 1562**

*Magdalena Fitzryk, RSAC c/o ESA-ESRIN, Italy; Yves-Louis Desnos, Marcus Engdahl, Diego Fernández, European Space Agency/ESRIN, Italy*

### **TU2-R5.2: GLOBAL MONITORING OF FAULT ZONES AND VOLCANOES WITH SENTINEL-1..... 1566**

*Andrew Hooper, Tim Wright, Karsten Spaans, University of Leeds, United Kingdom; Richard Walters, Durham University, United Kingdom; John Elliott, Jonathan Weiss, Marco Bagnardi, Emma Hatton, University of Leeds, United Kingdom; Pablo J. Gonzalez, University of Liverpool, United Kingdom; Fabien Albino, University of Bristol, United Kingdom; Susanna Ebmeier, University of Leeds, United Kingdom; Juliet Biggs, University of Bristol, United Kingdom; Matthew Gaddes, Qiang Qiu, Alistair McDougall, University of Leeds, United Kingdom*

<b>TU2-R5.3: INNOVATIVE EXPLOITATION OF LONG, DENSE AND COHERENT INSAR SENTINEL-1 TIME SERIES FOR LAND SURVEY AND CLASSIFICATION</b> .....	<b>1569</b>
<i>Javier Duro, Fernando Vicente, Giuseppe Centolanza, Rubén Iglesias, Dares Technology, Spain</i>	
<b>TU2-R5.4: SENTINEL-1 ACHIEVEMENTS FOR OCEAN AND EXTREME EVENTS MONITORING</b> .....	<b>1573</b>
<i>Romain Husson, CLS, France; Alexis Mouche, IFREMER, France; Harald Johnsen, NORUT, Norway; Fabrice Collard, OceanDataLab, France; Geir Engen, NORUT, Norway; Nicolas Longepe, CLS, France; Gilles Guitton, OceanDataLab, France; He Wang, NOTC, China; Xuan Wang, OUC, China; François Soulat, CLS, France; Bertrand Chapron, IFREMER, France</i>	
<b>TU2-R5.5: SENTINEL-1 MONITORING OF SANTORINI VOLCANO POST-UNREST STATE</b> .....	<b>1577</b>
<i>Elena Papageorgiou, Aristotle University of Thessaloniki, Greece; Michael Fomelis, BRGM - French Geological Survey, France; Antonios Mouratidis, Costas Papazachos, Aristotle University of Thessaloniki, Greece</i>	
 <b>TU3-R5: JPSS GLOBAL OBSERVATIONS FOR REGIONAL SERVICES I</b>	
<b>TU3-R5.1: THE JOINT POLAR SATELLITE SYSTEM OVERVIEW</b> .....	<b>1581</b>
<i>Mitch Goldberg, NOAA/NESDIS, United States</i>	
<b>TU3-R5.2: JOINT POLAR SATELLITE SYSTEM (JPSS) DATA PRODUCTS: ALGORITHM DEVELOPMENT AND SCIENTIFIC MATURITY</b> .....	<b>1585</b>
<i>Lihang Zhou, NOAA/NESDIS, United States; Murty Divakarla, Xingpin Liu, IMSG, United States; Harry Cikanek, NOAA/NESDIS/STAR, United States; Arron Layns, Mitch Goldberg, NOAA/NESDIS, United States</i>	
<b>TU3-R5.3: SENTINEL-5 PRECURSOR MISSION STATUS AND FIRST RESULTS</b> .....	<b>1589</b>
<i>Claus Zehner, European Space Agency, Italy</i>	
<b>TU3-R5.4: THE COPERNICUS PROGRAMME AND ITS CLIMATE CHANGE SERVICE</b> .....	<b>1591</b>
<i>Jean-Noel Thepaut, ECMWF, United Kingdom; Bernard Pinty, European Commission, Belgium; Dick Dee, Richard Engelen, ECMWF, United Kingdom</i>	
 <b>TU4-R5: JPSS GLOBAL OBSERVATIONS FOR REGIONAL SERVICES II</b>	
<b>TU4-R5.1: THE USE OF SATELLITE DATA IN THE COPERNICUS ATMOSPHERE MONITORING SERVICE (CAMS)</b> .....	<b>1594</b>
<i>Vincent-Henri Peuch, Richard Engelen, Melanie Ades, Jérôme Barré, Antje Inness, Johannes Flemming, Zak Kipling, Anna Agusti-Panareda, Mark Parrington, Roberto Ribas, Martin Suttie, European Centre for Medium Range Weather Forecasts, United Kingdom</i>	
<b>TU4-R5.2: JPSS DIRECT READOUT – EASY ACCESS TO REAL-TIME DATA</b> .....	<b>1597</b>
<i>Allen Huang, University of Wisconsin-Madison, United States; Mitch Goldberg, National Oceanic and Atmospheric Administration, United States</i>	
<b>TU4-R5.3: JPSS VIIRS OCEAN COLOR PRODUCTS AND APPLICATIONS</b> .....	<b>1601</b>
<i>Menghua Wang, Lide Jiang, Xiaoming Liu, SeungHyun Son, Junqiang Sun, Wei Shi, Karlis Mikelsons, Liqin Tan, Xiaolong Wang, Mike Chu, Veronica Lance, NOAA/NESDIS/STAR, United States</i>	
<b>TU4-R5.4: GLOBAL FLOOD MAPPING SERVICES FROM JPSS</b> .....	<b>1605</b>
<i>Bill Sjoberg, JPSS Program - NESDIS NOAA, United States</i>	
<b>TU4-R5.5: MONITORING THE CRYOSPHERE FOR COMMERCE AND TRANSPORTATION</b> .....	<b>1608</b>
<i>Arron Layns, Bonnie Reed, NOAA JPSS, United States</i>	

## **TU1-R6: REMOTE SENSING FOR SURFACE CHARACTERIZATION AND MINERAL EXPLORATION**

### **TU1-R6.1: QUALITY IMPROVEMENTS OF ‘AW3D’ GLOBAL DSM DERIVED FROM ALOS ..... 1612 PRISM**

*Junichi Takaku, Remote Sensing Technology Center of Japan, Japan; Takeo Tadono, Japan Aerospace Exploration Agency, Japan; Ken Tsutsui, Mayumi Ichikawa, NTT DATA Corporation, Japan*

### **TU1-R6.2: AN EARTH OBSERVATION FRAMEWORK FOR THE LITHIUM EXPLORATION..... 1616**

*Cristian Rossi, Stephen Spittle, Maral Bayarara, Anoop Pandey, Niki Henry, Satellite Applications Catapult, United Kingdom*

### **TU1-R6.3: LONG-WAVE HYPERSPECTRAL IMAGING FOR LITHOLOGICAL MAPPING: A ..... 1620 CASE STUDY**

*Sandra Lorenz, Moritz Kirsch, Robert Zimmermann, Laura Tusa, Robert Möckel, Helmholtz-Zentrum Dresden-Rossendorf, Germany; Martin Chamberland, Telops Inc., Canada; Richard Gloaguen, Helmholtz-Zentrum Dresden-Rossendorf, Germany*

### **TU1-R6.4: REMOTE COMPOSITIONAL PYROXENE ESTIMATES IN THE REINER GAMMA ..... 1624 FORMATION USING FEATURE-ORIENTED PCA: NEW INSIGHTS INTO LUNAR SWIRLS**

*Shashwat Shukla, Shashi Kumar, Indian Institute of Remote Sensing, ISRO, India*

## **TU2-R6: URBAN CHALLENGES AND REMOTELY SENSED INFORMATION CAPACITIES**

### **TU2-R6.1: HYPERSPECTRAL IMAGERY FOR ENVIRONMENTAL URBAN PLANNING ..... 1628**

*Cody Weber, R. Aguejdad, CNRS, France; Xavier Briottet, J. Avala, S. Fabre, ONERA, France; J. Demuyneck, E. Zenou, ISAE SUPAERO, France; Yannick Deville, Moussa Sofiane Karoui, F. Z. Benhalouche, IRAP, France; Sébastien Gadal, W. Ourghemmi, University of Aix Marseille, France; Clément Mallet, Arnaud Le Bris, Nesrine Chehata, IGN, France*

### **TU2-R6.2: URBAN VEGETATION MAPPING USING HYPERSPECTRAL IMAGERY AND ..... 1632 SPECTRAL LIBRARY**

*Walid Ouerghemmi, Sébastien Gadal, ESPACE (UMR 7300) -CNRS/Aix-Marseille université, France; Gintautas Mozgeris, Aleksandras Stulginskis University, Lithuania*

### **TU2-R6.3: EVALUATION OF DIMENSIONAL REDUCTION METHODS ON URBAN ..... 1636 VEGETATION CLASSIFICATION PERFORMANCE USING HYPERSPECTRAL DATA**

*Charlotte Brabant, Emilien Alvarez-Vanhard, Gwénaél Morin, Kim Thanh Nguyen, Achour Laribi, Université Rennes 2, France; Thomas Houet, CNRS, Université Rennes II, France*

### **TU2-R6.4: DETECTION AND AREA ESTIMATION FOR PHOTOVOLTAIC PANELS IN URBAN ..... 1640 HYPERSPECTRAL REMOTE SENSING DATA BY AN ORIGINAL NMF-BASED UNMIXING METHOD**

*Moussa Sofiane Karoui, Fatima Zohra Benhalouche, Centre des Techniques Spatiales, Algeria; Yannick Deville, IRAP, Université de Toulouse, UPS-OMP, CNRS, CNES, France; Khelifa Djerriri, Centre des Techniques Spatiales, Algeria; Xavier Briottet, ONERA, France; Arnaud Le Bris, Univ. Paris-Est, LASTIG MATIS, IGN, ENSG, France*

### **TU2-R6.5: STRUCTURAL OPTIMIZATION FOR ACCURATE CHARACTERIZATION OF URBAN ..... 1644 AREAS IN HYPERSPECTRAL DATASETS**

*Andrea Marinoni, Paolo Gamba, University of Pavia, Italy*

## **TU3-R6: URBAN REMOTE SENSING I**

### **TU3-R6.2: A HYBRID APPROACH FOR DELINEATION OF BUILDING FOOTPRINTS FROM ..... 1652 SPACE-BORNE STEREO IMAGES**

*Gholam Reza Dini, IGI mbH, Germany; Karsten Jacobsen, Franz Rottensteiner, University of Hannover, Germany; Mehdi Ravanbakhsh, University of Western Australia, Australia; Paolo Gamba, University of Pavia, Italy; Christian Heipke, University of Hannover, Germany*

<b>TU3-R6.3: A COMPARATIVE STUDY OF IMPERVIOUS SURFACE ESTIMATION FROM OPTICAL AND SAR DATA USING DEEP CONVOLUTIONAL NETWORKS</b>	<b>1656</b>
<i>Hongsheng Zhang, Luoma Wan, Ting Wang, Yinyi Lin, Hui Lin, The Chinese University of Hong Kong, Hong Kong SAR of China; Zezhong Zheng, University of Electronic Science and Technology of China, China</i>	
<b>TU3-R6.4: SPARSE REPRESENTATION FOR IMPERVIOUS SURFACE AREA EXTRACTION USING WORLDVIEW-2 AND TERRASAR-X DATA</b>	<b>1660</b>
<i>Yinyi Lin, Hongsheng Zhang, Gang Li, Ting Wang, Hui Lin, The Chinese University of Hong Kong, Hong Kong SAR of China</i>	
<b>TU3-R6.5: GROUND STABILITY ANALYSIS OF CONSTANȚA CITY, ROMANIA THROUGH PSI WITH ATMOSPHERIC PHASE SCREEN REMOVAL USING ERA-INTERIM DATA</b>	<b>1664</b>
<i>Stefan-Adrian Toma, Military Technical Academy, Romania; Delia Teleaga, Valentin Poncos, Terrasigna, Romania</i>	
 <b>TU4-R6: URBAN REMOTE SENSING II</b>	
<b>TU4-R6.1: AIR QUALITY MONITORING IN URBAN AREAS USING IN-SITU AND SATELLITE DATA WITHIN ERA-PLANET PROJECT</b>	<b>1668</b>
<i>Andrii Shelestov, Andrii Kolotii, Mykola Lavreniuk, EOS Data Analytics, Ukraine; Kyrylo Medyanovskyi, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Ukraine; Vladimir Vasiliev, EOS Data Analytics, Ukraine; Tatyana Bulanaya, Igor Gomilko, Noosphere Engineering School, Ukraine</i>	
<b>TU4-R6.2: VALIDATION OF THE SURFACE ENERGY BALANCE RETRIEVED FROM REMOTE SENSING DATA FOR THE METROPOLITAN AREA OF RIO DE JANEIRO (MARJ)</b>	<b>1672</b>
<i>Vitor Miranda, Federal University of Rio de Janeiro, Brazil; Leonardo Peres, Federal University of Rio de Janeiro/ The Portuguese Institute for Sea and Atmosphere, Brazil; Edson Pereira, Federal University of Bahia, Brazil; José Ricardo França, Federal University of Rio de Janeiro, Brazil</i>	
<b>TU4-R6.3: AUTOMATED BUILDING ENERGY CONSUMPTION ESTIMATION FROM AERIAL IMAGERY</b>	<b>1676</b>
<i>Artem Streltsov, Kyle Bradbury, Jordan Malof, Duke University, United States</i>	
<b>TU4-R6.4: ANALYSIS OF BUCHAREST'S LAND COVER EVOLUTION OVER A PERIOD OF 33 YEARS USING MULTI-SENSOR DATA</b>	<b>1680</b>
<i>Alexandru-Cosmin Grivei, University Politehnica of Bucharest, Romania; Mihai Datcu, German Aerospace Center (DLR), Germany</i>	
<b>TU4-R6.5: URBAN RADIATION SENSING AND MODELING</b>	<b>1684</b>
<i>Masoud Ghandehari, New York University, United States; Thorsten Emig, Massachusetts Institute of Technology, United States; Milad Aghamohamadnia, New York University, United States</i>	
 <b>TU1-R7: OPTICAL MODELING IN REMOTE SENSING I</b>	
<b>TU1-R7.1: PROGRESS IN EMULATION FOR RADIATIVE TRANSFER MODELING AND MAPPING</b>	<b>1688</b>
<i>Jochem Verrelst, University of Valencia, Spain; Juan Pablo Rivera-Caicedo, CONACYT-UAN, Mexico; José Moreno, Image Processing Laboratory, Spain</i>	
<b>TU1-R7.2: DART: A TOOL FOR STUDYING EARTH SURFACES - TIME SERIES OF URBAN RADIATIVE BUDGET FROM EO SATELLITES -</b>	<b>1692</b>
<i>Jean-Philippe Gastellu-Etchegorry, Lucas Landier, University of Toulouse, France; Ahmad Albitar, CNRS, France; Nicolas Lauret, University of Toulouse, France; Tiangang Yin, NASA, United States; Jianbo Qi, Jordan Guilleux, Eric Chavanon, University of Toulouse, France; Cristian Feigenwinter, Basel University, Switzerland; Zina Mitraka, Nektarios Chrysoulakis, Foundation for Research and Technology, Greece</i>	
<b>TU1-R7.3: RECENT PROGRESSES ON OPTICAL REMOTE SENSING MODELLING OVER COMPLEX LAND SURFACE</b>	<b>1696</b>
<i>Qinhua Liu, Jing Li, Yelu Zeng, Wentao Yu, Jing Zhao, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	

**TU1-R7.4: STATISTICAL LEARNING FOR END-TO-END SIMULATIONS**..... 1699  
*Jorge Vicent, Jochem Verrelst, University of Valencia, Spain; Juan Pablo Rivera-Caicedo, CONACYT-UAN, Mexico; Neus Sabater, Jordi Muñoz-Mari, Gustau Camps-Valls, José Moreno, University of Valencia, Spain*

## **TU2-R7: OPTICAL MODELING IN REMOTE SENSING II**

**TU2-R7.1: MODTRAN®6 MULTIPLE LINE-OF-SIGHT (MLOS) OPTION**..... 1703  
*Alexander Berk, Spectral Sciences, Inc., United States; Christopher Rice, Air Force Institute of Technology, United States*

**TU2-R7.2: FORWARD MODELING OF CLOUD SHADOWS AND THE IMPACT OF CLOUD SHADOWS ON REMOTE SENSING DATA PRODUCTS** ..... 1707  
*Robert Sundberg, Spectral Sciences, Inc., United States*

**TU2-R7.3: A SPECTRAL INVARIANT APPROACH TO MODELLING RADIATIVE TRANSFER OF SUN-INDUCED CHLOROPHYLL FLUORESCENCE** .....1711  
*Peiqi Yang, Christiaan van der Tol, University of Twente, Netherlands*

**TU2-R7.4: A METHOD TO ENHANCE THE GEOMETRIC-OPTICAL KERNEL FOR FURTHER IMPROVING HOTSPOT EFFECT IN MODIS BRDF MODEL** ..... 1715  
*Ziti Jiao, Yadong Dong, Beijing Normal University, China*

**TU2-R7.5: METHANE DETECTION IN THE LONGWAVE INFRARED**..... 1719  
*John Kerekes, Cody Webber, Rolando Raqueno, Rochester Institute of Technology, United States*

## **TU3-R7: DATA FUSION I**

**TU3-R7.1: MULTIPLE SOURCES DATA FUSION VIA DEEP FOREST**..... 1722  
*Junshi Xia, The University of Tokyo, Japan; Zuheng Ming, University of La Rochelle, France; Akira Iwasaki, The University of Tokyo, Japan*

**TU3-R7.2: A CONDITIONAL GENERATIVE ADVERSARIAL NETWORK TO FUSE SAR AND MULTISPECTRAL OPTICAL DATA FOR CLOUD REMOVAL FROM SENTINEL-2 IMAGES** ..... 1726  
*Claas Grohnfeldt, Michael Schmitt, Technical University of Munich (TUM), Germany; Xiao Xiang Zhu, German Aerospace Center (DLR), Germany*

**TU3-R7.3: TIMELY AND SEMI-AUTOMATIC DETECTION OF FOREST LOGGING EVENTS IN BOREAL FOREST USING ALL AVAILABLE LANDSAT DATA** ..... 1730  
*Matthieu Molinier, Heikki Astola, Tomi Rätty, VTT Technical Research Centre of Finland Ltd, Finland; Curtis Woodcock, Boston University, United States*

**TU3-R7.4: DECISION FUSION OF SPOT6 AND MULTITEMPORAL SENTINEL2 IMAGES FOR URBAN AREA DETECTION** ..... 1734  
*Cyril Wendl, EPFL, Switzerland; Arnaud Le Bris, IGN France / LaSTIG, France; Nesrine Chehata, EA G&E Bordeaux INP-Université Bordeaux Montaigne, France; Anne Puissant, CNRS UMR 7362 LIVE-Université de Strasbourg, France; Tristan Postadjian, IGN France / LaSTIG, France*

**TU3-R7.5: HARMONIZATION AND FUSION OF GLOBAL SCALE DATA**..... 1738  
*Nathan Longbotham, Caitlin Kontgis, Conor Maguire, Descartes Labs, United States*

## **TU4-R7: DATA FUSION II**

**TU4-R7.1: LIDAR-DRIVEN SPATIAL REGULARIZATION FOR HYPERSPECTRAL UNMIXING**..... 1740  
*Tatsumi Uezato, Mathieu Fauvel, Nicolas Dobigeon, University of Toulouse, France*



<b>TU4-R7.2: BANANA DISEASE DETECTION BY FUSION OF CLOSE RANGE HYPERSPECTRAL IMAGE AND HIGH-RESOLUTION RGB IMAGE</b>	<b>1744</b>
<i>Wenzhi Liao, Ghent University, Belgium; Daniel Ochoa, Escuela Superior Polit'ecnica del Litoral, ESPOL, Ecuador; Yongqiang Zhao, Northwestern Polytechnical University, China; Gladys Maria Villegas Rugel, Wilfried Philips, Ghent University, Belgium</i>	
<b>TU4-R7.4: IMAGE TRANSLATION BETWEEN SAR AND OPTICAL IMAGERY WITH GENERATIVE ADVERSARIAL NETS</b>	<b>1752</b>
<i>Kenji Enomoto, Nagoya University, Japan; Ken Sakurada, Weiming Wang, National Institute of Advanced Industrial Science and Technology, Japan; Nobuo Kawaguchi, Nagoya University, Japan; Masashi Matsuoka, Tokyo Institute of Technology, Japan; Ryosuke Nakamura, National Institute of Advanced Industrial Science and Technology, Japan</i>	
<b>TU4-R7.5: A STUDY ON FULL SCALE INJECTION COEFFICIENTS FOR PANSHARPENING</b>	<b>1756</b>
<i>Gemine Vivone, Rocco Restaino, University of Salerno, Italy; Jocelyn Chanussot, Grenoble Institute of Technology, France</i>	
<b>TU1-R8: BIG MACHINE LEARNING III</b>	
<b>TU1-R8.1: EARTH SCIENCE DEEP LEARNING: APPLICATIONS AND LESSONS LEARNED</b>	<b>1760</b>
<i>Manil Maskey, Rahul Ramachandran, NASA Marshall Space Flight Center, United States; J.J. Miller, University of Alabama in Huntsville, United States; Jia Zhang, Carnegie Mellon University, United States; Iksha Gurung, University of Alabama in Huntsville, United States</i>	
<b>TU1-R8.2: EDDYNET: A DEEP NEURAL NETWORK FOR PIXEL-WISE CLASSIFICATION OF OCEANIC EDDIES</b>	<b>1764</b>
<i>Redouane Lguensat, Université Grenoble Alpes, France; Miao Sun, Key Laboratory of Digital Ocean, China; Ronan Fablet, IMT Atlantique, France; Evan Mason, Mediterranean Institute for Advanced Studies, Spain; Pierre Tandeo, IMT Atlantique, France; Ge Chen, Ocean University of China, China</i>	
<b>TU1-R8.3: PREDICTING LANDSCAPES AS SEEN FROM SPACE FROM ENVIRONMENTAL CONDITIONS</b>	<b>1768</b>
<i>Christian Requena-Mesa, Computer Vision Group, Computer Science, FSU Jena, Germany, Germany; Markus Reichstein, Miguel Mahecha, Basil Kraft, Department of Biogeochemical Integration, Max-Planck-Institute for Biogeochemistry, Germany; Joachim Denzler, Computer Vision Group, Computer Science, FSU Jena, Germany, Germany</i>	
<b>TU1-R8.4: CLOUD-GAN: CLOUD REMOVAL FOR SENTINEL-2 IMAGERY USING A CYCLIC CONSISTENT GENERATIVE ADVERSARIAL NETWORKS</b>	<b>1772</b>
<i>Praveer Singh, Nikos Komodakis, Ecole des Ponts ParisTech, France</i>	
<b>TU2-R8: BIG MACHINE LEARNING IV</b>	
<b>TU2-R8.1: AUTOMATED GEOPHYSICAL CLASSIFICATION OF SENTINEL-1 WAVE MODE SAR IMAGES THROUGH DEEP-LEARNING</b>	<b>1776</b>
<i>Chen Wang, Alexis Mouche, Laboratoire d'Océanographie Physique et Spatiale, Ifremer, France; Pierre Tandeo, UMR LabSTICC, Institut Mines-Telecom Atlantique, France; Justin Stopa, Bertrand Chapron, Laboratoire d'Océanographie Physique et Spatiale, Ifremer, France; Ralph Foster, Applied Physics Laboratory, United States; Douglas Vandemark, Ocean Processes Analysis Laboratory, University of New Hampshire, United States</i>	
<b>TU2-R8.2: CSRS-SIAT: A BENCHMARK REMOTE SENSING DATASET TO SEMANTIC-ENABLED AND CROSS-SCALES SCENE RECOGNITION</b>	<b>1780</b>
<i>Yuan Shen, Shenzhen Institute of Advanced Technology, CAS; Shenzhen College of Advanced Technology, University of Chinese Academy of Sciences, China; Xiran Zhou, Arizona State University, United States; Jun Liu, Jinsong Chen, Shenzhen Institute of Advanced Technology, CAS, China</i>	
<b>TU2-R8.3: A TWO-STREAM UNIFIED INTERPRETATION NETWORK FOR HETEROGENEOUS REMOTE SENSING IMAGES CLASSIFICATION</b>	<b>1784</b>
<i>Yan Wang, Chu He, Dehui Xiong, Mingxia Tu, Electronic Information School, Wuhan University, China</i>	

<b>TU2-R8.4: FLOODED AREA DETECTION FROM UAV IMAGES BASED ON DENSELY CONNECTED RECURRENT NEURAL NETWORKS</b>	<b>1788</b>
<i>Maryam Rahneemofar, Texas A&amp;M University-Corpus Christi, United States; Robin Murphy, Texas A&amp;M University, United States; Marina Vicens Miquel, Dugan Dobbs, Ashton Adams, Texas A&amp;M University-Corpus Christi, United States</i>	
<b>TU2-R8.5: SCALING SUPPORT VECTOR MACHINES TOWARDS EXASCALE COMPUTING FOR CLASSIFICATION OF LARGE-SCALE HIGH-RESOLUTION REMOTE SENSING IMAGES</b>	<b>1792</b>
<i>Ernir Erlingsson, University of Iceland, Germany; Gabriele Cavallaro, Morris Riedel, Jülich Supercomputing Centre, Germany; Helmut Neukirchen, University of Iceland, Iceland</i>	
<b>TU3-R8: GLOBAL ESSENTIAL VARIABLES III</b>	
<b>TU3-R8.1: MAPPING SURFACE ALBEDO FROM THE COMPLETE LANDSAT ARCHIVE SINCE THE 1980S AND ITS CRYOSPHERIC APPLICATION</b>	<b>1796</b>
<i>Tao He, Wuhan University, China; Shunlin Liang, University of Maryland, College Park, United States</i>	
<b>TU3-R8.2: SURFACE ALBEDO MEASUREMENT COMPARISONS OVER SLOPING TERRAIN WITH TWO DIFFERENT RADIOMETER PLACEMENTS</b>	<b>1800</b>
<i>Wu Shengbiao, Jianguang Wen, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>TU3-R8.3: A SENSOR INVARIANT ATMOSPHERIC CORRECTION METHOD FOR SATELLITE IMAGES</b>	<b>1804</b>
<i>Feng Yin, Jose Gómez-Dans, Philip Lewis, University College London, United Kingdom</i>	
<b>TU3-R8.4: UNCERTAINTY FOR BURNT AREA PRODUCTS</b>	<b>1808</b>
<i>James Brennan, Jose Gómez-Dans, Philip Lewis, Maxim Chernetskiy, University College London, United Kingdom; Angelika Heil, Max Planck Institute for Chemistry, Germany</i>	
<b>TU3-R8.5: UNCERTAINTY CHARACTERISATION &amp; VALIDATION WITHIN ESA FIRE-CCI</b>	<b>1812</b>
<i>James Brennan, Philip Lewis, Jose Gómez-Dans, Maxim Chernetskiy, University College London, United Kingdom; Emilio Chuvieco, Joshua Lizundia, University of Alcalá, Spain; Manuel Campagnolo, Jose Pereira, Duarte Oom, University of Lisbon, Portugal</i>	
<b>TU4-R8: GLOBAL ESSENTIAL VARIABLES IV</b>	
<b>TU4-R8.1: SOIL MOISTURE ESTIMATION BY LINEAR REGRESSION FROM SMAP POLARIMETRIC RADAR DATA WITH AQUARIUS DERIVED COEFFICIENTS</b>	<b>1816</b>
<i>Mariko S Burgin, Lukas Mandrake, Gary B Doran, Brian D Bue, Jakob J van Zyl, NASA Jet Propulsion Laboratory, United States</i>	
<b>TU4-R8.2: TOWARDS A MERGED TOTAL WATER VAPOUR RETRIEVAL FROM AMSU-B AND AMSR-E DATA IN THE ARCTIC REGION</b>	<b>1818</b>
<i>Arantxa Triana Gómez, Georg Heygster, Christian Melsheimer, Gunnar Spreen, University of Bremen, Germany</i>	
<b>TU4-R8.3: THE SENSAGRI SENTINEL-2 LAI GREEN AND BROWN PRODUCT: FROM ALGORITHM DEVELOPMENT TOWARDS OPERATIONAL MAPPING</b>	<b>1822</b>
<i>Eatidal Amin Darei, Image Processing Laboratory, Spain; Jochem Verrelst, University of Valencia, Spain; Juan Pablo Rivera-Caicedo, CONACYT-UAN, Mexico; Nieves Pasqualotto, Jesús Delegido, Antonio Ruiz-Verdú, José Moreno, Image Processing Laboratory, Spain</i>	
<b>TU4-R8.4: GENERATION OF GLOBAL VEGETATION PRODUCTS FROM EUMETSAT AVHRR/METOP SATELLITES</b>	<b>1826</b>
<i>Francisco Javier García-Haro, Manuel Campos-Taberner, Beatriz Martínez, Sergio Sánchez-Ruiz, María Amparo Gilabert, Gustau Camps-Valls, Jordi Muñoz-Marí, Valero Laparra, Universitat de València, Spain; Fernando Camacho, Jorge Sánchez-Zapero, Beatriz Fuster, Earth Observation Laboratory (EOLAB), Spain</i>	

**TU4-R8.5: PATTERNS COMPARISON BETWEEN GOME-2 SUN-INDUCED FLUORESCENCE ..... 1830  
AND MSG GROSS PRIMARY PRODUCTION**

*Beatriz Martínez, Sergio Sánchez-Ruiz, Manuel Campos-Taberner, Francisco Javier García-Haro, María Amparo Gilabert, University of Valencia, Spain*

**TU1-R9: SPACE LIDAR: MISSIONS, TECHNOLOGIES AND OBSERVATIONS I**

**TU1-R9.1: ESA SPACE WIND LIDAR MISSION: AEOLUS READY FOR LAUNCH ..... 1834**

*Anders Elfving, Denny Wernham, Anne Grete Straume, Thomas Kanitz, European Space Agency/ESTEC, Netherlands; Olivier Le Crenier, Jean-Claude Barthes, Airbus Defence and Space SAS, France; Phil McGoldrick, Airbus Defence and Space Ltd, United Kingdom*

**TU1-R9.2: FLIGHT LASERS TRANSMITTER DEVELOPMENT FOR NASA ICE TOPOGRAPHY ..... 1837  
ICESAT-2 SPACE MISSION**

*Nicholas Sawruk, Patrick Burns, Ryan Edwards, Viatcheslav Litvinovitch, Floyd Hovis, Fibertek, Inc., United States*

**TU1-R9.3: THE ESA EARTHCARE MISSION: APPROACHING LAUNCH ..... 1841**

*Alain Lefebvre, Arnaud Hélière, Kotska Wallace, Joao Pereira do Carmo, European Space Agency, Netherlands; Hirotaka Nakatsuka, Eiichi Tomita, Japan Aerospace Exploration Agency, Japan*

**TU1-R9.4: ANTIMONIDE BASED INFRARED DETECTORS FOR REMOTE SENSING ..... 1845**

*Sanjay Krishna, The Ohio State University, United States*

**TU1-R9.5: CSEM SPACE LIDARS FOR IMAGING AND RANGEFINDING ..... 1849**

*Alexandre Pollini, Christophe Pache, Jacques Haesler, Centre Suisse d'Electronique et de Microtechnique, Switzerland*

**TU2-R9: SPACE LIDAR: MISSIONS, TECHNOLOGIES AND OBSERVATIONS II**

**TU2-R9.1: FIBER-BASED LASER TRANSMITTER TECHNOLOGY MATURATION FOR ..... 1853  
SPECTROSCOPIC MEASUREMENTS FROM SPACE**

*Mark Stephen, Anthony Yu, Jeffrey Chen, Kenji Numata, Stewart Wu, Brayler Gonzalez, Lawrence Han, Molly Fahey, Michael Plants, NASA Goddard Space Flight Center, United States; Michael Rodriguez, Graham Allan, William Hasselbrack, Sigma, United States; James Abshire, NASA Goddard Space Flight Center, United States; Jeffrey Nicholson, Anand Hariharan, OFS, United States; William Mamakos, Brian Bean, Designinterface, United States*

**TU2-R9.2: WATER VAPOR COLUMN MEASUREMENTS WITH INFRARED ACTIVE OPTICAL ..... 1857  
IPDA LIDAR**

*Upendra Singh, NASA Langley Research Center, United States; Syed Ismail, AS&M Inc, United States; Tamer Refaat, Mulugeta Petros, NASA Langley Research Center, United States*

**TU2-R9.3: CURRENT STATUS OF THE ISS-VEGETATION LIDAR MISSION-MOLI ..... 1861**

*Daisuke Sakaizawa, Rei Mitsuhashi, Murooka Junpei, Tadashi Imai, Toshiyoshi Kimura, Japan Aerospace Exploration Agency, Japan; Kazuhiro Asai, Tohoku Institute of Technology, Japan*

**TU2-R9.4: MCT AVALANCHE PHOTODIODE DETECTOR FOR TWO-MICRON ACTIVE ..... 1865  
REMOTE SENSING APPLICATIONS**

*Tamer Refaat, Upendra Singh, Mulugeta Petros, Ruben Remus, NASA Langley Research Center, United States*

**TU2-R9.5: ESA AIRBORNE 3+2+2 HSRL FOR ALADIN/ATLID CAL/VAL ..... 1869**

*Ilya Serikov, Björn Brüggmann, Holger Linné, Ludwig Worbes, Max Planck Institute for Meteorology, Germany; Doina Nicolae, Livio Belegante, National Institute of Research and Development for Optoelectronics, Romania; Vassilis Amiridis, National Observatory of Athens, Greece*

**TU3-R9: NEW SPACEBORNE SAR INSTRUMENTS AND MISSIONS**

**TU3-R9.1: THE CAPELLA SYNTHETIC APERTURE RADAR CONSTELLATION ..... 1873**

*Gordon Farquharson, William Woods, Craig Stringham, Navneet Sankarambadi, Lucas Riggi, Capella Space, United States*

<b>TU3-R9.2: METASENSING X BAND SAR PAYLOAD FOR SMALL SATELLITE AND HIGH ALTITUDE STRATOSPHERIC PLATFORMS: DESIGN AND VALIDATION MEASUREMENTS</b> .....	<b>1877</b>
<i>Adriano Meta, Filippo Speziali, Christian Trampuz, MetaSensing, Netherlands</i>	
<b>TU3-R9.3: SAR CONSTELLATION FOR LOW COST AND RAPID EARTH MONITORING</b> .....	<b>1879</b>
<i>Sam Doody, Airbus Defence and Space, United Kingdom; Martin Cohen, Emanuele Monchieri, Airbus Defence and Space Ltd, United Kingdom; Jose Marquez-Martinez, Airbus Defence and Space, United Kingdom</i>	
<b>TU4-R9: ADVANCES IN MODEL-DATA INTEGRATION AND ASSIMILATION</b>	
<b>TU4-R9.1: COMBINATION OF CROP GROWTH MODEL AND RADIATION TRANSFER MODEL WITH REMOTE SENSING DATA ASSIMILATION FOR FAPAR ESTIMATION</b> .....	<b>1882</b>
<i>Gaoxiang Zhou, China University of Geosciences Beijing, China; Ming Liu, University of Waterloo, Canada; Xiangnan Liu, China University of Geosciences Beijing, China; Jonathan Li, University of Waterloo, Canada</i>	
<b>TU4-R9.2: A MODEL DRIVEN APPROACH FOR SNOW WETNESS RETRIEVAL WITH SENTINEL-1</b> .....	<b>1886</b>
<i>Carlo Marin, Mattia Callegari, EURAC Research, Italy; Daniel Günther, University of Innsbruck, Austria; Giacomo Bertoldi, EURAC Research, Italy; Thomas Marke, Ulrich Strasser, University of Innsbruck, Austria; Lorenzo Bruzzone, University of Trento, Italy; Marc Zebisch, Claudia Notarnicola, EURAC Research, Italy</i>	
<b>TU4-R9.3: ASSIMILATION OF INSAR PROPAGATION DELAY MAPS IN HIGH-RESOLUTION NUMERICAL WEATHER MODEL: IMAGING OF WATER VAPOR STRUCTURES IN ATMOSPHERE</b> .....	<b>1890</b>
<i>Pedro Mateus, University of Lisbon, Portugal; Giovanni Nico, Consiglio Nazionale delle Ricerche (CNR), Italy; João Catalao, University of Lisbon, Portugal</i>	
<b>TU4-R9.4: INTEGRATION AND ASSIMILATION OF METEOROLOGICAL (ECMWF) AEROSOL ESTIMATES INTO SEN2COR ATMOSPHERIC CORRECTION</b> .....	<b>1894</b>
<i>Jérôme Louis, Telespazio France, France; Bringfried Pflug, Magdalena Main-Knorn, German Aerospace Center (DLR), Germany; Vincent Debaecker, Telespazio France, France; Uwe Mueller-Wilm, Telespazio Vega Deutschland, Germany; Ferran Gascon, European Space Agency, Italy</i>	
<b>TU4-R9.5: APPROXIMATING EXPERIMENTAL VEGETATION SPECTROSCOPY DATA THROUGH EMULATION</b> .....	<b>1898</b>
<i>Jochem Verrelst, University of Valencia, Spain; Juan Pablo Rivera-Caicedo, CONACYT-UAN, Mexico; Jorge Vicent, José Moreno, Image Processing Laboratory, Spain</i>	
<b>TU1-R10: CHANGE DETECTION TECHNIQUES IN OPTICAL IMAGES</b>	
<b>TU1-R10.1: UNSUPERVISED MULTIPLE-CHANGE DETECTION IN VHR OPTICAL IMAGES USING DEEP FEATURES</b> .....	<b>1902</b>
<i>Sudipan Saha, University of Trento and Fondazione Bruno Kessler, Italy; Francesca Bovolo, Fondazione Bruno Kessler, Italy; Lorenzo Bruzzone, University of Trento, Italy</i>	
<b>TU1-R10.2: STACKED AUTOENCODERS FOR MULTICLASS CHANGE DETECTION IN HYPERSPECTRAL IMAGES</b> .....	<b>1906</b>
<i>Javier López-Fandiño, Alberto S. Garea, Dora B. Heras, Francisco Argüello, Universidade de Santiago de Compostela, Santiago de Compostela, Spain</i>	
<b>TU1-R10.3: UNSUPERVISED MULTI-CLASS CHANGE DETECTION IN BITEMPORAL MULTISPECTRAL IMAGES USING BAND EXPANSION</b> .....	<b>1910</b>
<i>Sicong Liu, Qian Du, Tongji University, China; Lorenzo Bruzzone, University of Trento, Italy; Alim Samat, Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, China; Xiaohua Tong, Tongji University, China</i>	

<b>TU1-R10.4: CHANGE DETECTION IN OPTICAL REMOTE SENSING IMAGES WITH A FULLY OBJECT-LEVEL APPROACH</b>	<b>1914</b>
<i>Long Ma, Zhengzhou University, China; Zhihong Mai, He Chen, Wenchao Liu, Fan Feng, Beijing Institute of Technology, China; Guichi Liu, Zhengzhou University, China; Nouman Qadeer Soomro, Mehran University of Engineering and Technology, Pakistan</i>	
<b>TU1-R10.5: LEARNING DEEP RELATIONSHIP FOR IMAGE CHANGE DETECTION</b>	<b>1918</b>
<i>Chunlei Huo, Yushuang Zhang, Institute of Automation, Chinese Academy of Sciences, China; Jiayuan Yu, Beijing University of Civil Engineering and Architecture, China; Yunpeng Jing, Beijing Information Science and Technology University, China; Chunhong Pan, Institute of Automation, Chinese Academy of Sciences, China</i>	
<b>TU2-R10: CHANGE DETECTION TECHNIQUES IN SAR AND LIDAR DATA</b>	
<b>TU2-R10.1: AN UNSUPERVISED CHANGE DETECTION METHOD FOR LIDAR DATA IN FOREST AREAS BASED ON CHANGE VECTOR ANALYSIS IN THE POLAR DOMAIN</b>	<b>1922</b>
<i>Daniele Marinelli, University of Trento, Italy; Nicholas C. Coops, Douglas K. Bolton, University of British Columbia, Canada; Lorenzo Bruzzone, University of Trento, Italy</i>	
<b>TU2-R10.2: FLOODPLAIN DEM EXTRACTION BASED ON SWOT HR INSAR DATA</b>	<b>1926</b>
<i>Emmanuelle Sarrazin, Damien Desroches, Roger Fjørtoft, CNES, France; David Youssefi, CS-SI, France; Alessio Domeneghetti, Università di Bologna, Italy; Brent Williams, Jet Propulsion Laboratory, United States</i>	
<b>TU2-R10.3: CORRELATION-BASED VARIATIONAL CHANGE DETECTION FOR ELEVATION MODELS</b>	<b>1930</b>
<i>Gizem Aktaş, Middle East Technical University, Turkey; Fatih Nar, Konya Food and Agriculture University, Turkey; Fatoş Tunay Yarman Vural, Middle East Technical University, Turkey</i>	
<b>TU2-R10.5: MULTI-POLARIZATION METHODS TO DETECT DAMAGES RELATED TO EARTHQUAKES</b>	<b>1938</b>
<i>Emanuele Ferrentino, Università di Napoli Parthenope, Italy; Armando Marino, The Open University, United Kingdom; Ferdinando Nunziata, Maurizio Migliaccio, Università di Napoli Parthenope, Italy</i>	
<b>TU3-R10: ANALYSIS OF IMAGE TIME SERIES I</b>	
<b>TU3-R10.1: A MULTIVARIATE CHANGE VECTOR ANALYSIS SYSTEM FOR UNSUPERVISED DETECTION OF CLEAR-CUTS IN SENTINEL-2 TIME SERIES OF THE INDONESIAN FOREST</b>	<b>1942</b>
<i>Massimo Zanetti, Lorenzo Bruzzone, University of Trento, Italy; Diego Fernández-Prieto, European Space Agency/ESRIN, Italy</i>	
<b>TU3-R10.2: AUTOMATIC DERIVATION OF CROPLAND PHENOLOGICAL PARAMETERS BY ADAPTIVE NON-PARAMETRIC REGRESSION OF SENTINEL-2 NDVI TIME SERIES</b>	<b>1946</b>
<i>Yady Tatiana Solano-Correa, Fondazione Bruno Kessler - University of Trento, Italy; Francesca Bovolo, Fondazione Bruno Kessler, Italy; Lorenzo Bruzzone, University of Trento, Italy; Diego Fernández-Prieto, European Space Agency, Italy</i>	
<b>TU3-R10.3: CROP-ROTATION STRUCTURED CLASSIFICATION USING MULTI-SOURCE SENTINEL IMAGES AND LPIS FOR CROP TYPE MAPPING</b>	<b>1950</b>
<i>Simon Bailly, Sébastien Giordano, Loïc Landrieu, IGN, France; Nesrine Chehata, EA G&amp;E Bordeaux INP, France</i>	
<b>TU4-R10: ANALYSIS OF IMAGE TIME SERIES II</b>	
<b>TU4-R10.1: ESTIMATING THE NDVI FROM SAR BY CONVOLUTIONAL NEURAL NETWORKS</b>	<b>1954</b>
<i>Antonio Mazza, Massimiliano Gargiulo, University Federico II, Italy; Raffaele Gaetano, CIRAD, France; Giuseppe Scarpa, University Federico II, Italy</i>	
<b>TU4-R10.2: AN INTERVAL-BASED APPROACH FOR REASONING ABOUT LAND USE CHANGE TRAJECTORIES</b>	<b>1958</b>
<i>Adeline Maciel, Lúbia Vinhas, Gilberto Camara, Michelle Picoli, Rodrigo Begotti, National Institute for Space Research - INPE, Brazil</i>	

<b>TU4-R10.3: SENTINEL-1 AND SENTINEL-2 DATA FUSION FOR URBAN CHANGE DETECTION .....</b>	<b>1962</b>
<i>Benedetti Alessia, Matteo Picchiani, Fabio Del Frate, Tor Vergata University, Italy</i>	
<b>TU4-R10.5: LAND COVER CHANGE DETECTION BASED ON SPATIAL-TEMPORAL ..... SUB-PIXEL EVOLUTION MAPPING: A CASE STUDY FOR URBAN EXPANSION</b>	<b>1970</b>
<i>Da He, Yanfei Zhong, Liangpei Zhang, Wuhan University, China</i>	
<b>TU1-R11: SMALL SATELLITE TECHNOLOGY</b>	
<b>TU1-R11.1: MULTIBAND CIRCULARLY POLARIZED SYNTHETIC APERTURE RADAR ..... (CP-SAR) ONBOARD MICROSATELLITE CONSTELLATION</b>	<b>1974</b>
<i>Josaphat Tetuko Sri Sumantyo, Nobuyoshi Imura, Katia Nagamine Urata, Chiba University, Japan; Robertus Heru Triharjanto, National Institute for Aeronautics and Space, Indonesia; Steven Gao, University of Kent, United Kingdom</i>	
<b>TU1-R11.2: THE ON-ORBIT CALIBRATION METHOD BASED ON TERRAIN MATCHING ..... WITH PYRAMID-SEARCH FOR THE SPACEBORNE LASER ALTIMETER</b>	<b>1978</b>
<i>Xie Jun Feng, Mo Fan, Satellite Surveying and Mapping Application Center, NASG, China; Feng Wanwan, Southwest Forestry University, China; Liu Ren, Liaoning Technology University, China</i>	
<b>TU1-R11.3: INSTRUMENT NEEDS FOR THE COPERNICUS SPACE INFRASTRUCTURE IN ..... THE TIMEFRAME 2020-2030</b>	<b>1982</b>
<i>Estefany Lancheros, Adriano Camps, Hyuk Park, Universitat Politècnica de Catalunya - BarcelonaTech, Spain; Pedro Rodriguez, Thales Alenia Space Spain, Spain; Stefania Tonetti, Deimos Space S.L.U, Spain; Hripsime Matevosyan, Ignasi Lluch, Skolkovo Institute of Science and Technology, Russian Federation; Pierre Sicard, Antoine Mangin, ACRI-ST, France</i>	
<b>TU1-R11.4: MINIATURE SPECTRAL IMAGER IN-ORBIT DEMONSTRATION RESULTS FROM ..... AALTO-1 NANOSATELLITE MISSION</b>	<b>1986</b>
<i>Jaan Praks, Petri Niemelä, Aalto University, Finland; Antti Näsiliä, VTT Technical Research Centre of Finland Ltd, Finland; Antti Kestilä, Nemanja Jovanovic, Bagus Riwanto, Aalto University, Finland; Tuomas Tikka, Reaktor Space Lab, Finland; Hannu Leppinen, SSF, Finland; Rami Vainio, University of Turku, Finland; Pekka Janhunen, Finnish Meteorological Institute, Finland</i>	
<b>TU1-R11.5: DESIGN, TESTING AND RELIABILITY ANALYSIS OF COMMAND AND DATA ..... HANDLING (C&amp;DH) SUBSYSTEM FOR THE TROPOSPHERIC WATER AND CLOUD ICE (TWICE) INSTRUMENT FOR A 6U-CLASS SMALL SATELLITE</b>	<b>1990</b>
<i>Mehmet Ogut, Steven C. Reising, Colorado State University, United States; Xavier Bosch-Lluis, California Institute of Technology, United States; Yuriy V. Goncharenko, Braxton Kilmer, Colorado State University, United States; Pekka Kangaslahti, Erich Schlecht, Richard Cofield, Anders Skalare, Sharmila Padmanabhan, Jonathan Jiang, Shannon Brown, California Institute of Technology, United States; William Deal, Alex Zamora, Northrop Grumman Corporation, United States</i>	
<b>TU2-R11: MICROWAVE RADIOMETER MISSIONS AND METHODS</b>	
<b>TU2-R11.1: PRESENT AND FUTURE OF L-BAND RADIOMETRY.....</b>	<b>1994</b>
<i>Yann Kerr, CNES, France; Dara Entekhabi, Massachusetts Institute of Technology, United States; Rajat Bindlish, Tong Lee, Simon Yueh, NASA, United States; Gary Lagerloef, ESR, United States; Jean-Pierre Wigneron, INRA, France; Nemesio Rodríguez-Fernández, CESBIO, France; Jacqueline Boutin, LOCEAN, France; Nicolas Reul, IFREMER, France; Lars Kaleschke, Hambourg University, Germany</i>	
<b>TU2-R11.3: CRYORAD: A LOW FREQUENCY WIDEBAND RADIOMETER MISSION FOR THE ..... STUDY OF THE CRYOSPHERE</b>	<b>1998</b>
<i>Giovanni Macelloni, Marco Brogioni, Marion Leduc-Leballeur, Francesco Montomoli, IFAC-CNR, Italy; Annett Bartsch, B.GEOS GmbH, Austria; Arnaud Mialon, CESBIO, France; Catherine Ritz, Université Grenoble Alpes, France; Josep Closa Soteras, Airbus Defence and Space, Spain; Detlef Stammer, University of Hamburg, Germany; Ghislain Picard, Université Grenoble Alpes, France; Giacomo De Carolis, IREA-CNR, Italy; Jacqueline Boutin, UPMC, France; Joel Johnson, The Ohio State University, United States; Keith Nicholls, British Antarctic Survey, United Kingdom; Kenneth Jezek, The Ohio State University, United States; Kimmo Rautiainen, Finnish Meteorological Institute, Finland; Lars Kaleschke, University of Hamburg, Germany; Laurent Bertino, NERSC, Norway; Leung Tsang, University of Michigan, United States; Michiel van den Broeke, Utrecht University, Netherlands; Niels Skou, Technical University of Denmark, Denmark; Steffen Tietsche, ECMWF, United Kingdom</i>	

<b>TU2-R11.4: RADIOMETER FOR THE TEMPORAL EXPERIMENT FOR STORMS AND TROPICAL SYSTEMS TECHNOLOGY DEMONSTRATION MISSION</b>	<b>2001</b>
<i>Sharmila Padmanabhan, Todd C. Gaier, Boon H. Lim, Robert Stachnik, Alan Tanner, Shannon Brown, Jet Propulsion Laboratory, United States; Steven C. Reising, Wesley Berg, Christian D. Kummerow, V. Chandrasekar, Colorado State University, United States</i>	
<b>TU2-R11.5: PERFORMANCE AND RESULTS FROM THE JUNO MICROWAVE RADIOMETER</b>	<b>2004</b>
<i>Shannon Brown, Sidharth Misra, Michael Janssen, Jet Propulsion Laboratory, United States</i>	
 <b>TU3-R11: LAND AND OCEAN SCATTEROMETRY</b>	
<b>TU3-R11.1: BROADBAND FULL POLARIMETRIC SCATTEROMETRY FOR MONITORING SOIL MOISTURE AND VEGETATION PROPERTIES OVER A TIBETAN MEADOW</b>	<b>2007</b>
<i>Jan Hofste, Rogier van der Velde, University of Twente, Netherlands; Xin Wang, Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, China; Donghai Zheng, Institute of Tibetan Plateau Research, Chinese Academy of Sciences, China; Jun Wen, Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, China; Christiaan van der Tol, Zhongbo Su, University of Twente, Netherlands</i>	
<b>TU3-R11.2: FULLY POLARIMETRIC AIRBORNE WIND VECTOR SCATTEROMETER TO SUPPORT SPACE-BORNE GNSS-R MEASUREMENTS</b>	<b>2011</b>
<i>Juha Kainulainen, Sampo Salo, Janne Lahtinen, Harp Technologies Oy, Finland; Guifre Molera, Jaakko Seppänen, Jaan Praks, Aalto University, Finland; Teemu Hakala, Yuwei Chen, Juha Hyypä, National Land Survey, Finland; Martin Unwin, Philip Jales, Surrey Satellite Technology Ltd., United Kingdom; Gerhard Ressler, Tânia Casal, Josep Rosello, European Space Agency, Netherlands</i>	
<b>TU3-R11.3: SMAP TROPICAL CYCLONE SIZE AND INTENSITY VALIDATION</b>	<b>2015</b>
<i>Alexander Fore, Simon Yueh, Wenqing Tang, Bryan Stiles, Akiko Hayashi, Jet Propulsion Laboratory, United States</i>	
<b>TU3-R11.4: IN-FLIGHT CALIBRATION OF THE METOP-SG SCA WIND SCATTEROMETER</b>	<b>2019</b>
<i>Friedhelm Rostan, Dieter Ulrich, Eberhard Schied, Christoph Heer, Airbus Defence and Space GmbH, Germany; Allan Ostergaard, European Space Agency/ESTEC, Netherlands</i>	
<b>TU3-R11.5: DECONVOLUTION APPROACHES FOR RESOLUTION ENHANCEMENT WITH DPS SCATTEROMETER</b>	<b>2023</b>
<i>Liling Liu, China University of Mining and Technology, Beijing, China; Xiaolong Dong, The CAS Key Laboratory of Microwave Remote Sensing, National Space Science Center, Chinese Academy of Sciences, China; Wenming Lin, Nanjing University of Information Science and Technology, China</i>	
 <b>TU4-R11: GNSS-R IV: SENSORS AND APPLICATIONS</b>	
<b>TU4-R11.1: PRELIMINARY END-TO-END RESULTS OF THE MIR INSTRUMENT: THE MICROWAVE INTERFEROMETRIC REFLECTOMETER</b>	<b>2027</b>
<i>Raul Onrubia, Daniel Pascual, Jorge Querol, Hyuk Park, Adriano Camps, Universitat Politècnica de Catalunya, Spain</i>	
<b>TU4-R11.2: GEOPHYSICAL RELATIONSHIP BETWEEN CYGNSS GNSS-R BISTATIC REFLECTIVITY AND SMAP MICROWAVE RADIOMETRY BRIGHTNESS TEMPERATURE OVER LAND SURFACES</b>	<b>2031</b>
<i>Hugo Carreno-Luengo, Guido Luzi, Michele Crosetto, Centre Tecnològic de Telecomunicacions de Catalunya, Sri Lanka</i>	
<b>TU4-R11.3: GNSS-R TIME-SERIES SOIL MOISTURE RETRIEVALS FROM VEGETATED SURFACES</b>	<b>2035</b>
<i>Mohammad Al-Khaldi, Joel Johnson, Andrew O'Brien, The Ohio State University, United States; Francesco Mattia, Anna Balenzano, Istituto sui Sistemi Intelligenti per l'Automazione, Italy</i>	
<b>TU4-R11.4: PERFORMANCES OF GNSS-R GLORI DATA OVER LANDE FOREST</b>	<b>2039</b>
<i>Mehrez Zribi, CNRS, France; Dominique Guyon, INRA, France; Erwan Motte, CNRS, France; Jean-Pierre Wigneron, INRA, France; Nicolas Baghdadi, IRSTEA, France; Nazzareno Pierdicca, University of Roma, Italy; Pascal Fanise, IRD, France</i>	

<b>TU4-R11.5: TOWARDS REAL-TIME GNSS REFLECTOMETRY USING KALMAN FILTERING.....</b>	<b>2043</b>
<i>Joakim Strandberg, Thomas Hobiger, Rüdiger Haas, Chalmers University of Technology, Sweden</i>	
<b>TU1-R12: BIG EARTH DATA FOR GLOBAL SCALE APPLICATIONS I</b>	
<b>TU1-R12.1: PRINCIPLES AND APPLICATIONS OF THE GLOBAL HUMAN SETTLEMENT LAYER .....</b>	<b>2047</b>
<i>Martino Pesaresi, European Commission, Joint Research Centre (JRC), Italy</i>	
<b>TU1-R12.2: DATACUBE STANDARDS AND THEIR CONTRIBUTION TO ANALYSIS-READY DATA .....</b>	<b>2051</b>
<i>Peter Baumann, Jacobs University   rasdaman GmbH, Germany</i>	
<b>TU1-R12.3: AN AUTOMATIC DEPLOYMENT SUPPORT FOR PROCESSING REMOTE SENSING DATA IN THE CLOUD .....</b>	<b>2054</b>
<i>André Lage-Freitas, Raphael P. Ribeiro, Naelson D. C. Oliveira, Alejandro C. Frery, Universidade Federal de Alagoas, Brazil</i>	
<b>TU1-R12.4: ANALYSIS OF LOWLAND RICE ACROSS ASIA.....</b>	<b>2058</b>
<i>Caitlin Kontgis, Kornelijus Survila, Descartes Labs, United States</i>	
<b>TU2-R12: BIG EARTH DATA FOR GLOBAL SCALE APPLICATIONS II</b>	
<b>TU2-R12.1: DISCOVERING TEMPORAL PATTERNS OF AIR QUALITY IN DIFFERENT PARTS OF EUROPE WITH DATA DRIVEN FEATURE EXTRACTION .....</b>	<b>2062</b>
<i>Andrea Marinoni, University of Pavia, Italy; Daniele De Vecchi, Ticinum Aerospace, Italy; Devis Tuia, Wageningen University &amp; Research, Netherlands; Paolo Gamba, University of Pavia, Italy</i>	
<b>TU2-R12.2: SETTLEMENT DETECTION USING CONVOLUTIONAL NEURAL NETWORKS ON THE DIGITALGLOBE GEOSPATIAL BIG DATA PLATFORM .....</b>	<b>2066</b>
<i>Kostas Stamatiou, Lukas Kobr, Nikki Aldeborgh, Digital Globe, Inc, United States</i>	
<b>TU2-R12.3: WORLDPOP - FUSION OF EARTH AND BIG DATA FOR INTRAURBAN POPULATION MAPPING .....</b>	<b>2070</b>
<i>Jessica E Steele, Jeremiah Nieves, Andrew J Tatem, University of Southampton, United Kingdom; Yann Forget, University of Brussels, Belgium; Michal Shimoni, Royal Military Academy, Belgium; Catherine Linard, University of Brussels, University of Namur, Belgium</i>	
<b>TU2-R12.4: FUSION SCHEME FOR AUTOMATIC AND LARGE-SCALED BUILT-UP MAPPING .....</b>	<b>2072</b>
<i>Yann Forget, Université Libre de Bruxelles, Belgium; Michal Shimoni, Juanfran Lopez, Royal Military Academy, Belgium; Catherine Linard, Marius Gilbert, Université Libre de Bruxelles, Belgium</i>	
<b>TU2-R12.5: PREDICTING DENGUE INCIDENCE IN BRAZIL USING BROAD-SCALE SPECTRAL REMOTE SENSING IMAGERY .....</b>	<b>2076</b>
<i>Amanda Ziemann, Geoffrey Fairchild, Jessica Conrad, Carrie Manore, Nidhi Parikh, Sara Del Valle, Nicholas Generous, Los Alamos National Laboratory, United States</i>	
<b>TU3-R12: DEEP LEARNING METHODS FOR MULTISPECTRAL IMAGE ANALYSIS I</b>	
<b>TU3-R12.1: EXPLORATORY VISUAL ANALYSIS OF MULTISPECTRAL EO IMAGES BASED ON DNN .....</b>	<b>2079</b>
<i>Iulia Neagoe, Daniela Faur, Corina Vaduva, University Politehnica of Bucharest UPB, Romania; Mihai Datcu, University Politehnica of Bucharest UPB, German Aerospace Centre DLR, Romania</i>	
<b>TU3-R12.2: END-TO-END LEARNING OF POLYGONS FOR REMOTE SENSING IMAGE CLASSIFICATION .....</b>	<b>2083</b>
<i>Nicolas Girard, Yuliya Tarabalka, UCA, Inria, TITANE team, France</i>	



<b>TU3-R12.3: THE INFLUENCE OF SAMPLING METHODS ON PIXEL-WISE HYPERSPPECTRAL IMAGE CLASSIFICATION WITH 3D CONVOLUTIONAL NEURAL NETWORKS</b>	<b>2087</b>
<i>Julius Lange, Humboldt-Universität zu Berlin, Germany; Gabriele Cavallaro, Markus Götz, Forschungszentrum Jülich, Germany; Ernir Erlingsson, University of Iceland, Germany; Morris Riedel, Forschungszentrum Jülich, Germany</i>	
<b>TU3-R12.4: FUSENET: END-TO-END MULTISPECTRAL VHR IMAGE FUSION AND CLASSIFICATION</b>	<b>2091</b>
<i>John Ray Bergado, Claudio Persello, Alfred Stein, University of Twente, Netherlands</i>	
<b>TU3-R12.5: MODELING URBANIZATION PATTERNS WITH GENERATIVE ADVERSARIAL NETWORKS</b>	<b>2095</b>
<i>Adrian Albert, Massachusetts Institute of Technology, United States; Emanuele Strano, German Aerospace Center (DLR), Germany; Jasleen Kaur, Philips Research USA, United States; Marta Gonzalez, University of California, Berkeley, United States</i>	
 <b>TU4-R12: DEEP LEARNING METHODS FOR MULTISPECTRAL IMAGE ANALYSIS II</b>	
<b>TU4-R12.1: IMPROVING MAPS FROM CNNs TRAINED WITH SPARSE, SCRIBBLED GROUND TRUTHS USING FULLY CONNECTED CRFS</b>	<b>2099</b>
<i>Luca Maggiolo, University of Genoa, Italy; Diego Marcos, Wageningen University, Netherlands; Gabriele Moser, University of Genoa, Italy; Devis Tuia, Wageningen University, Netherlands</i>	
<b>TU4-R12.2: CONVOLUTIONAL NEURAL NETWORKS FOR CLOUD SCREENING: TRANSFER LEARNING FROM LANDSAT-8 TO PROBA-V</b>	<b>2103</b>
<i>Gonzalo Mateo-García, Luis Gómez-Chova, Universidad de València, Spain</i>	
<b>TU4-R12.3: DEEPCLOUD - A FULLY CONVOLUTIONAL NEURAL NETWORK FOR CLOUD AND SHADOW MASKING IN OPTICAL SATELLITE IMAGES</b>	<b>2107</b>
<i>Matthieu Molinier, Niko Reunanen, Arttu Lämsä, Heikki Astola, Tomi Rätty, VTT Technical Research Centre of Finland Ltd, Finland</i>	
<b>TU4-R12.4: TRANSFER LEARNING WITH CONVOLUTIONAL NETWORKS FOR ATMOSPHERIC PARAMETER RETRIEVAL</b>	<b>2111</b>
<i>David Malmgren-Hansen, Danmarks Tekniske Universitet, Denmark; Valero Laparra, University of Valencia, Spain; Allan Aasbjerg Nielsen, Danmarks Tekniske Universitet, Denmark; Gustau Camps-Valls, University of Valencia, Spain</i>	
<b>TU4-R12.5: URBAN CHANGE DETECTION FOR MULTISPECTRAL EARTH OBSERVATION USING CONVOLUTIONAL NEURAL NETWORKS</b>	<b>2115</b>
<i>Rodrigo Caye Daudt, Bertrand Le Saux, Alexandre Boulch, ONERA, France; Yann Gousseau, Télécom ParisTech, France</i>	
 <b>TUP1-PA: MICROWAVE MODELS FOR SOIL AND VEGETATION</b>	
<b>TUP1-PA.1: THE DECOMPOSITION-RECONSTITUTION THEOREM FOR SCATTERING COMPUTATION FROM RANDOM ROUGH SURFACE</b>	<b>2119</b>
<i>Ming Li, Ling Tong, Xun Yang, Yu Li, University of Electronic Science and Technology of China, China</i>	
<b>TUP1-PA.2: EVALUATING SCATTERED ELECTROMAGNETIC FIELD FROM FRACTAL SURFACE USING ITS COMPONENTS</b>	<b>2123</b>
<i>Yu Li, Ling Tong, Ming Li, Xun Yang, University of Electronic Science and Technology of China, China</i>	
<b>TUP1-PA.3: EXTRACTING INFORMATION FROM THE COHERENCE TENSOR AND THE IEM2MC MODEL IN MULTI-POINT SAR OBSERVATIONS</b>	<b>2127</b>
<i>Jose Luis Alvarez-Perez, University of Alcalá (UAH), Spain</i>	
<b>TUP1-PA.4: BACKSCATTERING FROM FRACTAL ROUGH SURFACES UNDER TAPERED WAVE ILLUMINATION</b>	<b>2131</b>
<i>Yu Li, Ling Tong, Xun Yang, Ming Li, University of Electronic Science and Technology of China, China</i>	

<b>TUP1-PA.5: COMPARISON AND VALIDATION ON MICROWAVE EXTINCTION PROPERTIES OF VEGETATION</b>	<b>2135</b>
<i>Fengmin Wu, Yan Hu, Jing Chen, Zhipeng Zheng, Chongqing Geomatics Center, China</i>	
<b>TUP1-PA.6: CALIBRATION OF SCATTERING MODELS FOR GROWING CORN AND SOYBEAN AT C-BAND USING SENTINEL-1 AND RADARSAT-2 OBSERVATIONS</b>	<b>2139</b>
<i>Alejandro Monsivais-Huertero, Instituto Politecnico Nacional, Mexico; Jasmeet Judge, University of Florida, United States</i>	
<b>TUP1-PA.7: A MODIFIED SCATTERING MODEL OF ROW WHEAT AT X- BAND</b>	<b>2142</b>
<i>Lei He, Chengdu University of Information Technology, China; Yuxia Li, University of Electronic Science and Technology of China, China; Wenyi Hu, Chengdu University of Technology, China; Hongping Shu, Chengdu University of Information Technology, China; Ling Tong, University of Electronic Science and Technology of China, China</i>	
<b>TUP1-PA.10: SPATIAL AND TEMPORAL PROPERTIES OF SMOS RETRIEVAL OVER TROPICAL FORESTS</b>	<b>2153</b>
<i>Cristina Vittucci, Paolo Ferrazzoli, Tor Vergata University, Italy; Yann Kerr, Philippe Richaume, CESBIO, France; Leila Guerriero, Tor Vergata University, Italy; Gaia Vaglio Laurin, Tuscia University, Italy</i>	
 <b>TUP2-PA: SAR INTERFEROMETRY: ALONG AND ACROSS III</b>	
<b>TUP2-PA.1: MAXIMUM LIKELIHOOD PHASE ESTIMATION METHOD BASED ON SPLIT-SPECTRUM FOR MULTI-FREQUENCY INSAR SYSTEM</b>	<b>2157</b>
<i>Shuo Li, Huaping Xu, Beihang University, China; Yanan You, Beijing University of Posts and Telecommunications, China; Bo Yang, Beihang University, China</i>	
<b>TUP2-PA.2: EXTENDED PUMA ALGORITHM FOR MULTIBASELINE SAR INTERFEROGRAMS</b>	<b>2161</b>
<i>Lifan Zhou, Changshu Institute of Technology, China; Dengfeng Chai, Zhejiang University, China; Yu Xia, Changshu Institute of Technology, China; Peifeng Ma, The Chinese University of Hong Kong, Hong Kong SAR of China</i>	
<b>TUP2-PA.3: SAR BASED THREE-DIMENSIONAL SURFACE DEFORMATION MONITORING OF HIGH MOUNTAIN GLACIERS</b>	<b>2165</b>
<i>Min-Jeong Jo, USRA, NASA-GSFC, United States; Batuhan Osmanoglu, NASA Goddard Space Flight Center, United States; Hyung-Sup Jung, The University of Seoul, Republic of Korea</i>	
<b>TUP2-PA.4: SPACEBORNE REPEAT-PASS INTERFEROMETRIC SYNTHETIC APERTURE RADAR EXPERIMENTAL EVALUATION FOR THE GAOFEN-3 SATELLITE</b>	<b>2168</b>
<i>Lixiang Ma, Yu Zhu, Beijing Institute of Spacecraft System Engineering, China; Fan Zhang, Beijing University of Chemical Technology, China; Jian Liang, Zheng Lv, Lei Liu, Beijing Institute of Spacecraft System Engineering, China; Yekun Wang, Xidian University, China</i>	
<b>TUP2-PA.5: PRELIMINARY COHERENCE ASSESSMENT OF GAOFEN-3 SAR DATA</b>	<b>2172</b>
<i>Tao Li, Xinming Tang, Qianfu Chen, Xiaoming Gao, Xiang Zhang, Li Guo, Satellite Surveying and Mapping Application Center, National Administration of Surveying, Mapping and Geoinformation, China</i>	
<b>TUP2-PA.6: JOINT DISTRIBUTION OF INTERFEROMETRIC PHASES FOR MULTIBASELINE INSAR</b>	<b>2176</b>
<i>Bo Yang, Huaping Xu, Shuo Li, Zening Song, Beihang University, China; Haifeng Liu, Hubei Sub-center of National Computer Network Emergency Response Technical Team/Coordination Center of China, China</i>	
<b>TUP2-PA.7: CLUSTER BASED METHOD TO IDENTIFY PERSISTENT SCATTERERS FOR NONLINEAR DISPLACEMENT ANALYSIS OF STRUCTURES</b>	<b>2180</b>
<i>Taichi Tanaka, Osamu Hoshuyama, NEC Corporation, Japan</i>	
<b>TUP2-PA.8: BISTATIC INSAR X-BAND STATISTICAL CHARACTERIZATION OF AGRICULTURAL FIELDS WITH TANDEM-X</b>	<b>2184</b>
<i>Carolina Gonzalez, Michele Martone, Paola Rizzoli, German Aerospace Center (DLR), Germany</i>	

<b>TUP2-PA.9: EXPLOITING NONLOCAL FILTERS FOR HIGH-RESOLUTION INSAR DEM GENERATION</b> .....	<b>2188</b>
<i>Francescopaolo Sica, Michele Martone, Muriel Pinheiro, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany; Davide Cozzolino, Università degli Studi di Napoli, Italy; Pau Prats-Iraola, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany; Giovanni Poggi, Università degli Studi di Napoli, Italy</i>	
<b>TUP2-PA.10: ATMOSPHERIC EFFECTS ON RADARSAT-2 INTERFEROGRAMS OF TOLBACHIK VOLCANIC COMPLEX</b> .....	<b>2192</b>
<i>Alexander Zakharov, Liudmila Zakharova, Kotelnikov institute of Radioengineering and Electronics, RAS, Russian Federation; Polina Mikhaylyukova, Lomonosov Moscow State University, Russian Federation; Pavel Denisov, JSC Russian Space Systems, Russian Federation</i>	
<b>TUP1-PB: DIFFERENTIAL SAR INTERFEROMETRY V</b>	
<b>TUP1-PB.1: A DIRECT METHOD TO ESTIMATE ATMOSPHERIC PHASE DELAY FOR INSAR WITH GLOBAL ATMOSPHERIC MODELS</b> .....	<b>2196</b>
<i>Zhongbo Hu, Jordi J. Mallorqui, Universitat Politècnica de Catalunya, Spain</i>	
<b>TUP1-PB.2: SURFACE DEFORMATION DETECTION BY SMALL BASELINE SAR INTERFEROMETRY IN CANGZHOU COASTAL ZONE</b> .....	<b>2200</b>
<i>Yi Luo, Jingfa Zhang, Zhimin Liu, Wenhao Shen, Qisong Jiao, Institute of Crustal Dynamics, China Earthquake Administration, China; Liming Zuo, Geologic Reconnaissance Institute for Hebei Province, China</i>	
<b>TUP1-PB.3: AN ADAPTIVE MULTILOOKING SCHEME FOR MULTI-TEMPORAL INSAR DATA</b> .....	<b>2204</b>
<i>Feng Zhao, Jordi J. Mallorqui, Universitat Politècnica de Catalunya, Spain</i>	
<b>TUP1-PB.5: A SIMPLE PHASE UNWRAPPING ERRORS CORRECTION ALGORITHM BASED ON PHASE CLOSURE ANALYSIS</b> .....	<b>2212</b>
<i>Béatrice Pinel-Puysségur, CEA, France; Cécile Lasserre, ENS Lyon, France; Angélique Benoit, Romain Jolivet, ENS Paris, France; Marie-Pierre Doin, Université Grenoble Alpes, France; Johann Champenois, CEA, France</i>	
<b>TUP1-PB.6: USE OF DIFFERENTIAL INTERFEROMETRY ON SENTINEL-1 IMAGES FOR THE MEASUREMENT OF GROUND DISPLACEMENTS. ISCHIA EARTHQUAKE AND COMPARISON WITH INGV DATA</b> .....	<b>2216</b>
<i>Silvia Liberata Ullo, Università degli Studi del Sannio, Italy; Cesario Vincenzo Angelino, Luca Cicala, CIRA, The Italian Aerospace Research Center, Italy; Nicomino Fiscante, Università degli Studi del Sannio, Italy; Pia Addabbo, Giustino Fortunato University, Italy</i>	
<b>TUP1-PB.7: MULTI-TEMPORAL INSAR MONITORING OF THE ASWAN HIGH DAM (EGYPT)</b> .....	<b>2220</b>
<i>Antonio M. Ruiz-Armenteros, Universidad de Jaén, Spain; J. Manuel Delgado, Universidad de Jaén / Delft University of Technology / University of Leuven, Italy; Francisco Lamas-Fernández, Rafael Bravo-Pareja, Universidad de Granada, Spain; Milan Lazecky, VSB-TU Ostrava, Czech Republic; Matus Bakon, insar.sk Ltd, Slovakia; Joaquim João Sousa, Universidade de Trás-os-Montes e Alto Douro, Portugal; Miguel Caro-Cuenca, TNO, Netherlands; Gert Verstraeten, University of Leuven, Belgium; Ramon F. Hanssen, Delft University of Technology, Netherlands</i>	
<b>TUP1-PB.8: AUTOMATIC DETECTION OF BUILDING AND INFRASTRUCTURE INSTABILITIES BY SPATIAL AND TEMPORAL ANALYSIS OF INSAR MEASUREMENTS</b> .....	<b>2224</b>
<i>Mario Costantini, e-GEOS - an Italian Space Agency and Telespazio company, Italy; Mao Zhu, Vastitude Technology, China; Song Huang, Shenzhen Urban Public Safety and Technology Institute, China; Shujian Bai, Jiangke Cui, Vastitude Technology, China; Federico Minati, Francesco Vecchioli, e-GEOS - an Italian Space Agency and Telespazio company, Italy; Dianqi Jin, Shenzhen Urban Public Safety and Technology Institute, China; Qiong Hu, Vastitude Technology, China</i>	
<b>TUP1-PB.9: THREE DIMENSIONAL DISASTER MONITORING OF THE POHANG EARTHQUAKE IN THE REPUBLIC OF KOREA BY SENTINEL-1</b> .....	<b>2228</b>
<i>Hyewon Yun, Junghum Yu, Soo Bong Lee, Mi Hee Lee, Disaster Information Research Division, National Disaster Management Research Institute, Republic of Korea</i>	

<b>TUP1-PB.10: THE PARALLEL SBAS-DINSAR PROCESSING CHAIN FOR MASSIVE GENERATION OF SENTINEL-1 DEFORMATION TIME-SERIES</b>	2231
<i>Michele Manunta, Paolo Berardino, IREA-CNR, Italy; Manuela Bonano, IMAA-CNR, Italy; Francesco Casu, Claudio De Luca, Adele Fusco, Riccardo Lanari, Mariarosaria Manzo, Antonio Pepe, Ivana Zinno, IREA-CNR, Italy</i>	
 <b>TUP2-PB: DIFFERENTIAL SAR INTERFEROMETRY VI</b>	
<b>TUP2-PB.1: MONITORING LAND SUBSIDENCE IN AZAR OILFIELD, ILAM, IRAN THROUGH SMALL-BASELINE SAR INTERFEROMETRY ANALYSIS</b>	2235
<i>Zahra Mirzaii, Mahdi Hasanlou, Javad Hatami, College of Engineering, University of Tehran, Iran</i>	
<b>TUP2-PB.2: RHETICUS®: A CLOUD-BASED GEO-INFORMATION SERVICE FOR GROUND INSTABILITIES DETECTION AND MONITORING</b>	2238
<i>Sergio Samarelli, Luigi Agrimano, Planetek Italia srl, Italy; Italo Epicoco, Massimo Cafaro, University of Salento, Italy; Raffaele Nutricato, Davide Oscar Nitti, Geophysical Applications Processing s.r.l., Italy; Fabio Bovenga, CNR, Italy</i>	
<b>TUP2-PB.3: SURFACE DEFORMATION MAPPING OF ITALY THROUGH THE P-SBAS DINSAR PROCESSING OF SENTINEL-1 DATA IN A CLOUD COMPUTING ENVIRONMENT</b>	2241
<i>Ivana Zinno, IREA-CNR, Italy; Manuela Bonano, IMAA - CNR, Italy; Sabatino Buonanno, Francesco Casu, Claudio De Luca, Riccardo Lanari, Mariarosaria Manzo, Michele Manunta, Giovanni Zeni, IREA-CNR, Italy</i>	
<b>TUP2-PB.4: DEFORMATION MONITORING OF THE NORTHERN SECTOR OF THE VALENCIA BASIN (E SPAIN) USING PS-INSAR (1993-2010)</b>	2244
<i>Antonio M. Ruiz-Armenteros, J. Manuel Delgado, Universidad de Jaén, Spain; Bruno J. Ballesteros-Navarro, Instituto Geológico y Minero de España, Spain; Milan Lazecky, VSB-TU Ostrava, Czech Republic; Matus Bakon, insar.sk Ltd, Slovakia; Joaquim João Sousa, Universidade de Trás-os-Montes e Alto Douro, Portugal</i>	
<b>TUP2-PB.5: SPATIOTEMPORAL EVOLUTION OF SEISMIC SLIP OF THE 31 OCTOBER 2013 RUISUI, TAIWAN, EARTHQUAKE</b>	2248
<i>Sanaz Vajedian, Institute of Photogrammetry and GeoInformation (IPI) Leibniz University, Germany; Mahdi Motagh, German Research Center for Geosciences (GFZ), Germany; Sergey Samsonov, Canada Centre for Mapping and Earth Observation, Canada</i>	
<b>TUP2-PB.6: SPATIAL CORRELATION BASED PSINSAR TECHNIQUE TO ESTIMATE GROUND DEFORMATION IN LAS VEGAS REGION, US</b>	2251
<i>Kousik Biswas, Debashish Chakravarty, Pabitra Mitra, Indian Institute of Technology Kharagpur, India; Arundhati Misra, ISRO, India</i>	
<b>TUP2-PB.7: LONG TERM DEFLECTION MONITORING OF CABLE-STAYED BRIDGE USING TIME-SERIES INTERFEROMETRY</b>	2255
<i>Jungkyo Jung, Duk-jin Kim, Suresh Krishnan P.V, Seoul National University, Republic of Korea</i>	
<b>TUP2-PB.8: A JOINT MODEL FOR ISOLATING STRATIFIED TROPOSPHERIC DELAYS IN MULTI-TEMPORAL INSAR</b>	2258
<i>Hongyu Liang, Lei Zhang, Xiaoli Ding, The Hong Kong Polytechnic University, Hong Kong SAR of China; Zhong Lu, South Methodist University, United States; Xin Li, The Hong Kong Polytechnic University, Hong Kong SAR of China</i>	
<b>TUP2-PB.9: ESTIMATION AND COMPENSATION OF WEATHER IMPACTS ON PERSISTENT SCATTERER INTERFEROMETRY IN LOWLAND AIRFIELDS</b>	2262
<i>Aleksey Sharov, Joanneum Research, Austria; Dmitry Nikol'skiy, Sovzond, Russian Federation</i>	
 <b>TUP1-PC: ISAR &amp; TARGET DETECTION</b>	
<b>TUP1-PC.1: HIGH QUALITY ISAR IMAGING FOR TARGET OF ARBITRARY TRAJECTORY BASED ON BACK PROJECTION AND PARTICLE SWARM OPTIMIZATION</b>	2266
<i>Tian Wang, Junjie Wu, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	

<b>TUP1-PC.2: OFF-GRID SPARSE ISAR IMAGING BY BASIS SHIFT ALGORITHM.....</b>	<b>2270</b>
<i>Mengjun Yang, Zhulin Zong, Jie Gao, University of Electronic Science and Technology of China, China</i>	
<b>TUP1-PC.4: SIMULATION OF ISAR MOTION COMPENSATION FOR MOVING TARGETS ..... BASED ON PARTICLE SWARM OPTIMIZATION</b>	<b>2278</b>
<i>Cheng-Yen Chiang, Yang-Lang Chang, Bo Yao Chen, Sina Hadipour, Yi Wen Wang, National Taipei University of Technology, Taiwan; Kuo-Chin Fan, National Central University, Taiwan</i>	
<b>TUP1-PC.5: A CROSS-RANGE SCALING METHOD FOR ISAR NON-UNIFORMLY ROTATING ..... TARGETS BASED ON SHARPNESS MAXIMIZATION</b>	<b>2282</b>
<i>Jialian Sheng, Shanghai Radio Equipment Research Institute, China; Rui Guo, Northwestern Polytechnical University, China; Chaowei Fu, Haitao Wang, Shanghai Radio Equipment Research Institute, China; Gang Xu, Southeast University, China</i>	
<b>TUP1-PC.6: A NOVEL INITIALIZATION METHOD FOR EM-BASED ISAR SCATTERER ..... TRAJECTORY MATRIX COMPLETION</b>	<b>2286</b>
<i>Lei Liu, Feng Zhou, Xiaoran Shi, Xidian University, China</i>	
<b>TUP1-PC.7: RESEARCH INTO SAR IMAGING OF MOVING SHIP TARGET BASED ON ISAR ..... TECHNOLOGY</b>	<b>2290</b>
<i>Lei Yu, Chunsheng Li, Pengbo Wang, Yue Fang, Beihang University, China; Xin Feng, Institute of Remote Sensing Information, China</i>	
<b>TUP1-PC.8: CLUTTER SUPPRESSION FOR SAR IMAGE BASED ON WAVEFORM DESIGN ..... METHOD</b>	<b>2294</b>
<i>Bingqi Zhu, Manjun Lu, Ke Du, Xiangzhen Yu, Qianli Dong, Shanghai Radio Equipment Research Institute, China</i>	
<b>TUP1-PC.9: L1/2 REGULARIZATION SAR IMAGING VIA COMPLEX IMAGE DATA: ..... REGULARIZATION PARAMETER SELECTION FOR TARGET DETECTION TASK</b>	<b>2298</b>
<i>Jiacheng Ni, Qun Zhang, Linghua Su, Jia Liang, Air Force Engineering University, China; Wenjun Huo, Xijing University, China</i>	
<b>TUP2-PC: OBJECT DETECTION IN SAR DATA</b>	
<b>TUP2-PC.1: SALIENT SEED EXTRACTION BASED TARGET DETECTION IN SAR IMAGES.....</b>	<b>2302</b>
<i>Zongxu Pan, Bin Lei, Institute of Electronics, Chinese Academy of Sciences, China</i>	
<b>TUP2-PC.2: TARGET DETECTION BASED ON SALIENCY ANALYSIS AND CONTOUR ..... EXTRACTION FOR SYNTHETIC APERTURE RADAR IMAGES</b>	<b>2306</b>
<i>Congyang Liu, Yue Wang, Shiyi Wang, Libao Zhang, Beijing Normal University, China</i>	
<b>TUP2-PC.3: TARGET ASPECT IDENTIFICATION IN SAR IMAGE: A MACHINE LEARNING ..... APPROACH</b>	<b>2310</b>
<i>Jifang Pei, Yulin Huang, Weibo Huo, Yin Zhang, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
<b>TUP2-PC.4: MULTI-VIEW BISTATIC SYNTHETIC APERTURE RADAR TARGET ..... RECOGNITION BASED ON MULTI-INPUT DEEP CONVOLUTIONAL NEURAL NETWORK</b>	<b>2314</b>
<i>Jifang Pei, Weibo Huo, Qianghui Zhang, Yulin Huang, Yuxuan Miao, Yin Zhang, University of Electronic Science and Technology of China, China</i>	
<b>TUP2-PC.5: MOVING TARGET DETECTION AND TRACKING BASED ON GMPHD FILTER ..... IN SAR SYSTEM</b>	<b>2318</b>
<i>Yun Zhang, Huilin Mu, Yicheng Jiang, Qinglong Hua, Harbin Institute of Technology, China</i>	
<b>TUP2-PC.6: LOCALITY-CONSTRAINED AND CLASS-SPECIFIC SPARSE REPRESENTATION ..... FOR SAR TARGET RECOGNITION</b>	<b>2322</b>
<i>Meiting Yu, Lingjun Zhao, Siqian Zhang, Gangyao Kuang, College of Electronic Science and Engineering, China</i>	
<b>TUP2-PC.7: D-ATR VIA DEEP NEURAL NETWORK FOR LARGE SCENE SAR IMAGES ..... FOR SAR TARGET RECOGNITION</b>	<b>2326</b>
<i>Cui Tang, Zongyong Cui, Nengyuan Liu, Zongjie Cao, University of Electronic Science and Technology of China, China</i>	

<b>TUP2-PC.9: SMALL SAMPLE LEARNING OPTIMIZATION FOR RESNET BASED SAR TARGET RECOGNITION</b>	<b>2330</b>
<i>Zhenzhen Fu, Fan Zhang, Qiang Yin, Ruirui Li, Wei Hu, Wei Li, Beijing University of Chemical Technology, China</i>	
<b>TUP2-PC.10: AIRCRAFT DETECTION IN SAR IMAGES USING SALIENCY BASED LOCATION REGRESSION NETWORK</b>	<b>2334</b>
<i>Wenhui Diao, Fangzheng Dou, Kun Fu, Xian Sun, Chinese Academy of Sciences, China</i>	
 <b>TUP1-PD: SAR WATER APPLICATIONS &amp; SPECKLE</b>	
<b>TUP1-PD.1: SEA ICE MOTION TRACKING FROM NEAR REAL TIME SAR DATA ACQUIRED DURING ANTARCTIC CIRCUMNAVIGATION EXPEDITION</b>	<b>2338</b>
<i>Anja Frost, Stefan Wiehle, Suman Singha, Detmar Krause, DLR - German Aerospace Center, Germany</i>	
<b>TUP1-PD.5: EFFECT OF BUILDING ORIENTATION ON URBAN FLOOD MAPPING USING ALOS-2 AMPILITUDE IMAGES</b>	<b>2350</b>
<i>Young-Joo Kwak, ICHARM-UNESCO-PWRI, Japan; Ryo Natsuaki, University of Tokyo / DLR, Germany; Sang-Ho Yun, Jet Propulsion Laboratory, United States</i>	
<b>TUP1-PD.6: PERFORMANCE ANALYSIS OF SPECKLE FILTERING ON SINGLE-LOOK POLSAR DATA FOR LAND COVER CLASSIFICATION</b>	<b>2354</b>
<i>Rakesh Sharma, Rajib Kumar Panigrahi, Indian Institute of Technology Roorkee, India</i>	
<b>TUP1-PD.7: A SPECKLE REDUCTION MODEL FOR SAR IMAGES BASED ON BELTRAMI REGULARIZATION</b>	<b>2358</b>
<i>Yong Meng, Yudi Liu, Zeming Zhou, Qixiang Luo, College of Meteorology and Oceanology, National University of Defense Technology, China</i>	
<b>TUP1-PD.8: SAR IMAGE DESPECKLING BASED ON A NOVEL TOTAL VARIATION REGULARIZATION MODEL AND GF-3 DATA</b>	<b>2362</b>
<i>Qingjun Zhang, Tengfei Li, Yu Zhu, Zheng Lv, China Academy of Space Technology, China</i>	
<b>TUP1-PD.10: LEARNING SPECKLE SUPPRESSION IN SAR IMAGES WITHOUT GROUND TRUTH: APPLICATION TO SENTINEL-1 TIME-SERIES</b>	<b>2366</b>
<i>Alexandre Boulch, Pauline Trouvé, Elise Koeniguer, Fabrice Janez, Bertrand Le Saux, ONERA, France</i>	
 <b>TUP2-PD: CLASSIFICATION OF SAR/POLSAR DATA I</b>	
<b>TUP2-PD.2: HIGH RESOLUTION SAR IMAGE CLASSIFICATION WITH DEEPER CONVOLUTIONAL NEURAL NETWORK</b>	<b>2374</b>
<i>Yue Zhang, Xian Sun, Institute of Electronics, Chinese Academy of Sciences, China; Hao Sun, Zequn Zhang, Wenhui Diao, Key Laboratory of Spatial Information Processing and Application System Technology, Chinese Academy of Sciences, China; Kun Fu, Institute of Electronics, Chinese Academy of Sciences, China</i>	
<b>TUP2-PD.3: POLARIZATION FEATURE EXTRACTION USING QUATERNION NEURAL NETWORKS FOR FLEXIBLE UNSUPERVISED POLSAR LAND CLASSIFICATION</b>	<b>2378</b>
<i>Hyunsoo Kim, Akira Hirose, The University of Tokyo, Japan</i>	
<b>TUP2-PD.5: AVALANCHE DETECTION IN SAR IMAGES USING DEEP LEARNING</b>	<b>2386</b>
<i>Anders U. Waldeland, Jarle Hamar Reksten, Arnt-Børre Salberg, Norwegian Computing Center, Norway</i>	
<b>TUP2-PD.6: SUPERPIXEL-BASED UNSUPERVISED CLASSIFICATION OF POLSAR IMAGES WITH ADAPTIVE NUMBER OF TERRAIN CLASSES</b>	<b>2390</b>
<i>Huanxin Zou, Ningyuan Shao, Meilin Li, Cheng Chen, National University of Defense Technology, China; Xianxiang Qin, Air Force Engineering University, China</i>	

<b>TUP2-PD.7: SAR POLARIMETRY IN REMOTE SENSING OF ARCTIC REGION .....</b>	<b>2394</b>
<i>Alexander Zakharov, Liudmila Zakharova, Mark Sorochinsky, Kotelnikov institute of Radioengineering and Electronics, RAS, Russian Federation; Tumen Chimitdorzhiev, Institute of Physical Materials Science of SB RAS, Russian Federation</i>	
<b>TUP2-PD.8: USING SENTINEL-1 SAR MEASUREMENTS TO DETECT HIGH RESOLUTION FREEZE AND THAW STATES IN ALASKA .....</b>	<b>2398</b>
<i>Marzi Azarderakhsh, Fairleigh Dickinson University, United States; Kyle McDonald, The City College of New York, United States; Hamid Norouzi, Adrian Barros, Patty Arunyavikul, Reginald Blake, The City University of New York - City Tech, United States</i>	
<b>TUP2-PD.9: EVALUATION OF RETRIEVED CATEGORIES FROM A TERRASAR-X BENCHMARKING DATA SET .....</b>	<b>2400</b>
<i>Corneliu Octavian Dumitru, Gottfried Schwarz, Mihai Datcu, DLR - German Aerospace Center, Germany</i>	
<b>TUP1-PE: DUAL-POL SAR</b>	
<b>TUP1-PE.1: EXPLORING DUAL-POLARIMETRIC DESCRIPTORS FOR SENTINEL-1 BASED SHIP DETECTION .....</b>	<b>2404</b>
<i>Ramona Pelich, Carlos López-Martínez, Marco Chini, Renaud Hostache, Patrick Matgen, Luxembourg Institute of Science and Technology, Luxembourg; Philippe Ries, Gerd Eiden, LuxSpace Sàrl, Luxembourg</i>	
<b>TUP1-PE.2: A CONTROLLED ENVIRONMENT TO ANALYZE DUAL-POLARIMETRIC FEATURES FOR RADAR REMOTE SENSING PURPOSES .....</b>	<b>2408</b>
<i>Ferdinando Nunziata, Angelo Urciuoli, Angelo Gifuni, Maurizio Migliaccio, Università degli Studi di Napoli Parthenope, Italy</i>	
<b>TUP1-PE.3: IMAGING EXPOSED INTERTIDAL FLATS USING MULTI-POLARIZATION SYNTHETIC APERTURE RADAR .....</b>	<b>2412</b>
<i>Martin Gade, Wensheng Wang, Universität Hamburg, Germany</i>	
<b>TUP1-PE.4: ASSESSMENT OF SIMULATED COMPACT POLARIMETRY OF THE RCM MEDIUM RESOLUTION SAR MODES FOR OIL SPILL DETECTION .....</b>	<b>2416</b>
<i>Mohammed Dabboor, Environment and Climate Change Canada, Canada; Suman Singha, German Aerospace Center (DLR), Germany; Benoit Montpetit, Benjamin Deschamps, Dean Flett, Environment and Climate Change Canada, Canada</i>	
<b>TUP1-PE.5: ASSESSMENT OF SIMULATED COMPACT POLARIMETRY OF THE HIGH RESOLUTION RADARSAT CONSTELLATION MISSION SAR MODE FOR MULTIYEAR AND FIRST YEAR SEA ICE CHARACTERIZATION .....</b>	<b>2420</b>
<i>Mohammed Dabboor, Benoit Montpetit, Stephen Howell, Environment and Climate Change Canada, Canada</i>	
<b>TUP1-PE.6: CONVOLUTIONAL HIGHWAY UNIT NETWORK FOR LARGE-SCALE CLASSIFICATION WITH GF-3 DUAL-POL SAR DATA .....</b>	<b>2424</b>
<i>Yujuan Guo, Erxue Chen, Zengyuan Li, Lei Zhao, Kunpeng Xu, Research Institute of Forest Resources Information Techniques, China</i>	
<b>TUP1-PE.7: CLASSIFYING MULTI-CHANNEL POLSAR IMAGES BASE ON POLARIZATION SIGNATURE .....</b>	<b>2428</b>
<i>Ramin Saadi, Mahdi Hasanlou, Abdolreza Safari, College of Engineering, University of Tehran, Iran</i>	
<b>TUP1-PE.8: SIGNAL PENETRATION OF LOW SAR FREQUENCY OVER THREE COMPACT POLARIMETRIC MODES .....</b>	<b>2432</b>
<i>Abdullah Algafsh, KACST, Saudi Arabia</i>	
<b>TUP1-PE.9: ON THE OPTIMAL COMPACT POLARIMETRIC SAR MODES AND FEATURES FOR MARINE OIL SPILL CLASSIFICATION .....</b>	<b>2435</b>
<i>Yu Li, Beijing University of Technology, China; Yuanzhi Zhang, Chinese Academy of Sciences, China; Maurizio Migliaccio, Ferdinando Nunziata, Andrea Buono, Università di Napoli Parthenope, Italy</i>	

<b>TUP1-PE.10: CHARACTERIZATION OF LAND SURFACE USING BACKSCATTERING FEATURES: AN APPLICATION OF HYBRID POLARIMETRIC RISAT-1 SAR DATA</b>	<b>2439</b>
<i>Nidhi Verma, Shantal Raj, Pooja Mishra, Neetesh Purohit, Indian Institute of Information Technology, Allahabad, India</i>	
 <b>TUP2-PE: ANALYSIS OF OPTICAL/HYPERSPECTRAL DATA</b>	
<b>TUP2-PE.3: FPGA BASED IMPLEMENTATION OF CONVOLUTIONAL NEURAL NETWORK FOR HYPERSPECTRAL CLASSIFICATION</b>	<b>2451</b>
<i>Xiaofeng Chen, Jingyu Ji, Shaohui Mei, Yifan Zhang, Northwestern Polytechnical University, China; Manli Han, Aeronautical Computing Technique Research Institute, China; Qian Du, Mississippi State University, United States</i>	
<b>TUP2-PE.4: AN EFFICIENT REGION PROPOSAL METHOD FOR OPTICAL REMOTE SENSING IMAGERY</b>	<b>2455</b>
<i>Shahid Karim, Ye Zhang, Shoulin Yin, Harbin Institute of Technology, China; Muhammad Rizwan Asif, Xi'an Jiaotong University, China</i>	
<b>TUP2-PE.5: SUB-PIXEL MAPPING WITH HYPERSPECTRAL IMAGES USING SUPER-RESOLUTION</b>	<b>2459</b>
<i>Shikha Gaur, University of Wisconsin-Madison, United States; Krishna Mohan Buddhiraju, Alok Porwal, Indian Institute of Technology Bombay, United States</i>	
<b>TUP2-PE.6: WIND TURBINE VISUAL CLASSIFICATION FROM OVERHEAD IMAGES</b>	<b>2463</b>
<i>Lily Lee, Virginia Goodwin, Jason Biddle, Massachusetts Institute of Technology, United States</i>	
<b>TUP2-PE.7: INVESTIGATION OF NATURAL ECOLOGICAL ENVIRONMENT USING REMOTE SENSING BASED INTEGRATED INDEX AT A CITY SCALE</b>	<b>2467</b>
<i>Jinling Zhao, Jie Wang, Qi Hong, Anhui University, China; Qixiang Song, Suzhou University, China; Linsheng Huang, Dongyan Zhang, Anhui University, China</i>	
<b>TUP2-PE.9: SEMI-SUPERVISED REMOTE SENSING CLASSIFICATION VIA ASSOCIATIVE TRANSFER</b>	<b>2475</b>
<i>Youyou Li, Teng Long, Binbin He, Xiaodong Zhang, University of Electronic Science and Technology of China, China; Xiaofang Liu, Sichuan University of Science and Engineering, China</i>	
<b>TUP2-PE.10: ENHANCING THE CLASSIFICATION OF REMOTE SENSING DATA USING MULTIBAND COMPACT TEXTURE UNIT DESCRIPTOR AND DEEP CONVOLUTIONAL NEURAL NETWORK</b>	<b>2479</b>
<i>Khelifa Djerriri, Centre des Techniques Spatiales, Algeria; Abdelmounaime Safia, Centre for Research and Applications in Remote Sensing (CARTEL), Canada; Moussa Sofiane Karoui, Centre des Techniques Spatiales, Algeria; Reda Adjoudj, Djillali Liabes University, Algeria</i>	
 <b>TUP1-PF: OBJECT DETECTION IN OPTICAL IMAGES II</b>	
<b>TUP1-PF.1: DECONV R-CNN FOR SMALL OBJECT DETECTION ON REMOTE SENSING IMAGES</b>	<b>2483</b>
<i>Wei Zhang, Shihao Wang, Sophanyouly Thachan, Jingzhou Chen, Yuntao Qian, Zhejiang University, China</i>	
<b>TUP1-PF.2: EFFICIENT DETECTION OF INTENSIVELY PARKED VEHICLES FORM SATELLITE IMAGE WITH 0.5-METER SPATIAL RESOLUTION</b>	<b>2487</b>
<i>Hao Chen, Wen Chen, Tong Gao, Zhichao Lai, Harbin Institute of Technology, China</i>	
<b>TUP1-PF.4: SINGLE-SAMPLE AEROPLANE DETECTION IN HIGH-RESOLUTION OPTIMAL REMOTE SENSING IMAGERY</b>	<b>2495</b>
<i>Bin Pan, Beihang University, China; Liming Wang, Institute of Information Engineering Chinese Academy of Sciences, China; Xinran Yu, The 28th Research Institute of China Electronics Technology Group, China; Zhenwei Shi, Beihang University, China</i>	



<b>TUP1-PF.6: SEMI-SUPERVISED OBJECT DETECTION IN REMOTE SENSING IMAGES USING GENERATIVE ADVERSARIAL NETWORKS</b> .....	<b>2503</b>
<i>Guowei Chen, University of Chinese Academy of Sciences, Institute of Electronics, Chinese Academy of Sciences, Key Laboratory of Technology in Geo-spatial Information Processing and Application System, Chinese Academy of Sciences, China; Lei Liu, Wenlong Hu, Zongxu Pan, Institute of Electronics, Chinese Academy of Sciences Key Laboratory of Technology in Geo-spatial Information Processing and Application System, Chinese Academy of Sciences, China</i>	
<b>TUP1-PF.7: OBJECT DETECTION WITH HEAD DIRECTION IN REMOTE SENSING IMAGES BASED ON ROTATIONAL REGION CNN</b> .....	<b>2507</b>
<i>Xue Yang, Kun Fu, Hao Sun, Xian Sun, Menglong Yan, Wenhui Diao, Zhi Guo, Institute of Electronics, Chinese Academy of Sciences, China</i>	
<b>TUP1-PF.8: AIRPORT DETECTION BASED ON SUPERPIXEL SEGMENTATION AND SALIENCY ANALYSIS FOR REMOTE SENSING IMAGES</b> .....	<b>2511</b>
<i>Shiyi Wang, Libao Zhang, Beijing Normal University, China</i>	
<b>TUP1-PF.9: JOINT FEATURE NETWORK FOR BRIDGE SEGMENTATION IN REMOTE SENSING IMAGES</b> .....	<b>2515</b>
<i>Jian Cai, Lei Ma, Feimo Li, Yiping Yang, Institute of Automation, Chinese Academy of Science, China</i>	
<b>TUP1-PF.10: AUTOMATIC RECOGNITION OF OIL INDUSTRY FACILITIES BASED ON DEEP LEARNING</b> .....	<b>2519</b>
<i>Nannan Zhang, Yang Liu, Liqun Zou, Hang Zhao, Wentong Dong, Hongying Zhou, Hongyan Guo, Research Institute of Petroleum Exploration &amp; Development, PetroChina, China; Miaofen Huang, Guangdong Ocean University, China</i>	
<b>TUP2-PF: ESTIMATION AND REGRESSION IN THERMAL IR DATA</b>	
<b>TUP2-PF.1: DEVELOPMENT AND VALIDATION OF A DAILY MAXIMUM TEMPERATURE ESTIMATION ALGORITHM USING LANDSAT-8</b> .....	<b>2523</b>
<i>Soo Bong Lee, Dalgeun Lee, Jongpil Kim, Jinyoung Kim, NDMI, Republic of Korea</i>	
<b>TUP2-PF.2: DOWNSCALING LAND SURFACE TEMPERATURE BY USING RANDOM FOREST REGRESSION ALGORITHM</b> .....	<b>2527</b>
<i>Wan Li, State Key Laboratory of Resources and Environment Information System, China; Li Ni, Key Laboratory of Digital Earth Science, China; Zhao-Liang Li, Key Laboratory of Agricultural Remote Sensing, China; Hua Wu, State Key Laboratory of Resources and Environment Information System, China</i>	
<b>TUP2-PF.3: PRELIMINARY EVALUATION OF THE TWO COLLECTION 6 MODIS LAND SURFACE TEMPERATURE PRODUCTS IN AN ARID AREA OF NORTHWEST CHINA</b> .....	<b>2531</b>
<i>Hua Li, Yikun Yang, Yongming Du, Biao Cao, Qinhuo Liu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>TUP2-PF.4: LAND SURFACE TEMPERATURE RETRIEVAL FROM THE INFRARED MEASUREMENTS OF ADVANCED HIMAWARI IMAGER ON HIMAWARI-8</b> .....	<b>2535</b>
<i>Geng-Ming Jiang, Wen-Xia Li, Fudan University, China</i>	
<b>TUP2-PF.5: A MACHINE LEARNING METHOD TO CORRECT THE TERRAIN EFFECT ON LAND SURFACE TEMPERATURE IN MOUNTAINOUS AREAS</b> .....	<b>2539</b>
<i>Wei Zhao, Fengping Wen, Ainong Li, Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, China</i>	
<b>TUP2-PF.6: A TEMPERATURE AND EMISSIVITY SEPARATION ALGORITHM FOR CHINESE GAOFEN-5 SATELLITE DATA</b> .....	<b>2543</b>
<i>Yikun Yang, Hua Li, Yongming Du, Biao Cao, Qinhuo Liu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Lin Sun, Jinshan Zhu, Geomatics college, Shandong University of Science and Technology, China; Fan Mo, Beijing Institute of Spacecraft System Engineering, China Academy of Space Technology, China</i>	

<b>TUP2-PF.8: A REFINED GENERALIZED SPLIT-WINDOW ALGORITHM FOR RETRIEVING LONG-TERM GLOBAL LAND SURFACE TEMPERATURE FROM SERIES NOAA-AVHRR DATA</b>	<b>2551</b>
<i>Xiangyang Liu, Bo-Hui Tang, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China; Zhao-Liang Li, Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, China</i>	
<b>TUP2-PF.9: DEVELOPMENT OF DAILY MAXIMUM AIR TEMPERATURE ESTIMATION ALGORITHM FOR THE KOREAN PENINSULA USING MODIS DATA</b>	<b>2555</b>
<i>Mi Hee Lee, Jung Hum Yu, Hyewon Yun, Eunji Cheon, National Disaster Management Research Institute, Republic of Korea</i>	
<b>TUP2-PF.10: ESTIMATION OF LAND SURFACE TEMPERATURE FROM CHINESE GAOFEN-5 SATELLITE DATA</b>	<b>2559</b>
<i>Bo-Hui Tang, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China; Zhao-Liang Li, Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, China</i>	
 <b>TUP1-PG: SPECTRAL-SPATIAL APPROACHES IN HYPERSPECTRAL REMOTE SENSING</b>	
<b>TUP1-PG.1: HYPERSPECTRAL CLASSIFICATION VIA SPATIAL CONTEXT EXPLORATION WITH MULTI-SCALE CNN</b>	<b>2563</b>
<i>Zhongqi Tian, Jingyu Ji, Shaohui Mei, Northwestern Polytechnical University, China; Junhui Hou, City University of Hong Kong, China; Shuai Wan, Northwestern Polytechnical University, China; Qian Du, Mississippi State University, United States</i>	
<b>TUP1-PG.2: HYPERSPECTRAL CLASSIFICATION BASED ON SIAMESE NEURAL NETWORK USING SPECTRAL-SPATIAL FEATURE</b>	<b>2567</b>
<i>Shizhi Zhao, Wei Li, Beijing University of Chemical Technology, China; Qian Du, Mississippi State University, United States; Qiong Ran, Beijing University of Chemical Technology, China</i>	
<b>TUP1-PG.4: SUPERPIXEL BASED DIMENSION REDUCTION FOR HYPERSPECTRAL IMAGERY</b>	<b>2575</b>
<i>Huilin Xu, Hongyan Zhang, Wuhan University, China; Wei He, RIKEN AIP, Japan; Liangpei Zhang, Wuhan University, China</i>	
<b>TUP1-PG.5: A NOVEL GRAPH BASED LABEL PROPAGATION METHOD FOR HYPERSPECTRAL REMOTE SENSING DATA CLASSIFICATION</b>	<b>2579</b>
<i>Xiaopan Wang, Yan Hu, Shaojia Zhang, Chongqing Geomatics Center, China</i>	
<b>TUP1-PG.7: ACTIVE MANIFOLD LEARNING FOR HYPERSPECTRAL IMAGE CLASSIFICATION</b>	<b>2587</b>
<i>Zhou Zhang, University of California, United States; Gulsen Taskin, Istanbul Technical University, Turkey; Melba Crawford, Purdue University, United States</i>	
<b>TUP1-PG.8: MULTISCALE SPECTRAL-SPATIAL HYPERSPECTRAL IMAGE CLASSIFICATION WITH ADAPTIVE FILTERING</b>	<b>2591</b>
<i>Sifan Wu, Junping Zhang, Harbin Institute of Technology, China; Chunyu Shi, Remote Sensing Information Institute of Beijing, China; Weike Li, Harbin Institute of Technology, China</i>	
<b>TUP1-PG.9: DUAL-CHANNEL DENSENET FOR HYPERSPECTRAL IMAGE CLASSIFICATION</b>	<b>2595</b>
<i>Gefei Yang, Utsav Gewali, Emmett Ientilucci, Micheal Gartley, Sildomar Monteiro, Rochester Institute of Technology, United States</i>	
 <b>TUP2-PG: ESTIMATION AND REGRESSION IN MULTISPECTRAL DATA</b>	
<b>TUP2-PG.2: INTER-SENSOR REGRESSION ANALYSIS FOR OPERATIONAL SENTINEL-2 AND SENTINEL-3 DATA PRODUCTS</b>	<b>2603</b>
<i>Juan M. Haut, Hyperspectral Computing Laboratory, Spain; Rubén Fernandez-Beltran, Institute of New Imaging Technologies, Spain; Mercedes E. Paoletti, Javier Plaza, Antonio Plaza, Hyperspectral Computing Laboratory, Spain; Filiberto Pla, Institute of New Imaging Technologies, Spain</i>	

<b>TUP2-PG.3: DOWNSCALING OF LAND SURFACE ALBEDO METHOD BASED ON STRATIFIED LINEAR REGRESSION</b> .....	<b>2607</b>
<i>Zihao Wang, Juan Sui, Yuanheng Sun, Huazhong Ren, Guhuai Han, Qiming Qin, Peking University, China</i>	
<b>TUP2-PG.4: DEEP IMAGE-TO-IMAGE TRANSFER APPLIED TO RESOLUTION ENHANCEMENT OF SENTINEL-2 IMAGES</b> .....	<b>2611</b>
<i>Mario Beaulieu, Samuel Foucher, Computer Research Institute of Montreal, Canada; Dan Haberman, Colin Stewart, Local Logic, Canada</i>	
<b>TUP2-PG.5: URBAN KNOWLEDGE ANALYSIS FOR DYNAMIC FORECASTING USING MULTISPECTRAL DATA</b> .....	<b>2615</b>
<i>Ivan Villalon-Turrubiates, Instituto Tecnológico y de Estudios Superiores de Occidente, ITESO, Mexico</i>	
<b>TUP2-PG.6: ESTIMATION OF LEAF AREA INDEX WITH VARIOUS VEGETATION INDICES FROM GAOFEN-5 BAND REFLECTANCES</b> .....	<b>2619</b>
<i>Ziyang Zhang, Bo-Hui Tang, State Key Laboratory of Resources and Environment Information System, China</i>	
<b>TUP2-PG.7: NET SURFACE SHORTWAVE RADIATION RETRIEVAL USING VIIRS DATA</b> .....	<b>2623</b>
<i>Wangmin Ying, Hua Wu, Zhao-Liang Li, State Key Laboratory of Resources and Environment Information System, China</i>	
<b>TUP2-PG.8: PALM TREES COUNTING IN REMOTE SENSING IMAGERY USING REGRESSION CONVOLUTIONAL NEURAL NETWORK</b> .....	<b>2627</b>
<i>Khelifa Djerriri, Mohamed Ghabi, Moussa Sofiane Karoui, Centre des Techniques Spatiales, Algeria; Reda Adjoudj, Djillali Liabes University, Algeria</i>	
<b>TUP2-PG.9: ESTIMATING IMPERVIOUS SURFACES OF GWADAR CITY BASED ON THE CHINESE MULTI-SOURCES REMOTE SENSING IMAGES</b> .....	<b>2631</b>
<i>Jiaqi Zuo, Southwest Petroleum University, China; Jinhu Bian, Ainong Li, Guangbin Lei, Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, China; Zegen Wang, Southwest Petroleum University, China</i>	
<b>TUP2-PG.10: EVALUATION OF TWO METHODS FOR DAILY EVAPOTRANSPIRATION ESTIMATION FROM FIELD AND MODIS DATA</b> .....	<b>2635</b>
<i>Yazhen Jiang, University of Chinese Academy of Sciences, China; Ronglin Tang, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China; Xiaoguang Jiang, University of Chinese Academy of Sciences, China; Zhao-Liang Li, Ministry of Agriculture/Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, China</i>	
 <b>TUP1-PH: CLASSIFICATION OF HYPERSPECTRAL DATA</b>	
<b>TUP1-PH.1: INNOVATIVE MULTI PCNN BASED NETWORK FOR GREEN AREA MONITORING - IDENTIFICATION AND DESCRIPTION OF NEARLY INDISTINGUISHABLE AREAS - IN HYPERSPECTRAL SATELLITE IMAGES</b> .....	<b>2639</b>
<i>Serban Vasile Carata, Institute of Space Science, Romania; Mihai Gabriel Constantin, University Politehnica of Bucharest, Romania; Veta Ghenescu, Institute of Space Science, Romania; Mihai Chindea, UTI Grup, Romania; Marian Traian Ghenescu, Institute of Space Science, Romania</i>	
<b>TUP1-PH.2: CLASSIFICATION OF HYPERSPECTRAL IMAGE BASED ON HYBRID NEURAL NETWORKS</b> .....	<b>2643</b>
<i>Anyan Fu, Xiaorui Ma, Hongyu Wang, Dalian University of Technology, China</i>	
<b>TUP1-PH.3: AI-NET: ATTENTION INCEPTION NEURAL NETWORKS FOR HYPERSPECTRAL IMAGE CLASSIFICATION</b> .....	<b>2647</b>
<i>Zhitong Xiong, Yuan Yuan, Qi Wang, Northwestern Polytechnical University, China</i>	
<b>TUP1-PH.4: SYNTHETIC MINORITY OVER-SAMPLING TECHNIQUE BASED ROTATION FOREST FOR THE CLASSIFICATION OF UNBALANCED HYPERSPECTRAL DATA</b> .....	<b>2651</b>
<i>Wei Feng, Wenjiang Huang, Huichun Ye, Longlong Zhao, Chinese Academy of Sciences, China</i>	

<b>TUP1-PH.6: CLASSIFICATION OF HYPERSPECTRAL REMOTE SENSING IMAGES BY AN ENSEMBLE OF SUPPORT VECTOR MACHINES UNDER IMBALANCED DATA</b>	<b>2659</b>
<i>Laxmi Narayana Eeti, Krishna Mohan Buddhiraju, Indian Institute of Technology Bombay, India</i>	
<b>TUP1-PH.7: IMPROVED ITERATIVE ERROR ANALYSIS USING SPECTRAL SIMILARITY MEASURES FOR VEGETATION CLASSIFICATION IN HYPERSPECTRAL IMAGES</b>	<b>2662</b>
<i>Ahram Song, Yongil Kim, Seoul National University, Republic of Korea</i>	
<b>TUP1-PH.9: SMALL SIZE CLASS PRESERVING CLASSIFICATION BASED ON SEGMENTATION FOR HYPERSPECTRAL DATA</b>	<b>2669</b>
<i>Tatsuya Yamada, Junshi Xia, Akira Iwasaki, The University of Tokyo, Japan</i>	
<b>TUP1-PH.10: CLASSIFICATION OF URBAN MATERIALS USING ARTIFICIAL COLOR FEATURES FOR HYPERSPECTRAL DATA</b>	<b>2673</b>
<i>Shailesh Deshpande, TCS Innovation and Research, Tata Research Development and Design Centre, India; Arun Inamdar, Centre of Studies in Resource Engineering, Indian Institute of Technology-Bombay, India; Balamuralidhar P, TCS Innovation and Research, India</i>	
<b>TUP2-PH: SPECTRAL UNMIXING TECHNIQUES I</b>	
<b>TUP2-PH.1: IMPROVING IMPERVIOUS SURFACE ESTIMATION BY INTEGRATING MULTISPECTRAL AND NIGHTTIME LIGHT IMAGES</b>	<b>2677</b>
<i>Xiaolin Chen, Xiuping Jia, Mark Pickering, University of New South Wales, Canberra, Australia; Genyun Sun, China University of Petroleum (East China), China</i>	
<b>TUP2-PH.2: SIMULTANEOUS DICTIONARY SPARSE PRUNING AND COLLABORATIVE SPARSE REGRESSION FOR HYPERSPECTRAL IMAGE UNMIXING</b>	<b>2681</b>
<i>Shengfu Li, Liang Xiao, Zhihui Wei, Ling Qian, Nanjing University of Science and Technology, China</i>	
<b>TUP2-PH.3: EXTENDED LINEAR MIXING MODEL IN AN ECOSYSTEM WITH HIGH SPECTRAL VARIABILITY</b>	<b>2685</b>
<i>Eduarne Ibarrola-Ulzurrun, Universidad de Las Palmas de Gran Canaria, ULPGC, Spain; Lucas Drumetz, IMT Atlantique, France; Jocelyn Chanussot, University of Grenoble Alpes, CNRS, France; Consuelo Gonzalo-Martín, Universidad Politécnica de Madrid, Spain; Javier Marcello, Universidad de Las Palmas de Gran Canaria, ULPGC, Spain</i>	
<b>TUP2-PH.4: AN ALGORITHM FOR FAST SPECTRAL ENDMEMBER DETERMINATION IN HYPERSPECTRAL DATA</b>	<b>2689</b>
<i>Hsiao-Chi Li, Fu-Jen Catholic University, Taiwan</i>	
<b>TUP2-PH.5: NONLINEAR HYPERSPECTRAL UNMIXING VIA MODELLING BAND DEPENDENT NONLINEARITY</b>	<b>2693</b>
<i>Bin Yang, Bin Wang, Bo Hu, Jian Qiu Zhang, Fudan University, China</i>	
<b>TUP2-PH.6: A GENERALIZATION OF P-LINEAR MIXING MODEL BY COMBINATION OF TWO KINDS OF APPROXIMATOR IN HYPERSPECTRAL UNMIXING</b>	<b>2697</b>
<i>Huimin Lu, Ying Li, Dalian Maritime University, China; Feng Chen, Xiamen University, China; Hui Zhou, Dalian Neusoft University of Information, China; Can Cui, Xueyuan Zhu, Dalian Maritime University, China</i>	
<b>TUP2-PH.7: MAPPING URBAN LAND COVER USING MULTIPLE CRITERIA SPECTRAL MIXTURE ANALYSIS: A CASE STUDY IN CHENGDU, CHINA</b>	<b>2701</b>
<i>Sen Cao, University of Alberta, Canada; Wenbo Xu, University of Electronic Science and Technology of China, China; Arturo Sanchez-Azofeifa, University of Alberta, Canada; Musa Tarawally, University of Electronic Science and Technology of China, China</i>	
<b>TUP2-PH.8: RELATIVE ATTRIBUTE BASED UNMIXING</b>	<b>2705</b>
<i>Genping Zhao, Lianglun Cheng, Heng Wu, Hui Li, Guangdong University of Technology, China; Xiaolin Li, Yantai University, China</i>	

<b>TUP2-PH.9: REPRESENTATIVE SIGNATURE GENERATION FOR PLANT DETECTION IN HYPERSPETRAL IMAGES</b>	<b>2709</b>
<i>Omer Ozdil, Yunus Emre Esin, Berkan Demirel, Safak Ozturk, HAVELSAN Inc., Turkey</i>	
<b>TUP2-PH.10: A NOVEL SUPERVISED LINEAR SPECTRAL UNMIXING MODEL CONSTRAINED PSO APPROACH FOR ABUNDANCE ESTIMATION</b>	<b>2713</b>
<i>Vaibhav Lodhi, Debashish Chakravarty, Pabitra Mitra, Indian Institute of Technology Kharagpur, India</i>	
 <b>TUP1-PI: ESTIMATION AND REGRESSION IN HYPERSPETRAL DATA I</b>	
<b>TUP1-PI.1: HYPERSPETRAL IMAGERY DENOISING USING MULTI-LINEAR WEIGHTED NUCLEAR NORM MINIMIZATION</b>	<b>2717</b>
<i>Xiangyang Kong, Yongqiang Zhao, Northwestern Polytechnical University, China; Jonathan Cheung-Wai Chan, Vrije Universiteit Brussel, China</i>	
<b>TUP1-PI.3: A NEW UNMIXING-BASED APPROACH FOR SHADOW CORRECTION OF HYPERSPETRAL REMOTE SENSING DATA</b>	<b>2725</b>
<i>Moussa Sofiane Karoui, Khelifa Djerriri, Centre des Techniques Spatiales, Algeria</i>	
<b>TUP1-PI.4: A NOVEL NONCONVEX SPARSITY MEASURE FOR HYPERSPETRAL IMAGES RESTORATION</b>	<b>2729</b>
<i>Ting Xie, Shutao Li, Leyuan Fang, Licheng Liu, Hunan University, China</i>	
<b>TUP1-PI.5: NON-CONVEX LOW-RANK APPROXIMATION FOR HYPERSPETRAL IMAGE RECOVERY WITH WEIGHTED TOTAL VARIATION REGULARIZATION</b>	<b>2733</b>
<i>Hanyang Li, Peipei Sun, Hongyi Liu, Zebin Wu, Zhihui Wei, Nanjing University of Science and Technology, China</i>	
<b>TUP1-PI.6: SEMI-TENSOR COMPRESSED SENSING FOR HYPERSPETRAL IMAGE</b>	<b>2737</b>
<i>Wei Fu, Shutao Li, Hunan University, China</i>	
<b>TUP1-PI.7: COMPARISON OF FOUR DIFFERENT SUN-INDUCED CHLOROPHYLL FLUORESCENCE RETRIEVAL ALGORITHMS USING SIMULATED AND FIELD-MEASURED DATA</b>	<b>2741</b>
<i>Menghao Ji, Bo-Hui Tang, State Key Laboratory of Resources and Environment Information System, China</i>	
<b>TUP1-PI.8: RETRIEVAL OF ATMOSPHERIC AND LAND SURFACE PARAMETERS FROM SATELLITE-BASED THERMAL INFRARED HYPERSPETRAL DATA USING AN ARTIFICIAL NEURAL NETWORK TECHNIQUE</b>	<b>2745</b>
<i>Mengshuo Chen, University of Chinese Academy of Sciences, China; Li Ni, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Xiaoguang Jiang, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China; Zhao-Liang Li, Ministry of Agriculture/Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, China; Hua Wu, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China</i>	
<b>TUP1-PI.9: DETECTING RICE BLAST DISEASE USING MODEL INVERTED BIOCHEMICAL VARIABLES FROM CLOSE-RANGE REFLECTANCE IMAGERY OF FRESH LEAVES</b>	<b>2749</b>
<i>Long Tian, Zefu Wan, Dong Li, Jiale Jiang, Xia Yao, Qiang Cao, Yongchao Tian, Yan Zhu, Weixing Cao, Tao Cheng, Nanjing Agricultural University, China</i>	
 <b>TUP2-PI: TARGET DETECTION I</b>	
<b>TUP2-PI.1: HYPERSPETRAL TARGET DETECTION: A PREPROCESSING METHOD BASED ON TENSOR PRINCIPAL COMPONENT ANALYSIS</b>	<b>2753</b>
<i>Zehao Chen, Bin Yang, Bin Wang, Fudan University, China</i>	

<b>TUP2-PI.2: MULTI-PRIORI LEARNING ALGORITHM FOR HYPERSPECTRAL TARGET DETECTION</b>	<b>2757</b>
<i>Yuxiang Zhang, China University of Geosciences Wuhan, China; Mingming Xu, China University of Petroleum (East China), China; Bo Du, Wuhan University, China; Ke Wu, Xiangyun Hu, Yanni Dong, China University of Geosciences Wuhan, China</i>	
<b>TUP2-PI.3: CNN-BASED TARGET DETECTION IN HYPERSPECTRAL IMAGERY</b>	<b>2761</b>
<i>Jinming Du, Zhiyong Li, Hao Sun, National University of Defense Technology, China</i>	
<b>TUP2-PI.4: SPATIALLY REGULARIZED SPARSECEM FOR TARGET DETECTION IN HYPERSPECTRAL IMAGES</b>	<b>2765</b>
<i>Xiaoli Yang, Zeng Li, Jie Chen, Northwestern Polytechnical University, China</i>	
<b>TUP2-PI.5: WEAK TARGET TRACKING BASED ON IMPROVED PARTICLE FILTER ALGORITHM</b>	<b>2769</b>
<i>Kaiqi Hu, Pengbo Wang, Xinkai Zhou, Hong-Cheng Zeng, Yue Fang, Beihang University, China</i>	
<b>TUP2-PI.7: CLOSED-FORM DETECTOR FOR SOLID SUB-PIXEL TARGETS IN MULTIVARIATE T-DISTRIBUTED BACKGROUND CLUTTER</b>	<b>2773</b>
<i>James Theiler, Los Alamos National Laboratory, United States; Beate Zimmer, Texas A&amp;M University-Corpus Christi, United States; Amanda Ziemann, Los Alamos National Laboratory, United States</i>	
<b>TUP2-PI.8: DETECTION OF FUSARIUM WILT ON PHALAENOPSIS STEM BASE REGION USING BAND SELECTION TECHNIQUES</b>	<b>2777</b>
<i>Meng-Chueh Lee, National Chung Hsing University, Taiwan; Kenneth-Yeonkong Ma, University of Maryland, Baltimore County, United States; Yen-Chieh Ouyang, National Chung Hsing University, Taiwan; Mang Ou-Yang, National Chiao Tung University, Taiwan; Horng-Yuh Guo, Tsang-Sen Liu, Council of Agriculture, Taiwan; Hsian-Min Chen, Taichung Veterans General Hospital, Taiwan; Chao-Cheng Wu, National Taipei University of Technology, Taiwan; Chein-I Chang, University of Maryland, Baltimore County, United States</i>	
<b>TUP2-PI.9: GPU PARALLEL IMPLEMENTATION OF GAS PLUME DETECTION IN HYPERSPECTRAL VIDEO SEQUENCES</b>	<b>2781</b>
<i>Huimin Yu, Zebin Wu, Jie Wei, Yang Xu, Nanjing University of Science and Technology, China; Jocelyn Chanussot, University of Grenoble Alpes, CNRS, Grenoble INP, GIPSA-lab, France; Andrea L. Bertozzi, University of California, Los Angeles, United States; Linlin Shi, Zhihui Wei, Nanjing University of Science and Technology, China</i>	
<b>TUP2-PI.10: ESTIMATING HYPERSPECTRAL BACKGROUNDS: THE NEED TO MAINTAIN SPECTRAL COHERENCE</b>	<b>2785</b>
<i>Omer Faybish, Stanley Rotman, Ben-Gurion University of the Negev, Israel</i>	
<b>TUP1-PJ: ESTIMATION AND REGRESSION IN MICROWAVE, RADAR &amp; LIDAR DATA</b>	
<b>TUP1-PJ.1: ESTIMATION OF SNOW WATER EQUIVALENT USING SENTINEL SAR DATA IN THE INDIAN HIMALAYA</b>	<b>2789</b>
<i>Akshay Patil, IITB-Monash Research Academy, India; Gulab Singh, Indian Institute of Technology Bombay, India; Christoph Rüdiger, Monash University, Australia</i>	
<b>TUP1-PJ.2: AN ADAPTIVE REGION-BASED METHOD FOR SPECKLE REDUCTION IN SAR IMAGES WITH LOCAL GEOMETRIC CORRELATION</b>	<b>2793</b>
<i>Jie Wu, Miao Ma, Ming Liu, Shannxi Normal University, China</i>	
<b>TUP1-PJ.3: A FAST ALONG-TRACK VELOCITY ESTIMATION METHOD FOR MOVING TARGETS IN MONOSTATIC SAR IMAGE</b>	<b>2797</b>
<i>Na Pu, Beihang University, Beijing Institute of Remote Sensing Information, China; Chunsheng Li, Shuo Li, Beihang University, China</i>	
<b>TUP1-PJ.4: AN IMPROVED NON-LOCAL MEANS FILTER FOR SAR IMAGE DESPECKLE BASED ON HETEROGENEITY MEASUREMENT</b>	<b>2801</b>
<i>Danping Tong, Haiguang Yang, Junjie Wu, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	

<b>TUP1-PJ.5: SAR SPECKLE FILTERING BY IMPROVED INLP FILTER .....</b>	<b>2805</b>
<i>Tej-Albaha Hamrouni, Université of Carthage: COSIM Lab, Higher School of Communications of Tunis, Tunisia; Mohamed Yahia, SYSCOM Laboratory ENIT/Université Tunis El Manar, Tunisia; Riadh Abdelfattah, Université of Carthage: COSIM Lab, Higher School of Communications of Tunis, Tunisia</i>	
<b>TUP1-PJ.6: AN APPROACH TO TREE SPECIES CLASSIFICATION USING VOXEL .....</b>	<b>2809</b>
<b>NEIGHBORHOOD DENSITY-BASED SUBSAMPLING OF MULTISCAN TERRESTRIAL LIDAR DATA</b>	
<i>Aravind Harikumar, Fondazione Bruno Kessler, Italy; Liang Xinlian, Finnish Geospatial Research Institute, Italy; Francesca Bovolo, Fondazione Bruno Kessler, Italy</i>	
<b>TUP1-PJ.7: ESTIMATION OF FOREST TREES DIAMETER FROM TERRESTRIAL LASER .....</b>	<b>2813</b>
<b>SCANNING POINT CLOUDS BASED ON A CIRCLE FITTING METHOD</b>	
<i>Rongren Wu, Yiping Chen, Cheng Wang, Jonathan Li, Xiamen University, China</i>	
<b>TUP1-PJ.8: CORRELATION BETWEEN GRACE TERRESTRIAL WATER STORAGE ANOMALY .....</b>	<b>2817</b>
<b>AND TRMM PRECIPITATION</b>	
<i>Shuxu Gao, Binbin He, Yuwei Guan, Kaiwei Luo, Ningning Xiao, University of Electronic Science and Technology of China, China; Xiaofang Liu, Sichuan University of Science and Engineering, China</i>	
<b>TUP1-PJ.9: PARTICLE FILTERING BASED TRACK-BEFORE-DETECT WITH SENSOR .....</b>	<b>2821</b>
<b>REGISTRATION IN SINGLE FREQUENCY NETWORK</b>	
<i>Wen Sun, Ping Wei, Lin Gao, Hongshu Liao, Lijuan Deng, University of Electronic Science and Technology of China, China</i>	
<b>TUP1-PJ.10: SMOS-IC VEGETATION OPTICAL DEPTH INDEX IN MONITORING .....</b>	<b>2825</b>
<b>ABOVEGROUND CARBON CHANGES IN THE TROPICAL CONTINENTS DURING 2010-2016</b>	
<i>Lei Fan, Jean-Pierre Wigneron, Institut National de la Recherche Agronomique, France; Arnaud Mialon, Nemesio Rodríguez-Fernández, CESBIO, CNES/CNRS/IRD/UPS, France; Amen Al-Yaari, Institut National de la Recherche Agronomique, France; Yann Kerr, CESBIO, CNES/CNRS/IRD/UPS, France; Martin Brandt, University of Copenhagen, France; Philippe Ciais, Laboratoire des Sciences du Climat et de l'Environnement, CEA-CNRS-UVSQ, France</i>	
<b>TUP2-PJ: TARGET DETECTION II</b>	
<b>TUP2-PJ.1: AN IMPROVED CFAR SCHEME FOR MAN-MADE TARGET DETECTION IN HIGH .....</b>	<b>2829</b>
<b>RESOLUTION SAR IMAGES</b>	
<i>Weike Li, Bin Zou, Harbin Institute of Technology, China; Yu Xin, Institute of Beijing Remote Sensing Information, China; Lamei Zhang, Zhilu Wu, Harbin Institute of Technology, China</i>	
<b>TUP2-PJ.2: MOVING TARGET DETECTION AND IMAGING FOR GEOSYNCHRONOUS SAR.....</b>	<b>2833</b>
<i>Haoyu Tian, Jianshu Cao, Shunsheng Zhang, Wen-Qin Wang, Huihui Ding, University of Electronic Science and Technology of China, China</i>	
<b>TUP2-PJ.3: A SALIENCY-BASED METHOD FOR SAR TARGET DETECTION.....</b>	<b>2837</b>
<i>Haixiang Li, Xuelian Yu, Xuegang Wang, University of Electronic Science and Technology of China, China</i>	
<b>TUP2-PJ.4: A TARGET RECAPTURING METHOD FOR THE MILLIMETER WAVE SEEKER .....</b>	<b>2841</b>
<b>WITH NARROW BEAMWIDTH</b>	
<i>Fugang Lu, Shichao Chen, Xi'an Modern Control Technology Research Institute, China; Ming Liu, Shaanxi Normal University, China; Jun Wang, Fei Ma, Xi'an Modern Control Technology Research Institute, China; Taoli Yang, University of Electronic Science and Technology of China, China</i>	
<b>TUP2-PJ.5: LOCALIZATION DECEPTION APPROACH USING FREQUENCY DIVERSE ARRAY .....</b>	<b>2845</b>
<b>AGAINST BI-SATELLITE POSITIONING RECONNAISSANCE</b>	
<i>Haoliang Guan, Shunsheng Zhang, Wen-Qin Wang, Hui Wang, University of Electronic Science and Technology of China, China</i>	
<b>TUP2-PJ.7: MANIFOLD REGULARIZED LOW-RANK REPRESENTATION FOR .....</b>	<b>2853</b>
<b>HYPERSPECTRAL ANOMALY DETECTION</b>	
<i>Tongkai Cheng, Bin Wang, Fudan University, China</i>	

<b>TUP2-PJ.8: HYPERSPECTRAL TARGET DETECTION USING SEMI- AND NON- PARAMETRIC METHODS</b> .....	<b>2857</b>
<i>Assaf Dvora, Ben-Gurion University of the Negev, Israel; Stefania Matteoli, National Research Council of Italy (CNR), Italy; Stanley Rotman, Gil Tidhar, Ben-Gurion University of the Negev, Israel; Marco Diani, Italian Naval Academy, Italy; Mayer Aladjem, Ben-Gurion University of the Negev, Israel</i>	
<b>TUP2-PJ.9: A DISTRIBUTED AND PARALLEL ANOMALY DETECTION IN HYPERSPECTRAL IMAGES BASED ON LOW-RANK AND SPARSE REPRESENTATION</b> .....	<b>2861</b>
<i>Jun Liu, Nanjing University of Science and Technology, China; Weixuan Zhang, Jinling High School, China; Zebin Wu, Yi Zhang, Yang Xu, Ling Qian, Zhihui Wei, Nanjing University of Science and Technology, China</i>	
<b>TUP2-PJ.10: TARGET DETECTION IN REMOTE SENSING IMAGE BASED ON SALIENCY COMPUTATION OF SPIKING NEURAL NETWORK</b> .....	<b>2865</b>
<i>Yang Liu, Kun Cai, Miao-hui Zhang, Feng-Bin Zheng, Henan University, China</i>	
<b>TUP1-PK: REMOTE SENSING OF VEGETATION I</b>	
<b>TUP1-PK.1: OLIVE BIOPHYSICAL PROPERTY ESTIMATION BASED ON SENTINEL-2 IMAGE INVERSION</b> .....	<b>2869</b>
<i>Hana Abdelmoula, Ecole National d'Ingénieur de Sfax, Tunisia; Abdelaziz Kallel, Digital Research Center of Sfax, Tunisia; Jean-Louis Roujean, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France; Sihem Chaabouni, Digital Research Center of Sfax, Tunisia; Kamel Gargouri, Mohamed Ghrab, Olive Tree Institute of Sfax, Tunisia; Jean-Philippe Gastellu-Etchegorry, Nicolas Lauret, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France</i>	
<b>TUP1-PK.2: INTER-COMPARISON OF FIRE SEVERITY INDICES FROM MODERATE (MODIS) AND MODERATE-TO-HIGH SPATIAL RESOLUTION (LANDSAT 8 &amp; SENTINEL-2A) SATELLITE SENSORS</b> .....	<b>2873</b>
<i>Shahriar Rahman, PhD Candidate, Australia; Hsing-Chung Chang, Senior Lecturer, Australia; Warwick Hehir, GIS Data Coordinator, Australia; Christina Magill, Senior Lecturer, Australia; Kerrie Tomkins, Lecturer, Australia</i>	
<b>TUP1-PK.3: PRELIMINARY VALIDATION OF MIXED-PIXEL CLUMPING INDEX IN THE ARID AND SEMI-ARID REGION, WESTERN CHINA</b> .....	<b>2877</b>
<i>Qingmiao Ma, Yingjie Li, Jing Chen, Wen Chen, Xianwen Ji, Chen Cong, Yan Wang, Jiangsu Normal University, China</i>	
<b>TUP1-PK.4: MODIS-BASED GRASSLAND TRENDS WITHIN AND AROUND THE KEKEXILI CORE PROTECTION ZONE OF THE SANJIANGYUAN NATURE RESERVE</b> .....	<b>2880</b>
<i>Fabian Ewald Fassnacht, Christopher Schiller, Karlsruhe Institute of Technology, Germany; Jiapeng Qu, Chinese Academy of Sciences, China; Teja Kattenborn, Karlsruhe Institute of Technology, Germany; Xinquan Zhao, Chinese Academy of Sciences, China</i>	
<b>TUP1-PK.5: APPLICATION OF A ONE-CLASS CLASSIFIER AND A LINEAR SPECTRAL UNMIXING METHOD FOR DETECTING INVASIVE SPECIES IN CENTRAL CHILE</b> .....	<b>2883</b>
<i>Michael Förster, Tobias Schmidt, Alexandra Rios Gonzalez, TU Berlin, Germany; Julián Cabezas, Fabian Ewald Fassnacht, KIT, Germany</i>	
<b>TUP1-PK.6: UP-SCALING OF LEAF AREA INDEX BY AN IMPROVED COMPUTATIONAL GEOMETRY METHOD</b> .....	<b>2887</b>
<i>Hong Chen, Hua Wu, Zhao-Liang Li, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China</i>	
<b>TUP1-PK.7: ASSESSING THE ECOLOGICAL VALUE OF GRASSLANDS FROM SENTINEL 2: A CASE STUDY IN FLANDERS</b> .....	<b>2891</b>
<i>Stien Heremans, Instituut voor Natuur- en Bosonderzoek (Research Institute Nature and Forest), Belgium; Rob Hillen, Laura Vanierschot, Ben Somers, KU Leuven (University of Leuven), Belgium</i>	
<b>TUP1-PK.8: RETRIEVING LAI AND LCC SIMULTANEOUSLY FROM SENTINEL-2 DATA USING PROSAIL AND PSO-COUPLED BI-LUT</b> .....	<b>2895</b>
<i>Zihua Wu, Qiming Qin, Peking University, China</i>	



**TUP1-PK.9: OBTAIN THE PATTERNS OF GLOBAL FOREST NPP AND ITS INFLUENCE FACTORS WITH GOOGLE EARTH ENGINE ..... 2898**  
*Wenjin Wu, RADI, CAS, China; Xuejing Zhao, Shandong University of Science and Technology, China; Chen Gong, Xinwu Li, RADI, CAS, China*

## **TUP2-PK: GEOGRAPHIC INFORMATION SCIENCE II**

**TUP2-PK.1: THE “URBAN GEOMATICS FOR BULK INFORMATION GENERATION, DATA ASSESSMENT AND TECHNOLOGY AWARENESS” PROJECT: DETECTION, REPRESENTATION AND ANALYSIS OF THE URBAN SCENARIO CHANGES ..... 2902**

*Antonio Pepe, Manuela Bonano, Institute for the Electromagnetic Sensing of the Environment (IREA), National Research Council (CNR), Italy; Gloria Bordogna, Institute for the Electromagnetic Sensing of the Environment (IREA), National Research Council (CNR), Italy; Maria Antonia Brovelli, Politecnico di Milano, Como, Italy; Fabiana Calò, Paola Carrara, Institute for the Electromagnetic Sensing of the Environment (IREA), National Research Council (CNR), Italy; Luca Congedo, ISPRA, Italian Institute for Environmental Protection and Research, Italy; Luca Frigerio, Institute for the Electromagnetic Sensing of the Environment (IREA), National Research Council (CNR), Italy; Pasquale Imperatore, Riccardo Lanari, Simone Lanucara, Institute for the Electromagnetic Sensing of the Environment (IREA), National Research Council (CNR), Italy; Lorenzo Busetto, IREA-CNR, Italy; Mariarosaria Manzo, Michele Munafò, Institute for the Electromagnetic Sensing of the Environment (IREA), National Research Council (CNR), Italy*

**TUP2-PK.2: AN INDOOR ROUTE PLANNING METHOD WITH ENVIRONMENT AWARENESS ..... 2906**

*Yan Zhou, Hong Chen, Yueying Huang, Yunxin Luo, University of Electronic Science and Technology of China, China; Yeting Zhang, Wuhan University, China; Xiao Xie, Chinese Academy of Sciences, China*

**TUP2-PK.3: ANALYSIS OF VULNERABILITY TO WATER STRESS AT A NATIONWIDE SCALE ..... 2910**

*Pratiman Patel, Subhankar Karmakar, Indian Institute of Technology Bombay, India*

**TUP2-PK.6: THE DEVELOPMENT OF RAPID EXTRACTION AND PUBLISHING SYSTEM OF EARTHQUAKE DAMAGE BASED ON REMOTE SENSING ..... 2921**

*Xiaoqing Wang, Aixia Dou, Xiang Ding, Xiaoxiang Yuan, Institute of Earthquake Forecasting, China*

**TUP2-PK.8: RISK ASSESSMENT OF GEOLOGICAL HAZARDS OF WENCHUAN COUNTY BASED ON AHP AND FCE ..... 2929**

*Fan Mou, Jiali Yang, Zezhong Zheng, Pingchuan Zhong, University of Electronic Science and Technology of China, China; Mingcang Zhu, Land and Resources Department of Sichuan Province, China; Yong He, Sichuan Institute of Geo-Environment Monitoring, China; Ling Jiang, University of Electronic Science and Technology of China, China; Guoqing Zhou, Guilin University of Technology, China; Jiang Li, Old Dominion University, China*

**TUP2-PK.9: A SIMILARITY EVALUATION MODAL FOR REMOTE SENSING DATA DISTRIBUTION ..... 2933**

*Xiaoxia Yang, Chengdu University of Technology, China; Yan Zhou, University of Electric Science and Technology of China, China; Lina Hao, Xi Liu, Chengdu University of Technology, China*

## **TUP1-PL: URBAN AND BUILT ENVIRONMENT II**

**TUP1-PL.1: REGION-BASED CO-SEISMIC GROUND DISPLACEMENT DETECTION USING OPTICAL AERIAL IMAGERY ..... 2940**

*Min-Lung Cheng, Toshiaki Satoh, Masashi Matsuoka, Tokyo Institute of Technology, Japan*

**TUP1-PL.2: TREE CROWN DETECTION AND DELINEATION USING OPTICAL SATELLITE IMAGERY ..... 2944**

*Xiaoqing Huang, Chenghua Shi, Soo Chin Liew, National University of Singapore, Singapore*

**TUP1-PL.3: LAND PRICE PREDICTION BASED ON RANDOM FOREST ..... 2948**

*Ankai Hou, Pingchuan Zhong, Zezhong Zheng, University of Electronic Science and Technology of China, China; Mingcang Zhu, Land and Resources Department of Sichuan Province, China; Yong He, Sichuan Institute of Geo-Environment Monitoring, China; Qiuying Li, Biao Zhang, Fang Huang, University of Electronic Science and Technology of China, China; Guoqing Zhou, Guilin University of Technology, China; Jiang Li, Old Dominion University, China*

<b>TUP1-PL.4: RAILWAY BRIDGE MONITORING WITH SAR: A CASE STUDY .....</b>	<b>2952</b>
<i>Gerardo Di Martino, Manuela Esposito, Bruna Festa, Antonio Iodice, Laura Mancini, Davod Poreh, Daniele Riccio, Giuseppe Ruello, University of Naples Federico II, Italy</i>	
<b>TUP1-PL.5: POTENTIAL OF SATELLITE REMOTE SENSING TO MONITOR .....</b>	<b>2956</b>
<b>VULNERABILITY OF BUILDINGS TO EARTHQUAKES WITHIN A SEMI-EMPIRICAL MACROSEISMIC APPROACH</b>	
<i>Gonéri Le Cozannet, Daniel Raucoules, Marcello De Michele, Abed Benaichouche, Pierre Gehl, Daniel Monfort Climent, Caterina Negulescu, Jeremy Rohmer, BRGM, France; Nazzareno Pierdicca, University of Rome - La Sapienza, Italy; Matteo Albano, INGV, Istituto Nazionale di Geofisica e Vulcanologia, Italy; Sonia Giovinazzi, University of Rome - La Sapienza, Italy; Michael Foumelis, BRGM, France</i>	
<b>TUP1-PL.6: URBAN BOUNDARY MAPPING USING SENTINEL-1A SAR DATA .....</b>	<b>2960</b>
<i>Christopher Storie, The University of Winnipeg, Canada</i>	
<b>TUP1-PL.7: MONITORING BRIDGES VIBRATION USING A GROUND BASED RADAR.....</b>	<b>2964</b>
<i>Armando Marino, The University of Stirling, United Kingdom</i>	
<b>TUP1-PL.8: ROBUST MAPPING OF URBAN STRUCTURE TYPES ACROSS THREE GERMAN .....</b>	<b>2968</b>
<b>CITIES</b>	
<i>Christian Berger, University of Jena, Germany; Voltersen Michael, Tama Group GmbH, Germany; Christiane Schmuilius, Sören Hese, University of Jena, Germany</i>	
<b>TUP1-PL.10: LANDSAT 8 IMAGE-BASED ANALYSIS OF THE URBAN HEAT ISLAND .....</b>	<b>2976</b>
<b>CHARACTERISTICS IN JINAN, CHINA</b>	
<i>Fei Meng, Qingfeng Xiao, Shandong Jianzhu University, China</i>	
 <b>TUP2-PL: DYNAMICS OF VEGETATED AREAS</b>	
<b>TUP2-PL.1: TOWARDS JOINT LAND COVER AND CROP TYPE MAPPING WITH .....</b>	<b>2980</b>
<b>NUMEROUS CLASSES</b>	
<i>Christina Karakizi, Georgia Espeseth, Konstantinos Karantzalos, National Technical University of Athens, Greece</i>	
<b>TUP2-PL.2: GRASS BIOMASS ESTIMATION ON ZAMBIAN PASTURES FOR FUTURE .....</b>	<b>2984</b>
<b>CLIMATE CHANGE EFFECTS MITIGATION AND ADAPTATION USING SATELLITE IMAGERY AND NEURAL NETWORK TECHNIQUE</b>	
<i>Chiara Clementini, Fabio Del Frate, Andrea Pomente, Tor Vergata University of Rome, Italy; Giorgia Salvucci, GEO-K S.r.l, Italy; Felix Teillard, Hideki Kanamaru, Mariko Fujisawa, Anne Mottet, Ana Heuroux, Food and Agriculture, Italy</i>	
<b>TUP2-PL.3: IMPROVED CHARACTERIZATION OF DRYLAND DEGRADATION USING .....</b>	<b>2988</b>
<b>TRENDS IN VEGETATION/ RAINFALL SEQUENTIAL LINEAR REGRESSION (SERGS-TREND)</b>	
<i>Christin Abel, Martin Brandt, University of Copenhagen, Denmark; Torbern Tagesson, Lund University, Sweden; Rasmus Fensholt, University of Copenhagen, Denmark</i>	
<b>TUP2-PL.4: OPTICAL RESPONSES ON MULTIPLE SPATIAL SCALES FOR ASSESSING .....</b>	<b>2992</b>
<b>VEGETATION DYNAMICS - A CASE STUDY FOR ALPINE GRASSLANDS</b>	
<i>Mattia Rossi, Free University of Bolzano, Italy; Georg Niedrist, EURAC Research, Italy; Sarah Asam, German Aerospace Center (DLR), Germany; Tonon Giustino, Free University of Bolzano, Italy; Marc Zebisch, EURAC Research, Italy</i>	
<b>TUP2-PL.5: LAND USE AND LAND COVER DYNAMICS IN RELATION TO FIRE .....</b>	<b>2996</b>
<b>RECURRENCE IN THE BRAZILIAN AMAZON, 2008-2014.</b>	
<i>João Felipe Pinto, Foundation for Science, Technology and Space Applications, Brazil; Alberto Setzer, Fabiano Morelli, National Institute for Space Research - INPE, Brazil; Marcos Adami, National Institute for Space Research - INPE / Regional Amazon Center, Brazil; Adriano Venturieri, Brazilian Agricultural Research Corporation / Eastern Amazon, Brazil; Alessandra Gomes, National Institute for Space Research - INPE, Brazil</i>	

**TUP2-PL.6: REMOTE SENSING AND LANDSCAPE METRICS FOR EVALUATION OF ..... 3000  
SECONDARY VEGETATION PATTERNS IN THE FOREST FRAGMENTATION IN AN AREA OF  
THE BRAZILIAN AMAZON**

*Andréa Coelho, Lucyana Santos, Marcia Barros, Fundação de Ciência, Aplicações e Tecnologia Espaciais – FUNCATE, Brazil; Alessandra Gomes, Instituto Nacional de Pesquisas Espaciais – INPE, Brazil; Larisse Souza, Universidade Federal do Pará - UFPA, Brazil; Ana Luisa Albernaz, Museu Paraense Emilio Goeldi - MPEG, Brazil; Lais Santos, Universidade de Brasília, Brazil; Marcos Adami, Instituto Nacional de Pesquisas Espaciais – INPE, Brazil*

**TUP2-PL.7: RADAR ALTIMETRY BACKSCATTERING FROM JASON-3 AND SENTINEL-3A ..... 3004  
OVER LAND**

*Fabien Blarel, Frédéric Frappart, Eric Mougin, Observatoire Midi-Pyrénées, France*

**TUP2-PL.8: TOWARDS AN IMPROVED INVENTORY OF N2O EMISSIONS USING LAND ..... 3007  
COVER MAPS DERIVED FROM OPTICAL REMOTE SENSING IMAGES**

*Tiphaine Tallec, Claire Marais Sicre, Rémy Fieuzal, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France*

**TUP2-PL.9: CROPLAND USE CHANGE ANALYSIS IN SHAANXI PROVINCE OF CHINA BASED ..... 3011  
ON THE SHAPE-MATCHING CROPPING INDEX MAPPING METHOD**

*Jianhong Liu, Xuyang He, Fan Liang, Tongsheng Li, Northwest University, China*

**TUP1-PM: CLOUDS AND PRECIPITATION: MODELING AND EVALUATION**

**TUP1-PM.1: A NEURAL NETWORK SEA-ICE CLOUD CLASSIFICATION ALGORITHM FOR ..... 3015  
COPERNICUS SENTINEL-3 SEA AND LAND SURFACE TEMPERATURE RADIOMETER**

*Matteo Picchiani, GEO-K S.r.l, Italy; Fabio Del Frate, Massimiliano Sist, Tor Vergata University, Italy*

**TUP1-PM.4: TYPHOON CLOUD PREDICTION VIA GENERATIVE ADVERSARIAL ..... 3023  
NETWORKS**

*Hui Li, Xingrui Yu, Peng Ren, China University of Petroleum (East China), China*

**TUP1-PM.5: SYSTEMATIC STUDY OF WEATHER VARIABLES FOR RAINFALL DETECTION..... 3027**

*Shilpa Manandhar, Nanyang Technological University, Singapore; Soumyabrata Dev, The ADAPT Centre, Trinity College, Ireland; Yee Hui Lee, Nanyang Technological University, Singapore; Stefan Winkler, Advanced Digital Sciences Center (ADSC), Singapore; Yu Song Meng, National Metrology Centre, Agency for Science, Technology and Research (ASTAR), Singapore*

**TUP1-PM.7: ATMOSPHERIC INTEGRATED WATER PARAMETERS IN THE ARCTIC: ..... 3035  
SEASONAL VARIABILITY AND INFLUENCE ON THE AMSR2 MEASURED MICROWAVE  
RADIATION OF THE SEA ICE-ATMOSPHERE SYSTEM**

*Elizaveta Zabolotskikh, RSHU, Russian Federation; Bertrand Chapron, IFREMER, France*

**TUP1-PM.9: EVALUATION OF THE LATEST SATELLITE-BASED PRECIPITATION PRODUCTS ..... 3043  
THROUGH PIXEL-POINT COMPARISON AND HYDROLOGICAL APPLICATION OVER THE  
MEKONG RIVER BASIN**

*Yishan Li, Tsinghua University, China; Wei Wang, Changjiang Institute of Survey, Planning, Design and Research, China; Hui Lu, Tsinghua University, China*

**TUP1-PM.10: IMPROVING GPM PRECIPITATION DATA OVER YARLUNG ZANGBO RIVER ..... 3047  
BASIN USING SMAP SOIL MOISTURE RETRIEVALS**

*Fan Yang, Tsinghua University, China; Wei Wang, Changjiang Institute of Survey, Planning, Design and Research, China; Hui Lu, Kun Yang, Fuqiang Tian, Tsinghua University, China*

**TUP2-PM: LAND MAPPING AND MINERAL EXPLORATION**

**TUP2-PM.1: VERTICAL DISPLACEMENT DISTRIBUTION OF THE SOUTH HELI SHAN ..... 3051  
FAULT AT NORTHEASTERN TIBETAN PLATEAU DERIVED FROM HIGH-RESOLUTION  
TOPOGRAPHIC DATA**

*Haiyun Bi, China Earthquake Administration, China; Wenjun Zheng, Sun Yat-Sen University, China; Jianguan Zeng, Chinese Academy of Sciences, China*

**TUP2-PM.2: SOURCE MODEL OF THE 12 NOVEMBER 2017 MW 7.3 KERMANSHAH ..... 3055**  
**EARTHQUAKE (IRAN-IRAQ BORDER) INFERRED FROM ALOS-2 SCANSAR AND SENTINEL-1**  
**DATA**

*Jianming Kuang, Linlin Ge, Graciela Isabel Metternicht, University of New South Wales, Australia; Alex Hay-Man Ng, Guangdong University of Technology, China; Mehdi Zare, International Institute of Earthquake Engineering and Seismology, Iran; Farnaz Kamranzad, University of Tehran, Iran*

**TUP2-PM.3: SURFACE DEFORMATION OF KANGDING AIRPORT, QINGHAI-TIBET PLATEAU, ..... 3059**  
**CHINA USING INSAR TECHNIQUES AND MULTI-TEMPORAL SENTINEL-1 DATASETS**

*Hanning Chen, Yong Wang, Yin Zhang, Yan Yan, University of Electronic Science and Technology of China, China*

**TUP2-PM.4: SURFACE DEFORMATION AND SOURCE MODELING FOR THE MW 7.3 IRAN ..... 3063**  
**EARTHQUAKE (NOVEMBER 12, 2017) EXPLOITING SENTINEL-1 AND ALOS-2 INSAR DATA**

*Cristiano Tolomei, Istituto Nazionale di Geofisica e Vulcanologia, Italy; Nikos Svigkas, Istituto Nazionale di Geofisica e Vulcanologia, Aristotle University of Thessaloniki, Italy; Aram Fathian, RWTH Aachen University, Germany; Simone Atzori, Giuseppe Pezzo, Istituto Nazionale di Geofisica e Vulcanologia, Italy*

**TUP2-PM.5: MONITORING OF SAKURAJIMA VOLCANO, JAPAN, WITH SAR DATA: FROM ..... 3067**  
**SMALL DISPLACEMENT MEASUREMENTS TO MODELING AND FORECAST**

*Giulia Tessari, Sarmap, Switzerland; Lisa Beccaro, University of Padova, Italy; Simone Ippoliti, La Sapienza University, Italy; Paolo Riccardi, Sarmap, Switzerland; Mario Floris, Andrea Marzoli, University of Padova, Italy; Fumitaka Ogushi, Harris, Japan; Paolo Pasquali, Sarmap, Switzerland*

**TUP2-PM.7: THE APPLICATION OF LANDSLIDE INVESTIGATION BASED ON HIGH ..... 3074**  
**RESOLUTION SATELLITE STEREO PAIRS**

*Xia Li, Hongga Li, Xiaoxia Huang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Bangyong Qin, Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China; Jinliang Han, Institute of Geomechanics, Chinese Academy of Geological Science, China*

**TUP1-PN: MICROWAVE RADIOMETERS: CALIBRATION AND DATA PRODUCT**  
**PERFORMANCE**

**TUP1-PN.1: VALIDATION OF AMSR2 OCEANIC ENVIRONMENTAL DATA RECORDS USING ..... 3078**  
**TROPICAL CYCLONE COMPOSITE FIELDS**

*Suleiman Alsweiss, Joseph Sapp, Zorana Jelenak, Paul Chang, National Oceanic and Atmospheric Administration/National Environmental Satellite, Data, and Information Service, United States*

**TUP1-PN.2: AQUARIUS FINAL RELEASE PRODUCT AND FULL RANGE CALIBRATION OF ..... 3082**  
**L-BAND RADIOMETERS**

*Emmanuel Dinnat, Chapman University & NASA/GSFC, United States; David Le Vine, NASA Goddard Space Flight Center, United States; Liang Hong, SAIC & NASA-GSFC, United States*

**TUP1-PN.3: GALAXY CORRECTION UPGRADE IN THE SOIL MOISTURE ACTIVE/PASSIVE ..... 3086**  
**(SMAP) MICROWAVE RADIOMETER ALGORITHM**

*Jinzheng Peng, Universities Space Research Association / NASA Goddard Space Flight Center, United States; Jeffrey Piepmeier, NASA Goddard Space Flight Center, United States; Simon Yueh, NASA Jet Propulsion Laboratory, United States; Giovanni De Amici, NASA Goddard Space Flight Center, United States*

**TUP1-PN.4: NEW METHODOLOGY FOR THE FARADAY ROTATION ANGLE RETRIEVAL IN ..... 3089**  
**THE SMOS FIELD OF VIEW**

*Roselena Rubino, Nuria Duffo, Universitat Politècnica de Catalunya, Spain; Verónica González-Gambau, Institute of Marine Sciences, Spain; Francesc Torres, Ignasi Corbella, Universitat Politècnica de Catalunya, Spain; Manuel Martín-Neira, European Space Agency, Netherlands*

**TUP1-PN.5: COMPARISON OF RO-ESTIMATED ATMS BIASES BETWEEN NOAA-20 AND S-NPP ..... 3093**

*Xiaoxu Tian, Xiaolei Zou, University of Maryland, College Park, United States; Ninghai Sun, National Oceanic and Atmospheric Administration, United States*

<b>TUP1-PN.6: COMPARISON OF ATMS STRIPING NOISE BETWEEN NOAA-20 AND S-NPP.....</b>	<b>3097</b>
<i>Xiaolei Zou, Xiaoxu Tian, University of Maryland, College Park, United States</i>	
<b>TUP1-PN.7: CALIBRATION OF MICROWAVE RADIOMETERS FROM GPM TO CUBESATS.....</b>	<b>3101</b>
<i>Wesley Berg, Colorado State University, United States</i>	
<b>TUP1-PN.8: UTILIZING BRIGHTNESS TEMPERATURE HISTOGRAMS FOR MICROWAVE RADIOMETER HIGH FREQUENCY (150-183 GHZ) CALIBRATION.....</b>	<b>3105</b>
<i>Rachael Kroodsmas, ESSIC, University of Maryland, United States</i>	
<b>TUP1-PN.9: A COMPARISON ANALYSIS BETWEEN SMAP, SMOS AND ATI ROOT ZONE SOIL MOISTURE ESTIMATIONS.....</b>	<b>3109</b>
<i>Ángel González-Zamora, Miriam Pablos, Nilda Sánchez, José Martínez-Fernández, University of Salamanca, Spain</i>	
 <b>TUP2-PN: SCIENCE AND TECHNIQUES IN ATMOSPHERIC SOUNDING I</b>	
<b>TUP2-PN.1: MICROWAVE MEASUREMENTS OF STRATOSPHERIC AND MESOSPHERIC OZONE IN MOSCOW.....</b>	<b>3116</b>
<i>Sergey Rozanov, P.N.Lebedev Physical Institute of the Russian Academy of Sciences, Russian Federation; Alexey Zavgorodniy, Russian Metrological Institute of Technical Physics and Radio Engineering, Russian Federation; Sergey Solomonov, Elena Kropotkina, Alexandr Lukin, P.N.Lebedev Physical Institute of the Russian Academy of Sciences, Russian Federation; Alexandr Ignatyev, Federal State Unitary Enterprise NII Kvant, Russian Federation</i>	
<b>TUP2-PN.2: CONSISTENCY IN XCO<sub>2</sub> RETRIEVALS FROM SCIAMACHY, GOSAT AND OCO-2 FOR SPATIO-TEMPORAL CHARACTERISTICS AT A GLOBAL SCALE.....</b>	<b>3120</b>
<i>Liping Lei, Hui Zhong, Changjiang Wu, Institute of Remote Sensing and Digital Earth, China; Zhaocheng Zeng, California Institute of Technology, United States; Zhonghua He, Yanhong Wu, Key Laboratory of Digital Earth Science, China</i>	
<b>TUP2-PN.3: EXPERIMENTS OF CRYOGENIC DEW AND FROST POINT HYGROMETER FOR UPPER AIR SOUNDING.....</b>	<b>3123</b>
<i>Zhendong Yao, Chengdu University of Information Technology, China; Xiangdong Zheng, China Meteorological Administration, China; Jian Li, Xiaobiao Zheng, Chengdu University of Information Technology, China</i>	
<b>TUP2-PN.6: HIGH-ORDER IONOSPHERIC EFFECTS ON 3-D GPS COORDINATE ESTIMATION IN TURKEY.....</b>	<b>3135</b>
<i>Volkan Akgul, Shuanggen Jin, Gokhan Gurbuz, Eray Koksak, Bulent Ecevit University, Turkey</i>	
<b>TUP2-PN.7: OPEN LOOP PERFORMANCE OF GNOS UNDER SEVERE IONOSPHERIC SCINTILLATION.....</b>	<b>3139</b>
<i>Yusen Tian, National Space Science Center, Chinese Academy of Sciences/University of Chinese Academy of Sciences, China; Xianyi Wang, Yueqiang Sun, National Space Science Center, Chinese Academy of Sciences, China; Dongwei Wang, Chunjun Wu, National Space Science Center, Chinese Academy of Sciences/University of Chinese Academy of Sciences, China; Yuerong Cai, Cheng Liu, Fu Li, Hao Qiao, National Space Science Center, Chinese Academy of Sciences, China</i>	
<b>TUP2-PN.8: ANALYSING SEASONAL CHARACTERISTICS OF RESIDUAL IONOSPHERIC ERRORS IN BENDING ANGLES BASED ON ENSEMBLES OF PROFILES FROM END-TO-END SIMULATIONS.....</b>	<b>3143</b>
<i>Congliang Liu, National Space Science Center, Chinese Academy of Sciences, China; Gottfried Kirchengast, Wegener Center for Climate and Global Change, Austria; Yueqiang Sun, Qifei Du, Weihua Bai, Xianyi Wang, Xiangguang Meng, Junming Xia, Danyang Zhao, Yuerong Cai, Dongwei Wang, Chunjun Wu, Wei Li, Cheng Liu, National Space Science Center, Chinese Academy of Sciences, China</i>	
<b>TUP2-PN.9: A LEO-LEO OCCULTATION SYSTEM USING MICROWAVE SIGNALS.....</b>	<b>3147</b>
<i>Chunjun Wu, Yueqiang Sun, Xianyi Wang, Congliang Liu, Qifei Du, Weihua Bai, Dongwei Wang, Xiangguang Meng, Yuerong Cai, Cheng Liu, Junming Xia, Danyang Zhao, Wei Li, Fu Li, Hao Qiao, National Space Science Center, China</i>	

**TUP2-PN.10: A LOW COST MICROWAVE TRANSMITTER-RECEIVER LINK FOR ..... 3149  
MEASURING THE INTEGRATED WATER VAPOR**

*Giovanni Macelloni, Francesco Montomoli, IFAC- CNR, Italy; Luca Facheris, University of Florence, Italy; Fabrizio Cuccoli, RaSS CNIT laboratory, Pisa, Italy; Alberto Toccafondi, Federico Puggelli, University of Siena, Italy; Alessio Cucini, Francesco Mariottini, WaveComm srl, Italy; Luigi Volpi, Pasquali Microwave System srl, Italy; Devis Dei, Florence Engineering srl, Italy; Marco Gai, Laboratori Victoria srl, Italy*

**TUP1-PO: GNSS-R II: MODELS AND APPLICATIONS**

**TUP1-PO.2: SPACEBORNE GNSS-R END-TO-END SIMULATOR: TOPOGRAPHY AND ..... 3157  
VEGETATION EFFECTS**

*Hyuk Park, Adriano Camps, Daniel Pascual, Jorge Querol, Raul Onrubia, Universitat Politècnica de Catalunya, Spain*

**TUP1-PO.3: SENSITIVITY TO SOIL MOISTURE OF SPACEBORNE GNSS-R OBSERVABLES..... 3161**

*Adriano Camps, Mercè Vall-llossera, Hyuk Park, Gerard Portal, Luciana Rossato, Universitat Politècnica de Catalunya- BarcelonaTech & IEEC/CTE-UPC, Spain*

**TUP1-PO.4: SIMULATION STUDY OF THE COMMON SURFACE SCENARIO IN ..... 3165  
GNSS-REFLECTOMETRY**

*Ian Collett, Yu Morton, University of Colorado Boulder, United States*

**TUP1-PO.5: ESTIMATING SNOW DEPTH WITH PSEUDORANGE AND CARRIER-PHASE ..... 3169  
COMBINATION OF BDS DUAL-FREQUENCY SIGNALS**

*Yunwei Li, Kegen Yu, Xin Chang, Wuhan University, China*

**TUP1-PO.6: SNOW DENSITY ESTIMATION BASED ON SNR AMPLITUDE ATTENUATION ..... 3173  
MODELING AND MATCHING**

*Xin Chang, Kegen Yu, Yunwei Li, Jiancheng Li, Wuhan University, China*

**TUP1-PO.7: OCEAN ROUGHNESS AND WIND MEASUREMENTS WITH L- AND S-BAND ..... 3177  
SIGNALS OF OPPORTUNITY (SOOP) REFLECTOMETRY**

*Han Zhang, James Garrison, Purdue University, United States; Derek Burrage, Naval Research Laboratory, United States*

**TUP1-PO.8: TWO-SCALE MODEL FOR THE EVALUATION OF SEA-SURFACE SCATTERING ..... 3181  
IN GNSS-R SHIP-DETECTION APPLICATIONS**

*Maurizio Di Bisceglie, Università del Sannio, Italy; Gerardo Di Martino, Alessio Di Simone, University of Naples Federico II, Italy; Carmela Galdi, Università del Sannio, Italy; Antonio Iodice, Daniele Riccio, Giuseppe Ruello, University of Naples Federico II, Italy*

**TUP1-PO.9: DETERMINATION OF SEA CORRELATION TIME AT L-BAND WITH AIRBORNE ..... 3185  
REFLECTED NEW GNSS SIGNALS**

*Daniel Pascual, Raul Onrubia, Jorge Querol, Jordi Castellvi-Esturi, Huyk Park, Adriano Camps, CommSensLab - Department of Signal Theory and Communications, Spain*

**TUP1-PO.10: GPS-DERIVED VELOCITY FIELDS OF NORTHERN TIEN SHAN FROM ..... 3189  
PERMANENT STATIONS IN KAZAKHSTAN**

*Zhumabek Zhantayev, Azamat Kaldybayev, Assylkhan Bibossinov, Andrey Vilyaev, Arman Turgumbayev, Serik Nurakynov, Institute of Ionosphere, National Center of Space Research and Technology, Kazakhstan*

**TUP2-PO: OCEAN SURFACE WINDS AND CURRENTS II**

**TUP2-PO.1: WAVE SPECTRUM AND SURFACE CURRENT RETRIEVAL FROM AIRBORNE ..... 3192  
AND SATELLITE SUNGLITTER IMAGERY**

*Maria Yurovskaya, Vladimir Kudryavtsev, Russian State Hydrometeorological University, Russian Federation; Bertrand Chapron, IFREMER, Russian State Hydrometeorological University, France; Nicolas Rasclé, CICESE, Mexico; Fabrice Collard, Ocean Data Laboratory, France*

<b>TUP2-PO.2: VALIDATION OF THE NSCAT-5 GEOPHYSICAL MODEL FUNCTION FOR SCATSAT-1 WIND SCATTEROMETER</b>	<b>3196</b>
<i>Wenming Lin, Nanjing University of Information Science and Technology, China; Marcos Portabella, Institute of Marine Sciences (ICM-CSIC), Spain; Ad Stoffelen, Anton Verhoef, Royal Netherlands Meteorological Institute (KNMI), Netherlands; Zhixiong Wang, Nanjing University of Information Science and Technology, China</i>	
<b>TUP2-PO.4: SIGNIFICANT WAVE HEIGHT RETRIEVAL FROM GAOFEN-3 WAVE MODE IMAGES</b>	<b>3204</b>
<i>Jing Wang, Zhejiang Ocean University, China; He Wang, National Ocean Technology Center, China; Weizeng Shao, Zhejiang Ocean University, China; Jianhua Zhu, National Ocean Technology Center, China; Xinzhe Yuan, National Satellite Ocean Application Service, China</i>	
<b>TUP2-PO.5: NUMERICAL STUDY FOR OCEAN WAVE MEASUREMENT BY HIGH RESOLUTION ALONG-TRACK INTERFEROMETRIC SAR</b>	<b>3208</b>
<i>Shoichiro Kojima, National Institute of Information and Communications Technology, Japan</i>	
<b>TUP2-PO.6: A SAR CROSS-POL CORRELATION SEA SURFACE WIND SPEED STUDY</b>	<b>3212</b>
<i>Lanqing Huang, Shanghai Jiao Tong University, Shanghai Key Laboratory of Intelligent Sensing and Recognition, China; Maurizio Migliaccio, Ferdinando Nunziata, Valeria Corcione, Università di Napoli Parthenope, Italy; Zenghui Zhang, Wenxian Yu, Shanghai Jiao Tong University, Shanghai Key Laboratory of Intelligent Sensing and Recognition, China</i>	
<b>TUP2-PO.7: LG-MOD MULTI-SCALE APPROACH FOR SAR SEA SURFACE WIND DIRECTIONS RETRIEVAL</b>	<b>3216</b>
<i>Fabio Michele Rana, Maria Adamo, Palma Blonda, National Research Council of Italy, Istituto sull'Inquinamento Atmosferico, Italy</i>	
<b>TUP2-PO.8: SWELL WAVELENGTH VARIATION ACROSS THE OCEAN BASED ON SAR WAVE MODE DATA</b>	<b>3220</b>
<i>Jian Sun, Ocean University of China, China; Alexander V Babanin, University of Melbourne, Australia</i>	
<b>TUP2-PO.9: DYNAMIC VALIDATION OF OCEAN SWELL DERIVED FROM SENTINEL-1 WAVE MODE AGAINST BUOYS</b>	<b>3223</b>
<i>He Wang, National Ocean Technology Center, China; Alexis Mouche, IFREMER, France; Romain Husson, CLS, France; Bertrand Chapron, IFREMER, France</i>	
<b>TUP1-PP: LIDAR SYSTEMS AND APPLICATIONS</b>	
<b>TUP1-PP.1: AEROSOL MAPPING USING A BISTATIC CAMERA LIDAR AND COMPARING WITH RADIOSONDE DATA IN THE BAHAMAS</b>	<b>3230</b>
<i>Amin Kabir, University of The Bahamas, Bahamas; Nimmi Sharma, Central Connecticut State University, United States; John Barnes, NOAA/ESRL/Global Monitoring Division, United States; Jalal Butt, Central Connecticut State University, United States; Mauricio Bridgewater, Najee Stubbs, University of The Bahamas, Bahamas</i>	
<b>TUP1-PP.3: FOREST CANOPY LEAF AREA DENSITY ESTIMATION BASED ON AIRBORNE AND TERRESTRIAL LIDAR DATA</b>	<b>3238</b>
<i>Leiyu Dai, Shihua Li, Yankai Zhao, Sen Lin, Ze He, University of Electronic Science and Technology of China, China</i>	
<b>TUP1-PP.4: WHEEL-BASED LIDAR DATA FOR PLANT HEIGHT AND CANOPY COVER EVALUATION TO AID BIOMASS PREDICTION</b>	<b>3242</b>
<i>Radhika Ravi, Yun-Jou Lin, Tamer Shamseldin, Magdy Elbahnasawy, Ali Masjedi, Melba Crawford, Ayman Habib, Purdue University, United States</i>	
<b>TUP1-PP.5: BIOMASS INVERSION BASED ON GEOMETRIC INFORMATION OF LASER POINT CLOUD</b>	<b>3246</b>
<i>Li Pan, Beijing Research Center for Information Technology In Agriculture, China; Wei Guo, Henan Agriculture University, China; Liang Pei, Liaoning Technical University, China; Haikuan Feng, Beijing Research Center for Information Technology In Agriculture, China; Fan Yang, National Calibration Center for Surveying Instruments, China; Haojie Pei, Guijun Yang, Zhichao Wu, Mingxing Liu, Beijing Research Center for Information Technology In Agriculture, China</i>	

## **TUP2-PP: OCEAN SURFACE WINDS AND CURRENTS III**

### **TUP2-PP.1: WIND DIRECTION EXTRACTION FROM SAR IMAGES USING NSCT TRANSFORM ..... 3254**

*Fatemeh Tabarteh Farahani, Ahmad Keshavarz, Persian Gulf University, Iran; Stefano Zecchetto, National Research Council of Italy (CNR), Italy*

### **TUP2-PP.2: CFOSAT MISSION: USING OF SWIM MEASUREMENTS FOR IMPROVING SCAT WIND VECTOR RETRIEVAL ..... 3258**

*Alexey Mironov, OceanDataLab, France; Yves Quilfen, Bertrand Chapron, Institut Francais de Recherche pour l'Exploitation de la Mer, France*

### **TUP2-PP.3: WIND DIRECTION AMBIGUITY REMOVAL USING ALONG-TRACK INSAR: A CASE STUDY ..... 3262**

*Anis Elyouncha, Leif E.B. Eriksson, Chalmers University of Technology, Sweden; Roland Romeiser, University of Miami, United States; Lars M. H. Ulander, Chalmers University of Technology, Sweden*

### **TUP2-PP.4: A MODIFIED WAVE SPECTRUM FOR MODELING IN REMOTE SENSING PROBLEMS ..... 3266**

*Maria Ryabkova, Vladimir Karaev, Institute of Applied Physics of the Russian Academy of Sciences, Russian Federation*

### **TUP2-PP.5: WAVE-DEPENDENT DIRECTIONAL BIASES IN AIRBORNE OCEAN SURFACE CURRENT ESTIMATION ..... 3270**

*Shadi Aslebagh, University of Washington, United States; Gordon Farquharson, Capella Space, United States; John Sahr, University of Washington, United States; Roland Romeiser, University of Miami, United States*

### **TUP2-PP.6: ROUTINE SHIPBOARD MARINE X-BAND RADAR NEAR-SURFACE CURRENT MAPPING: INSIGHTS FROM TWO RESEARCH CRUISES ..... 3274**

*Björn Lund, Lisa Nyman, Neil Williams, Hans Graber, University of Miami, United States; Jochen Horstmann, Helmholtz Zentrum Geesthacht, Germany*

### **TUP2-PP.7: VALIDATION OF TWO-WAY COUPLED AIR-SEA MODEL STRESS AND CURRENTS THROUGH REMOTELY SENSED WINDS AND SST ..... 3278**

*Mark Bourassa, Qi Shi, Florida State University, United States*

### **TUP2-PP.8: COMPARISON OF WIND SPEED FROM QUIKSCAT, ASCAT, WINDSAT, ERA-INTERIM REANALYSIS AND SHIP MEASUREMENTS OVER THE CHINA SEA ..... 3282**

*Dongxiang Zhang, Chao Yang, Kaijun Ren, Jia Liu, Junqiang Song, National University of Defense Technology, China*

### **TUP2-PP.9: ABNORMAL WAVES GENERATED BY POLAR LOWS: EVALUATION OF EXPECTANCY ..... 3286**

*Pavel Golubkin, Vladimir Kudryavtsev, Russian State Hydrometeorological University, Russian Federation; Julia Smirnova, Nansen International Environmental and Remote Sensing Centre, Russian Federation; Bertrand Chapron, Institute Français de Recherche pour l'Exploitation de la Mer, France*

## **TUP1-PQ: OPTICAL CALIBRATION II**

### **TUP1-PQ.3: PERFORMANCE STABILITY EVALUATION OF CLOUDS AND THE EARTH'S RADIANT ENERGY SYSTEM (CERES) FLIGHT MODEL 5 (FM5) INSTRUMENT ON S-NPP ..... 3292**

*Susan Thomas, Science Systems and Applications, Inc, United States; Kory Priestley, NASA, United States; Nathaniel Smith, Robert Wilson, Dale Walikainen, Natvidad Smith, Science Systems and Applications, Inc, United States*

### **TUP1-PQ.4: VICARIOUS RADIOMETRIC CALIBRATION USING A GROUND RADIANCE-BASED APPROACH: A CASE STUDY OF SENTINEL 2A MSI ..... 3296**

*Yaokai Liu, Zhihong Ma, Key Laboratory of Quantitative Remote Sensing Information Technology, Academy of Opto-Electronics, Chinese Academy of Sciences, University of Chinese Academy of Sciences, China; Lingling Ma, Ning Wang, Yonggang Qian, Chuanrong Li, Lingli Tang, Key Laboratory of Quantitative Remote Sensing Information Technology, Academy of Opto-Electronics, Chinese Academy of Sciences, China*



<b>TUP1-PQ.5: STAR IMAGE SIMULATION AND SUBPIXEL CENTROIDDING FOR AN EARTH OBSERVING SENSOR</b>	<b>3300</b>
<i>Haopeng Zhang, Yi Su, Bowen Cai, Zhiguo Jiang, Beihang University, China</i>	
<b>TUP1-PQ.6: SPECTRAL CHARACTERIZATION AND SMILE CORRECTION FOR THE IMAGING SPECTROSCOPY MISSION ENMAP</b>	<b>3304</b>
<i>Tobias Storch, DLR - German Aerospace Center, Germany; Hans-Peter Honold, OHB System AG, Germany; Harald Krawczyk, DLR - German Aerospace Center, Germany; Richard Wachter, OHB System AG, Germany; Raquel de los Reyes, Maximilian Langheinrich, DLR - German Aerospace Center, Germany; Martin Muecke, OHB System AG, Germany; Sebastian Fischer, DLR - German Aerospace Center, Germany</i>	
<b>TUP1-PQ.8: QUALITY OF INTA-AHS IMAGES FOR ESTIMATING APPARENT THERMAL INERTIA IN SOILS</b>	<b>3311</b>
<i>Eduardo de Miguel, Víctor Bartolomé Carrascosa, INTA, Spain; Malena González Lagos, ISDEFE, Spain; Marcos Jiménez Michavila, INTA, Spain; Thomas Schmid, CIEMAT, Spain; Óscar Gutiérrez de la Cámara, INTA, Spain</i>	
<b>TUP1-PQ.9: REMOVING SUNLIGHT DAMAGE PATTERNS IN SHATTER-LESS BOLOMETER IMAGES BY UTILIZING DEEPSPACE OBSERVATIONS</b>	<b>3315</b>
<i>Toru Kouyama, Soushi Kato, National Institute of Advanced Industrial Science and Technology, Japan; Tetsuya Fukuhara, Rikkyo University, Japan; Hiroaki Akiyama, Wakayama University, Japan; Ryosuke Nakamura, National Institute of Advanced Industrial Science and Technology, Japan</i>	
<b>TUP1-PQ.10: RADIATION BUDGET INSTRUMENT ON-BOARD SOLAR CALIBRATION TARGET – CONCEPT AND OPERATION</b>	<b>3319</b>
<i>Georgi Georgiev, Yana Williams, NASA, United States; Christopher Randall, SSAI, United States; Kory Priestley, Elena Georgieva, NASA, United States</i>	
 <b>TUP2-PQ: GNSS-R III: SENSORS AND APPLICATIONS</b>	
<b>TUP2-PQ.1: A GNSS-R FORWARD MODEL FOR DELAY-DOPPLER MAP ASSIMILATION</b>	<b>3323</b>
<i>Feixiong Huang, James Garrison, Purdue University, United States; Mark Leidner, Atmospheric and Environmental Research, United States; Bachir Annane, Cooperative Institute for Marine and Atmospheric Studies, United States; Ross Hoffman, Atmospheric and Environmental Research, United States</i>	
<b>TUP2-PQ.2: REAL-VALUED SOLUTIONS TO AN INVERSE FRESNEL PROBLEM IN GNSS-R</b>	<b>3327</b>
<i>Patrizia Savi, Politecnico di Torino, Italy; Albert James Milani, Botswana International University of Science and Technology, Botswana</i>	
<b>TUP2-PQ.3: PRELIMINARY ALTIMETRY RESULTS OF THE MALYGNSS INSTRUMENT IN THE HUMIT PROJECT</b>	<b>3331</b>
<i>Raul Onrubia, Daniel Pascual, Jorge Querol, Jordi Castellvi-Esturi, Universitat Politècnica de Catalunya, Spain; Jordi Corbera Simó, Institut Cartogràfic i Geològic de Catalunya, Spain; Hyuk Park, Adriano Camps, Universitat Politècnica de Catalunya, Spain</i>	
<b>TUP2-PQ.4: COMPARISON OF INTEGRATED PRECIPITABLE WATER DERIVED FROM COSMIC OCCULTATION DATA AND GROUND GPS MEASUREMENTS</b>	<b>3335</b>
<i>Wenyang He, LAGEO, Institute of Atmospheric Physics, Chinese Academy of Sciences, China</i>	
<b>TUP2-PQ.5: IONOSPHERIC SCINTILLATION MONITORING USING GNSS-R?</b>	<b>3339</b>
<i>Adriano Camps, Hyuk Park, Universitat Politècnica de Catalunya-BarcelonaTech &amp; IEEC/CTE-UPC, Spain; José Miguel Juan, Jaume Sanz, Guillermo González-Casado, Universitat Politècnica de Catalunya - BarcelonaTech, Spain; Jose Barbosa, RDA -Research and Development in Aerospace GmbH, Spain; Vincent Fabbro, Joel Lemorton, ONERA, France; Raul Orús, European Space Agency/ESTEC, Netherlands</i>	
<b>TUP2-PQ.6: SPACEBORNE GNSS REFLECTOMETRY DATA FOR LAND APPLICATIONS: AN ANALYSIS OF TECHDEMOSAT DATA</b>	<b>3343</b>
<i>Nazzareno Pierdicca, Sapienza Università di Roma, Italy; Antonio Mollfulleda, Starlab, Spain; Fabiano Costantini, Deimos Engenharia S.A, Portugal; Leila Guerriero, Laura Dente, Tor Vergata University of Rome, Italy; Simonetta Paloscia, Emanuele Santi, IFAC-CNR, Italy; Mehrez Zribi, CESBIO, France</i>	

<b>TUP2-PQ.8: THE ADVANCEMENTS IN RESEARCH OF FY-3 GNOS II AND INSTRUMENT PERFORMANCE</b>	<b>3347</b>
<i>Qifei Du, Yueqiang Sun, Weihua Bai, Xianyi Wang, Dongwei Wang, Xiangguang Meng, Yuerong Cai, Junming Xia, Chunjun Wu, Congliang Liu, Wei Li, Cheng Liu, National Space Science Center, China</i>	
 <b>TUPI-PR: CLOSE RANGE REMOTE SENSING I</b>	
<b>TUPI-PR.2: ESTIMATION MODEL FOR DUST-RETENTION CONTENT OF MAIN GREEN PLANTS IN SOUTH CHINA BASED ON THE RED EDGE OF REFLECTANCE</b>	<b>3355</b>
<i>Chongyang Wang, Guangzhou Institute of Geography, China; Chen Zhang, Guangzhou Institute of Geography; Shandong University of Science and Technology, China; Xia Zhou, Ji Yang, Wenlong Jing, Shuisen Chen, Guangzhou Institute of Geography, China</i>	
<b>TUPI-PR.3: DENSITY BASED SPATIO-TEMPORAL TRAJECTORY CLUSTERING ALGORITHM</b>	<b>3358</b>
<i>Zhiyuan Cheng, Ling Jiang, Desheng Liu, Zezhong Zheng, University of Electronic Science and Technology of China, China</i>	
<b>TUPI-PR.5: ON THE INFLUENCE OF SPATIAL RESOLUTION IN SOIL SURFACE ROUGHNESS CHARACTERIZATION USING TLS AND SFM TECHNIQUES</b>	<b>3362</b>
<i>Alex Martinez-Agirre, Jesús Álvarez-Mozos, Rafael Giménez, Public University of Navarre, Spain; Milutin Milenkovic, Norbert Pfeifer, Technische Universität Wien, Austria; José Manuel Valle Melón, Álvaro Rodríguez Miranda, University of the Basque Country, Spain</i>	
<b>TUPI-PR.6: DETERMINATION OF DEGREE OF DAMAGE ON BUILDING ROOFS DUE TO WIND DISASTER FROM CLOSE RANGE REMOTE SENSING IMAGES USING TEXTURE WAVELET ANALYSIS</b>	<b>3366</b>
<i>Sudha Radhika, BITS Pilani Hyderabad Campus, India; Yukio Tamura, Chongqing University, Tokyo Polytechnic University, Japan; Masahiro Matsui, Tokyo Polytechnic University, Japan</i>	
<b>TUPI-PR.7: VERY HIGH-RESOLUTION IMAGING OF THE CITY OF GOMA (NORTH KIVU, D.R. CONGO) USING SFM-MVS PHOTOGRAMMETRY</b>	<b>3370</b>
<i>Benoît Smets, Caroline Michellier, Royal Museum for Central Africa, Belgium; Adalbert M. Syavulisembo, Goma Volcano Observatory, Democratic Republic of the Congo; Gustave Munganga, Institut Géographique du Congo, Democratic Republic of the Congo; Nicolas d'Oreye, European Center for Geodynamics and Seismology, Luxembourg; François Kervyn, Royal Museum for Central Africa, Belgium</i>	
<b>TUPI-PR.8: A HIGH-PRECISION ELLIPTICAL TARGET IDENTIFICATION METHOD FOR IMAGE SEQUENCES</b>	<b>3374</b>
<i>Shouzhu Zheng, Peng Chen, Sicong Liu, Xiaolong Ma, Sa Gao, Xiaohua Tong, Tongji University, China</i>	
<b>TUPI-PR.9: A GRID PROJECTION METHOD BASED ON ULTRASONIC SENSOR FOR PARKING SPACE DETECTION</b>	<b>3378</b>
<i>Yunfeng Shao, Pengzhen Chen, Tongtong Cao, Huawei Digital Technologies Co., Ltd., China</i>	
<b>TUPI-PR.10: USE OF SHORT RANGE SENSOR FOR TEMPORAL ANALYSIS OF VEGETATION COVER INDEX FOR AN EXPERIMENT CONSIDERING EROSION CONTROL WITH VERTIVER PLANT ASSOCIATED WITH BIODEGRADABLE GEOMESHES</b>	<b>3382</b>
<i>Felipe Franca Lafaiete, Regla Toujaguez, Federal University of Alagoas, Brazil</i>	
 <b>TUP2-PR: OPTICAL CALIBRATION III</b>	
<b>TUP2-PR.1: STREAMLINED USER INTERFACES FOR FIELD SPECTRORADIOMETERS</b>	<b>3385</b>
<i>Andreas Hueni, University of Zürich, Switzerland; Raphael Bolliger, Andreas Luescher, Yarx GmbH, Switzerland; Patrick Wigger, Roland Mosimann, Martin Gwerder, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland</i>	

<b>TUP2-PR.3: RADIOMETRIC PERFORMANCE OF MULTISPECTRAL CAMERA APPLIED TO OPERATIONAL PRECISION AGRICULTURE</b>	<b>3393</b>
<i>José González-Piqueras, Sergio Sánchez, Julio Villodre, University of Castilla-La Mancha, Spain; Horacio López, Instituto Técnico Agronómico Provincial (ITAP) and FUNDESCAM, Spain; Alfonso Calera, David Hernández-López, Juan Manuel Sánchez, University of Castilla-La Mancha, Spain</i>	
<b>TUP2-PR.4: A METROLOGICAL APPROACH TO PRODUCING HARMONISED FUNDAMENTAL CLIMATE DATA RECORDS FROM LONG-TERM SENSOR SERIES DATA</b>	<b>3397</b>
<i>Samuel Hunt, National Physical Laboratory, United Kingdom; Ralf Quast, FastOpt GmbH, Germany; Peter Harris, National Physical Laboratory, United Kingdom; Jonathan Mittaz, University of Reading, National Physical Laboratory, United Kingdom; Emma Woolliams, National Physical Laboratory, United Kingdom; Ralf Giering, FastOpt GmbH, Germany; Arta Dilo, National Physical Laboratory, United Kingdom; Christopher Merchant, University of Reading, United Kingdom</i>	
<b>TUP2-PR.5: A DENSE VECTOR MATCHING APPROACH FOR BAND TO BAND REGISTRATION OF ALSAT-2 IMAGES</b>	<b>3401</b>
<i>Issam Boukerch, Nezha Farhi, Moussa Sofiane Karoui, Khelifa Djerriri, Redouane Mahmoudi, Centre des Techniques Spatiales, Algeria</i>	
<b>TUP2-PR.7: ENABLING GROUND BASED MATERIALS ANALYSIS AND IDENTIFICATION USING REFLECTANCE SPECTROSCOPY</b>	<b>3408</b>
<i>Bogdan Lita, Brian Curtiss, Gary A. Fager, Lee Feldman, Susan M. Parks, Kevin B. Tanguay, ASD Inc. a Malvern Panalytical Brand, United States</i>	
<b>TUP2-PR.8: MULTI-SENSOR INTEGRATION ONBOARD A UAV-BASED MOBILE MAPPING SYSTEM FOR AGRICULTURAL MANAGEMENT</b>	<b>3412</b>
<i>Magdy Elbahnasawy, Tamer Shamseldin, Radhika Ravi, Tian Zhou, Yun-Jou Lin, Ali Masjedi, Evan Flatt, Melba Crawford, Ayman Habib, Purdue University, United States</i>	
 <b>TUP1-PS: GLOBAL ESSENTIAL VARIABLES II</b>	
<b>TUP1-PS.1: MAPPING OF PLANT FUNCTIONAL TYPE FROM SATELLITE-DERIVED LAND COVER DATASETS FOR CLIMATE MODELS</b>	<b>3416</b>
<i>Libo Wang, Paul Bartlett, Ed Chan, Ming Xiao, Environment and Climate Change Canada, Canada</i>	
<b>TUP1-PS.2: SPECTRAL IDENTIFICATION OF NATIVE AND NON-NATIVE PLANT SPECIES FOR BIODIVERSITY ASSESSMENTS</b>	<b>3420</b>
<i>Maria Santos, University of Zürich, Switzerland; Susan Ustin, University of California, Davis, United States</i>	
<b>TUP1-PS.3: A GLOBAL ANALYSIS OF LAND SURFACE TEMPERATURE DIURNAL CYCLE</b>	<b>3424</b>
<i>Zahra Sharifnezhadazizi, City College of New York, United States; Christopher Beale, Hamid Norouzi, Reginald Blake, Sergio Cortes, Makini Valentine, New York City College of Technology, United States</i>	
<b>TUP1-PS.5: HIGH RESOLUTION ALBEDO ESTIMATION WITH CHINESE GF-1 WFV DATA</b>	<b>3426</b>
<i>Hongmin Zhou, Beijing Normal University, China; Ni Hu, Patent examination cooperation center of sipo, China; Tao He, Wuhan University, China; Shunlin Liang, University of Maryland, United States; Jindi Wang, Beijing Normal University, China</i>	
<b>TUP1-PS.6: ESTIMATION OF 1-KM ALL-WEATHER LAND SURFACE TEMPERATURE OVER THE TIBETAN PLATEAU</b>	<b>3430</b>
<i>Xiaodong Zhang, Ji Zhou, Weichen Dong, University of Electronic Science and Technology of China, China; Lisheng Song, Southwestern University, China</i>	
<b>TUP1-PS.7: NEW SCHEME FOR ESTIMATING LAND SURFACE TEMPERATURE FROM AMSR-E OVER THE CONTINENTAL UNITED STATES</b>	<b>3434</b>
<i>Rui Zhao, Jilin University, China; Tianxing Wang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Zhiguo Meng, Jilin University, China; Jiancheng Shi, Wang Zhou, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Shangnan Li, Jilin University, China</i>	

## TUP2-PS: BIG MACHINE LEARNING I

### TUP2-PS.1: TOWARDS INTERNET OF THINGS BASED APPROACH FOR USING ARCHIVES ..... 3437 OF EARTH OBSERVATION FOR CROP WATER MANAGEMENT IN SEMI-ARID AREAS

*Suryakant Sawant, Jayant Mohite, TCS Innovation Labs, Tata Consultancy Services, India*

### TUP2-PS.2: TOWARD THE USE OF DEEP LEARNING FOR TOPOGRAPHIC FEATURE ..... 3441 EXTRACTION FROM HIGH RESOLUTION OPTICAL SATELLITE IMAGERY

*Jean-Samuel Proulx-Bourque, Mathieu Turgeon-Pelchat, Canada Center for Mapping and Earth Observation, Canada*

### TUP2-PS.3: DEEP LEARNING NEURAL NETWORKS FOR LAND USE LAND COVER ..... 3445 MAPPING

*Christopher Storie, Christopher Henry, The University of Winnipeg, Canada*

### TUP2-PS.4: DEEP HYBRID WAVELET NETWORK FOR ICE BOUNDARY DETECTION IN ..... 3449 RADAR IMAGERY

*Hamid Kamangir, Maryam Rahneemofar, Dugan Dobbs, John Paden, Geoffrey Fox, Texas A&M University-Corpus Christi, United States*

### TUP2-PS.7: BUILDING DETECTION AND SEGMENTATION USING A CNN WITH ..... 3461 AUTOMATICALLY GENERATED TRAINING DATA

*Xiangyu Zhuo, German Aerospace Center (DLR), Germany; Friedrich Fraundorfer, Graz University of Technology, Austria; Franz Kurz, Peter Reinartz, German Aerospace Center (DLR), Germany*

## TUP1-PT: ADVANCES IN MODEL-DATA INTEGRATION AND ASSIMILATION

### TUP1-PT.1: A METHOD FOR MULTISCALE ESTIMATION OF LEAF AREA INDEX FROM ..... 3465 TIME-SERIES MULTI-SOURCE REMOTE SENSING DATA

*Xuchen Zhan, Zhiqiang Xiao, Beijing Normal University, China; Jingyi Jiang, French National Institute for Agricultural Research, France*

### TUP1-PT.2: SOFTWARE SUITE FOR CREATING DOWNSTREAM APPLICATIONS AND ..... 3469 THEMATIC SERVICES ON THE BASE OF REMOTE SENSING DATA PROCESSING AND INTEGRATED MODELLING

*Viacheslav Zelentsov, Semen Potryasaev, Ilya Pimanov, Viktor Mochalov, St. Petersburg Institute for Informatics and Automation of the Russian Academy of Sciences, Russian Federation*

### TUP1-PT.3: DISASTER MONITORING AND EMERGENCY RESPONSE SERVICES IN CHINA ..... 3473

*Jianjun Wu, Xinyi Han, Beijing Normal University, China; Yi Zhou, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Peng Yue, Wuhan University, China; Xiaoqing Wang, Institute of Earthquake Forecasting, China Earthquake Administration, China; Jingxuan Lu, China Institute of Water Resources and Hydropower Research, China; Weiguo Jiang, Jing Li, Hong Tang, Beijing Normal University, China; Futao Wang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Xiaotao Li, China Institute of Water Resources and Hydropower Research, China; Jinlong Fan, National Satellite Meteorological Center, China Meteorological Administration, China*

### TUP1-PT.4: A MULTIMODAL APPROACH TO MAPPING SOUNDSCAPES ..... 3477

*Tawfiq Salem, Menghua Zhai, Scott Workman, Nathan Jacobs, University of Kentucky, United States*

## TUP2-PT: NEW REMOTE SENSING TECHNIQUES AND METHODS III

### TUP2-PT.1: EVALUATION OF A NEW VISIOMETER FOR AUTOMATED VISIBILITY ..... 3481 OBSERVATION

*Jingli Wang, Institute of Urban Meteorology, China Meteorological Administration, Beijing, China, China; Xulin Liu, Beijing Meteorological Observation Center, China*

### TUP2-PT.2: THREE-DIMENSIONAL IMAGING APPROACH FOR A NOVEL AIRBORNE ..... 3485 ARRAY-ENCODING LIDAR

*Fan Xu, Daiyin Zhu, Xiaofei Zhang, Nanjing University of Aeronautics and Astronautics, China*

<b>TUP2-PT.3: MULTI-DISCRIMINATOR GENERATIVE ADVERSARIAL NETWORK FOR HIGH RESOLUTION GRAY-SCALE SATELLITE IMAGE COLORIZATION</b>	<b>3489</b>
<i>Feimo Li, Lei Ma, Jian Cai, Institute of Automation, Chinese Academy of Science, China</i>	
<b>TUP2-PT.5: SIMULATION STUDY OF THE EARTH RADIATION BUDGET EXPERIMENT ON THE MOON-BASED EARTH OBSERVATION PLATFORM</b>	<b>3497</b>
<i>Hanlin Ye, Huadong Guo, Guang Liu, Guozhuang Shen, Zhen Xu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>TUP2-PT.7: TESTING THE MEASURABILITY OF SUN INDUCED FLUORESCENCE UNDER OPTIMAL AND NON-OPTIMAL SKY CONDITIONS</b>	<b>3505</b>
<i>Marcos Jiménez, Adrián Moncholí, Elena Salido, Eduardo De Miguel, National Institute of Aerospace Technology (INTA), Spain</i>	
<b>TUP2-PT.8: CLOUD COVER ASSESSMENT IN SATELLITE IMAGES VIA DEEP ORDINAL CLASSIFICATION</b>	<b>3509</b>
<i>Chaomin Shen, Chenxiao Zhao, Mixue Yu, East China Normal University, China; Yaxin Peng, Shanghai University, China</i>	
<b>TUP2-PT.9: ESTIMATING PIXEL TO METRE SCALE AND SEA STATE FROM REMOTE OBSERVATIONS OF THE OCEAN SURFACE</b>	<b>3513</b>
<i>Antonis Loizou, Jacqueline Christmas, University of Exeter, United Kingdom</i>	
<b>TUP2-PT.10: METHOD TO ELIMINATE FARADAY ROTATION ANGLE AMBIGUITY ERROR IN LINEARLY POLARIZED SAR DATA</b>	<b>3517</b>
<i>Jinhui Li, Yifei Ji, Yongsheng Zhang, Qilei Zhang, Haifeng Huang, Zhen Dong, National University of Defense Technology, China</i>	
 <b>TUP1-PU: NEW REMOTE SENSING TECHNIQUES AND METHODS II</b>	
<b>TUP1-PU.1: IMPROVED FLOOD MAPPING BASED ON THE FUSION OF MULTIPLE SATELLITE DATA SOURCES AND IN-SITU DATA</b>	<b>3521</b>
<i>Young-Joo Kwak, PWRI-ICHARM-UNESCO, Japan; Ramona Pelich, Luxembourg Institute of Science and Technology, Luxembourg; Jonggeol Park, Tokyo University of Information Sciences, Japan; Wataru Takeuchi, The University of Tokyo, Japan</i>	
<b>TUP1-PU.2: ATMOSPHERIC CORRECTION ICOR AND INTEGRATION IN OPERATIONAL WORKFLOWS</b>	<b>3524</b>
<i>Stefan Adriaensen, Sindy Sterckx, Liesbeth De Keukelaere, Ruben Van De Kerchove, Els Knaeps, VITO NV, Belgium</i>	
<b>TUP1-PU.3: THE GEOMETRY NUMERICAL SIMULATION AND ANALYSIS FOR MOON-BASED EARTH OBSERVATION</b>	<b>3527</b>
<i>Guozhuang Shen, Huadong Guo, Guang Liu, RADI, CAS, China</i>	
<b>TUP1-PU.4: THE MONITORING AND RESTORATION TECHNOLOGY OF GEOLOCATION ACCURACY OF HIGH SPATIAL RESOLUTION REMOTE SENSING DATA</b>	<b>3531</b>
<i>Victor Eremeev, Andrei Kochergin, Aleksei Kuznetsov, Vasilii Poshekhonov, Andrei Ryzhikov, Ryazan State Radio Engineering University, Russian Federation</i>	
<b>TUP1-PU.5: A METHOD OF RETRIEVING BRDF FROM SURFACE REFLECTED RADIANCE USING DECOUPLING OF ATMOSPHERIC RADIATIVE TRANSFER AND SURFACE REFLECTION</b>	<b>3535</b>
<i>Alexander Radkevich, Science Systems and Applications, Inc, United States</i>	
<b>TUP1-PU.7: A MODIFIED FRAMEWORK FOR SHIP DETECTION FROM COMPACT POLARIZATION SAR IMAGE</b>	<b>3539</b>
<i>Qiancong Fan, Feng Chen, Ming Cheng, Cheng Wang, Jonathan Li, Xiamen University, China</i>	
<b>TUP1-PU.8: A SEABORNE ISAR AUTOFOCUSING METHOD UNDER MINIMUM ENTROPY CRITERION</b>	<b>3543</b>
<i>Qun Zhang, Yichang Chen, Air Force Engineering University, China; Yong Wu, Shaanxi Institute of Metrology Science, China; Dan Wang, Air Force Engineering University, China</i>	

<b>TUP1-PU.10: SIMULATION AND SIGNAL DETECTION OF PHOTON COUNTING LIDAR DATA</b>	<b>3547</b>
<b>IN FORESTED AREA</b>	
<i>Bowei Chen, Yong Pang, Zengyuan Li, Chinese Academy of Forestry, China; Peter North, Jacqueline Rosette, Iain Bye, Swansea University, United Kingdom; Hao Lu, Beijing Forestry University, China; Liuxia Liu, Anhui Agricultural University, China; Zhenyu Ma, Chinese Academy of Forestry, China</i>	
<b>WE1-R1: MANIFOLD LEARNING</b>	
<b>WE1-R1.1: IMPROVING LINEAR CLASSIFICATION USING SEMI-SUPERVISED</b>	<b>3551</b>
<b>INVERTIBLE MANIFOLD ALIGNMENT</b>	
<i>Wolfgang Gross, Nayeli Espinosa, Merlin Becker, Simon Schreiner, Wolfgang Middelmann, Fraunhofer Institute of Optronics, System Technologies and Image Exploitation (IOSB), Germany</i>	
<b>WE1-R1.2: LEARNING A STABLE LOCAL MANIFOLD REPRESENTATION FOR</b>	<b>3555</b>
<b>HYPERSPECTRAL LINEAR DIMENSIONALITY REDUCTION</b>	
<i>Wenbo Yu, Miao Zhang, Yi Shen, Harbin Institute of Technology, China</i>	
<b>WE1-R1.4: FULLY CONVOLUTIONAL NETWORK WITH POLARIMETRIC MANIFOLD FOR</b>	<b>3563</b>
<b>SAR IMAGERY CLASSIFICATION</b>	
<i>Mingxia Tu, Gong Han, Xinlong Liu, Chu He, Wuhan University, China</i>	
<b>WE1-R1.5: A MANIFOLD LEARNING APPROACH OF LAND COVER CLASSIFICATION FOR</b>	<b>3567</b>
<b>OPTICAL AND SAR FUSING DATA</b>	
<i>Xiangyu Tan, Yunnan Electric Power Research Institute, Yunnan Power Grid Co., Ltd., China; Shaobin Jiang, Zezhong Zheng, Pingchuan Zhong, University of Electronic Science and Technology of China, China; Mingcang Zhu, Land and Resources Department of Sichuan Province, China; Yong He, Sichuan Institute of Geo-Environment Monitoring, China; Zhenlu Yu, Na Wang, Ling Jiang, University of Electronic Science and Technology of China, China; Guoqing Zhou, Guangxi Key Laboratory for Spatial Information and Geomatics, China; Hongsheng Zhang, The Chinese University of Hong Kong, China; Jiang Li, Old Dominion University, United States</i>	
<b>WE2-R1: HYPERSPECTRAL IMAGE CLASSIFICATION I</b>	
<b>WE2-R1.1: HYPERSPECTRAL IMAGE CLASSIFICATION BASED ON CAPSULE NETWORK</b>	<b>3571</b>
<i>Wei-Ye Wang, Heng-Chao Li, Lei Pan, Gang Yang, Southwest Jiaotong University, China; Qian Du, Mississippi State University, China</i>	
<b>WE2-R1.2: AN ADVERSARIAL APPROACH TO CROSS-SENSOR HYPERSPECTRAL DATA</b>	<b>3575</b>
<b>CLASSIFICATION</b>	
<i>Mesay Belete Bejiga, Farid Melgani, University of Trento, Italy</i>	
<b>WE2-R1.3: GLOBAL SPATIAL AND LOCAL SPECTRAL SIMILARITY-BASED GROUP SPARSE</b>	<b>3579</b>
<b>REPRESENTATION FOR HYPERSPECTRAL IMAGERY CLASSIFICATION</b>	
<i>Haoyang Yu, University of Chinese Academy of Sciences, China; Lianru Gao, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Wenzhi Liao, IMEC-TELIN-Ghent University, Belgium; Paolo Gamba, Dipartimento di Ingegneria Industriale e dell'Informazione, Università degli Studi di Pavia, Italy; Bing Zhang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>WE2-R1.4: AN UNMIXING-BASED CONTENT RETRIEVAL METHOD FOR HYPERSPECTRAL</b>	<b>3583</b>
<b>IMAGERY REPOSITORY ON CLOUD COMPUTING PLATFORM</b>	
<i>Peng Zheng, Zebin Wu, Nanjing University of Science and Technology, China; Weixuan Zhang, Jingling High School, China; Min Li, Nanjing University of Science and Technology, China; Jiandong Yang, China Satellite Maritime Tracking and Control Department, China; Yi Zhang, Zhihui Wei, Nanjing University of Science and Technology, China</i>	
<b>WE2-R1.5: COVARIANCE MATRIX BASED FEATURE FUSION FOR SCENE CLASSIFICATION</b>	<b>3587</b>
<i>Nanjun He, Leyuan Fang, Shutao Li, Hunan University, China; Antonio Plaza, University of Extremadura, Spain</i>	

## **WE3-R1: DEEP LEARNING FOR HYPERSPECTRAL REMOTE SENSING**

### **WE3-R1.1: HYPERSPECTRAL IMAGE CLASSIFICATION BASED ON A CONVOLUTIONAL NEURAL NETWORK AND DISCONTINUITY PRESERVING RELAXATION ..... 3591**

*Qishuo Gao, Samsung Lim, University of New South Wales, Australia*

### **WE3-R1.2: SIMILARITY-PRESERVING DEEP FEATURES FOR HYPERSPECTRAL IMAGE CLASSIFICATION ..... 3595**

*Weiwei Song, Leyuan Fang, Shutao Li, Hunan University, China*

### **WE3-R1.3: LARGE-SCALE LAND COVER CLASSIFICATION IN GAOFEN-2 SATELLITE IMAGERY ..... 3599**

*Xin-Yi Tong, Qikai Lu, Gui-Song Xia, Liangpei Zhang, Wuhan University, China*

### **WE3-R1.4: EVALUATION OF DIFFERENT REGULARIZATION METHODS FOR THE EXTREME LEARNING MACHINE APPLIED TO HYPERSPECTRAL IMAGES .....3603**

*Juan M. Haut, Hyperspectral Computing Laboratory, Spain; Yi Liu, Faculty of Information Technology and Electrical Engineering, Norway; Mercedes E. Paoletti, Hyperspectral Computing Laboratory, Spain; Xiong Xu, College of Surveying and Geo-Informatics, China; Javier Plaza, Antonio Plaza, Hyperspectral Computing Laboratory, Spain*

### **WE3-R1.5: AN INVESTIGATION ON SELF-NORMALIZED DEEP NEURAL NETWORKS FOR HYPERSPECTRAL IMAGE CLASSIFICATION ..... 3607**

*Mercedes E. Paoletti, Juan M. Haut, Javier Plaza, Antonio Plaza, Hyperspectral Computing Laboratory, Spain*

## **WE4-R1: LEARNING AND DOMAIN ADAPTATION**

### **WE4-R1.1: SEMISUPERVISED ADVERSARIAL DISCRIMINATIVE DOMAIN ADAPTATION, WITH APPLICATION TO REMOTE SENSING DATA ..... 3611**

*Rui Wang, Leslie Collins, Kyle Bradbury, Jordan Malof, Duke University, United States*

### **WE4-R1.2: BOOSTING FOR DOMAIN ADAPTATION EXTREME LEARNING MACHINES FOR HYPERSPECTRAL IMAGE CLASSIFICATION ..... 3615**

*Junshi Xia, The University of Tokyo, Japan; Naoto Yokoya, RIKEN Center for Advanced Intelligence Project, Japan; Akira Iwasaki, The University of Tokyo, Japan*

### **WE4-R1.3: A NOVEL METHOD BASED ON SOURCE DOMAIN UNDERSTANDING AND MODELING TO TRANSFER LABELS FROM LAND-COVER VECTOR MAPS TO CLASSIFIERS FOR MULTISPECTRAL IMAGES ..... 3619**

*Claudia Paris, Lorenzo Bruzzone, University of Trento, Italy; Diego Fernández-Prieto, European Space Agency, Italy*

### **WE4-R1.4: DOMAIN ADAPTATION FOR LARGE SCALE CLASSIFICATION OF VERY HIGH RESOLUTION SATELLITE IMAGES WITH DEEP CONVOLUTIONAL NEURAL NETWORKS ..... 3623**

*Tristan Postadjian, Arnaud Le Bris, Univ. Paris Est, LASTIG MATIS, IGN, ENSG, France; Hichem Sahbi, CNRS, LIP6 UPMC Sorbonne Universités, Paris, France; Clément Mallet, Univ. Paris Est, LASTIG MATIS, IGN, ENSG, France*

### **WE4-R1.5: CROSS-DOMAIN CNN FOR HYPERSPECTRAL IMAGE CLASSIFICATION ..... 3627**

*Hyungtae Lee, Sungmin Eum, Booz Allen Hamilton Inc., United States; Heesung Kwon, US Army Research Laboratory, United States*

## **WE1-R2: TARGET RECOGNITION**

### **WE1-R2.1: SALIENT OBJECT DETECTION VIA DOUBLE SPARSE REPRESENTATIONS UNDER VISUAL ATTENTION GUIDANCE ..... 3631**

*Xiang Wang, Yongjun Zhang, Xunwei Xie, Yansheng Li, School of Remote Sensing and Information Engineering, Wuhan University, China*

**WE1-R2.2: AIRCRAFT TARGET RECOGNITION USING COPULA JOINT STATISTICAL MODEL ..... 3635  
AND SPARSE REPRESENTATION BASED CLASSIFICATION**

*Ayoub Karine, Lab-STICC UMR CNRS 6285, ENSTA Bretagne, Brest, France & LRIT-CNRST, URAC 29, Rabat IT Center, Faculty of Sciences, Mohammed V University in Rabat, Rabat, Morocco, Morocco; Abdelmalek Toumi, Khenchaf Ali, Lab-STICC UMR CNRS 6285, ENSTA Bretagne, Brest, France, France; Mohammed El Hassouni, LRIT-CNRST, URAC 29, Rabat IT Center, FLSH, Mohammed V University in Rabat, Rabat, Morocco, Morocco*

**WE1-R2.3: HIGH FRAME-RATE BASED MOVING POINT TARGET DETECTION..... 3639**

*Wenlong Niu, Yong Wu, Wei Zheng, Zhen Yang, National Space Science Center, Chinese Academy of Sciences, China; Balazs Vagvolgyi, Johns Hopkins University, United States; Bo Liu, National Space Science Center, Chinese Academy of Sciences, China*

**WE1-R2.4: DETECTING ANIMALS IN REPEATED UAV IMAGE ACQUISITIONS BY MATCHING ..... 3643  
CNN ACTIVATIONS WITH OPTIMAL TRANSPORT**

*Benjamin Kellenberger, Diego Marcos, Wageningen University, Netherlands; Nicolas Courty, Université de Bretagne du Sud, France; Devis Tuia, Wageningen University, Netherlands*

**WE1-R2.5: TASK-ADAPTED TARGET RECOGNITION FOR TIME-SENSITIVE SPACE ..... 3647  
INFORMATION NETWORKS**

*Leigang Huo, Guangxi Teachers Education University, China; Yushuang Zhang, Beijing Institute of Applied Physics and Computational Mathematics, China; Chunlei Huo, Institute of Automation, Chinese Academy of Sciences, China; Jiayuan Yu, Yunpeng Jing, Beijing University of Civil Engineering and Architecture, China*

**WE2-R2: BISTATIC AND DIGITAL BEAMFORMING I**

**WE2-R2.1: REPEAT-PASS SPACEBORNE TRANSMITTER-STATIONARY RECEIVER BISTATIC ..... 3651  
SAR INTERFEROMETRY - FIRST RESULTS**

*Andrei Anghel, Remus Cacoveanu, University Politehnica of Bucharest, Romania; Mihai Datcu, University Politehnica of Bucharest/German Aerospace Center (DLR), Germany*

**WE2-R2.2: A NEW SLOW PRI VARIATION SCHEME FOR MULTICHANNEL SAR ..... 3655  
HIGH-RESOLUTION WIDE-SWATH IMAGING**

*Felipe Queiroz de Almeida, Marwan Younis, Gerhard Krieger, Alberto Moreira, German Aerospace Center (DLR), Germany*

**WE2-R2.3: INVESTIGATIONS ON THE RECONSTRUCTION OF MULTISTATIC LARGE ..... 3659  
ALONG-TRACK SAR CONSTELLATIONS FOR HRWS IMAGING**

*Nida Sakar, Marc Rodriguez-Cassola, Pau Prats-Iraola, Andreas Reigber, Alberto Moreira, German Aerospace Center (DLR), Germany*

**WE2-R2.4: AZIMUTH AMBIGUITY SUPPRESSION FOR MULTICHANNEL ..... 3663  
GEOSYNCHRONOUS SPACEBORNE-AIRBORNE BISTATIC SAR**

*Hongyang An, Junjie Wu, Zhichao Sun, Jianyu Yang, Yulin Huang, Haiguang Yang, University of Electronic Science and Technology of China, China*

**WE2-R2.5: ANALYSIS OF NSRCM IN BIFORSAR IMAGERY ..... 3667**

*Wei Pu, University of Electronic Science and Technology of China, China; Yulin Huang, Junjie Wu, Jianyu Yang, Haiguang Yang, UESTC, China*

**WE3-R2: SAR IMAGE FORMATION I**

**WE3-R2.1: CIRCULAR SAR IMAGING OF NOT PLANAR TARGETS. LIMITATIONS OF THE ..... 3671  
“HEIGHT FROM FOCUS” PARADIGM.**

*Hubert Cantalloube, ONERA, France*

**WE3-R2.2: AN EFFICIENT IMAGE FORMATION ALGORITHM FOR SPACEBORNE VIDEO SAR..... 3675**

*Jian Liang, Running Zhang, Lixiang Ma, Zheng Lv, Ke Jiao, Dawei Wang, Zhiyun Tan, Beijing Institute of Spacecraft System Engineering, China*



<b>WE3-R2.3: A DOPPLER CENTROID ESTIMATOR FOR SYNTHETIC APERTURE RADAR BASED ON PHASE CENTER POINT TRACKING</b>	<b>3679</b>
<i>Jingzeng Wang, Junjie Wu, Wei Pu, Wenchao Li, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
<b>WE3-R2.4: AIRBORNE SAR FOCUSING IN TIME DOMAIN: EFFECTS OF EXTERNAL DEM ERRORS</b>	<b>3683</b>
<i>Antonio Natale, Carmen Esposito, Riccardo Lanari, IREA-CNR, Italy; Stefano Perna, Università degli Studi di Napoli "Parthenope", Italy</i>	
 <b>WE4-R2: SAR IMAGE FORMATION II</b>	
<b>WE4-R2.1: SPHERICAL HARMONIC-BASED SPECTRAL PROJECTION MODEL FOR HOLOGRAPHIC SAR IMAGING</b>	<b>3687</b>
<i>Dayalan Kasilingam, John Summerfield, University of Massachusetts Dartmouth, United States</i>	
<b>WE4-R2.2: EFFICIENT AUTOFOCUS FOR 3-D SAR SPARSE IMAGING BASED ON JOINT CRITERION OPTIMIZATION</b>	<b>3691</b>
<i>Shunjun Wei, Min Yan, Bokun Tian, Lin Pu, Xiaoling Zhang, Jun Shi, University of Electronic Science and Technology of China, China</i>	
<b>WE4-R2.3: SPARSE-CODING ADAPTED TO SAR IMAGES WITH AN APPLICATION TO DESPECKLING</b>	<b>3695</b>
<i>Sonia Tabti, Université de Caen, France; Luisa Verdoliva, Giovanni Poggi, Università degli Studi di Napoli, Federico II, Italy</i>	
<b>WE4-R2.4: FOCUSING OF SPACEBORNE BISTATIC SAR DATA BASED ON TIME-DOMAIN PERTURBATION</b>	<b>3699</b>
<i>Zheng Lu, Yu Zhu, Beijing Institute of Spacecraft System Engineering, China; Yuekun Wang, National Laboratory of Radar Signal Processing, China; Mingming Xu, Tengfei Li, Beijing Institute of Spacecraft System Engineering, China; Zhenfang Li, National Laboratory of Radar Signal Processing, China</i>	
<b>WE4-R2.5: MULTICHANNEL SLIDING SPOTLIGHT SAR IMAGING BASED ON SPARSE SIGNAL PROCESSING</b>	<b>3703</b>
<i>Zhilin Xu, Zhonghao Wei, Chenyang Wu, Bingchen Zhang, University of Chinese Academy of Sciences, China</i>	
 <b>WE1-R3: MICROWAVE ALGORITHMS FOR SOIL MOISTURE II</b>	
<b>WE1-R3.1: TOWARDS MULTI-FREQUENCY SOIL MOISTURE RETRIEVAL USING P- AND L-BAND PASSIVE MICROWAVE SENSING TECHNOLOGY</b>	<b>3707</b>
<i>Nan Ye, Xiaoling Wu, Jeffrey Walker, Nithyapriya Boopathi, Monash University, Australia; Thomas Jackson, USDA-ARS, United States; Yann Kerr, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France; Edward Kim, NASA, United States; Andrew McGrath, Flinders University, Australia; In-Young Yeo, The University of Newcastle, Australia; Mahta Moghaddam, University of Southern California, United States</i>	
<b>WE1-R3.2: GLOBAL COMPARISON OF SURFACE SOIL MOISTURE FROM THE ESA CCI COMBINED PRODUCT AND THE ORCHIDEE LAND-SURFACE MODEL</b>	<b>3711</b>
<i>Nina Raoult, Bertrand Delorme, Vladislav Bastrikov, Catherine Ottlé, Philippe Peylin, Laboratoire des Sciences du Climat et de l'Environnement, France</i>	
<b>WE1-R3.3: THE ADDED-VALUE OF SATELLITE SOIL MOISTURE OBSERVATIONS OVER IRRIGATED AREAS TO SUPPORT LAND SURFACE MODEL DEVELOPMENTS</b>	<b>3715</b>
<i>Amen Al-Yaari, Jean-Pierre Wigneron, INRA, France; Fredrique Cheruy, UMR METIS, CNRS/UPMC, Paris, France, France; Wade Crow, Science Systems and Applications, Inc, France; Claire Magand, UMR METIS, CNRS/UPMC, Paris, France, France; Lei Fan, INRA, France; Yann Kerr, CESBIO, France; Agnes Ducharne, CNRS/IPSL/LMD, Université Pierre et Marie Curie, Paris, France, France</i>	
<b>WE1-R3.4: ASSESSMENT OF SOIL MOISTURE INFORMATION CONTENT IN LEVEL-1 DATA FROM LOW-FREQUENCY ACTIVE AND PASSIVE MICROWAVE SENSORS</b>	<b>3719</b>
<i>Moritz Link, Matthias Drusch, Klaus Scipal, European Space Agency, Netherlands</i>	

**WE1-R3.5: ACCOUNTING FOR STATIC AND DYNAMIC OPEN WATER IN THE MODELING OF SMAP BRIGHTNESS TEMPERATURES OVER PEATLANDS ..... 3723**

*Michel Bechtold, Simon De Cannière, KU Leuven (University of Leuven), Belgium; Rolf Reichle, NASA Goddard Space Flight Center, United States; Gabrielle De Lannoy, KU Leuven (University of Leuven), Belgium*

**WE2-R3: SOIL MOISTURE SCALING AND ASSESSMENT**

**WE2-R3.1: COMPARISON OF DIFFERENT HIGH-RESOLUTION SOIL MOISTURE PRODUCTS ACROSS AN AGRICULTURAL LANDSCAPE IN SOUTH-EASTERN AUSTRALIA ..... 3727**

*Christoph Rüdiger, Monash University, Australia; Alessandra Moneris, The University of Melbourne, Australia; David McJannet, CSIRO, Australia; Luigi Renzullo, Australian National University, Australia; Mariette Vreugdenhil, Wolfgang Wagner, Vienna University of Technology, Austria*

**WE2-R3.2: SMAP RADIOMETER SOIL MOISTURE DOWNSCALING IN CONUS..... 3731**

*Bin Fang, Venkat Lakshmi, University of South Carolina, United States; Rajat Bindlish, NASA Goddard Space Flight Center, United States; Thomas Jackson, USDA-ARS Hydrology and Remote Sensing Laboratory, United States*

**WE2-R3.3: SEQUENTIAL DOWNSCALING OF THE SMOS SOIL MOISTURE AT 100 M RESOLUTION VIA A VARIABLE INTERMEDIATE SPATIAL RESOLUTION ..... 3735**

*Nitu Ojha, Olivier Merlin, Beatriz Molero-Rodenas, Christophe Suere, Luis Olivera, Vincent Rivalland, CESBIO, Université de Toulouse, CNES/CNRS/IRD/UPS, France; Salah Er-Raki, Université Cadi Ayyad, Faculté des Sciences et Techniques, Morocco*

**WE2-R3.4: THE AQUI NETWORK: SOIL MOISTURE SITES IN THE “LES LANDES” FOREST AND GRAVES VINEYARDS (BORDEAUX AQUITAINE REGION, FRANCE) ..... 3739**

*Jean-Pierre Wigneron, Sylvia Dayau, Alain Kruszewski, Christelle Aluome, Marie Guillot-Ehret, Amen Al-Yaari, Lei Fan, Serhat Güven, Christophe Chipeaux, Christophe Moisy, Dominique Guyon, Denis Loustau, INRA, France*

**WE2-R3.5: VALIDATION OF SATELLITE MICROWAVE RETRIEVED SOIL MOISTURE WITH GLOBAL GROUND-BASED MEASUREMENTS ..... 3743**

*Amen Al-Yaari, INRA, France; Arnaud Mialon, CESBIO, France; Wouter Dorigo, Technische Universität Wien, France; Andreas Colliander, Jet Propulsion Laboratory, France; Lie Fan, INRA, France; Yann Kerr, CESBIO, France; Thierry Pellarin, University of Grenoble Alpes, France; Jean-Pierre Wigneron, INRA, France*

**WE3-R3: SCIENCE PRODUCTS AND RESULTS BASED ON NASA SOIL MOISTURE ACTIVE PASSIVE (SMAP) SATELLITE MISSION I**

**WE3-R3.1: SMAP MISSION STATUS, NEW PRODUCTS AND EXTENDED-PHASE GOALS ..... 3747**

*Dara Entekhabi, Massachusetts Institute of Technology, United States; Simon Yueh, Jet Propulsion Laboratory, United States; Peggy O’Neill, Goddard Space Flight Center, United States; Jared Entin, Tung-Han You, NASA Headquarters, United States*

**WE3-R3.2: SMAP MICROWAVE RADIOMETER: INSTRUMENT STATUS AND CALIBRATION FOR THE FIRST THREE YEARS OF OPERATION ..... 3751**

*Jeffrey Piepmeier, NASA Goddard Space Flight Center, United States; Jinzheng Peng, Universities Space Research Association, United States; Sidharth Misra, Jet Propulsion Laboratory, United States; Emmanuel Dinnat, Chapman University, United States; Simon Yueh, Jet Propulsion Laboratory, United States; Thomas Meissner, Remote Sensing Systems, United States; David Le Vine, NASA Goddard Space Flight Center, United States; Kacie Shelton, Adam Freedman, Scott Dunbar, Steven Chan, Julian Chaubell, Jet Propulsion Laboratory, United States; Rajat Bindlish, Giovanni De Amici, NASA Goddard Space Flight Center, United States; Priscilla Mohammed, Morgan State University, United States; Liang Hong, Science Application International Corporation, United States*

**WE3-R3.3: SMAP MISSION: CHANGES IN THE RFI ENVIRONMENT ..... 3754**

*Alexandra Bringer, Matthew Daehn, Joel Johnson, ElectroScience Laboratory, The Ohio State University, United States; Yan Soldo, David Le Vine, Paolo de Matthaëis, Jeffrey Piepmeier, Priscilla Mohammed, NASA Goddard Space Flight Center, United States*

**WE3-R3.4: IMPROVING BRIGHNESS TEMPERATURE MEASUREMENTS NEAR COASTAL AREAS ..... 3758**

*Julian Chaubell, Simon Yueh, Jet Propulsion Laboratory, United States; Jinzheng Peng, Goddard Space Flight Center, Greenbelt, MD, USA, United States; Steven Chan, Scott Dunbar, Jet Propulsion Laboratory, United States; Dara Entekhabi, The Massachusetts Institute of Technology, Cambridge, Massachusetts, USA, United States*

**WE3-R3.5: GLOBAL FREEZE/THAW PRODUCT FROM L-BAND RADIOMETER DATA ..... 3762**

*Xiaolan Xu, Jet Propulsion Laboratory, United States; Youngwook Kim, John Kimball, University of Montana, United States; Chris Derksen, Environment Canada, United States; Scott Dunbar, Andreas Colliander, Jet Propulsion Laboratory, United States*

**WE4-R3: SCIENCE PRODUCTS AND RESULTS BASED ON NASA SOIL MOISTURE ACTIVE PASSIVE (SMAP) SATELLITE MISSION II**

**WE4-R3.1: LARGE-SCALE HYDROLOGICAL FLUXES AS REVEALED BY DATA FROM THE SOIL MOISTURE ACTIVE-PASSIVE MISSION ..... 3765**

*Randal Koster, Rolf Reichle, Global Modeling and Assimilation Office, United States; Sarith Mahanama, Science Systems and Applications, Inc, United States; Wade Crow, United States Department of Agriculture, United States*

**WE4-R3.2: HIGH RESOLUTION SOIL MOISTURE PRODUCT BASED ON SMAP ACTIVE-PASSIVE APPROACH USING COPERNICUS SENTINEL 1 DATA ..... 3768**

*Narendra N. Das, Dara Entekhabi, Seungbum Kim, NASA Jet Propulsion Laboratory, United States; Thomas Jaghuber, German Aerospace Center, Microwaves and Radar Institute, Germany; Scott Dunbar, Simon Yueh, NASA Jet Propulsion Laboratory, United States; Pe O'Neill, Goddard Space Flight Center, United States; Andreas Colliander, NASA Jet Propulsion Laboratory, United States; Jeffrey Walker, Monash Univeristy, Australia; Thomas Jackson, USDA-ARS Hydrology and Remote Sensing Laboratory, United States*

**WE4-R3.3: POLARIZATION DECOMPOSITION AND TEMPERATURE BIAS RESOLUTION FOR SMAP PASSIVE SOIL MOISTURE RETRIEVAL USING TIME SERIES BRIGHTNESS TEMPERATURE OBSERVATIONS ..... 3771**

*Steven Chan, NASA Jet Propulsion Laboratory, California Institute of Technology, United States; Rajat Bindlish, Peggy O'Neill, NASA Goddard Space Flight Center, United States; Thomas Jackson, USDA-ARS Hydrology and Remote Sensing Laboratory, United States; Andreas Colliander, Simon Yueh, NASA Jet Propulsion Laboratory, California Institute of Technology, United States*

**WE4-R3.4: INTEGRATION OF SMAP AND SMOS OBSERVATIONS..... 3775**

*Rajat Bindlish, NASA Goddard Space Flight Center, United States; Steven Chan, NASA Jet Propulsion Laboratory, United States; Thomas Jackson, USDA-ARS, United States; Andreas Colliander, NASA Jet Propulsion Laboratory, United States; Yann Kerr, CESBIO, France*

**WE4-R3.5: EVALUATION OF SMAP PASSIVE SOIL MOISTURE PRODUCTS USING IN-SITU DATA FROM A DENSE OBSERVATION NETWORK OVER AGRICULTURAL AREA IN NORTHEAST CHINA ..... 3779**

*Xingming Zheng, Northeast Institute of Geography Agroecology, Chinese Academy of Sciences, China; Yu Bai, Jilin Unviersity, China; Tao Jiang, Northeast Institute of Geography Agroecology, Chinese Academy of Sciences, China; Xiaowei Zhao, Jilin Unviersity, China; Jianwei Yang, Beijing Normal University, China*

**WE1-R4: OCEAN ALTIMETRY I**

**WE1-R4.1: OBSERVING THE OCEAN SURFACE TOPOGRAPHY AT HIGH-RESOLUTION BY THE SWOT (SURFACE WATER AND OCEAN TOPOGRAPHY) MISSION ..... 3783**

*Lee-Lueng Fu, Jet Propulsion Laboratory, United States; Rosemary Morrow, LEGOS, France*

**WE1-R4.2: AN IMPROVED GEOMETRIC MODEL FOR SPACE-BASED GNSS-R ALTIMETRY ..... 3785**

*Changjiang Hu, Craig Benson, University of New South Wales, Canberra, Australia; Chris Rizos, University of New South Wales, Sydney, Australia; Li Qiao, University of New South Wales, Canberra, Australia*

<b>WE1-R4.3: CHARACTERIZATION OF THE OCEAN WAVES SIGNATURE TO ASSESS THE SEA STATE BIAS IN WIDE-SWATH INTERFEROMETRIC ALTIMETRY</b>	<b>3789</b>
<i>Pierre Dubois, Collecte LocalisationSatellite, France; Bertrand Chapron, Institut Francais de Recherche pour l'Exploitation de la Mer, France</i>	
<b>WE1-R4.4: JASON-3 AND SENTINEL-3A ALTIMETER VALIDATION ALONG THE FRENCH ATLANTIC COAST IN THE SOUTHERN BAY OF BISCAY</b>	<b>3793</b>
<i>Phuong Lan Vu, Frédéric Frappart, José Darrozes, Guillaume Ramillien, Observatoire Midi-Pyrénées, France; Vincent Marieu, CNRS, France; Fabien Blarel, Observatoire Midi-Pyrénées, France; Pascal Bonnefond, Observatoire de Paris, France</i>	
<b>WE1-R4.5: ASSESSMENT OF REPROCESSED SSH AND SWH MEASUREMENTS DERIVED FROM HY-2A RADAR ALTIMETER</b>	<b>3797</b>
<i>Maofei Jiang, Ke Xu, Key Laboratory of Microwave Remote Sensing, National Space Science Center, Chinese Academy of Sciences, China; Yalong Liu, Yantai Marine Environmental Monitoring Center Station, State Oceanic Administration, China</i>	
<b>WE2-R4: HYPERSPECTRAL TECHNIQUES FOR BIOPHYSICAL PARAMETER ESTIMATION</b>	
<b>WE2-R4.1: SIMULATION OF SPACEBORNE HYPERSPECTRAL REMOTE SENSING TO ASSIST CROP NITROGEN CONTENT MONITORING IN AGRICULTURAL CROPS</b>	<b>3801</b>
<i>Katja Berger, Ludwig-Maximilian University of Munich, Germany; Zihui Wang, University of Wisconsin–Madison, United States; Martin Danner, Matthias Wocher, Wolfram Mauser, Tobias Hank, Ludwig-Maximilian University of Munich, Germany</i>	
<b>WE2-R4.2: HYPERSPECTRAL RETRIEVAL OF CANOPY WATER CONTENT THROUGH INVERSION OF THE BEER-LAMBERT LAW</b>	<b>3805</b>
<i>Matthias Wocher, Katja Berger, Martin Danner, Wolfram Mauser, Tobias Hank, Ludwig-Maximilian University of Munich, Germany</i>	
<b>WE2-R4.3: DETERMINING UNCERTAINTY PREDICTION MAP OF COPPER CONCENTRATION IN PASTURE FROM HYPERSPECTRAL DATA USING QUNATILE REGRESSION FOREST</b>	<b>3809</b>
<i>Rajasheker Reddy Pullanagari, Gabor Kereszturi, Ian Yule, Matthew Irwin, Massey University, New Zealand</i>	
<b>WE2-R4.4: REMOTE ESTIMATION OF CANOPY WATER CONTENT IN DIFFERENT CROP TYPES WITH NEW HYPERSPECTRAL INDICES</b>	<b>3812</b>
<i>Nieves Pasqualotto, Jesús Delegido, Shari Van Wittenberghe, Jochem Verrelst, University of Valencia, Spain; Juan Pablo Rivera-Caicedo, CONACYT-UAN, Mexico; José Moreno, University of Valencia, Spain</i>	
<b>WE2-R4.5: WEED CLASSIFICATION IN HYPERSPECTRAL REMOTE SENSING IMAGES VIA DEEP CONVOLUTIONAL NEURAL NETWORK</b>	<b>3816</b>
<i>Adnan Farooq Awan, Jiankun Hu, Xiuping Jia, University of New South Wales, Australia</i>	
<b>WE3-R4: CROP IDENTIFICATION AND CLASSIFICATION USING REMOTE SENSING I</b>	
<b>WE3-R4.1: POTENTIAL OF MULTI-TEMPORAL SENTINEL-1A DUAL POLARIZATION SAR IMAGES FOR VEGETABLE CLASSIFICATION IN INDONESIA</b>	<b>3820</b>
<i>Mengmeng Li, Wietske Bijker, University of Twente, Netherlands</i>	
<b>WE3-R4.2: AN HYBRID RECURRENT CONVOLUTIONAL NEURAL NETWORK FOR CROP TYPE RECOGNITION BASED ON MULTITEMPORAL SAR IMAGE SEQUENCES</b>	<b>3824</b>
<i>Jose Bermudez Castro, Raul Queiroz Feitosa, Patrick Nigri Happ, Pontifical Catholic University of Rio de Janeiro, Brazil</i>	
<b>WE3-R4.3: SAR SPECKLE FILTERING AND AGRICULTURE FIELD SIZE: DEVELOPMENT OF SAR DATA PROCESSING BEST PRACTICES FOR THE JECAM SAR INTER-COMPARISON EXPERIMENT</b>	<b>3828</b>
<i>Laura Dingle Robertson, Andrew Davidson, Heather McNairn, Agriculture and Agri-Food Canada, Canada; Mehdi Hosseini, Scott Mitchell, Carleton University, Canada; Diego de Abelleyra, Santiago Verón, Instituto Nacional de Tecnología Agropecuaria (INTA), Argentina; Michael H. Cosh, USDA-ARS, United States</i>	

## **WE4-R4: REMOTE SENSING FOR ESTIMATION OF BIOPHYSICAL PARAMETERS II**

### **WE4-R4.1: ASSESSMENT OF THE SPATIAL VARIABILITY OF CWSI WITHIN ALMOND TREE CROWNS AND ITS EFFECTS ON THE RELATIONSHIP WITH STOMATAL CONDUCTANCE ..... 3832**

*Carlos Camino, Pablo Jesús Zarco-Tejada, Victoria González-Dugo, Consejo Superior de Investigaciones Científicas (CSIC), Spain*

### **WE4-R4.2: GLOBAL SENSITIVITY ANALYSIS OF POLARIMETRIC DATA TO RETRIEVE BIOPHYSICAL PARAMETERS OF CANOLA AND BARLEY CROPS ..... 3836**

*Esra Erten, The Open University, Turkey; Gulsen Taskin, Istanbul Technical University, Turkey; Juan M. Lopez-Sanchez, University of Alicante, Spain*

### **WE4-R4.3: LAI RETRIEVAL OF WINTER WHEAT USING SIMULATED COMPACT SAR DATA THROUGH GA-PLS MODELING ..... 3840**

*Chang-An Liu, Zhongxin Chen, Pengyu Hao, Key Laboratory of Agricultural Remote Sensing, Ministry of Agriculture/Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, China; Kun Li, Xiaochen Wang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China*

### **WE4-R4.4: LANDSAT-8 AND WORLDVIEW-3 DATA FOR ASSESSING CROP RESIDUE COVER ..... 3844**

*Craig S.T. Daughtry, USDA-ARS, United States; M.W. Graham, Virginia Tech University, United States; A.J. Stern, USDA-ARS, United States; M. Quemada, Technical University of Madrid, Spain; W.D. Hively, US Geological Survey, United States; A.L. Russ, USDA-ARS, United States*

### **WE4-R4.5: CROP MAPPING FOR A FUTURE COPERNICUS AGRICULTURAL SERVICE ..... 3848**

*Linda Moser, Gernot Ramminger, Markus Probeck, Christoph Rieke, Benjamin Mack, Cornelia Storch, Carolin Sommer, Christopher Sandow, Regine Richter, Marcus Sindram, Anna Homolka, Hannes Ott, Martin Ickerott, Axel Relin, GAF AG, Germany*

## **WE1-R5: IEEE GRSS DATA FUSION CONTEST**

### **WE1-R5.1: THE DATA FUSION CONTEST 2018: ADVANCED MULTI-SENSOR OPTICAL REMOTE SENSING FOR URBAN LAND USE AND LAND COVER CLASSIFICATION ..... N/A**

*Naoto Yokoya, RIKEN, Japan; Bertrand Le Saux, ONERA, France; Ronny Hänsch, Technische Universität Berlin, Germany; Saurabh Prasad, University of Houston, United States*

### **WE1-R5.2: MULTI-SOURCE REMOTE SENSING DATA CLASSIFICATION VIA FULLY CONVOLUTIONAL NETWORKS AND POST-CLASSIFICATION PROCESSING ..... 3852**

*Yonghao Xu, Bo Du, Liangpei Zhang, Wuhan University, China*

### **WE1-R5.3: COMBINING DEEP AND SHALLOW NEURAL NETWORKS WITH AD HOC DETECTORS FOR THE CLASSIFICATION OF COMPLEX MULTI-MODAL URBAN SCENES ..... 3856**

*Daniele Cerra, Miguel Pato, Emiliano Carmona, Seyed Majid Azimi, Jiaojiao Tian, Reza Bahmanyar, Franz Kurz, Eleonora Vig, Ksenia Bittner, Corentin Henry, Pablo d'Angelo, Rupert Müller, Kevin Alonso, Peter Fischer, Peter Reinartz, DLR - German Aerospace Center, Germany*

### **WE1-R5.4: A TWO-BRANCH NETWORK WITH SEMI-SUPERVISED LEARNING FOR HYPERSPECTRAL CLASSIFICATION ..... 3860**

*Shuai Fang, Dou Quan, Shuang Wang, Lei Zhang, Ligang Zhou, Key Laboratory of Intelligent Perception and Image Understanding of Ministry of Education, School of Artificial Intelligence, Xidian University, China*

### **WE1-R5.5: FUSION OF LIDAR, HYPERSPECTRAL AND RGB DATA FOR URBAN LAND USE AND LAND COVER CLASSIFICATION ..... 3864**

*Sergey Sukhanov, Dmitrii Budylskii, Ivan Tankoyeu, Roel Heremans, Christian Debes, AGT International, Germany*

## **WE2-R5: CLOUDS AND PRECIPITATION I**

### **WE2-R5.1: PRECIPITATION RETRIEVAL ACCURACIES OF THE TROPICS CONSTELLATION ..... 3868 OF PASSIVE MICROWAVE CUBESATS**

*Chinnawat Surussavadee, King Mongkut's Institute of Technology Ladkrabang, Thailand; William Blackwell, Dara Entekhabi, Robert Vincent Leslie, Massachusetts Institute of Technology, United States*

### **WE2-R5.2: A DATA-DRIVEN APPROACH TO DETECT PRECIPITATION FROM ..... 3872 METEOROLOGICAL SENSOR DATA**

*Shilpa Manandhar, Nanyang Technological University, Singapore; Soumyabrata Dev, The ADAPT Centre, Trinity College, Ireland; Yee Hui Lee, Nanyang Technological University, Slovakia; Yu Song Meng, National Metrology Centre, Agency for Science, Technology and Research (ASTAR), Slovakia; Stefan Winkler, Advanced Digital Sciences Center (ADSC), Singapore*

### **WE2-R5.3: THE EFFECTS OF CLOUD LIQUID WATER ON POLARIZED RADIATIVE ..... 3876 TRANSFER CALCULATIONS DURING SNOWFALL AT MICROWAVE BAND**

*Xinxin Xie, Shanghai Spaceflight Institute of TT&C and Telecommunication, China; Yaohai Dong, Shanghai Academy of Spaceflight Technology, China; Weimin Yu, Weiliang Liu, Hongxin Xu, Shanghai Spaceflight Institute of TT&C and Telecommunication, China*

### **WE2-R5.4: DEVELOPMENT OF 3-D ANALYTIC RADIATIVE TRANSFER MODEL BASED ON ..... 3880 THE UMRT MODEL AND HORIZONTAL PERTURBATION SERIES**

*Kun Zhang, Albin J. Gasiewski, University of Colorado Boulder, United States*

## **WE3-R5: CLOUDS AND PRECIPITATION II**

### **WE3-R5.1: ADVANCES IN REAL-TIME WEATHER RADAR AND GROUND SENSOR DATA WITH ..... 3884 CHORDS**

*Ryan Gooch, V. Chandrasekar, Colorado State University, United States*

### **WE3-R5.2: PROFILING SUPERCOOLED LIQUID WATER CLOUDS WITH ..... 3888 MULTI-FREQUENCY RADAR**

*Ian Stuart Adams, Stephen (Joe) Munchak, Lihua Li, Paul Racette, Dong L. Wu, Gerald M. Heymsfield, Adrian M. Loftus, NASA Goddard Space Flight Center, United States*

### **WE3-R5.3: CROSS VALIDATION OF GPM AND GROUND-BASED RADAR IN LATIN AMERICA ..... 3891 AND THE CARIBBEAN**

*Ivan Arias, V. Chandrasekar, Colorado State University, United States*

### **WE3-R5.4: DEVELOPMENT OF A RAINFALL ESTIMATION ALGORITHM BASED ON ..... 3894 COMBINATION OF THE COMS AND GPM DATASETS**

*Jongpil Kim, Eunji Cheon, Dalgeun Lee, Jinyoung Kim, National Disaster Management Research Institute, Republic of Korea; Kyungwon Park, APEC Climate Center, Republic of Korea*

## **WE4-R5: NUMERICAL WEATHER PREDICTION AND DATA ASSIMILATION**

### **WE4-R5.1: ASSIMILATION OF INSAR-DERIVED PWV MAPS EXHIBIT POTENTIAL FOR ..... 3897 ATMOSPHERE CONVECTIVE STORM CHARACTERIZATION**

*Pedro Mateus, Instituto Dom Luiz (IDL), Faculdade de Ciências, Universidade Lisboa, Portugal; Giovanni Nico, Consiglio Nazionale delle Ricerche (CNR), Istituto per le Applicazioni del Calcolo, Italy; João Catalao, Pedro Ma Miranda, Instituto Dom Luiz (IDL), Faculdade de Ciências, Universidade Lisboa, Portugal*

### **WE4-R5.2: INGESTION OF SENTINEL-DERIVED REMOTE SENSING PRODUCTS IN ..... 3901 NUMERICAL WEATHER PREDICTION MODELS: FIRST RESULTS OF THE ESA STEAM PROJECT**

*Antonio Parodi, Luca Pulvirenti, CIMA Research Foundation, Italy; Martina Lagasio, CIMA Research foundation, Italy; Nazzareno Pierdicca, Frank S. Marzano, Sapienza Università di Roma, Italy; Carlo Riva, Giovanna Venuti, Politecnico di Milano, Italy; Luca Piloni, Istituto Superiore Mario Boella, Italy; Eugenio Realini, Geomatics Research & Development srl, Italy; Emanuele Passera, TRE ALTAMIRA SLU, Italy; Björn Rommen, European Space Agency/ESTEC, Netherlands*

<b>WE4-R5.3: IMPACTS OF MHS DATA ASSIMILATION OF TIBET PLATEAU ON LOWER REACHES RAINFALL FORECASTS</b>	<b>3905</b>
<i>Ruixia Liu, National Satellite Meteorological Center, China; Jie Liu, China Meteorological Press, China; Zhigang Zhang, Department and Forecasting and Networking, China; Xiaoqing Li, National Satellite Meteorological Center, China</i>	
<b>WE4-R5.4: DIRECT ASSIMILATION OF HIGH RESOLUTION ABI INFRARED RADIANCES</b>	<b>3909</b>
<i>Zhengkun Qin, Nanjing University of Information Science and Technology, China; Xiaolei Zou, University of Maryland, United States</i>	
 <b>WE1-R6: FLUORESCENCE FORTHCOMING FROM FLEX I</b>	
<b>WE1-R6.1: THE FLUORESCENCE EXPLORER (FLEX)—ESA’S EARTH EXPLORER 8</b>	<b>3913</b>
<i>Michael Francois, Matteo Taccola, Matthias Drush, European Space Agency, Netherlands; Annalisa Capanni, Leonardo, Italy</i>	
<b>WE1-R6.2: ESA’S SENTINEL-3 MISSION - STATUS AND PERFORMANCE</b>	<b>3917</b>
<i>Susanne Mecklenburg, Steffen Dransfeld, Ferran Gascon, Jens Nieke, Craig Donlon, Matthias Drusch, Dirk Schüttemeyer, Bruno Berruti, European Space Agency, Italy</i>	
<b>WE1-R6.3: THE FLEX END-TO-END SIMULATOR: FROM CONCEPT PHASE (A/B1) TO GROUND SEGMENT AND OPERATIONS (C/D)</b>	<b>3920</b>
<i>Jorge Vicent, Rosario Ruiloba, Magellium, France; Antonio Ruiz-Verdú, University of Valencia, Spain; Gwenaël Matot, Magellium, France; Neus Sabater, University of Valencia, Spain; Béatrice Berthelot, Magellium, France; Federico Magnani, University of Bologna, Italy; Sergio Cogliati, Università degli studi di Milano-Bicocca, Italy; José Moreno, University of Valencia, Spain; Raffaella Franco, Matthias Drusch, European Space Agency/ESTEC, Netherlands; Christine Fernandez-Martin, Magellium, France</i>	
<b>WE1-R6.4: ESA’S CAMPAIGN ACTIVITIES IN SUPPORT OF THE FLEX MISSION</b>	<b>3924</b>
<i>Dirk Schuettemeyer, Mareike Burba, Matthias Drusch, Anders Elfving, Susanne Mecklenburg, European Space Agency, Netherlands</i>	
 <b>WE2-R6: FLUORESCENCE FORTHCOMING FROM FLEX II</b>	
<b>WE2-R6.1: GROUND-BASED MEASUREMENTS AND VALIDATION PROTOCOLS FOR FLEX</b>	<b>3927</b>
<i>Elizabeth Middleton, NASA Goddard Space Flight Center, United States; Fred Huemrich, Petya Campbell, University of Maryland, Baltimore County, United States; Qingyuan Zhang, Universities Space Research Association, United States; David Landis, Global Science &amp; Technology, Inc., United States; Cris Garrish, University of Maryland, Baltimore County, United States; Lawrence Ong, Science Systems and Applications, Inc, United States; Craig S.T. Daughtry, USDA-ARS Hydrology and Remote Sensing Laboratory, United States</i>	
<b>WE2-R6.2: IMAGING SPECTROMETRY AND FLUOROMETRY IN SUPPORT OF FLEX: WHAT CAN WE LEARN FROM MULTI-SCALE EXPERIMENTS?</b>	<b>3931</b>
<i>John Gamon, University of Alberta, and University of Nebraska - Lincoln, Canada; Gabriel Hmimina, University of Nebraska - Lincoln, United States; Guofang Miao, Kaiyu Guan, University of Illinois at Urbana-Champaign, United States; Kyle Springer, Ran Wang, University of Alberta, Canada; Rong Yu, Hamed Gholizadeh, Ryan Moore, Elizabeth Walter-Shea, Tim Arkebauer, Andy Suyker, Trenton Franz, Brian Wardlow, David Wedin, University of Nebraska - Lincoln, United States</i>	
<b>WE2-R6.3: RED AND FAR-RED FLUORESCENCE EMISSION RETRIEVAL FROM AIRBORNE HIGH-RESOLUTION SPECTRA COLLECTED BY THE HYPLANT-FLUO SENSOR</b>	<b>3935</b>
<i>Sergio Cogliati, Roberto Colombo, Marco Celesti, Giulia Tagliabue, University of Milano Bicocca, Italy; Uwe Rascher, Anke Schickling, Patrick Rademske, Forschungszentrum Juelich GmbH, Germany; Luis Alonso, Neus Sabater, University of Valencia, Spain; Dirk Schuettemeyer, Matthias Drusch, European Space Agency, Netherlands</i>	
<b>WE2-R6.4: ATMOSPHERIC AND INSTRUMENTAL EFFECTS ON THE FLUORESCENCE REMOTE SENSING RETRIEVAL</b>	<b>3939</b>
<i>Luis Alonso, Neus Sabater, University of Valencia, Spain; Jorge Vicent, Magellium, France; Laura Mihai, National Institute for Laser, Plasma and Radiation Physics - LMSL, Romania; José Moreno, University of Valencia, Spain</i>	

<b>WE2-R6.5: CHARACTERIZATION OF FIREFLY, AN IMAGING SPECTROMETER DESIGNED FOR AIRBORNE MEASUREMENTS OF SOLAR-INDUCED FLUORESCENCE</b>	<b>3943</b>
<i>Bruce Cook, NASA, United States; Lawrence Corp, Science Systems and Applications, Inc., United States; Peter Clemens, Headwall Photonics, Inc., United States; Ian Paynter, Universities Space Research Association, United States; Jyoteshwar Nagol, University of Maryland, United States; Joel McCorkel, NASA, United States</i>	
 <b>WE3-R6: OPTICAL AND INFRARED MONITORING OF VEGETATION II</b>	
<b>WE3-R6.1: THE EFFECT OF TRUNKS ON DIRECTIONAL BRIGHTNESS TEMPERATURES OF A LEAFLESS FOREST USING A GEOMETRIC OPTICAL MODEL</b>	<b>3947</b>
<i>Zunjian Bian, Biao Cao, Hua Li, Yongming Du, Qing Xiao, Qinhuo Liu, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>WE3-R6.2: FIRST EVALUATION OF LAND SURFACE EMISSIVITY SPECTRA SIMULATED WITH THE SAIL-THERMIQUE MODEL</b>	<b>3951</b>
<i>Albert Olioso, INRA, France; Frédéric Jacob, IRD, France; Marie Weiss, INRA, France</i>	
<b>WE3-R6.3: A SIMPLIFIED 3D RADIATIVE TRANSFER APPROACH FOR THE RETRIEVAL OF CHEMICAL AND STRUCTURAL PROPERTIES OF INDIVIDUAL TREE CROWNS FROM HYPERSPECTRAL DATA</b>	<b>3955</b>
<i>Matheus Pinheiro Ferreira, National Institute for Space Research - INPE, Brazil; Jean-Baptiste Féret, Eloi Grau, National Research Institute of Science and Technology for Environment and Agriculture, France; Fabien Hubert Wagner, Luiz Eduardo Oliveira e Cruz de Aragão, Yosio Edemir Shimabukuro, National Institute for Space Research - INPE, Brazil; Carlos Roberto de Souza Filho, University of Campinas, Brazil</i>	
<b>WE3-R6.4: AN IMPROVED KERNEL-DRIVEN BRDF MODEL COUPLED WITH TOPOGRAPHY: KDCT</b>	<b>3959</b>
<i>Dalei Hao, Jianguang Wen, Qing Xiao, Shengbiao Wu, Juan Cheng, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
 <b>WE4-R6: OPTICAL AND INFRARED MONITORING OF VEGETATION III</b>	
<b>WE4-R6.1: DETECTING VEGETATION RESPONSE TO OIL POLLUTION USING HYPERSPECTRAL INDICES</b>	<b>3963</b>
<i>Nkeiruka Nneti Onyia, Heiko Balzter, Juan Carlos Berrio, University of Leicester, United Kingdom</i>	
<b>WE4-R6.2: INDIVIDUAL TREE DETECTION FROM MULTI-VIEW SATELLITE IMAGES</b>	<b>3967</b>
<i>Changlin Xiao, ETH Zurich, Singapore; Rongjun Qin, Xu Huang, The Ohio State University, United States; Jiaqiang Li, ETH Zurich, Singapore</i>	
<b>WE4-R6.3: NPP ESTIMATION USING TIME-SERIES GF-1 DATA IN SPARSE VEGETATION AREA -A CASE STUDY IN ZHENGLANQI OF INNER MONGOLIA, CHINA</b>	<b>3971</b>
<i>Bin Sun, Zengyuan Li, Zhihai Gao, Wentao Gao, Yuanyuan Zhang, Xiangyuan Ding, Changlong Li, Institute of Forest Resource Information Techniques, Chinese Academy of Forestry, China</i>	
<b>WE4-R6.4: RECONSTRUCTION OF 3D FOREST MOCK-UPS FROM AIRBORNE LIDAR DATA FOR MULTISPECTRAL IMAGE SIMULATION USING DART MODEL</b>	<b>3975</b>
<i>Jianbo Qi, Jean-Philippe Gastellu-Etchegorry, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France; Tiangang Yin, NASA Goddard Space Flight Center and USRA-GESTAR, United States</i>	
<b>WE4-R6.5: ESTIMATING THE SEVERITY OF DEFOLIATION DUE TO PINE PROCESSIONARY MOTH USING A COMBINATION OF LANDSAT AND UAV IMAGERY</b>	<b>3979</b>
<i>Kaori Otsu, Centre for Ecological Research and Forestry Applications (CREAF), Spain; Magda Pla, Lluís Brotons, Forest Science Center of Catalonia (CTFC), Spain</i>	



## WE1-R7: STUDENT PAPER COMPETITION I

- WE1-R7.1: MULTI-ATTRIBUTE SUPER-TENSOR MODEL FOR REMOTE SENSING IMAGE CLASSIFICATION WITH HIGH SPATIAL RESOLUTION** ..... 3983  
*Tianzhu Liu, Yanfeng Gu, Harbin Institute of Technology, China*
- WE1-R7.2: IMPROVED CALIBRATION OF CYGNSS MEASUREMENTS FOR DOWNBURSTS IN THE INTERTROPICAL CONVERGENCE ZONE** ..... 3987  
*Rajeswari Balasubramaniam, Christopher Ruf, University of Michigan, Ann Arbor, United States*
- WE1-R7.3: ACCURATE BUILDING DETECTION IN VHR REMOTE SENSING IMAGES USING GEOMETRIC SALIENCY** ..... 3991  
*Jin Huang, Gui-Song Xia, Fan Hu, Liangpei Zhang, Wuhan University, China*
- WE1-R7.4: DETECTION & SEPARATION OF COHERENT REFLECTIONS IN GNSS-R MEASUREMENTS USING CYGNSS DATA** ..... 3995  
*Eric Loria, Andrew O'Brien, Inder J. Gupta, The Ohio State University, United States*
- WE1-R7.5: FUSION OF MULTITEMPORAL LIDAR DATA FOR INDIVIDUAL TREE CROWN PARAMETER ESTIMATION ON LOW DENSITY POINT CLOUDS** ..... 3999  
*Daniele Marinelli, Claudia Paris, Lorenzo Bruzzone, University of Trento, Italy*

## WE2-R7: STUDENT PAPER COMPETITION II

- WE2-R7.1: HYPERSPECTRAL IMAGE SUPER-RESOLUTION VIA LOCAL LOW-RANK AND SPARSE REPRESENTATIONS** .....4003  
*Renwei Dian, Shutao Li, Leyuan Fang, Hunan University, China; Jose Bioucas, Instituto Superior Técnico, Portugal*
- WE2-R7.2: OPTIMIZING KERNEL RIDGE REGRESSION FOR REMOTE SENSING PROBLEMS** ..... 4007  
*Gonzalo Mateo-García, Valero Laparra, Luis Gómez-Chova, Universidad de València, Spain*
- WE2-R7.3: CHARACTERIZATION OF THE TRANSMIT POWER AND ANTENNA PATTERN OF THE GPS CONSTELLATION FOR THE CYGNSS MISSION** ..... 4011  
*Tianlin Wang, Christopher Ruf, Bruce Block, Darren McKague, University of Michigan, United States*
- WE2-R7.4: HY-DEMOSAICING: HYPERSPECTRAL BLIND RECONSTRUCTION FROM SPECTRAL SUBSAMPLING** ..... 4015  
*Lina Zhuang, Jose Bioucas-Dias, Instituto de Telecomunicacoes, Instituto Superior Tecnico, Universidade de Lisboa, Portugal*
- WE2-R7.5: MULTIOUTPUT AUTOMATIC EMULATOR FOR RADIATIVE TRANSFER MODELS**..... 4019  
*Daniel Heestermans Svendsen, University of Valencia, Spain; Luca Martino, Universidad Carlos III de Madrid, Spain; Jorge Vicent, European Space Agency, Spain; Gustau Camps-Valls, University of Valencia, Spain*

## WE3-R7: HYPERSPECTRAL DENOISING & FILTERING

- WE3-R7.1: HYPERSPECTRAL IMAGE DENOISING VIA NONNEGATIVE MATRIX FACTORIZATION AND CONVOLUTIONAL NEURAL NETWORKS** ..... 4023  
*Baihong Lin, Xiaoming Tao, Tsinghua University, China; Xiaowei Qin, University of Science and Technology of China, China; Yiping Duan, Jianhua Lu, Tsinghua University, China*
- WE3-R7.2: HYPERSPECTRAL IMAGE RESTORATION BASED ON SALIENT EDGES**..... 4027  
*Mo Zhang, Benoit Vozel, Kacem Chehdi, University of Rennes, France; Mykhail L. Uss, Sergey Abramov, Vladimir V. Lukin, National Aerospace University, Ukraine*
- WE3-R7.3: CLOUD SHADOW REMOVAL BASED ON CLOUD TRANSMITTANCE ESTIMATION**..... 4031  
*Madhuri Nagare, Eiji Kaneko, Masato Toda, Hirofumi Aoki, Masato Tsukada, NEC Corporation, Japan*

**WE3-R7.4: ADAPTIVE HYPERSPECTRAL MIXED NOISE REMOVAL..... 4035**  
*Tai-Xiang Jiang, University of Electronic Science and Technology of China, China; Lina Zhuang, Instituto Superior Técnico, Universidade de Lisboa, Portugal; Ting-Zhu Huang, University of Electronic Science and Technology of China, China; Jose Bioucas-Dias, Instituto Superior Técnico, Universidade de Lisboa, Portugal*

## **WE4-R7: BIO-GEOPHYSICAL PARAMETER RETRIEVAL**

**WE4-R7.1: GAP FILLING OF BIOPHYSICAL PARAMETER TIME SERIES WITH ..... 4039**  
**MULTI-OUTPUT GAUSSIAN PROCESSES**  
*Anna Mateo-Sanchis, Jordi Muñoz-Marí, Manuel Campos-Taberner, Francisco Javier García-Haro, Gustau Camps-Valls, Universidad de València, Spain*

**WE4-R7.2: POTENTIAL OF LANDSAT-OLI FOR SEAGRASS AND ALGAE SPECIES DETECTION ..... 4043**  
**AND DISCRIMINATION IN BAHRAIN NATIONAL WATER USING SPECTRAL REFLECTANCE**  
*Alanoud Alkhatlan, Abderrazak Bannari, Ali El-Battay, Thamer Al-Dawood, Asma Abahussain, Arabian Gulf University, Bahrain*

**WE4-R7.3: CONSISTENT REGRESSION OF BIOPHYSICAL PARAMETERS WITH KERNEL ..... 4047**  
**METHODS**  
*Emiliano Díaz, Adrián Pérez-Suay, Valero Laparra, Gustau Camps-Valls, Universitat de València, Spain*

**WE4-R7.4: DISENTANGLING DERIVATIVES, UNCERTAINTY AND ERROR IN GAUSSIAN ..... 4051**  
**PROCESS MODELS**  
*Juan Emmanuel Johnson, Valero Laparra, Gustau Camps-Valls, Universitat de València, Spain*

**WE4-R7.5: ON THE EFFECT OF NUMBER AND DISTRIBUTION OF ACQUISITIONS IN ..... 4055**  
**L-BAND SAR TOMOGRAPHY FOR FOREST STRUCTURE ESTIMATION**  
*Victor Cazcarra-Bes, Marivi Tello-Alonso, Matteo Pardini, Konstantinos Papathanassiou, German Aerospace Center (DLR), Germany*

## **WE1-R8: CLOSE RANGE REMOTE SENSING II**

**WE1-R8.1: A NEW RADAR FOR DETECTION OF OIL-SPILLS ON QUIET SEAS..... 4059**  
*Richard Norland, ISPAS AS, Norway*

**WE1-R8.2: A PHENOMENOLOGICAL STUDY OF RADAR BACKSCATTER RESPONSE OF ..... 4063**  
**VEHICLES FOR THE NEXT GENERATION AUTOMOTIVE RADARS**  
*Abdulrahman Alaqeel, Amr Ibrahim, Adib Nashashibi, The university of Michigan, Ann Arbor, United States; Hussein Shaman, King Abdulaziz City for Science and Technology, Saudi Arabia; Kamal Sarabandi, The university of Michigan, Ann Arbor, United States*

**WE1-R8.3: INTERIM REPORT OF SUPER LOW ALTITUDE SATELLITE OPERATION ..... 4066**  
*Haruo Kawasaki, Kazuya Konoue, Hirokazu Hoshino, Yutaka Kaneko, Masanori Sasaki, Japan Aerospace Exploration Agency, Japan*

**WE1-R8.4: EXTRACTION OF STRUCTURAL AND MINERALOGICAL FEATURES FROM ..... 4070**  
**HYPERSPECTRAL DRILL-CORE SCANS**  
*Laura Tusa, Louis Andreani, Helmholtz-Zentrum Dresden-Rossendorf, Helmholtz Institute Freiberg for Resource Technology, Germany; Eric Pohl, LSCE/IPSL, CEA-CNRS-UVSQ, Université Paris-Saclay, Gif-sur-Yvette, France, France; Cecilia Contreras, Mahdi Khodadadzadeh, Richard Gloaguen, Jens Gutzmer, Helmholtz-Zentrum Dresden-Rossendorf, Helmholtz Institute Freiberg for Resource Technology, Germany*

## **WE2-R8: NEW REMOTE SENSING TECHNIQUES AND METHODS IV**

### **WE2-R8.1: THE INDIAN-FRENCH TRISHNA MISSION : EARTH OBSERVATION IN THE THERMAL INFRARED WITH HIGH SPATIO-TEMPORAL RESOLUTION ..... 4078**

*Jean-Pierre Lagouarde, INRA, France; B.K. Bhattacharya, ISRO, India; Philippe Crébassol, Philippe Gamet, CNES, France; S.S. Babu, ISRO, India; G. Boulet, IRD, France; Xavier Briottet, ONERA, France; K.M. Buddhiraju, ISRO, India; S. Cherchali, CNES, France; I. Dadou, LEGOS, France; Gérard Dedieu, CESBIO, France; M. Gouhier, OPGC, France; Olivier Hagolle, CESBIO, France; M. Irvine, INRA, France; F. Jacob, IRD, France; Anil Kumar, K.K. Kumar, ISRO, India; Benoit Laignel, Université de Rouen, France; K. Mallick, LIST, Luxembourg; C.S. Murthy, ISRO, India; Albert Olioso, INRA, France; C. Ottlé, LSCE, France; M.R. Pandya, P.V. Raju, ISRO, India; Jean-Louis Roujean, CESBIO, France; M. Sekhar, Indian Institute of Science, India; M.V. Shukla, S. K. Singh, ISRO, India; José Antonio Sobrino, Universitat de València, Spain; R. Ramakrishnan, ISRO, India*

### **WE2-R8.2: A THERMAL IMAGING INSTRUMENT WITH UNCOOLED DETECTORS..... 4082**

*Alicia Joseph, Emily Barrentine, Ari Brown, NASA Goddard Space Flight Center, United States*

### **WE2-R8.3: A NOVEL FINE REGISTRATION TECHNIQUE FOR VERY HIGH RESOLUTION REMOTE SENSING IMAGES ..... 4085**

*Xianzhang Zhu, Yongjun Zhang, Hui Cao, Wuhan University, China; Kai Tan, HUAWEI Technology Co., Ltd, China; Xiao Ling, Wuhan University, China*

### **WE2-R8.4: A NEW OPTIMIZED DENOISING METHOD APPLIED TO THE SPOT WORLD HERITAGE INITIATIVE AND ITS SPOT 5 SUPERMODE IMAGES ..... 4089**

*Antoine Masse, French Spatial Agency (CNES), France; Sébastien Lefèvre, Université Bretagne Sud, France; Christophe Latry, Julien Nosavan, Simon Baillarin, French Spatial Agency (CNES), France*

### **WE2-R8.5: COLOR: CYCLING OFFLINE LEARNING AND ONLINE REPRESENTING FOR REMOTE SENSING DATAFLOW ..... 4093**

*Zhuo Zheng, Yanfei Zhong, Wuhan University, China*

## **WE3-R8: NEW REMOTE SENSING TECHNIQUES AND METHODS V**

### **WE3-R8.1: SATELLITE OBSERVATIONS OF SURFACE AIR PRESSURE USING ACTIVE MICROWAVE REMOTE SENSING TECHNIQUE FOR SEVERE WEATHER FORECAST IMPROVEMENTS ..... 4097**

*Bing Lin, NASA Langley Research Center, United States; Qilong Min, University at Albany, State University of New York, United States; Steven Harrah, Yongxiang Hu, NASA Langley Research Center, United States; Roland Lawrence, National Institute of Aerospace, United States*

### **WE3-R8.2: HIGH-SPEED RAILWAY BRIDGE VIBRATION MEASUREMENT AND ANALYSIS BASED ON RADAR INTERFEROMETRY ..... 4099**

*Zelong Shao, Xiangkun Zhang, Jiawei Ren, Yingsong Li, Chinese Academy of Sciences, China*

### **WE3-R8.3: ATMOSPHERIC SLANT DELAY FROM SAR INTERFEROMETRY, GNSS AND NUMERICAL WEATHER PREDICTION MODEL: A COMPARISON STUDY IN VIEW OF A GEOSYNCHRONOUS SAR MISSION ..... 4103**

*Nazzareno Pierdicca, Ida Maiello, Federica Murgia, Sapienza Università di Roma, Italy; Giovanna Venuti, Polytechnic of Milan, Italy; Eugenio Sansosti, Simona Verde, CNR-IREA, Italy; Andrea Gatti, Polytechnic of Milan, Italy; Christian Bignami, INGV, Italy; Rossella Ferretti, CETEMPS, Italy; Eugenio Realini, GReD srl, Italy; Stefano Barindelli, Andrea Monti-Guarnieri, Politecnico di Milano, Italy*

### **WE3-R8.4: WAVE SPECTROMETER TILT MODULATION TRANSFERT FUNCTION USING NEAR-NADIR KU- AND KA-BAND GPM RADAR MEASUREMENTS .....4107**

*Victor Gressani, CNES / CLS, France; Frédéric Nouguier, Alexis Mouche, LOPS Ifremer (SIAM), France*

## **WE4-R8: NEW REMOTE SENSING TECHNIQUES AND METHODS VI**

### **WE4-R8.1: SOLAR RADIO OBSERVATIONS FROM SOIL MOISTURE AND OCEAN SALINITY .....4111 (SMOS) MISSION**

*Raffaele Crapolichio, European Space Agency/ESRIN, Italy; Daniele Casella, Serco Italia S.p.A., Italy; Christophe Marqué, Royal Observatory of Belgium, Italy*

### **WE4-R8.3: STATE-OF-THE-ART AND GAPS FOR DEEP LEARNING ON LIMITED TRAINING ..... 4119 DATA IN REMOTE SENSING**

*John Ball, Mississippi State University, United States; Derek Anderson, The University of Missouri, United States; Pan Wei, Mississippi State University, United States*

### **WE4-R8.4: OPTIMAL SAMPLING OF BRDF'S OF VARYING COMPLEXITY..... 4123**

*Katarina Doctor, Jeff Byers, U.S. Naval Research Laboratory, United States*

### **WE4-R8.5: DOPPLER SPECTRUM OF MICROWAVES AT FORWARD SCATTERING FROM ..... 4127 THE SEA SURFACE**

*Yuriy Titchenko, Vladimir Karaev, Institute of Applied Physics, Russian Academy of Science, Russian Federation*

## **WE1-R9: ADVANCES IN RADAR SOUNDER SCIENCE AND ENGINEERING I**

### **WE1-R9.1: DESIGN AND PERFORMANCE OF THE ICEPOD LC-130 DEEP AND SHALLOW ..... 4131 RADAR SOUNDERS**

*Nick Frearson, Tej Dhakal, Lamont-Doherty Earth Observatory of Columbia University in New York City, United States*

### **WE1-R9.2: L-BAND RADAR SOUNDER FOR MEASURING ICE BASAL CONDITIONS AND ..... 4135 ICE-SHELF MELT RATE**

*Jie-Bang Yan, Prasad Gogineni, Charles R. O'Neill, University of Alabama, United States*

### **WE1-R9.3: A CUBESAT TRAIN FOR RADAR SOUNDING AND IMAGING OF ANTARCTIC ICE ..... 4138 SHEET**

*Prasad Gogineni, Christopher R. Simpson, Jie-Bang Yan, Charles R. O'Neill, Rohan Sood, Sevgi Z. Gurbuz, Ali C. Gurbuz, The University of Alabama, United States*

### **WE1-R9.4: SOUNDING THE ANTARCTIC ICE SHEET FROM SPACE: A FEASIBILITY STUDY ..... 4142 BASED ON AIRBORNE P-BAND RADAR DATA**

*Jørgen Dall, Technical University of Denmark, Denmark; Hugh Corr, British Antarctic Survey, United Kingdom; Nick Walker, eOsphere Limited, United Kingdom; Björn Rommen, Chung-Chi Lin, European Space Agency, Netherlands*

## **WE2-R9: ADVANCES IN RADAR SOUNDER SCIENCE AND ENGINEERING II**

### **WE2-R9.1: REFRACTION ANGLE CALCULATION IN MULTILAYERED ICE FOR WIDE-BEAM ..... 4146 AIRBORNE RADAR**

*Alvaro Arenas-Pingarron, Paul Brennan, University College London, United Kingdom; Hugh Corr, British Antarctic Survey, United Kingdom*

### **WE2-R9.2: UNFOCUSED SAR PROCESSING FOR ENGLACIAL LAYER SLOPE ESTIMATION ..... 4150 USING RADAR SOUNDER DATA**

*Davide Castelletti, Dustin M. Schroeder, Elisa Mantelli, Andrew Hilger, Stanford University, United States*

### **WE2-R9.3: FIRST IN-SITU DEMONSTRATION OF PASSIVE RADIO SOUNDING USING THE ..... 4154 SUN AS A SOURCE FOR ECHO DETECTION**

*Sean Peters, Dustin M. Schroeder, Davide Castelletti, Stanford University, United States; Mark Haynes, Andrew Romero-Wolf, Jet Propulsion Laboratory, California Institute of Technology, United States*

<b>WE2-R9.4: NOISE CHARACTER CONSTRAINTS ON PASSIVE RADIO SOUNDING OF JUPITER'S ICY MOONS USING JOVIAN DECAMETRIC RADIATION</b>	<b>4158</b>
<i>Leonardo Carrer, University of Trento, Italy; Dustin M. Schroeder, Stanford University, United States; Andrew Romero-Wolf, Paul A Ries, Jet Propulsion Laboratory, California Institute of Technology, United States; Lorenzo Bruzzone, University of Trento, Italy</i>	
<b>WE2-R9.5: AUTOMATED TRACKING OF 2D AND 3D ICE RADAR IMAGERY USING VITERBI AND TRW-S</b>	<b>4162</b>
<i>Victor Berger, University of Kansas, United States; Mingze Xu, Intelligent Systems Engineering, United States; Shane Chu, University of Kansas, United States; David Crandall, Intelligent Systems Engineering, United States; John Paden, University of Kansas, United States; Geoffrey Fox, Intelligent Systems Engineering, United States</i>	
 <b>WE3-R9: ALOS-2/ALOS-4 I</b>	
<b>WE3-R9.1: ALOS-2 MISSION STATUS UPDATES</b>	<b>4166</b>
<i>Masato Ohki, Takeshi Motooka, Takahiro Abe, Hiroto Nagai, Takeo Tadono, Yukihiro Kankaku, Japan Aerospace Exploration Agency, Japan; Masanobu Shimada, Tokyo Denki University, Japan</i>	
<b>WE3-R9.2: RESULTS OF ALOS-2 PALSAR-2 CALIBRATION AND VALIDATION AFTER 3 YEARS OF OPERATION</b>	<b>4169</b>
<i>Takeshi Motohka, Japan Aerospace Exploration Agency, Japan; Osamu Isoguchi, Masanori Sakashita, Remote Sensing Technology Center of Japan, Japan; Masanobu Shimada, Tokyo Denki University, Japan</i>	
<b>WE3-R9.3: ASSESSMENT OF PALSAR-2 COMPACT CALIBRATION</b>	<b>4171</b>
<i>Ridha Touzi, Canada Centre for Remote Sensing, Canada; Masanobu Shimada, Tokyo Denki University, Canada; Takeshi Motohka, Japan Aerospace Exploration Agency, Japan; S. Nedelcu, CCRS, Canada</i>	
<b>WE3-R9.4: HARDWARE PERFORMANCE OF PALSAR-3 ONBOARD ALOS-4</b>	<b>4175</b>
<i>Yu Okada, Yuya Yokota, Akira Karasawa, Makoto Matsuki, Motofumi Arii, Shohei Nakamura, Mitsubishi Electric Corporation, Japan</i>	
 <b>WE4-R9: ALOS-2/ALOS-4 II</b>	
<b>WE4-R9.1: SEMI-AUTOMATIC DEFORESTATION DETECTION ALGORITHM WITH PALSAR-2/SCANSAR HH/HV POLARIZATIONS</b>	<b>4177</b>
<i>Manabu Watanabe, Christian Koyama, Tokyo Denki University, Japan; Masato Hayashi, Izumi Nagatani, Takeo Tadono, Japan Aerospace Exploration Agency, Japan; Masanobu Shimada, Tokyo Denki University, Japan</i>	
<b>WE4-R9.2: FOREST EARLY WARNING SYSTEM USING ALOS-2/PALSAR-2 SCANSAR DATA (JJ-FAST)</b>	<b>4181</b>
<i>Izumi Nagatani, Masato Hayashi, Japan Aerospace Exploration Agency, Japan; Manabu Watanabe, Tokyo Denki University, Japan; Takeo Tadono, Tomohiro Watanabe, Japan Aerospace Exploration Agency, Japan; Christian Koyama, Masanobu Shimada, Tokyo Denki University, Japan</i>	
<b>WE4-R9.3: COMPARISON OF MIMP SAR DATA FROM RICE PADDY AT X- AND L-BANDS</b>	<b>4185</b>
<i>Motofumi Arii, Mitsubishi Electric Corporation, Japan; Hiroyoshi Yamada, Niigata University, Japan; Shoichiro Kojima, National Institute of Information and Communications Technology, Japan; Masato Ohki, Japan Aerospace Exploration Agency, Japan; Yu Okada, Mitsubishi Electric Corporation, Japan</i>	
<b>WE4-R9.4: EFFECT OF FARADAY ROTATION ON L-BAND NRCS AND WIND SPEED DETECTION</b>	<b>4189</b>
<i>Osamu Isoguchi, Kenta Ishizuka, RESTEC, Japan; Takeo Tadono, Takeshi Motohka, Japan Aerospace Exploration Agency, Japan; Masanobu Shimada, Tokyo Denki University/JAXA, Japan</i>	
<b>WE4-R9.5: MONITORING OF AURORAL ACTIVITIES OVER FAIRBANKS, ALASKA, USING SAR, PFISR AND KEOGRAMS</b>	<b>4193</b>
<i>Jun-Su Kim, Konstantinos Papathanassiou, German Aerospace Center (DLR), Germany; Franz J Meyer, Donald Hampton, University of Alaska Fairbanks, United States</i>	

## **WE1-R10: MULTI-TEMPORAL ANALYSIS OF SAR IMAGES**

**WE1-R10.1: RABASAR: A FAST RATIO BASED MULTI-TEMPORAL SAR DESPECKLING..... 4197**  
*Weiyang Zhao, Télécom ParisTech, France; Charles-Alban Deledalle, University of Bordeaux, France; Loic Denis, University of Lyon, France; Henri Maitre, Jean-Marie Nicolas, Florence Tupin, Télécom ParisTech, France*

**WE1-R10.2: A CIRCULAR APPROACH TO MULTI-CLASS CHANGE DETECTION IN ..... 4201**  
**MULTITEMPORAL SENTINEL-1 SAR IMAGE TIME SERIES**  
*Manuel Bertoluzza, Lorenzo Bruzzone, University of Trento, Italy; Francesca Bovolo, Fondazione Bruno Kessler, Italy*

**WE1-R10.3: SPATIAL AND TEMPORAL STATISTICAL ANALYSIS OF STACK OF SAR IMAGES : ..... 4205**  
**THE CONTRIBUTION OF THE VARIOGRAM**  
*David Schwartz, Béatrice Pinel-Puysségur, CEA, France*

**WE1-R10.4: FINDING COMPLEMENTARY AND RELIABLE PATTERNS IN DISPLACEMENT ..... 4209**  
**FIELD TIME SERIES OF ALPINE GLACIERS**  
*Tuan Nguyen, Nicolas Méger, University of Savoie Mont Blanc, France; Christophe Rigotti, Catherine Pothier, Univ Lyon, France; Emmanuel Trouvé, Jean-Louis Mugnier, University of Savoie Mont Blanc, France*

**WE1-R10.5: POTENTIALS OF TANDEM-X FOREST/NON-FOREST MAP FOR CHANGE ..... 4213**  
**DETECTION**  
*José Luis Bueso Bello, Paola Rizzoli, Michele Martone, Carolina Gonzalez, German Aerospace Center (DLR), Germany*

## **WE2-R10: SPECTRAL UNMIXING TECHNIQUES II**

**WE2-R10.1: SPECTRAL VARIABILITY IN A MULTILINEAR MIXING MODEL..... 4217**  
*Thorvald Dox, Rob Heylen, Paul Scheunders, University of Antwerp, Belgium*

**WE2-R10.2: CONSTRAINED NONNEGATIVE MATRIX FACTORIZATION FOR ROBUST ..... 4221**  
**HYPERSPECTRAL UNMIXING**  
*Fan Feng, Chenwei Deng, Wenzheng Wang, Jiahui Dai, Zhenzhen Li, Baojun Zhao, Beijing Institute of Technology, China*

**WE2-R10.3: BLIND NONLINEAR HYPERSPECTRAL UNMIXING USING AN LQ ..... 4225**  
**REGULARIZER**  
*Jakob Sigurdsson, Magnus Orn Ulfarsson, Johannes Sveinsson, University Of Iceland, Iceland*

**WE2-R10.4: BLIND SPECTRAL UNMIXING CONSIDERING THE ADJACENT EFFECT..... 4229**  
*Xinyu Wang, Yanfei Zhong, Liangpei Zhang, Yanyan Xu, Wuhan University, China*

**WE2-R10.5: A NEURAL NETWORK METHOD FOR NONLINEAR HYPERSPECTRAL ..... 4233**  
**UNMIXING**  
*Bikram Koirala, Rob Heylen, Paul Scheunders, University of Antwerp, Belgium*

## **WE3-R10: TARGET DETECTION III**

**WE3-R10.1: RANDOMIZED RX FOR TARGET DETECTION ..... 4237**  
*Fatih Nar, Konya Food and Agriculture University, Turkey; Adrián Pérez-Suay, Jose Antonio Padron, Gustau Camps-Valls, University of Valencia, Spain*

**WE3-R10.2: HYBRID PARAMETRIC - NONPARAMETRIC TARGET DETECTOR FOR ..... 4241**  
**HYPERSPECTRAL IMAGES**  
*Stefania Matteoli, National Research Council of Italy (CNR), Italy; Marco Diani, Italian Naval Academy, Italy; Giovanni Corsini, University of Pisa, Italy*

**WE3-R10.3: STATIONARY COVARIANCE MATRICES FOR HYPERSPECTRAL POINT TARGET ..... 4245**  
**DETECTION**  
*Yoram Furth, Adi Falik, Stanley Rotman, Ben-Gurion University of the Negev, Israel*

**WE3-R10.4: PROCESSING A NEW HYPERSPECTRAL DATA SET FOR TARGET DETECTION AND ATMOSPHERIC COMPENSATION ALGORITHM ASSESSMENT: THE RIT2017 DATA SET** ..... 4249  
*Emmett Ientilucci, Rochester Institute of Technology, United States*

**WE3-R10.5: SPECTRAL DETECTION ON A MANIFOLD FOR FINDING UNDERSEA OBJECTS**..... 4253  
*Alan Schaum, U.S. Naval Research Laboratory, United States*

## **WE4-R10: SPECTRAL UNMIXING TECHNIQUES III**

**WE4-R10.1: HYPERSPECTRAL UNMIXING USING SECANT FUNCTION OPTIMIZATION**..... 4257  
*Elnaz Sharifi, Azam Karami, Shahid Bahonar University of Kerman, Iran*

**WE4-R10.2: BUILDING A HYPERSPECTRAL LIBRARY AND ITS INCORPORATION INTO SPARSE UNMIXING FOR MINERAL IDENTIFICATION** ..... 4261  
*Thanh Bui, Beate Orberger, Simon B. Blancher, Eramet Research, Eramet Group, France; Ali Mohammad-Djafari, L2S, CNRS, Centrale Supélec, Université Paris-Saclay, France; Henry Pilliere, ThermoFisher Scientific, France; Anne Salaun, Eramet Research, Eramet Group, France; Xavier Bourrat, Nicolas Maubec, Caractérisation minérale, physico-chimique et texturale, BRGM, France; Thomas Lefevre, ThermoFisher Scientific, France; Celine Rodriguez, Eramet Research, France; Antanas Vaitkus, Saulius Grazulis, Vilnius University Institute of Biotechnology, Lithuania; Cedric Duée, Caractérisation minérale, physico-chimique et texturale, BRGM, France; Dominique Harang, ThermoFisher Scientific, France; Thomas Wallmach, Eramet Research, France; Yassine El Mendili, Daniel Chateigner, CRISMAT-CNRS, Normandie Université, France; Mike Buxton, Faculty of Civil Engineering and Geosciences, Delft University of Technology, Netherlands; Monique Le Guen, Eramet Nickel Division, Eramet Group, France*

**WE4-R10.3: HYPERSPECTRAL ENDMEMBER EXTRACTION PREPROCESSING USING COMBINATION OF EUCLIDEAN AND GEODESIC DISTANCES** ..... 4265  
*Fatemeh Kowkabi, College of Engineering, Marvdasht Branch, Islamic Azad University, Iran; Ahmad Keshavarz, Electrical Engineering Department, Scholar Engineering, Persian Gulf University, Iran*

**WE4-R10.4: A FAST ALGORITHM TO FIND ALL PATHS FOR HYPERSPECTRAL UNMIXING** ..... 4269  
*Yang Liu, CAST-Xi'an Institute of Space Radio Technology, China; Guo Yi, Western Sydney University, Australia; Feng Li, Lei Xin, Qian Xuesen Laboratory of Space Technology, China; Puming Huang, CAST-Xi'an Institute of Space Radio Technology, China*

**WE4-R10.5: ROLLING GUIDANCE BASED SCALED-AWARE SPATIAL SPARSE UNMIXING FOR HYPERSPECTRAL REMOTE SENSING IMAGERY** ..... 4273  
*Ruyi Feng, Tian Tian, Xianju Li, Kun Sun, China University of Geosciences, China*

## **WE1-R11: GNSS-R V: MISSIONS AND APPLICATIONS**

**WE1-R11.1: COMPARISON OF WIDE BANDWIDTH CONVENTIONAL AND INTERFEROMETRIC GNSS-R TECHNIQUES FOR POSSIBLE CYGNSS FOLLOW-ON MISSION** ..... 4277  
*Rachel Norris, Christopher Ruf, University of Michigan, United States; Eric Loria, Andrew O'Brien, The Ohio State University, United States*

**WE1-R11.2: AN ALGORITHM FOR WIND SPEED RETRIEVAL FROM CYGNSS SPACE OBSERVATORIES** ..... 4281  
*Pia Addabbo, Università degli Studi Giustino Fortunato, Italy; Maurizio di Bisceglie, Carmela Galdi, Generoso Giangregorio, Università degli Studi del Sannio, Italy*

**WE1-R11.3: CYGNSS OBSERVATIONS OF OCEAN WINDS AND WAVES** ..... 4285  
*Paul Chang, NOAA/NESDIS, United States; Zorana Jelenak, NOAA/NESDIS-UCAR, United States; Faozi Said, NOAA/NESDIS-GST, United States; Seubson Soisuvann, NOAA/NESDIS-UCAR, United States*

**WE1-R11.4: A COMPARISON OF WAVEFORM MODEL RE-TRACKING METHODS USING DATA FROM CYGNSS ..... 4289**

*Jake Mashburn, University of Colorado, United States; Andrew O'Brien, The Ohio State University, United States; Penina Axelrad, University of Colorado, United States; Cinzia Zuffada, Stephen Lowe, Rashmi Shah, Jet Propulsion Laboratory, United States; Alexander Voronovich, Valery Zavorotny, National Oceanic and Atmospheric Administration, United States*

**WE2-R11: LIDAR TECHNOLOGY AND APPLICATIONS**

**WE2-R11.1: A HYPERSPECTRAL LIDAR WITH EIGHT CHANNELS COVERING FROM VIS TO SWIR ..... 4293**

*Zhen Wang, Key Laboratory of Quantitative Remote Sensing Information Technology, Chinese Academy of Sciences, China; Yuwei Chen, Finnish Geospatial Research Institute, Finland; Chuanrong Li, Mi Tian, Mei Zhou, Wenjing He, Haohao Wu, Huijing Zhang, Lingli Tang, Key Laboratory of Quantitative Remote Sensing Information Technology, Chinese Academy of Sciences, China; Yiwu Wang, Hui Zhou, Eetu Puttonen, Juha Hyypä, Finnish Geospatial Research Institute, Finland*

**WE2-R11.2: A SOLVER FOR ESTIMATING RANGE-RESOLVED BEAM ATTENUATION COEFFICIENT FROM IN-WATER LIDAR WAVEFORMS ..... 4297**

*Martin Montes-Hugo, Florida Atlantic University, United States; Anni K. Vuorenkoski, Bing Ouyang, Fraser R. Dalgleish, Ocean Visibility and Optics Laboratory, Harbor Branch Oceanographic Institute, Florida Atlantic University, United States*

**WE2-R11.3: GAUSSIAN DECOMPOSITION OF LIDAR WAVEFORM DATA SIMULATED BY DART ..... 4300**

*Tiangang Yin, NASA Goddard Space Flight Center / ESSIC, University of Maryland, United States; Jianbo Qi, Jean-Philippe Gastellu-Etchegorry, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France; Shanshan Wei, Singapore-MIT Alliance for Research and Technology, Singapore; Bruce Cook, Douglas C. Morton, NASA Goddard Space Flight Center, United States*

**WE2-R11.4: EXTRACTION OF BUILDING WINDOWS FROM MOBILE LASER SCANNING POINT CLOUDS ..... 4304**

*Menglan Zhou, Lingfei Ma, Ying Li, Jonathan Li, University of Waterloo, Canada*

**WE2-R11.5: INDIVIDUAL TREE LEVEL FOREST FIRE ASSESSMENT USING BI-TEMPORAL LIDAR DATA ..... 4308**

*Qin Ma, University of California, Merced, United States; Tianyu Hu, Yanjun Su, Qinghua Guo, Chinese Academy of Sciences, China; John J. Battles, Maggi Kelly, University of California, Berkeley, United States*

**WE3-R11: SENSOR CALIBRATION I**

**WE3-R11.1: VICARIOUS CALIBRATION OF LANDSAT-8 THERMAL DATA COLLECTIONS AND ITS INFLUENCE ON SPLIT-WINDOW ALGORITHM VALIDATION ..... 4312**

*Drazen Skokovic, José Antonio Sobrino, Juan Carlos Jimenez, Soria Guillem, Yves Julien, José Gomis-Cebolla, Susana García-Monteiro, University of Valencia, Spain*

**WE3-R11.2: ANOMALOUS PIXEL REPLACEMENT AND SPECTRAL QUALITY ALGORITHM FOR LONGWAVE INFRARED HYPERSPECTRAL IMAGERY ..... 4316**

*Blake Rankin, Joshua Broadwater, The Johns Hopkins University Applied Physics Laboratory, United States; Milton Smith, Lawrence Livermore National Laboratory, United States*

**WE3-R11.3: VEN $\mu$ S COMMISSIONING PHASE: SPECIFICITIES OF RADIOMETRIC CALIBRATION ..... 4320**

*Arthur Dick, Philippe Gamet, Sébastien Marcq, CNES, France; Gérard Dedieu, Olivier Hagolle, CESBIO, France; Philippe Crébassol, Jean-Louis Raynaud, CNES, France; Emmanuel Hillairet, Silvia Juglea Enache, Magellium, France*

**WE3-R11.4: REDUCING UNCERTAINTIES OF MOLECULAR LINE INTENSITIES VIA CAVITY RING-DOWN SPECTROSCOPY MEASUREMENTS AND AB INITIO CALCULATIONS ..... 4324**

*Zachary Reed, David Long, National Institute of Standards and Technology, United States; Aleksandra Kyuberis, Russian Academy of Science, Russian Federation; Oleg Polyansky, University College of London, United Kingdom; Joseph Hodges, National Institute of Standards and Technology, United States*



<b>WE3-R11.5: REPROCESSING OF S-NPP ENVIRONMENTAL DATA RECORDS USING ENTERPRISE ALGORITHMS: PLANS AND PREPARATIONS</b> .....	<b>4328</b>
<i>Murty Divakarla, IM Systems Group, Inc, United States; Lihang Zhou, Center for Satellite Applications and Research, United States; Xingpin Liu, IM Systems Group, Inc, United States; Satya Kalluri, Center for Satellite Applications and Research, United States</i>	
<b>WE4-R11: SENSOR CALIBRATION II</b>	
<b>WE4-R11.1: CROSS-CALIBRATION OF AQUA-MODIS AND NPP-VIIRS REFLECTIVE SOLAR BANDS FOR A SEAMLESS RECORD OF CERES CLOUD AND FLUX PROPERTIES</b> .....	<b>4332</b>
<i>Rajendra Bhatt, SSAI/NASA LaRC, United States; David Doelling, NASA Langley Research Center, United States; Benjamin Scarino, Conor Haney, Arun Gopalan, SSAI (Contractor to NASA LaRC), United States</i>	
<b>WE4-R11.2: INTERCOMPARISON OF EARTH-OBSERVING SENSORS USING THE RADIOMETRIC CALIBRATION TEST SITE (RADCATS)</b> .....	<b>4336</b>
<i>Jeffrey Czapla-Myers, Nikolaus Anderson, University of Arizona, United States</i>	
<b>WE4-R11.3: NOAA-20 OMPS SENSOR DATA RECORD FROM EARLY ORBIT OPERATION</b> .....	<b>4339</b>
<i>Chunhui Pan, University of Maryland, United States; Lihang Zhou, Changyong Cao, Trevor Beck, Larry Flynn, NOAA, United States; Eric Beach, I M Systems Group Inc, United States</i>	
<b>WE4-R11.4: NOAA-20 VIIRS DAY/NIGHT BAND UNIQUE FEATURE AND PRELIMINARY VERIFICATION ON-ORBIT</b> .....	<b>4343</b>
<i>Wenhui Wang, ERT@NOAA/NESDIS/STAR, United States; Changyong Cao, NOAA/NESDIS/STAR, United States; Lin Lin, University of Maryland, United States</i>	
<b>WE4-R11.5: SENTINEL-2 LEVEL-1 CALIBRATION AND VALIDATION STATUS FROM THE MISSION PERFORMANCE CENTRE</b> .....	<b>4347</b>
<i>Catherine Bouzinac, Bruno Lafrance, Laetitia Pessiot, CSSI, France; Dimitra Touli, Mathieu Jung, Airbus, France; Stephane Massera, IGN, France; Marion Neveu-VanMalle, Aude Espeset, Benjamin Francesconi, Thales Alenia Space, France; Sebastien Clerc, ACRI-ST, France; Jan Jackson, Bahjat Alhammoud, ARGANS, United Kingdom; Françoise Viallefont, ONERA, France; Enrico G. Cadau, Rosario Iannone, ESRIN, Italy; Ferran Gascon, European Space Agency/ESRIN, Italy</i>	
<b>WE1-R12: DEEP LEARNING IN REMOTE SENSING I</b>	
<b>WE1-R12.1: A DEEP NETWORK APPROACH TO MULTITEMPORAL CLOUD DETECTION</b> .....	<b>4351</b>
<i>Devis Tuia, Benjamin Kellenberger, Wageningen University, Netherlands; Adrián Pérez-Suay, Gustau Camps-Valls, Universidad de València, Spain</i>	
<b>WE1-R12.2: HIERARCHICAL REGION BASED CONVOLUTION NEURAL NETWORK FOR MULTISCALE OBJECT DETECTION IN REMOTE SENSING IMAGES</b> .....	<b>4355</b>
<i>Qingpeng Li, Beihang University, China; Lichao Mou, Technical University of Munich (TUM), Germany; Kaiyu Jiang, Qingjie Liu, Yunhong Wang, Beihang University, China; Xiao Xiang Zhu, Technical University of Munich (TUM), Germany</i>	
<b>WE1-R12.3: GENERATIVE ADVERSARIAL NETWORKS FOR REALISTIC SYNTHESIS OF HYPERSPECTRAL SAMPLES</b> .....	<b>4359</b>
<i>Nicolas Audebert, ONERA - IRISA, France; Bertrand Le Saux, ONERA, France; Sébastien Lefèvre, IRISA, France</i>	
<b>WE1-R12.4: A RECURRENT CONVOLUTIONAL NEURAL NETWORK FOR LAND COVER CHANGE DETECTION IN MULTISPECTRAL IMAGES</b> .....	<b>4363</b>
<i>Lichao Mou, Xiao Xiang Zhu, German Aerospace Center (DLR) / Technical University of Munich (TUM), Germany</i>	
<b>WE1-R12.5: EXTRACTION OF BUILDINGS IN VHR SAR IMAGES USING FULLY CONVOLUTION NEURAL NETWORKS</b> .....	<b>4367</b>
<i>Muhammad Shahzad, National University of Sciences and Technology (NUST), Pakistan; Michael Maurer, Friedrich Fraundorfer, Technical University of Graz (TU Graz), Austria; Yuanyuan Wang, Xiao Xiang Zhu, Technical University of Munich (TUM), Germany</i>	

## **WE2-R12: DEEP LEARNING IN REMOTE SENSING II**

### **WE2-R12.1: RECENT ADVANCES AND OPPORTUNITIES IN SCENE CLASSIFICATION OF AERIAL IMAGES WITH DEEP MODELS ..... 4371**

*Fan Hu, Gui-Song Xia, Wen Yang, Liangpei Zhang, Wuhan University, China*

### **WE2-R12.2: WHAT GOES WHERE: PREDICTING OBJECT DISTRIBUTIONS FROM ABOVE ..... 4375**

*Connor Greenwell, Scott Workman, Nathan Jacobs, University of Kentucky, United States*

### **WE2-R12.3: SELF-SUPERVISED LEARNING FOR STEREO RECONSTRUCTION ON AERIAL IMAGES ..... 4379**

*Patrick Knöbelreiter, Christoph Vogel, Thomas Pock, Graz University of Technology, Austria*

### **WE2-R12.4: RECONSTRUCTION OF FULL-POL SAR DATA FROM PARTIAL-POL DATA USING DEEP NEURAL NETWORKS ..... 4383**

*Qian Song, Feng Xu, Ya-Qiu Jin, Fudan University, China*

## **WE3-R12: DEEP LEARNING THEORIES AND APPLICATIONS IN THE REMOTE SENSING I**

### **WE3-R12.1: INTELLIGENT SHIP RECONGNITION FROM SYNTHETIC APERTURE RADAR IMAGES ..... 4387**

*Feng Xu, Haipeng Wang, Qian Song, Wei Ao, Yanqing Shi, Yutong Qian, Fudan University, China*

### **WE3-R12.2: GENERATIVE ADVERSARIAL NETWORKS FOR HARD NEGATIVE MINING IN CNN-BASED SAR-OPTICAL IMAGE MATCHING ..... 4391**

*Lloyd H. Hughes, Michael Schmitt, Xiao Xiang Zhu, Technical University of Munich (TUM), Germany*

### **WE3-R12.3: TRANSFER LEARNING FOR MULTI-FREQUENCY SYNTHETIC APERTURE RADAR APPLICATIONS ..... 4395**

*Colin Schwegmann, Waldo Kleynhans, Council For Scientific and Industrial Research, South Africa; Brian Salmon, University of Tasmania, Australia; Lizwe Mdakane, Rory Meyer, Council For Scientific and Industrial Research, South Africa; Juergan Janoth, Parivash Lumsdon, Airbus Defence and Space GmbH, Germany*

### **WE3-R12.4: SHADOW TRACKING OF MOVING TARGET BASED ON CNN FOR VIDEO SAR SYSTEM ..... 4399**

*Yun Zhang, Shiyu Yang, Hongbo Li, Zhenhua Xu, Harbin Institute of Technology, China*

## **WE4-R12: DEEP LEARNING THEORIES AND APPLICATIONS IN THE REMOTE SENSING II**

### **WE4-R12.1: DEEP NEURAL NETWORKS BASED SEMANTIC SEGMENTATION FOR OPTICAL TIME SERIES ..... 4403**

*Wei Yao, Mihai Datcu, German Aerospace Center (DLR), Germany*

### **WE4-R12.2: POLSAR TARGET CLASSIFICATION USING POLARIMETRIC-FEATURE-DRIVEN DEEP CONVOLUTIONAL NEURAL NETWORK .....4407**

*Si-Wei Chen, Chen-Song Tao, Xue-Song Wang, Shun-Ping Xiao, National University of Defense Technology, China*

### **WE4-R12.3: SAR TARGET CLASSIFICATION WITH CYCLEGAN TRANSFERRED SIMULATED SAMPLES ..... 4411**

*Lei Liu, Zongxu Pan, Xiaolan Qiu, Lingxiao Peng, Institute of Electronics, Chinese Academy of Sciences, China*

### **WE4-R12.4: LAND COVER GENERATION FROM OPTICAL IMAGE ..... 4415**

*Haipeng Wang, Feng Xu, Fudan University, China*

### **WE4-R12.5: A PARAMETERIZATION SCHEME FOR TYPHOON-OCEAN INTERACTION BASED ON A DEEP LEARNING NEURAL NETWORK ..... 4419**

*Guoqing Jiang, Jun Wei, Peking University, China*

## **WEP1-PA: SAR INTERFEROMETRY: ALONG AND ACROSS IV**

### **WEP1-PA.1: PERFORMANCE ASSESSMENT METRICS FOR LINE-INFRASTRUCTURE MONITORING WITH MULTI-SENSOR SAR DATA ..... 4423**

*Ling Chang, University of Twente, Netherlands; Rolf Dollevoet, Ramon F. Hanssen, Delft University of Technology, Netherlands*

### **WEP1-PA.2: AUTOMATIC INSAR PHASE MODELING AND QUALITY ASSESSMENT USING MACHINE LEARNING AND HYPOTHESIS TESTING ..... 4427**

*Bas van de Kerkhof, Delft University of Technology, Netherlands Aerospace Centre, Massachusetts Institute of Technology, Netherlands; Victor Pankratius, Massachusetts Institute of Technology, United States; Ling Chang, Delft University of Technology, Netherlands; Rob van Swol, Netherlands Aerospace Centre, Netherlands; Ramon F. Hanssen, Delft University of Technology, Netherlands*

### **WEP1-PA.3: INTERFEROMETRIC PROCESSING OF CIRCULAR SAR USING FULLY POLARIMETRIC C-BAND DATA ..... 4431**

*Xiaoning Hu, Bingnan Wang, Maosheng Xiang, Liangjiang Zhou, Xikai Fu, Qian Qian, Institute of Electronics, Chinese Academy of Sciences, China*

### **WEP1-PA.4: EFFICIENT REGISTRATION FOR INSAR LARGE-SCALE IMAGE USING QUADTREE SEGMENTATION ..... 4435**

*Shunjun Wei, Liming Pu, Xinxin Tang, Xiaoling Zhang, Jun Shi, University of Electronic Science and Technology of China, China*

### **WEP1-PA.5: PROPOSAL OF SINGULAR-UNIT COMPENSATION IN POLARIMETRIC-INTERFEROMETRIC SYNTHETIC APERTURE RADAR BY PHASOR-QUATERNION NEURAL NETWORKS ..... 4439**

*Kohei Oyama, Akira Hirose, The University of Tokyo, Japan*

### **WEP1-PA.6: SLOPE STABILITY ANALYSIS IN NAINITAL TOWN USING PS AND QPS INSAR TECHNIQUE ..... 4443**

*Manoj Kuri, Indian Institute of Technology Roorkee, India; Manoj K. Arora, PEC University of Technology, India; M. L. Sharma, Indian Institute of Technology Roorkee, India*

## **WEP2-PA: BISTATIC AND DIGITAL BEAMFORMING II**

### **WEP2-PA.1: SPACECRAFT FORMATION DESIGN FOR BISTATIC SAR WITH GEO ILLUMINATOR AND LEO RECEIVER ..... 4451**

*Zheng Lu, Beijing Institute of Spacecraft System Engineering, China; Yuekun Wang, National Laboratory of Radar Signal Processing, China; Mingming Xu, Yu Zhu, Jian Liang, Beijing Institute of Spacecraft System Engineering, China; Zhenfang Li, National Laboratory of Radar Signal Processing, China*

### **WEP2-PA.2: RANGE LINEARIZATION FOR BISTATIC SAR..... 4455**

*Gaogao Liu, Dan Bao, Bin Wu, Guodong Qin, Jingjing Cai, Xidian University, China*

### **WEP2-PA.3: SPACEBORNE BISTATIC SAR SCENE SIMULATION..... 4459**

*Rolf Scheiber, Muriel Pinheiro, Marc Rodriguez-Cassola, Pau Prats-Iraola, German Aerospace Center (DLR), Germany*

## **WEP1-PB: GENERAL SAR APPLICATIONS**

### **WEP1-PB.1: RETRIEVAL OF RICE PHENOLOGY BASED ON TIME-SERIES POLARIMETRIC SAR DATA ..... 4463**

*Hongyu Li, China University of Geosciences Beijing, China; Kun Li, Yun Shao, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Ping Zhou, China University of Geosciences Beijing, China; Xianyu Guo, Shandong University of Science and Technology, China; Changan Liu, Chinese Academy of Agricultural Sciences, China; Long Liu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China*

<b>WEP1-PB.2: INVESTIGATION ON THE CORRELATION BETWEEN THE SUBSIDENCE PATTERN AND LAND USE IN BANDUNG, INDONESIA WITH BOTH SENTINEL-1/2 AND ALOS-2 SATELLITE IMAGES</b>	<b>4467</b>
<i>Zheyuan Du, Linlin Ge, The University of New South Wales, Australia; Alex Hay-Man Ng, Guangdong University of Technology, China</i>	
<b>WEP1-PB.3: EVALUATION OF THE POTENTIALITY OF POLARIMETRIC C- AND L-SAR TIME-SERIES IMAGES FOR THE IDENTIFICATION OF WINTER LAND-USE.</b>	<b>4471</b>
<i>Julien Denize, IETR UMR CNRS 6164 and University of Rennes, France; Laurence Hubert-Moy, Samuel Corgne, LETG UMR CNRS 6554 and University of Rennes, France; Julie Betbeder, CIRAD, France; Eric Pottier, IETR - UMR 6164, University of Rennes 1, France</i>	
<b>WEP1-PB.4: SPARSE SAR IMAGE FORMATION OF MOVING TARGETS-A REWEIGHTED SPARSE APPROACH</b>	<b>4475</b>
<i>Gang Xu, Southeast University, China; Xianpeng Wang, State Key Laboratory of Marine Resource Utilization in South China Sea, College of Information Science &amp; Technology, Hainan University, China; Yanyang Liu, Di Zhao, Shanghai Institute of Satellite Engineering, China</i>	
<b>WEP1-PB.5: SPATIAL FUZZY CLUSTERING AND DEEP AUTO-ENCODER FOR UNSUPERVISED CHANGE DETECTION IN SYNTHETIC APERTURE RADAR IMAGES</b>	<b>4479</b>
<i>Yangyang Li, Linhao Zhou, Cheng Peng, Licheng Jiao, Xidian University, China</i>	
<b>WEP1-PB.6: SALIENCY DETECTION FOR L1/2 REGULARIZATION-BASED SAR IMAGE FEATURE ENHANCEMENT VIA BAYESIAN INFERENCE</b>	<b>4483</b>
<i>Hua Guan, Jiacheng Ni, Qun Zhang, Li Sun, Kai Wang, Air Force Engineering University, China</i>	
<b>WEP1-PB.7: ANALYZING CONSPICUOUS FEATURES OF A CURVED AND GRADED BAY BRIDGE ON SAR IMAGERY</b>	<b>4487</b>
<i>Yong Wang, Xiaojian Gan, Taoli Yang, University of Electronic Science and Technology of China, United States</i>	
<b>WEP1-PB.8: CLASSIFICATION OF POLSAR IMAGES BASED ON SVM WITH SELF-PACED LEARNING OPTIMIZATION</b>	<b>4491</b>
<i>Wenshuai Chen, Dong Hai, Shuiping Gou, Licheng Jiao, Xidian University, China</i>	
<b>WEP1-PB.9: ATTENTION-BASED CONVOLUTIONAL NEURAL NETWORK FOR THE DETECTION OF BUILT-UP AREAS IN HIGH-RESOLUTION SAR IMAGES</b>	<b>4495</b>
<i>Yunfei Wu, Rong Zhang, Yibing Zhan, University of Science and Technology of China, China</i>	
<b>WEP1-PB.10: A NEW METHOD OF RETRIEVING THE INCLINATION DIRECTION OF POWER TRANSMISSION TOWER BY GEOCODING</b>	<b>4499</b>
<i>Yue Yang, Yunping Chen, Yan Chen, Fanghong Xiao, University of Electronic Science and Technology of China, China; Wenzhu He, Sichuan Academy of Agricultural Sciences, China</i>	
 <b>WEP2-PB: DATA ANALYSIS METHODS I</b>	
<b>WEP2-PB.1: ASSESSMENT OF TREE ATTRIBUTES EXTRACTION ALGORITHMS</b>	<b>4503</b>
<i>Li Liu, Samsung Lim, University of New South Wales, Australia</i>	
<b>WEP2-PB.2: ATTRIBUTE PROFILES WITHOUT THRESHOLDS</b>	<b>4507</b>
<i>Erchan Aptoula, Gebze Technical University, Turkey; Safak Guner Koc, Okan University, Turkey</i>	
<b>WEP2-PB.3: CLASSIFICATION OF REMOTE SENSING IMAGES USING ATTRIBUTE PROFILES AND FEATURE PROFILES FROM DIFFERENT TREES: A COMPARATIVE STUDY</b>	<b>4511</b>
<i>Minh-Tan Pham, IRISA - Université Bretagne Sud, France; Erchan Aptoula, Institute of Information Technologies, Gebze Technical University, Turkey; Sébastien Lefèvre, IRISA - Université Bretagne Sud, France</i>	
<b>WEP2-PB.5: DISCRIMINATIVE LEARNING OF POINT CLOUD FEATURE DESCRIPTORS BASED ON SIAMESE NETWORK</b>	<b>4519</b>
<i>Xuelun Shen, Cheng Wang, Chenglu Wen, Weiquan Liu, Xiaotian Sun, Jonathan Li, Xiamen University, China</i>	

<b>WEP2-PB.8: KNOWLEDGE-BASED FOR DAMAGE DETECTION OF BRIDGE OVER WATER FROM HIGH-SPATIAL RESOLUTION REMOTE SENSING IMAGES</b>	<b>4531</b>
<i>Chao Chen, Jiaoqi Fu, Zhejiang Ocean University, China; Li Chen, China Aero Geophysical Survey and Remote Sensing Center for Land and Resources, China; Xu Lu, Zhejiang Ocean University, China</i>	
<b>WEP2-PB.9: TBR MAXIMUM CRITERIA FOR HIGH RESOLUTION IMAGE VESSEL TARGET EXTRACTION</b>	<b>4535</b>
<i>Peng Chen, Navigation College, Dalian Maritime University, China; Hui Zhou, Dalian Neusoft University of Information, China; Shengtao Yu, Navigation College, Dalian Maritime University, China</i>	
<b>WEP2-PB.10: DEEP METRIC AND HASH-CODE LEARNING FOR CONTENT-BASED RETRIEVAL OF REMOTE SENSING IMAGES</b>	<b>4539</b>
<i>Subhankar Roy, Enver Sangineto, University of Trento, Italy; Begum Demir, Technische Universität Berlin, Germany; Nicu Sebe, University of Trento, Italy</i>	
 <b>WEP1-PC: POLSAR CLASSIFICATION METHODS</b>	
<b>WEP1-PC.1: ANISOTROPIC SCATTERING DETECTION FOR CHARACTERIZING POLARIMETRIC CIRCULAR SAR MULTI-ASPECT SIGNATURES</b>	<b>4543</b>
<i>Yang Li, Beijing Institute of Electronic System Engineering, China; Yun Lin, Wen Hong, Institute of Electronics, Chinese Academy of Science, China; Ran Xu, Zhimin Zhuo, Beijing Institute of Electronic System Engineering, China; Qiang Yin, Beijing University of Chemical Technology, China</i>	
<b>WEP1-PC.2: MODEL-BASED DECOMPOSITION WITH REDUCED NEGATIVE SCATTERING POWERS</b>	<b>4547</b>
<i>Ken Yoong Lee, Chen Guang Hou, Jun Xiang Chen, Soo Chin Liew, Leong Keong Kwoh, National University of Singapore, Singapore</i>	
<b>WEP1-PC.3: POLARIMETRIC SAR TERRAIN CLASSIFICATION USING 3D CONVOLUTIONAL NEURAL NETWORK</b>	<b>4551</b>
<i>Lamei Zhang, Zexi Chen, Bin Zou, Harbin Institute of Technology, China; Ye Gao, Product Quality Supervision and Inspection Institute of Harbin, China</i>	
<b>WEP1-PC.4: AN TENSOR-BASED CORN MAPPING SCHEME WITH RADARSAT-2 FULLY POLARIMETRIC IMAGES</b>	<b>4555</b>
<i>Lu Xu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China; Hong Zhang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Chao Wang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China; Bo Zhang, Meng Liu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>WEP1-PC.5: POLSAR ADAPTIVE MODEL-BASED DECOMPOSITION WITHOUT ASSUMPTION OF REFLECTION SYMMETRY</b>	<b>4559</b>
<i>Hongzhong Li, Yu Han, Xinpeng Deng, Jinsong Chen, Shenzhen Institute of Advanced Technology, CAS, China</i>	
<b>WEP1-PC.6: A FOUR-COMPONENT DECOMPOSITION MODEL FOR POLARIMETRIC SAR IMAGES BASED ON ADAPTIVE VOLUME SCATTERING MODEL</b>	<b>4563</b>
<i>Xiao Wang, Lamei Zhang, Harbin Institute of Technology, China; Sha Zhu, Institute of Beijing Remote Sensing Information (IBRSI), China</i>	
<b>WEP1-PC.7: DETECTION OF POSSIBLE WATER-ICE DEPOSITS ON LUNAR SURFACE USING CONFORMITY COEFFICIENT: AN APPLICATION OF MINISAR DATA</b>	<b>4567</b>
<i>Nidhi Verma, Pooja Mishra, Neetesh Purohit, Indian Institute of Information Technology, Allahabad, India; Dharmendra Singh, Indian Institute of Information Technology, Roorkee, India</i>	
<b>WEP1-PC.8: A NEW FARADAY ROTATION ESTIMATOR BASED ON POLARIMETRIC COHERENCY MATRIX AND ITS EFFECT ON SEA ICE</b>	<b>4571</b>
<i>Bing Li, Zemin Wang, Jiachun An, Chunxia Zhou, Yiming Chen, Wuhan University, China</i>	

<b>WEP1-PC.9: A NEW VOLUME SCATTERING MODEL FOR THREE-COMPONENT DECOMPOSITION OF POLARIMETRIC SAR DATA</b>	<b>4575</b>
<i>Zezhong Wang, Qiming Zeng, Jian Jiao, Peking University, China</i>	
<b>WEP1-PC.10: FOREST CANOPY HEIGHT ESTIMATION FROM INTERFEROMETRIC TANDEM-X COHERENCE DATA OVER COMPLEX TERRAIN AREA</b>	<b>4579</b>
<i>Yaxiong Fan, Erxue Chen, Zengyuan Li, Institute of Forest Resource Information Techniques, Chinese Academy of Forestry, China; Wangfei Zhang, College of Forestry, Southwest Forestry University, China; Lei Zhao, Institute of Forest Resource Information Techniques, Chinese Academy of Forestry, China; Yongjie Ji, College of Forestry, Southwest Forestry University, China</i>	
 <b>WEP2-PC: RADAR AND LIDAR</b>	
<b>WEP2-PC.1: BARRAGE JAMMING DETECTION AND CLASSIFICATION BASED ON CONVOLUTIONAL NEURAL NETWORK FOR SYNTHETIC APERTURE RADAR</b>	<b>4583</b>
<i>Yu Junfei, Li Jingwen, Sun Bing, Jiang YuMing, Beihang University, China</i>	
<b>WEP2-PC.3: ISAR IMAGING OF OBJECTS EMBEDDED IN CLUTTER USING COMPRESSIVE SENSING</b>	<b>4587</b>
<i>Jon Mitchell, Saibun Tjuatja, University of Texas at Arlington, United States</i>	
<b>WEP2-PC.4: MULTI FREQUENCY ANALYSIS OF SCATTERING MATRIX AND SCATTERING POWER MATRIX FOR MARINE VESSELS DETECTION</b>	<b>4591</b>
<i>Gaurav Kumar Dashondhi, Krishna Mohan Buddhiraju, Indian Institute of Technology Bombay, India</i>	
<b>WEP2-PC.5: NONPARAMETRIC BAYESIAN 3-D ISAR IMAGING OF SPACE DEBRIS</b>	<b>4595</b>
<i>Feng Zhou, Yu Ning, Xueru Bai, Lei Liu, Xidian University, China</i>	
<b>WEP2-PC.6: UNDERWATER MATERIAL DISCRIMINABILITY WITH FLUORESCENCE LIDAR IN UNKNOWN ENVIRONMENTAL CONDITIONS</b>	<b>4599</b>
<i>Stefania Matteoli, National Research Council of Italy (CNR), Italy; Giovanni Corsini, University of Pisa, Italy</i>	
<b>WEP2-PC.7: COMPARATIVE STUDY ON DIFFERENT TIME DISCRIMINATION METHODS FOR FULL-WAVEFORM LIDAR</b>	<b>4603</b>
<i>Duan Li, Beihang University, China</i>	
<b>WEP2-PC.8: SEGMENT-BASED TRAFFIC SIGN DETECTION FROM MOBILE LASER SCANNING DATA</b>	<b>4607</b>
<i>Ying Li, Lingfei Ma, University of Waterloo, Canada; Yuchun Huang, Wuhan University, China; Jonathon Li, University of Waterloo, Canada</i>	
 <b>WEP1-PD: POLSAR APPLICATIONS</b>	
<b>WEP1-PD.1: AUTOMATIC-ZOOMING-TYPE WINDOW SIZE OPTIMIZATION FOR POLSAR DATA INTERPRETATION</b>	<b>4615</b>
<i>Masanari Sugita, Naoto Kishi, Fang Shang, University of Electro-Communications, Japan</i>	
<b>WEP1-PD.2: SOIL MOISTURE RETRIEVAL BY MEANS OF ADAPTIVE POLARIMETRIC TWO-SCALE TWO-COMPONENT MODEL WITH FULLY POLARIMETRIC ALOS-2 DATA</b>	<b>4619</b>
<i>Yuta Izumi, Tohoku University, Japan; Joko Widodo, Chiba university, Japan; Husnul Kausarian, Universitas Islam Riau, Indonesia; Sevket Demirci, Mersin University, Turkey; Ayaka Takahashi, Josaphat Tetuko Sri Sumantyo, Chiba university, Japan; Motoyuki Sato, Tohoku University, Japan</i>	
<b>WEP1-PD.3: VALIDATION OF SAR ICEBERG DETECTION WITH GROUND-BASED RADAR AND GPS MEASUREMENTS</b>	<b>4623</b>
<i>Vahid Akbari, UiT The Arctic University of Norway, Norway; Tom Rune Lauknes, Line Rouyet, Northern Research Institute, Norway; Jean Negrel, NPI Norwegian Polar Institute, Norway; Torbjørn Eltoft, UiT The Arctic University of Norway, Norway</i>	

**WEP1-PD.4: STUDY OF POLARIMETRIC DECOMPOSITION TECHNIQUES FOR ..... 4627**  
**MONITORING TEMPORAL GROWTH OF MAJOR KHARIF CROPS AND SURROUNDING**  
**LANDUSE IN INDIA**

*Bindi Dave, Centre For Environment Planning And Technology, India; Shiv Mohan, Physical Research Laboratory, India*

**WEP1-PD.5: BURN SCAR DETECTION USING POLARIMETRIC ALOS-2 DATA..... 4631**

*Simon Plank, Susanne Karg, Sandro Martinis, German Aerospace Center (DLR), Germany*

**WEP1-PD.6: A THREE-LAYER SCATTERING MODEL OF THE SLOPE FOREST AREA FOR ..... 4635**  
**POLARIMETRIC SAR INTERFEROMETRY**

*Lamei Zhang, Baolong Duan, Bin Zou, Harbin Institute of Technology, China; Yan Cheng, Product Quality Supervision and Inspection Institute of Harbin, China*

**WEP1-PD.9: CODEBOOK-BASED HIERARCHICAL POLARIZATION FEATURE FOR ..... 4643**  
**UNSUPERVISED FINE LAND CLASSIFICATION USING HIGH-RESOLUTION POLSAR DATA**

*Hyunsoo Kim, Akira Hirose, The University of Tokyo, Japan*

**WEP2-PD: APPLICATIONS OF REMOTE SENSING**

**WEP2-PD.2: EVALUATING THE POTENTIAL OF SENTINEL-2 FOR LOW SEVERITY MITES ..... 4651**  
**INFESTATION DETECTION IN GRAPES**

*Jayantrao Mohite, Navin Twarakavi, Srinivasu Pappula, Tata Consultancy Services, India*

**WEP2-PD.4: FULLY CONVOLUTIONAL NEURAL NETWORKS FOR LARGE SCALE ..... 4659**  
**CROPLAND MAPPING WITH HISTORICAL LABEL DATASET**

*Dujuan Zhang, Jinshui Zhang, Yaozhong Pan, Yaming Duan, Beijing Normal University, China*

**WEP2-PD.5: CLASSIFICATION OF RARE BUILDING CHANGE USING CNN WITH ..... 4663**  
**MULTI-CLASS FOCAL LOSS**

*Keisuke Nemoto, Ryuhei Hamaguchi, Tomoyuki Imaizumi, Shuhei Hikosaka, PASCO CORPORATION, Japan*

**WEP2-PD.7: IDENTIFYING FAVORABLE SPATIO-TEMPORAL CONDITIONS FOR WEST ..... 4670**  
**NILE VIRUS OUTBREAKS BY CO-CLUSTERING OF MODIS LST INDICES TIME SERIES**

*Veronica Andreo, University of Twente, Netherlands; Emma Izquierdo-Verdiguier, University of Twente / Image Processing Laboratory (IPL), University of Valencia, Netherlands; Raúl Zurita-Milla, University of Twente, Netherlands; Roberto Rosà, Annapaola Rizzoli, Center of Research and Innovation. Fondazione Edmund Mach., Italy; Anna Papa, Arboviruses Reference Laboratory, Aristotle University of Thessaloniki., Greece*

**WEP2-PD.9: EXPLORING SENTINEL-1 DATA FOR LOCAL CLIMATE ZONE CLASSIFICATION ..... 4677**

*Jingliang Hu, Xiao Xiang Zhu, DLR - German Aerospace Center, Germany*

**WEP2-PD.10: FEATURE IMPORTANCE ANALYSIS OF SENTINEL-2 IMAGERY FOR ..... 4681**  
**LARGE-SCALE URBAN LOCAL CLIMATE ZONE CLASSIFICATION**

*Chunping Qiu, Michael Schmitt, Technical University of Munich (TUM), China; Pedram Ghamisi, Remote Sensing Technology Institute (IMF), German Aerospace Center (DLR), Germany; Lichao Mou, Xiao Xiang Zhu, Technical University of Munich (TUM), Germany*

**WEP1-PE: BAND SELECTION FOR HYPERSPECTRAL DATA**

**WEP1-PE.1: COMBINATION OF BAND SELECTION AND WEIGHTED SPATIAL-SPECTRAL ..... 4685**  
**METHOD FOR HYPERSPECTRAL IMAGE CLASSIFICATION**

*Xiangjuan Li, College of Computer Science, Xi'an ShiYou University, China; Giorgos Mountrakis, State University of New York College of Environmental Science and Forestry, United States; Chuanyuan Zhao, Feng Zhang, College of Computer Science, Xi'an ShiYou University, China*

**WEP1-PE.2: HYPERSPECTRAL BAND SELECTION USING PAIR-WISE CONSTRAINT AND ..... 4689**  
**BAND-WISE CORRELATION**

*Ting Lu, Shutao Li, Hunan University, China*

<b>WEP1-PE.3: HYPERSPECTRAL BAND SELECTION BASED ON ENDMEMBER DISSIMILARITY FOR HYPERSPECTRAL UNMIXING</b>	<b>4693</b>
<i>Mingming Xu, School of Geosciences, China University of Petroleum (East China), China; Yuxiang Zhang, Institute of Geophysics and Geomatics, China University of Geosciences, China; Jie Li, School of Geodesy and Geomatics, Wuhan University, China; Jiayi Li, School of Remote Sensing and Information Engineering, Wuhan University, China; Dongmei Song, Yanguo Fan, Ning Sun, School of Geosciences, China University of Petroleum (East China), China</i>	
<b>WEP1-PE.4: SELECTING BAND SUBSETS FROM HYPERSPECTRAL IMAGE THROUGH A NOVEL EVOLUTIONARY-BASED STRATEGY</b>	<b>4697</b>
<i>Xuefeng Jiang, Lin Zhang, Fahong Zhang, Junrui Liu, Qi Wang, Northwestern Polytechnical University, China</i>	
<b>WEP1-PE.5: THREE-DIMENSIONAL EMPIRICAL MODE DECOMPOSITION BASED HYPERSPECTRAL BAND SELECTION METHOD</b>	<b>4701</b>
<i>Miao Zhang, Wenbo Yu, Yi Shen, Harbin Institute of Technology, China</i>	
<b>WEP1-PE.6: TOWARDS WEAKLY PARETO OPTIMAL: AN IMPROVED MULTI-OBJECTIVE BASED BAND SELECTION METHOD FOR HYPERSPECTRAL IMAGERY</b>	<b>4705</b>
<i>Bin Pan, Beihang University, China; Liming Wang, Institute of Information Engineering Chinese Academy of Sciences, China; Xia Xu, Zhenwei Shi, Beihang University, China</i>	
<b>WEP1-PE.7: OPTIMAL NEIGHBORING RECONSTRUCTION FOR HYPERSPECTRAL BAND SELECTION</b>	<b>4709</b>
<i>Fahong Zhang, Qi Wang, Northwestern Polytechnical University, China; Xuelong Li, Chinese Academy of Sciences, China</i>	
<b>WEP1-PE.9: A CNN-BASED FUSION METHOD FOR SUPER-RESOLUTION OF SENTINEL-2 DATA</b>	<b>4713</b>
<i>Massimiliano Gargiulo, Antonio Mazza, University Federico II, Italy; Raffaele Gaetano, CIRAD, France; Giuseppe Ruello, Giuseppe Scarpa, University Federico II, Italy</i>	
<b>WEP2-PE: SCENE CLASSIFICATION</b>	
<b>WEP2-PE.1: A NOVEL MULTIPLE KERNEL LEARNING FRAMEWORK FOR REMOTE SENSING SCENE CLASSIFICATION</b>	<b>4717</b>
<i>Xiaoyong Bian, Yuxia Sheng, Wuhan University of Science and Technology, China; Yan Xu, Qian Du, Mississippi State University, United States</i>	
<b>WEP2-PE.2: AID++: AN UPDATED VERSION OF AID ON SCENE CLASSIFICATION</b>	<b>4721</b>
<i>Pu Jin, Gui-Song Xia, Fan Hu, Qikai Lu, Liangpei Zhang, Wuhan University, China</i>	
<b>WEP2-PE.4: LAHNET: A CONVOLUTIONAL NEURAL NETWORK FUSING LOW- AND HIGH-LEVEL FEATURES FOR AERIAL SCENE CLASSIFICATION</b>	<b>4728</b>
<i>Yuansheng Hua, Lichao Mou, Xiao Xiang Zhu, Technical University of Munich (TUM) / German Aerospace Center (DLR), Germany</i>	
<b>WEP2-PE.5: SEMI-SUPERVISED SCENE CLASSIFICATION FOR REMOTE SENSING IMAGES BASED ON CNN AND ENSEMBLE LEARNING</b>	<b>4732</b>
<i>Xueyuan Dai, Xiaofeng Wu, Bin Wang, Liming Zhang, Fudan University, China</i>	
<b>WEP2-PE.6: ADAPTIVE SPATIAL-SCALE-AWARE DEEP CONVOLUTIONAL NEURAL NETWORK FOR HIGH-RESOLUTION REMOTE SENSING IMAGERY SCENE CLASSIFICATION</b>	<b>4736</b>
<i>Wei Han, Ruyi Feng, Lizhe Wang, Lang Gao, China University of Geosciences, China</i>	
<b>WEP2-PE.7: ATTENTION BASED NETWORK FOR REMOTE SENSING SCENE CLASSIFICATION</b>	<b>4740</b>
<i>Shaoteng Liu, Qi Wang, Northwestern Polytechnical University, China; Xuelong Li, Chinese Academy of Sciences, China</i>	
<b>WEP2-PE.8: DIVERSIFYING DEEP MULTIPLE CHOICES FOR REMOTE SENSING SCENE CLASSIFICATION</b>	<b>4744</b>
<i>Zhiqiang Gong, Ping Zhong, Jiaxin Shan, Weidong Hu, National University of Defense Technology, China</i>	



<b>WEP2-PE.9: ENHANCED INTERACTIVE REMOTE SENSING IMAGE RETRIEVAL WITH SCENE CLASSIFICATION CONVOLUTIONAL NEURAL NETWORKS MODEL</b>	<b>4748</b>
<i>Yaakoub Boualleg, Mohamed Farah, University of Manouba, Tunisia</i>	
<b>WEP2-PE.10: GENERATIVE ADVERSARIAL NETWORKS FOR CROSS-SCENE CLASSIFICATION IN REMOTE SENSING IMAGES</b>	<b>4752</b>
<i>Laila Bashmal, Yakoub Bazi, Haikel AlHichri, Naif Alajlan, King Saud University, Saudi Arabia</i>	
 <b>WEP1-PF: HYPERSPECTRAL DATA PROCESSING I</b>	
<b>WEP1-PF.1: LOW-COMPLEXITY HYPERSPECTRAL IMAGE COMPRESSION USING FOLDED PCA AND JPEG2000</b>	<b>4756</b>
<i>Shaohui Mei, Bakht Muhammad Khan, Yifan Zhang, Northwestern Polytechnical University, China; Qian Du, Mississippi State University, United States</i>	
<b>WEP1-PF.2: SPARSE AND SMOOTH FEATURE EXTRACTION FOR HYPERSPECTRAL IMAGERY</b>	<b>4760</b>
<i>Behnood Rasti, Keilir Institute of Technology (KIT), University of Iceland, Iceland; Magnus Orn Ulfarsson, University of Iceland, Iceland; Pedram Ghamisi, German Aerospace Center (DLR), Germany</i>	
<b>WEP1-PF.3: CROSS-SCENE FEATURE SELECTION FOR HYPERSPECTRAL IMAGES BASED ON CROSS-DOMAIN INFORMATION GAIN</b>	<b>4764</b>
<i>Minchao Ye, Yongqiu Xu, Huijuan Lu, Ke Yan, China Jiliang University, China; Yuntao Qian, Zhejiang University, China</i>	
<b>WEP1-PF.5: IMPROVED RANDOM PROJECTION WITH K-MEANS CLUSTERING FOR HYPERSPECTRAL IMAGE CLASSIFICATION</b>	<b>4768</b>
<i>Vineetha Menon, University of Alabama in Huntsville, United States; Qian Du, Mississippi State University, United States; Sundar Christopher, University of Alabama in Huntsville, United States</i>	
<b>WEP1-PF.6: MONTE CARLO NON-LOCAL MEANS METHOD FOR HYPERSPECTRAL IMAGE DENOISING</b>	<b>4772</b>
<i>Chuyin Deng, Liyan Li, Zhi He, Jun Li, Guangdong Provincial Key Laboratory of Urbanization and Geo-simulation, Center of Integrated Geographic Information Analysis, School of Geography and Planning, Sun Yat-sen University, China; Yuanhui Zhu, Center of Geographic Information Analysis for Public Security, School of Geographic Sciences, Guangzhou University, China</i>	
<b>WEP1-PF.7: SEMI-SUPERVISED CLASSIFICATION OF HYPERSPECTRAL DATA FOR GEOLOGIC BODY BASED ON GENERATIVE ADVERSARIAL NETWORKS AT TIANSHAN AREA</b>	<b>4776</b>
<i>Jin Qin, Ying Zhan, Kang Wu, Wei Liu, Zhaoying Yang, Wang Yao, Yasmine Medjadba, Beijing Normal University, China; Yuanfei Zhang, China Non-ferrous Metals Resource Geological Survey, China; Xianchuan Yu, Beijing Normal University, China</i>	
<b>WEP1-PF.8: A NOVEL DEEP LEARNING FRAMEWORK BY COMBINATION OF SUBSPACE-BASED FEATURE EXTRACTION AND CONVOLUTIONAL NEURAL NETWORKS FOR HYPERSPECTRAL IMAGES CLASSIFICATION</b>	<b>4780</b>
<i>Tayeb Alipourfard, Hossein Arefi, University of Tehran, Iran; Somayeh Mahmoudi, Kerman Graduate University of Advanced Technology, Iran</i>	
<b>WEP1-PF.9: HYPERSPECTRAL IMAGE DENOISING VIA COUPLED SPECTRAL-SPATIAL TENSOR REPRESENTATION</b>	<b>4784</b>
<i>Lu Zhao, Yang Xu, Zhihui Wei, Nanjing University of Science and Technology, China; Renping Yu, Zhengzhou University, China; Ling Qian, Nanjing University of Science and Technology, China</i>	
<b>WEP1-PF.10: DEEP TENSOR FACTORIZATION FOR HYPERSPECTRAL IMAGE CLASSIFICATION</b>	<b>4788</b>
<i>Jingzhou Chen, Wei Zhang, Yuntao Qian, Zhejiang University, China; Minchao Ye, China Jiliang Univeristy, China</i>	

## **WEP2-PF: TECHNIQUES FOR MULTI-TEMPORAL RADAR IMAGE ANALYSIS**

### **WEP2-PF.1: A NEW NEURAL APPROACH OF SUPERVISED CHANGE DETECTION IN SAR IMAGES USING TRAINING DATA GENERATION WITH CONCURRENT SELF-ORGANIZING MAPS ..... 4792**

*Victor-Emil Neagoe, Radu-Mihai Stoica, Polytechnic University of Bucharest, Romania*

### **WEP2-PF.2: CHANGE DETECTION APPROACH USING FUZZY LABELED CO-OCCURRENCE MATRIX ON MULTI-TEMPORAL TERRASAR-X IMAGES ..... 4796**

*Na Li, Tian Hui Satellite Center of China, China; Fang Liu, National University of Defense Technology, China; Lei Qiu, Beijing Institute of Tracking and Telecommunication Technology, China; Xiangchenyang Su, National University of Defense Technology, China*

### **WEP2-PF.3: INTEGRATION OF SAR AND GEOBIA FOR THE ANALYSIS OF TIME-SERIES DATA ..... 4800**

*Donato Amitrano, University of Napoli Federico II, Italy; Francesca Cecinati, University of Bath, United Kingdom; Gerardo Di Martino, Antonio Iodice, University of Napoli Federico II, Italy; Pierre-Philippe Mathieu, European Space Agency, Italy; Daniele Riccio, Giuseppe Ruello, University of Napoli Federico II, Italy*

### **WEP2-PF.4: CHANGE DETECTION USING CURVELET AND CONTOURLET TRANSFORMS USING MULTITEMPORAL SAR IMAGERY ..... 4804**

*Rizwan Ahmed Ansari, Krishna Mohan Buddhiraju, Avik Bhattacharya, Indian Institute of Technology Bombay, India*

### **WEP2-PF.5: SAR IMAGE CHANGE DETECTION BASED ON CONDITIONAL SPATIAL AND KERNEL FUZZY C-MEANS ..... 4808**

*Weitong Zhang, Ailing Wen, Ronghua Shang, Licheng Jiao, Xidian University, China*

### **WEP2-PF.6: DEEP LEARNING CROP CLASSIFICATION APPROACH BASED ON SPARSE CODING OF TIME SERIES OF SATELLITE DATA ..... 4812**

*Mykola Lavreniuk, Nataliia Kussul, Space Research Institute NASU-SSAU, Ukraine; Alexei Novikov, National Technical University of Ukraine "Igor Sikorsky Kiev Polytechnic Institute", Ukraine*

## **WEP1-PG: OBJECT DETECTION IN OPTICAL IMAGES III**

### **WEP1-PG.2: RAILWAY DETECTION: FROM FILTERING TO SEGMENTATION NETWORKS ..... 4819**

*Bertrand Le Saux, Anne Beaupère, Alexandre Boulch, ONERA, France; Jérémie Brossard, Antoine Manier, Guilhem Villemin, ALTAMETRIS, France*

### **WEP1-PG.3: TOWARDS AUTOMATED VESSEL DETECTION AND TYPE RECOGNITION FROM VHR OPTICAL SATELLITE IMAGES ..... 4823**

*Sergey Voinov, Detmar Krause, Egbert Schwarz, German Aerospace Center (DLR), Germany*

### **WEP1-PG.4: FROM TRANSDUCTIVE TO INDUCTIVE SEMI-SUPERVISED ATTRIBUTES FOR SHIP CATEGORY RECOGNITION ..... 4827**

*Quentin Oliveau, Télécom ParisTech, France; Hichem Sahbi, CNRS, University of Pierre and Marie Curie, Sorbonne University, France*

### **WEP1-PG.5: INTEGRATING MSER INTO A FAST ICA APPROACH FOR IMPROVING BUILDING DETECTION ACCURACY ..... 4831**

*Lipika Agarwal, K. S. Rajan, International Institute of Information Technology, Hyderabad, India*

### **WEP1-PG.7: THREE APPLICATIONS OF DEEP LEARNING ALGORITHMS FOR OBJECT DETECTION IN SATELLITE IMAGERY ..... 4839**

*Milena Napiorkowska, David Petit, Deimos Space UK Ltd, United Kingdom; Paula Marti, Deimos Engenharia S.A, Portugal*

### **WEP1-PG.8: HOW TO QUICKLY FIND THE OBJECT OF INTEREST IN LARGE SCALE REMOTE SENSING IMAGES ..... 4843**

*Zhina Song, Haigang Sui, Wuhan University, China; Li Hua, Huazhong Agricultural University, China*

<b>WEP1-PG.9: FAST AIRPLANE DETECTION WITH HIERARCHICAL STRUCTURE IN LARGE SCENE REMOTE SENSING IMAGES AT HIGH SPATIAL RESOLUTION</b>	<b>4846</b>
<i>Hao Chen, Jing Zhao, Tong Gao, Wen Chen, Harbin Institute of Technology, China</i>	
<b>WEP1-PG.10: DEVELOPMENT OF PATTERN RECOGNITION ALGORITHMS TO DETECT INTENSE CONVECTIVE STORMS FROM MULTISPECTRAL SATELLITE IMAGERY</b>	<b>4850</b>
<i>Konstantin Khlopenkov, Science Systems and Applications, Inc., United States; Kristopher Bedka, NASA, United States</i>	
<b>WEP2-PG: SURFACE PARAMETER ESTIMATION</b>	
<b>WEP2-PG.1: THE ADDITION OF TEMPERATURE SIGNIFICANTLY IMPROVES THE DETECTION OF LAND DEGRADATION IN COLD DRYLANDS USING THE TSS-RESTREND METHODOLOGY</b>	<b>4853</b>
<i>Arden Burrell, Jason Evans, University of New South Wales, Australia; Yi Liu, Nanjing University of Information Science and Technology, Australia</i>	
<b>WEP2-PG.2: ESTIMATION OF GROUND DEFORMATION OF TRANSMISSION CORRIDORS IN MOUNTAIN AREAS USING STANFORD METHOD</b>	<b>4857</b>
<i>Shaochun Su, Yiyu Gong, Songhai Fan, State Grid Sichuan Electric Power Research Institute, China; Hongbo Zhu, Yan Chen, Yunping Chen, University of Electronic Science and Technology of China, China</i>	
<b>WEP2-PG.3: WATER QUALITY ANALYSIS OF REMOTE SENSING IMAGES BASED ON INVERSION MODEL</b>	<b>4861</b>
<i>Jinzhe Wang, Junping Zhang, Tong Li, Xiao Wang, Harbin Institute of Technology, China</i>	
<b>WEP2-PG.5: MEDIUM AND HIGH RESOLUTION MULTISPECTRAL DATA FROM LANDSAT-8 AND SENTINEL-2 FOR ACTIVE FIRE MONITORING AND POST-FIRE ASSESSMENT OF BURNED AREAS: A CASE STUDY ON VESUVIUS</b>	<b>4869</b>
<i>Luca Cicala, CIRA, The Italian Aerospace Research Center, Italy; Nicomino Fiscante, Università degli Studi del Sannio, Italy; Cesario Vincenzo Angelino, Sara Parrilli, CIRA, The Italian Aerospace Research Center, Italy</i>	
<b>WEP2-PG.6: MODELING THE TOA BRIGHTNESS TEMPERATURE ON THE SWIR-SENSORS</b>	<b>4873</b>
<i>Igor Garkusha, Volodymyr Hnatushenko, EOS Data Analytics, Ukraine</i>	
<b>WEP1-PH: SAR/INSAR SURFACE EVOLUTION ANALYSIS</b>	
<b>WEP1-PH.1: USE OF SENTINEL-1 DATA FOR EARTHQUAKE DAMAGE ASSESSMENT IN CASES OF AMATRICE AND SARPOL-E ZAHAB</b>	<b>4877</b>
<i>Asset Akhmediya, Qiming Zeng, Peking University, China</i>	
<b>WEP1-PH.2: SURFACE DEFORMATION EVALUATION IN DUJIANGYAN, CHINA USING TIME-SERIES INSAR TECHNIQUE AND MULTIPLE TEMPORAL C-BAND SAR DATASETS</b>	<b>4881</b>
<i>Ningning Xiao, Yong Wang, Yin Zhang, Zhu Zeng, University of Electronic Science and Technology of China, China</i>	
<b>WEP1-PH.3: STUDY OF LANDSLIDE CHARACTERISTICS USING TIME-SERIES INSAR TECHNIQUE</b>	<b>4885</b>
<i>Yan Yan, University of Electronic Science and Technology of China, China; Yong Wang, East Carolina University, United States; Zhu Zeng, University of Electronic Science and Technology of China, China</i>	
<b>WEP1-PH.4: ANALYZING LANDSLIDE-PRONE LOESS AREA OF HEIFANGTAI, GANSU, CHINA USING SBAS-INSAR TECHNIQUE</b>	<b>4889</b>
<i>Zhu Zeng, University of Electronic Science and Technology of China, China; Yong Wang, East Carolina University, United States; Yan Yan, Ningning Xiao, Dongzi Chen, University of Electronic Science and Technology of China, China</i>	

<b>WEP1-PH.6: THE INSAR SCIENTIFIC COMPUTING ENVIRONMENT 3.0: A FLEXIBLE FRAMEWORK FOR NISAR OPERATIONAL AND USER-LED SCIENCE PROCESSING</b>	<b>4897</b>
<i>Paul A. Rosen, Eric Gurrola, Piyush Agram, Joshua Cohen, Marco Lavallo, Bryan Riel, Heresh Fattahi, Jet Propulsion Laboratory, California Institute of Technology, United States; Michael Aivazis, ParaSim Inc, United States; Mark Simons, California Institute of Technology, United States; Sean Buckley, Jet Propulsion Laboratory, California Institute of Technology, United States</i>	
<b>WEP1-PH.7: USING SENTINEL 1-SAR FOR MONITORING LONG TERM VARIATION IN BURNT FOREST AREAS</b>	<b>4901</b>
<i>Javier Ruiz-Ramos, Armando Marino, Carl P. Boardman, The Open University, United Kingdom</i>	
<b>WEP1-PH.8: TEMPORAL DIFFERENCE AND DENSITY-BASED LEARNING METHOD APPLIED FOR DEFORESTATION DETECTION USING ALOS-2/PALSAR-2</b>	<b>4905</b>
<i>Irene Erlyn Wina Rachmawan, Keio University, Japan; Takeo Tadono, Masato Hayashi, Japan Aerospace Exploration Agency, Japan; Yasushi Kiyoki, Keio University, Japan</i>	
<b>WEP1-PH.9: A NOVEL TOOL FOR UNSUPERVISED FLOOD MAPPING USING SENTINEL-1 IMAGES</b>	<b>4909</b>
<i>Donato Amitrano, Gerardo Di Martino, Antonio Iodice, Daniele Riccio, Giuseppe Ruello, University of Napoli Federico II, Italy</i>	
<b>WEP2-PH: CHANGE DETECTION AND MULTITEMPORAL ANALYSIS</b>	
<b>WEP2-PH.1: BFAST EXPLORER: AN EFFECTIVE TOOL FOR TIME SERIES ANALYSIS</b>	<b>4913</b>
<i>Alexandre Almeida, Nathalia Menini, University of Campinas, Brazil; Jan Verbesselt, Wageningen University &amp; Research, Netherlands; Ricardo Torres, University of Campinas, Brazil</i>	
<b>WEP2-PH.2: DEEP SEMI-NONNEGATIVE MATRIX FACTORIZATION BASED UNSUPERVISED CHANGE DETECTION OF REMOTE SENSING IMAGES</b>	<b>4917</b>
<i>Gang Yang, Heng-Chao Li, Southwest Jiaotong University, China; Wen Yang, Wuhan University, China; William J. Emery, University of Colorado Boulder, United States</i>	
<b>WEP2-PH.5: TOWARDS UNSUPERVISED FLOOD MAPPING GENERATION USING AUTOMATIC THRESHOLDING AND CLASSIFICATION APPROACHES</b>	<b>4927</b>
<i>Rubén Iglesias, Emma Garcia-Boadas, Fernando Vicente-Guijalba, Giuseppe Centolanza, Javier Duro, Dares Technology, Spain</i>	
<b>WEP2-PH.6: ROBUST PCANET FOR HYPERSPECTRAL IMAGE CHANGE DETECTION</b>	<b>4931</b>
<i>Zhenghang Yuan, Qi Wang, Northwestern Polytechnical University, China; Xuelong Li, Chinese Academy of Sciences, China</i>	
<b>WEP2-PH.7: MONITORING OF DROUGHT CHANGE IN THE MIDDLE REACH OF YANGTZE RIVER</b>	<b>4935</b>
<i>Pingchuan Zhong, Na Wang, Zezhong Zheng, University of Electronic Science and Technology of China, China; Jun Xia, Liping Zhang, Xiang Zhang, Wuhan University, China; Mingcang Zhu, Yong He, Land and Resources Department of Sichuan Province, China; Ling Jiang, University of Electronic Science and Technology of China, China; Guoqing Zhou, Guangxi Key Laboratory for Spatial Information and Geomatics, China; Jiang Li, Old Dominion University, United States</i>	
<b>WEP1-PI: LAND USE AND LAND COVER CHANGES ANALYSIS</b>	
<b>WEP1-PI.2: LAND-COVER AND LAND-USE CLASSIFICATION BASED ON MULTITEMPORAL SENTINEL-2 DATA</b>	<b>4946</b>
<i>Martin Weinmann, Uwe Weidner, Karlsruhe Institute of Technology, Germany</i>	
<b>WEP1-PI.3: THE RESEARCH OF BUILDING EARTHQUAKE DAMAGE OBJECT-ORIENTED CHANGE DETECTION BASED ON ENSEMBLE CLASSIFIER WITH REMOTE SENSING IMAGE</b>	<b>4950</b>
<i>Yan Zhao, Peking University / China Transport Telecommunications Information Center, China; Huazhong Ren, Peking University, China; Desheng Cao, China Transport Telecommunications &amp; Information Center, China</i>	

<b>WEP1-PI.4: A NEW SEMI-AUTOMATIC SEAMLESS CLOUD-FREE LANDSAT MOSAICING APPROACH TRACKS FOREST CHANGE OVER LARGE EXTENTS</b>	<b>4954</b>
<i>Samuel Hislop, Simon Jones, Mariela Soto-Berelov, RMIT University, Australia; Andrew K Skidmore, University of Twente, Netherlands; Andrew Haywood, European Forest Institute, Spain; Trung Nguyen, RMIT University, Australia</i>	
<b>WEP1-PI.5: DYNAMIC CHANGE MONITORING AND ASSESSMENT FOR SANDY LAND BASED ON QUANTITATIVE REMOTE SENSING</b>	<b>4958</b>
<i>Junjun Wu, Chinese Academy of Sciences, China; Zhihai Gao, Chinese Academy of Forestry, China; Qinhuo Liu, Chinese Academy of Sciences, China; Zengyuan Li, Chinese Academy of Forestry, China; Bo Zhong, Chinese Academy of Sciences, China; Bin Sun, Chinese Academy of Forestry, China; Xiangyuan Ding, Insights value of Beijing, China; Changlong Li, State Academy of Forestry Administration, China; Hongyan Wang, Aixia Yang, Chinese Academy of Sciences, China; Xinshuang Wang, Shaanxi Geomatics Center of National Administration of Surveying, China</i>	
<b>WEP1-PI.6: A FLEXIBLE APPROACH FOR SPATIO-TEMPORAL REMOTE SENSING DATA ANALYSIS</b>	<b>4962</b>
<i>Rudiger Gens, University of Alaska Fairbanks, United States</i>	
<b>WEP1-PI.7: EXPLOITATION OF SENTINEL-2 TIME SERIES FOR HORTICULTURE CROPS INVENTORY</b>	<b>4965</b>
<i>Ana Navarro, João Catalão, Luís Ribeiro, Instituto Dom Luiz (IDL), Faculdade de Ciências, Universidade Lisboa, Portugal</i>	
<b>WEP1-PI.10: METEOR IMPACT DETECTION ON MARS WITH CHANGE DETECTION FRAMEWORK</b>	<b>4969</b>
<i>Stéphane May, CNES, France</i>	
 <b>WEP2-PI: DATA FUSION IV</b>	
<b>WEP2-PI.1: SATELLITE-BASED ESTIMATION OF TERRESTRIAL LATENT HEAT IN CHINA BASED ON FUSION ALGORITHM</b>	<b>4973</b>
<i>Nannan Zhang, Yang Liu, Hang Zhao, Liqun Zou, Research Institute of Petroleum Exploration &amp; Development, PetroChina, China; Yunjun Yao, Beijing Normal University, China; Wentong Dong, Hongyan Guo, Hongying Zhou, Research Institute of Petroleum Exploration &amp; Development, PetroChina, China; Miaofen Huang, Guangdong Ocean University, China</i>	
<b>WEP2-PI.2: ELIMINATING EFFECT OF IMAGE BORDER WITH IMAGE PERIODIC DECOMPOSITION FOR PHASE CORRELATION BASED IMAGE REGISTRATION</b>	<b>4977</b>
<i>Yunyun Dong, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China; Tengfei Long, Weili Jiao, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>WEP2-PI.3: A UNIFIED SPATIAL-TEMPORAL-SPECTRAL LEARNING FRAMEWORK FOR RECONSTRUCTING MISSING DATA IN REMOTE SENSING IMAGES</b>	<b>4981</b>
<i>Qiang Zhang, Qiangqiang Yuan, Huanfeng Shen, Liangpei Zhang, Wuhan University, China</i>	
<b>WEP2-PI.4: DENSE-ADD NET: AN NOVEL CONVOLUTIONAL NEURAL NETWORK FOR REMOTE SENSING IMAGE INPAINTING</b>	<b>4985</b>
<i>Daoyu Lin, UCAS, China; Guangluan Xu, Yang Wang, Xian Sun, Kun Fu, IECAS, China</i>	
<b>WEP2-PI.5: MARINE SEDIMENT MAPPING USING MULTI-SOURCE AND MULTI-DIMENSIONAL ACOUSTIC IMAGES BASED ON EVIDENTIAL FUSION</b>	<b>4989</b>
<i>Xi Chen, Peking University, China; Jing Li, Beijing Normal University, China; Wei Shen, Shanghai Ocean University, China; Liangliang Tao, Nanjing University of Information Science and Technology, China; Yaokui Cui, Yang Hong, Peking University, China</i>	
<b>WEP2-PI.7: JOINT ENCODING LBP FEATURES FROM INFRARED AND VISIBLE-LIGHT CLOUD IMAGE OBSERVATIONS FOR GROUND-BASED CLOUD CLASSIFICATION</b>	<b>4993</b>
<i>Yu Wang, Shanxi University, China; Chunheng Wang, Cunzhao Shi, Baihua Xiao, State Key Laboratory of Management and Control for Complex Systems, Institute of Automation, Chinese Academy of Sciences, China</i>	

<b>WEP2-PI.9: A MULTIVARIATE GRADIENT AND MUTUAL INFORMATION MEASURE METHOD FOR HYPERSPECTRAL IMAGE VISUALIZATION</b>	<b>5001</b>
<i>Anthony Amankwah, Amankwah Consult, Germany</i>	
<b>WEP2-PI.10: JOINT FEATURE EXTRACTION FOR MULTISPECTRAL AND PANCHROMATIC IMAGES BASED ON CONVOLUTIONAL NEURAL NETWORK</b>	<b>5005</b>
<i>Yi Chen, Mengmeng Zhang, Wei Li, Beijing University of Chemical Technology, China; Qian Du, Mississippi State University, United States</i>	
<b>WEP1-PJ: TECHNIQUES FOR MULTI-TEMPORAL OPTICAL IMAGE ANALYSIS</b>	
<b>WEP1-PJ.1: RADIOMETRIC NORMALIZATION OF MULTI-TEMPORAL IMAGES USING KERNEL CANONICAL CORRELATION ANALYSIS WITH LINEAR, POLYNOMIAL AND GAUSSIAN KERNELS</b>	<b>5009</b>
<i>Yang Bai, University of Chinese Academy of Sciences/Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Ping Tang, Changmiao Hu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>WEP1-PJ.2: AN IMPROVED SVM+GA RELEVANCE FEEDBACK MODEL IN THE REMOTE SENSING IMAGE CHANGE INFORMATION RETRIEVAL</b>	<b>5013</b>
<i>Caihong Ma, Fu Chen, Jianbo Liu, Jianbo Duan, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>WEP1-PJ.3: CHANGE DETECTION BASED ON FULLY-CONNECTED CONDITIONAL RANDOM FIELD WITH REGION POTENTIAL IN REMOTE SENSING IMAGES</b>	<b>5017</b>
<i>Yanfeng Shang, The Third Research Institute of Ministry of Public Security, China; Guo Cao, Youqiang Zhang, Nanjing University of Science and Technology, China</i>	
<b>WEP1-PJ.4: A COMPARATIVE STUDY OF FUSION-BASED CHANGE DETECTION METHODS FOR MULTI-BAND IMAGES WITH DIFFERENT SPECTRAL AND SPATIAL RESOLUTIONS</b>	<b>5021</b>
<i>Vinicius Ferraris, University of Toulouse, France; Naoto Yokoya, Geoinformatics Unit, Japan; Nicolas Dobigeon, Marie Chabert, University of Toulouse, France</i>	
<b>WEP1-PJ.5: NONLINEAR COOK DISTANCE FOR ANOMALOUS CHANGE DETECTION</b>	<b>5025</b>
<i>Jose A. Padrón Hidalgo, Adrián Pérez-Suay, Universitat de València, Spain; Fatih Nar, Konya Food and Agriculture University, Turkey; Gustau Camps-Valls, Universitat de València, Spain</i>	
<b>WEP1-PJ.7: GROUND-MOVING TARGET INDICATION FROM OBLIQUE AERIAL RGB IMAGERY BY BACKGROUND SUBTRACTION OF A PROJECTION ON A 3-D MODEL</b>	<b>5033</b>
<i>Julian Fagir, Daniel Henke, University of Zürich, Switzerland</i>	
<b>WEP1-PJ.9: OPTICAL REMOTE SENSING CHANGE DETECTION THROUGH DEEP SIAMESE NETWORK</b>	<b>5041</b>
<i>Mohammed El Amin Arabi, Moussa Sofiane Karoui, Khelifa Djerriri, Centre des Techniques Spatiales, Algeria</i>	
<b>WEP1-PJ.10: FUZZY FUSION OF CHANGE VECTOR ANALYSIS AND SPECTRAL ANGLE MAPPER FOR HYPERSPECTRAL CHANGE DETECTION</b>	<b>5045</b>
<i>Sarp Erturk, University of Kocaeli, Turkey</i>	
<b>WEP2-PJ: GEOGRAPHIC INFORMATION SCIENCE III</b>	
<b>WEP2-PJ.1: A SPATIAL CO-LOCATION MINING ALGORITHM BASED ON A SPATIAL CONTINUOUS FIELD WITH REFINED ROAD-NETWORK CONSTRAINTS</b>	<b>5049</b>
<i>Xiaojing Yao, Dacheng Wang, Liuja Chen, Shaolong Cui, Tianhe Chi, Chinese Academy of Sciences, Beijing, China</i>	
<b>WEP2-PJ.2: URBAN THERMAL RADIATION SIMULATION USING HIGH RESOLUTION DIGITAL SURFACE MODELS AND MULTISPECTRAL IMAGES</b>	<b>5053</b>
<i>Yitong Zheng, Huazhong Ren, Juan Sui, Jiaji Dong, Dingfang Tian, Peking University, China; Rongyuan Liu, China Aero Geophysical Survey and Remote Sensing Center for Land and Resources, China; Qiming Qin, Peking University, China</i>	

**WEP2-PJ.3: USING IMAGE CLASSIFICATION WITH SPACE SYNTAX MODEL TO PREDICT PEDESTRIAN VOLUMES AND VEHICULAR TRIP LENGTHS ..... 5057**

*Vidit Kundu, Sabyasachi Purkayastha, Bindi Dave, Centre of Environmental Planning and Technology, Ahmedabad, India*

**WEP2-PJ.4: URBAN FUNCTIONAL REGIONS USING SOCIAL MEDIA CHECK-INS ..... 5061**

*Zhengqiang Guo, Key Laboratory of Urban Land Resources Monitoring and Simulation, Ministry of Land and Resources, China; Zezhong Zheng, Jiayi Liu, Shengli Wang, Pingchuan Zhong, University of Electronic Science and Technology of China, China; Mingcang Zhu, Land and Resources Department of Sichuan Province, China; Yong He, Sichuan Institute of Geo-Environment Monitoring, China; Ling Jiang, University of Electronic Science and Technology of China, China; Guoqing Zhou, Guangxi Key Laboratory for Spatial Information and Geomatics, China; Hongsheng Zhang, University of Electronic Science and Technology of China, China; Jiang Li, Old Dominion University, United States*

**WEP1-PK: HYPERSPECTRAL DATA PROCESSING II**

**WEP1-PK.1: HYPERSPECTRAL COMPRESSIVE SENSING ON LOW ENERGY CONSUMPTION BOARD ..... 5065**

*Jose Nascimento, Instituto de Telecomunicações and Instituto Superior de Engenharia de Lisboa, Portugal; Gabriel Martin, Instituto de Telecomunicações, Portugal*

**WEP1-PK.2: A DETAILED PERFORMANCE ANALYSIS OF HYPERSPECTRAL IMAGE COMPRESSION TECHNIQUES ..... 5069**

*Mehmetali Danişman, Ali Can Karaca, Ergün Can, Oğuzhan Urhan, Mehmet Kemal Güllü, Kocaeli University, Turkey*

**WEP1-PK.3: COMPRESSION OF HYPERSPECTRAL IMAGES USING LUMINANCE TRANSFORM AND 3D-DCT ..... 5073**

*Ergün Can, Ali Can Karaca, Mehmetali Danişman, Oğuzhan Urhan, Mehmet Kemal Güllü, Kocaeli University, Turkey*

**WEP1-PK.4: A DATASET WITH GROUND-TRUTH FOR HYPERSPECTRAL UNMIXING ..... 5077**

*Min Zhao, Jie Chen, Northwestern Polytechnical University, China*

**WEP1-PK.5: GABOR-FILTERING-BASED PROBABILISTIC COLLABORATIVE REPRESENTATION FOR HYPERSPECTRAL IMAGE CLASSIFICATION ..... 5081**

*Yan Xu, Qian Du, Mississippi State University, United States; Wei Li, Beijing University of Chemical Technology, China; Nicolas H. Younan, Mississippi State University, United States*

**WEP2-PK: MICROWAVE REMOTE SENSING OF SNOW COVER**

**WEP2-PK.1: ASSESSMENT OF PASSIVE MICROWAVE SNOW COVER MAPPING METHODS FROM FY-3C/MWRI DATA IN CHINA ..... 5085**

*Xiaojing Liu, Lingmei Jiang, Shirui Hao, Gongxue Wang, Jianwei Yang, Beijing Normal University, China; Zhizhong Chen, China Transport Telecommunications & Information Center, China*

**WEP2-PK.2: IMPROVEMENT OF SNOW DEPTH ESTIMATION USING SSM/I BRIGHTNESS TEMPERATURE IN CHINA ..... 5089**

*Jianwei Yang, Lingmei Jiang, State Key Laboratory of Remote Sensing Science, Jointly Sponsored by Beijing Normal University and Institute of Remote Sensing and Digital Earth of Chinese Academy of Sciences, Beijing Normal University, China; Shengli Wu, National Satellite Meteorological Center, China Meteorological Administration, China; Xiaojing Liu, Gongxue Wang, Shirui Hao, Jian Wang, State Key Laboratory of Remote Sensing Science, Jointly Sponsored by Beijing Normal University and Institute of Remote Sensing and Digital Earth of Chinese Academy of Sciences, Beijing Normal University, China*

**WEP2-PK.3: ESTIMATION OF SNOW COVER PARAMETERS BY ALOS-2 PALSAR INTERFEROMETRY ..... 5093**

*Pavel Dagurov, Tumen Chimitdorzhiev, Aleksey Dmitriev, Institute of Physical Materials Science of SB RAS, Russian Federation; Sergey Dobrynin, Siberian State University of Telecommunications and Information Sciences, Buryat Branch, Russian Federation; Alexander Zakharov, V.A. Kotelnikov Institute of Radio Engineering and Electronics RAS, Fryazino branch, Russian Federation; Arcadiy Baltukhaev, Michail Bykov, Irina Kirbizhekova, Institute of Physical Materials Science of SB RAS, Russian Federation*

<b>WEP2-PK.4: SNOW COVER MONITORING USING MICROWAVE RADARS: DIELECTRIC CHARACTERIZATION, FABRICATION, AND TESTING OF A SYNTHETIC SNOWPACK</b>	<b>5097</b>
<i>Pedro Fidel Espin-Lopez, Marco Pasian, Massimiliano Barbolini, Fabio Dell'Acqua, Università degli Studi di Pavia, Italy</i>	
<b>WEP2-PK.6: MAPPING SNOW COVER EXTENT USING OPTICAL AND SAR DATA</b>	<b>5104</b>
<i>Anna Wendleder, Andreas J. Dietz, Katharina Schork, German Aerospace Center (DLR), Germany</i>	
 <b>WEP1-PL: PANSHARPENING AND SUPERRESOLUTION I</b>	
<b>WEP1-PL.1: A CNN-BASED MODEL FOR PANSHARPENING OF WORLDVIEW-3 IMAGES</b>	<b>5108</b>
<i>Sergio Vitale, Giampaolo Ferraioli, University Parthenope of Naples, Italy; Giuseppe Scarpa, University Federico II of Naples, Italy</i>	
<b>WEP1-PL.2: IMPROVEMENT OF MRA-BASED PANSHARPENING METHODS THROUGH THE CONSIDERATION OF MIXED PIXELS</b>	<b>5112</b>
<i>Hui Li, Linhai Jing, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>WEP1-PL.3: PAN-SHARPENING WITH HESSIAN NUCLEAR NORM INDUCED SPATIAL CONSISTENCY</b>	<b>5116</b>
<i>Pengfei Liu, Nanjing University of Posts and Telecommunications, China; Liang Xiao, Nanjing University of Science and Technology, China; Songze Tang, Nanjing Forest Police College, China</i>	
<b>WEP1-PL.4: LOCAL SIMILARITY REGULARIZED SPARSE REPRESENTATION FOR HYPERSPETRAL IMAGE SUPER-RESOLUTION</b>	<b>5120</b>
<i>Songze Tang, Nan Zhou, Nanjing Forest Police College, China</i>	
<b>WEP1-PL.5: A COMPARISON OF HYPER-SHARPENING ALGORITHMS FOR FUSING VNIR AND SWIR BANDS OF WORLDVIEW-3 SATELLITE IMAGERY</b>	<b>5124</b>
<i>Honglyun Park, Jaewan Choi, Chungbuk National University / Republic of Korea, Republic of Korea</i>	
<b>WEP1-PL.6: BAYESIAN SUPERRESOLUTION METHOD OF FORWARD-LOOKING IMAGING WITH GENERALIZED GAUSSIAN CONSTRAINT</b>	<b>5128</b>
<i>Yin Zhang, Changlin Li, Deqing Mao, Yulin Huang, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
<b>WEP1-PL.7: SPATIAL CONSISTENCY FOR FULL-SCALE ASSESSMENT OF PANSHARPENING</b>	<b>5132</b>
<i>Luciano Alparone, University of Florence, Italy; Andrea Garzelli, University of Siena, Italy; Gemine Vivone, University of Salerno, Italy</i>	
<b>WEP1-PL.8: A BAYESIAN SUPER-RESOLUTION METHOD FOR FORWARD-LOOKING SCANNING RADAR IMAGING BASED ON SPLIT BREGMAN</b>	<b>5135</b>
<i>Qiping Zhang, Yin Zhang, Deqing Mao, Yongchao Zhang, Yulin Huang, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
<b>WEP1-PL.9: A MULTI-DIRECTION SUBBANDS AND DEEP NEURAL NETWORKS BASED PAN-SHARPENING METHOD</b>	<b>5139</b>
<i>Wei Huang, Zhengzhou University of Light Industry, China; Xuan Fei, Henan University of Technology, China; Junru Yin, Yan Liu, Zhengzhou University of Light Industry, China</i>	
<b>WEP1-PL.10: PAN-SHARPEN MULTISPECTRAL IMAGES USING SPARSE REPRESENTATION</b>	<b>5143</b>
<i>Pai-Hui Hsu, Hsiang-Lin Kuo, National Taiwan University, Taiwan</i>	
 <b>WEP2-PL: ICE SHEETS AND GLACIERS I</b>	
<b>WEP2-PL.1: THE GREENLAND ICE SHEET AS A DIELECTRIC RESONATOR</b>	<b>5147</b>
<i>Alexander Voronovich, Scott Abbott, Paul Johnston, Richard Latatits, Jesse Leach, Robert Zamora, NOAA/Earth System Research Laboratory, United States</i>	



<b>WEP2-PL.2: MAPPING, MODELING AND SIMULATION OF SNOW AVALANCHE IN ALAKNANDA VALLEY, CENTRAL HIMALAYA: HAZARD ASSESSMENT</b>	<b>5150</b>
<i>Kunj Kishore Sethia, Pratima Pandey, Shovanlal Chatteraj, Indian Institute of Remote Sensing, India; Surendar Manickam, Friedrich-Alexander-University Erlangen- Nuremberg, Germany; Prashant K. Champati Ray, Indian Institute of Remote Sensing, India</i>	
<b>WEP2-PL.3: LATERAL MAPPING OF GLACIER FLOW SPEED WITH A SCANNING RADAR</b>	<b>5154</b>
<i>Richard Norland, Rune Gundersen, ISPAS AS, Norway</i>	
<b>WEP2-PL.5: RETRIEVAL OF NEAR-SURFACE ICE SHEET PROPERTIES USING THE GLOBAL PRECIPITATION MEASUREMENT (GPM) RADIOMETER CONSTELLATION</b>	<b>5161</b>
<i>Mustafa Aksoy, University at Albany, State University of New York, United States</i>	
<b>WEP2-PL.6: POTENTIAL AND LIMITS OF SENTINEL-1 DATA FOR SMALL ALPINE GLACIERS MONITORING</b>	<b>5165</b>
<i>Matthias Jauvin, Yajing Yan, Emmanuel Trouvé, Université Savoie Mont Blanc, LISTIC, France; Bénédicte Fruneau, Université Paris-Est Marne-la-Vallée, LaSTIG, IGN-UPEM, France</i>	
<b>WEP2-PL.7: LONG TERM ELEVATION CHANGE MONITORING OF ANTARCTIC ICE SHEET BY COMBINING ICESAT, ENVISAT AND CRYOSAT-2 DATA</b>	<b>5169</b>
<i>Huan Xie, Wenjia Du, Lei Chen, Gang Hai, Shanshan Zhang, Jiajin Chen, Yixiang Tian, Shijie Liu, Xiaohua Tong, Rongxing Li, Tongji University, China</i>	
<b>WEP2-PL.8: OBSERVATION OF HUGE ICEBERG DETACHMENT FROM LARSEN-C ICE SHELF IN ANTARCTIC PENINSULA BY ALOS-2/PALSAR-2</b>	<b>5172</b>
<i>Takahiro Abe, Masato Ohki, Takeo Tadono, Japan Aerospace Exploration Agency, Japan</i>	
<b>WEP2-PL.9: A FRAMEWORK OF FRACTURE MAPPING OF FILCHNER - RONNE ICE SHELF, ANTARCTICA, USING MULTISOURCE SATELLITE DATA</b>	<b>5176</b>
<i>Rongxing Li, Haifeng Xiao, Shijie Liu, Da Lv, Xiaohua Tong, Tongji University, China</i>	
<b>WEP2-PL.10: DETECTING GLACIER SURFACE CHANGES USING OBJECT-BASED CHANGE DETECTION</b>	<b>5180</b>
<i>Kavita V. Mitkari, Manoj K. Arora, Punjab Engineering College, Chandigarh, India; Reet Kamal Tiwari, Indian Institute of Technology Ropar, India</i>	
 <b>WEP1-PM: OPTICAL REMOTE SENSING OF SNOW COVER</b>	
<b>WEP1-PM.1: THE EFFECT OF SNOW ON BOREAL FOREST ALBEDO</b>	<b>5184</b>
<i>Terhikki Manninen, Emmihenna Jääskeläinen, Finnish Meteorological Institute, Finland</i>	
<b>WEP1-PM.2: SPATIO-TEMPORAL VARIABILITY OF SNOW COVER OF YAMUNOTRI CATCHMENT, INDIA</b>	<b>5188</b>
<i>Chetan Sharma, Chandra Shekhar Prasad Ojha, Indian Institute of Technology Roorkee, India</i>	
<b>WEP1-PM.3: CLOUD-FREE FRACTIONAL SNOW COVER ESTIMATION FROM BLENDED MODIS AND FY-2 VISSR MEASUREMENTS</b>	<b>5191</b>
<i>Gongxue Wang, Lingmei Jiang, Shirui Hao, Xiaojing Liu, Jianwei Yang, Huizhen Cui, Beijing Normal University, China</i>	
<b>WEP1-PM.6: ASSESSMENT OF SNOW COVER PRODUCT USING GOOGLE EARTH ENGINE CLOUD COMPUTING PLATFORM</b>	<b>5203</b>
<i>Zhen Li, Chang Liu, Ping Zhang, Bangseng Tian, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>WEP1-PM.7: SPATIOTEMPORAL PATTERN OF SNOW COVER ACROSS THE TIBETAN PLATEAU BASED ON OBSERVED SNOW PROBABILITY</b>	<b>5206</b>
<i>Muyi Li, Beijing Normal University, China; Ruiyin Dou, Xi'an University of Architecture and Technology, China; Lin Li, Yaozhong Pan, Beijing Normal University, China</i>	

<b>WEP1-PM.8: WARM SEASON SNOW/ICE PROBABILITY MAPS FROM MODIS AND VIIRS SENSORS OVER CANADA</b>	<b>5210</b>
<i>Alexander Trishchenko, Calin Ungureanu, Canada Centre for Remote Sensing, Canada</i>	
<b>WEP1-PM.9: SATELLITE OBSERVATIONS TO MONITOR SUBARCTIC RAIN-ON-SNOW EVENTS</b>	<b>5213</b>
<i>Ludovic Brucker, NASA Goddard Space Flight Center / USRA, United States; Stephen (Joe) Munchak, NASA Goddard Space Flight Center, United States</i>	
<b>WEP1-PM.10: COMPARISON OF QUEBEC SNOW GRID DATA AND GLOBSNOW PRODUCTS OVER THE LA GRANDE AND MANICOUAGAN WATERSHEDS IN CANADA FROM 2006 TO 2010</b>	<b>5216</b>
<i>Saida Farah Badreddine, Kalifa Goïta, Université de Sherbrooke, Canada; François Vachon, Hydro-Quebec, Canada</i>	
<b>WEP2-PM: OPTICAL AND INFRARED MONITORING OF FORESTS II</b>	
<b>WEP2-PM.1: A NOVEL EFFECTIVE CHLOROPHYLL INDICATOR FOR FOREST MONITORING USING WORLDVIEW-3 MULTISPECTRAL REFLECTANCE</b>	<b>5220</b>
<i>Chinsu Lin, National Chiayi University, Taiwan</i>	
<b>WEP2-PM.3: POTENTIAL OCCURRENCE RISK PREDICTION OF SUDDEN OAK DEATH UNDER DIFFERENT FUTURE CLIMATE SCENARIOS BASED ON SVM MODEL</b>	<b>5228</b>
<i>Wei Chen, Chunxiang Cao, Zhou Fang, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Houzhi Jiang, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China; Xiaotong Fang, China Institute of Marine Technology and Economy, China; Shanning Bao, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Bo Xie, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China</i>	
<b>WEP2-PM.4: EFFECT OF DEFORESTATION ON LAND SURFACE TEMPERATURE: A CASE OF FREETOWN AND BO TOWN IN SIERRA LEONE</b>	<b>5232</b>
<i>Musa Tarawally, Wenbo Xu, University of Electronic Science and Technology of China, China; Weiming Hou, Hebei University of Science and Technology, China; Terence Darlington Mushore, University of Zimbabwe, University of KwaZulu-Natal, Zimbabwe; Sen Cao, University of Alberta, Canada</i>	
<b>WEP2-PM.5: STUDIES ON THE FOREST DIEBACK PHENOMENON IN A SEMI-ARID REGION USING REMOTELY SENSED DATA</b>	<b>5236</b>
<i>Buho Hoshino, Takashi Sasamura, Rakuno Gakuen University, Japan; Atsuko Sugimoto, Hokkaido University, Japan; Tserenochir Tserendulam, Uuganbayar Ganbold, Hustai National Park Mongolia, Mongolia; Christopher McCarthy, Kyoto University, United States; Masami Kaneko, Rakuno Gakuen University, Japan</i>	
<b>WEP2-PM.6: CHANGE ANALYSIS OF SUBALPINE CONIFEROUS FOREST AREA OVER THE LAST 20 YEARS USING TIME-SERIES LANDSAT IMAGES</b>	<b>5240</b>
<i>Eunsook Kim, Ji-sun Lee, Go-eun Park, Jong-Hwan Lim, National Institute of Forest Science, Republic of Korea</i>	
<b>WEP2-PM.7: DETECTING VEGETATION PHENOLOGY IN VARIOUS FOREST TYPES USING LONG-TERM MODIS VEGETATION INDICES</b>	<b>5243</b>
<i>Bora Lee, Eunsook Kim, Jong-Hwan Lim, National Institute of Forest Science, Republic of Korea; Bumsuk Seo, Karlsruhe Institute of Technology, Germany; Jae-Min Chung, Korea National Arboretum, Republic of Korea</i>	
<b>WEP2-PM.8: COMPARISON OF RADIOSONDE AND REMOTE SENSING DATA TO EVALUATE CONVECTIVE FOREST FIRE RISK: THE HAINES INDEX</b>	<b>5247</b>
<i>Maria Jesús Barberà, Raquel Niclòs, Maria José Estrela, University of Valencia, Spain</i>	
<b>WEP2-PM.10: OPEN SOURCE PLATFORM FOR UNDERSTANDING FOREST COVER DYNAMICS-OBSERVING EARTH FROM SPACE</b>	<b>5255</b>
<i>Deepika Mann, Shiv Nadar University, India; Pawan Kumar Joshi, Jawaharlal Nehru University, India; Girish Agrawal, Shiv Nadar University, India</i>	

## WEP1-PN: DATA MANAGEMENT AND SYSTEMS I

### WEP1-PN.1: TOWARDS A FRAMEWORK FOR OFFERING REMOTE SENSING DATA IN AN ANALYSIS-READY FORMAT ..... 5258

*Jianghua Zhao, Xuezi Wang, Yuanchun Zhou, Chinese Academy of Sciences, China; Qiming Qin, Peking University, China*

### WEP1-PN.2: GEO-BASED IMAGE ANALYSIS SYSTEM SUPPORTING OGC-WPS STANDARD ON OPEN PAAS CLOUD PLATFORM ..... 5262

*Kiwon Lee, Kwangseob Kim, Hansung University, Republic of Korea*

### WEP1-PN.3: AUTOMATIC WATER DETECTION METHOD IN FLOODING AREA FOR GF-3 SINGLE-POLARIZATION DATA ..... 5266

*Deke Tang, University of Chinese Academy of Sciences, China; Feng Wang, YuMing Xiang, Hongjian You, WenChao Kang, Institute of Electronics, Chinese Academy of Sciences, China*

### WEP1-PN.4: RAPID ACCESS AND VISUALIZATION OF SPACEBORNE ALTIMETRY DATA FROM ICESAT AND ICESAT-2 ..... 5270

*Viswanath Nandigam, Kai Lin, Minh Phan, Adrian Borsa, University of California, San Diego, United States; Siri Jodha Khalsa, University of Colorado Boulder, United States; Christopher Crosby, UNAVCO, United States*

### WEP1-PN.5: A GEOSPATIAL ONTOLOGICAL MODEL FOR REMOTE SENSING SCENE SEMANTIC KNOWLEDGE MINING FOR THE FLOOD DISASTER ..... 5274

*Abhishek Potnis, Surya Durbha, Kuldeep Kurte, Indian Institute of Technology Bombay, India*

### WEP1-PN.6: ASSESSING SUITABILITY OF SATELLITE RAINFALL DATA FOR ESTIMATION OF DAILY STREAMFLOWS OF A SMALL TROPICAL CATCHMENT IN INDIA ..... 5278

*Saswata Nandi, M Janga Reddy, Indian Institute of Technology Bombay, India*

### WEP1-PN.7: ESA-NASA MULTI-MISSION ANALYSIS PLATFORM FOR IMPROVING GLOBAL ABOVEGROUND TERRESTRIAL CARBON DYNAMICS ..... 5282

*Clement Albinet, European Space Agency/ESRIN, Italy; Amanda S. Whitehurst, NASA Headquarters, United States; Henri Laur, European Space Agency/ESRIN, Italy; Kevin J. Murphy, NASA Headquarters, United States; Bjorn Frommknecht, European Space Agency/ESRIN, Italy; Klaus Scipal, European Space Agency/ESTEC, Netherlands; Andrew E. Mitchell, NASA Goddard Space Flight Center, United States; Benhan Jai, NASA Jet Propulsion Laboratory, United States; Rahul Ramachandran, NASA Marshall Space Flight Center, United States*

### WEP1-PN.8: A FLEXIBLE DESKTOP TOOL FOR THE DEPLOYMENT OF PERIODIC DOWNSTREAM SERVICES ..... 5285

*Andrea Ceresi, Alessia Goffi, Luigi Ranghetti, Lorenzo Busetto, Daniela Stroppiana, Gloria Bordogna, Mirco Boschetti, Pietro Alessandro Brivio, Monica Pepe, Massimo Antoninetti, Simone Sterlacchini, CNR, Italy*

### WEP1-PN.9: MEASURING CONTRIBUTION OF SPATIAL INFORMATION TO ENVIRONMENTAL RESEARCH USING TEXT MINING TECHNIQUES ..... 5289

*Jeong-Ho Lee, Moungh-Jin Lee, Korea Environment Institute, Republic of Korea*

### WEP1-PN.10: DATA AUGMENTATION METHOD OF SAR IMAGE DATASET ..... 5292

*Mingrui Zhang, Zongyong Cui, Xianyuan Wang, Zongjie Cao, University of Electronic Science and Technology of China, China*

## WEP2-PN: CROP IDENTIFICATION AND CLASSIFICATION USING REMOTE SENSING II

### WEP2-PN.1: PADDY RICE FIELD EXTRACTION USING ALOS-2 PALSAR-2 FULL POLARIMETRIC DATA WITH AGRICULTURAL PARCEL VECTOR DATA ..... 5296

*Chinatsu Yonezawa, Tohoku University, Japan*

### WEP2-PN.2: CROPS CLASSIFICATION FROM SENTINEL-2A MULTI-SPECTRAL REMOTE SENSING IMAGES BASED ON CONVOLUTIONAL NEURAL NETWORKS ..... 5300

*Zhuang Zhou, Shengyang Li, Yuyang Shao, Chinese Academy of Sciences, China*

<b>WEP2-PN.3: HYPERSPECTRAL IMAGE CLASSIFICATION BASED ON SPECTRAL MIXTURE ANALYSIS FOR CROP TYPE DETERMINATION</b>	<b>5304</b>
<i>Yeji Kim, Yongil Kim, Seoul National University, Republic of Korea</i>	
<b>WEP2-PN.4: DEVELOPMENT OF AN APPROACH FOR MONITORING SUGARCANE HARVESTED AND NON-HARVESTED CONDITIONS USING TIME SERIES SENTINEL-1 DATA</b>	<b>5308</b>
<i>Deepak Murugan, Dharmendra Singh, Indian Institute of Technology Roorkee, India</i>	
<b>WEP2-PN.5: CROP-IDENTIFICATION USING SENTINEL-1 AND SENTINEL-2 DATA FOR INDIAN REGION</b>	<b>5312</b>
<i>Jitendra Singh, Umamaheswari Devi, Jagabondhu Hazra, Shivkumar Kalyanaraman, IBM, India</i>	
<b>WEP2-PN.7: MULBERRY IDENTIFICATION BASED ON SPECTRAL DERIVATIVE AND SUPPORT VECTOR MACHINE</b>	<b>5315</b>
<i>Shanning Bao, Chunxiang Cao, Wei Chen, Tianyu Yang, Insitute of Remote Sensing and Digital Earth, China; Changyu Qiu, Fangrong Zhu, Guangxi Academy of Semiculture Sciences, China</i>	
<b>WEP2-PN.8: MAPPING CROPLAND EXTENT BY ASYNCHRONOUS FUSION OF OPTICAL AND ACTIVE MICROWAVE IMAGERY</b>	<b>5319</b>
<i>Subit Chakrabarti, Tina Cormier, Nick Malizia, David Potere, Damien Sulla-Menashe, Kirk Zmijewski, Telluslabs, Inc., United States; Mark Friedl, Boston University, United States</i>	
<b>WEP2-PN.9: USING STOKES PARAMETERS DERIVED FROM RADARSAT-2 DATA FOR RAPE (BRASSICA NAPUS L.) BIOMASS INVERSION</b>	<b>5322</b>
<i>Yue Yang, Wangfei Zhang, Southwest Forestry University, China; Zengyuan Li, Erxue Chen, Lei Zhao, Chinese Academy of Forestry, China; Yahong Zhang, Southwest Forestry University, China; Bin Sun, Chinese Academy of Forestry, China</i>	
<b>WEP1-PO: FOREST MONITORING USING SAR</b>	
<b>WEP1-PO.1: POLARIZATION SIGNATURE OF LACUNARITY FOR HETEROGENEITY ESTIMATION OF RADAR BACKSCATTERING FROM PINE FOREST</b>	<b>5326</b>
<i>Aleksey Dmitriev, Tumen Chimitdorzhiev, Pavel Dagurov, Institute of Physical Materials Science of SB RAS, Russian Federation</i>	
<b>WEP1-PO.2: SENSITIVITY OF SENTINEL-1 TO RAIN STORED IN TEMPERATE FOREST</b>	<b>5330</b>
<i>César Cisneros Vaca, Christiaan van der Tol, University of Twente, Netherlands</i>	
<b>WEP1-PO.3: TROPICAL FOREST TREE HEIGHT AND ABOVE GROUND BIOMASS MAPPING IN NEPAL USING TANDEM-X AND ALOS PALSAR DATA</b>	<b>5334</b>
<i>Oleg Antropov, Aalto University, Finland; Yrjö Rauste, VTT Technical Research Centre of Finland Ltd, Finland; Katri Tegel, Yamuna Baral, Arbonaut, Finland; Virpi Junttila, Lappeenranta University of Technology, Finland; Tuomo Kauranne, Arbonaut, Finland; Tuomas Häme, VTT Technical Research Centre of Finland Ltd, Finland; Jaan Praks, Aalto University, Finland</i>	
<b>WEP1-PO.4: DETECTION OF BURNED AREAS IN SOUTHERN AFRICAN SAVANNAHS USING TIME SERIES OF C-BAND SENTINEL-1 DATA</b>	<b>5337</b>
<i>Renaud Mathieu, Russell Main, Council of Science and Industrial Research, South Africa; David Roy, South Dakota State University, United States; Laven Naidoo, Council of Science and Industrial Research, South Africa; Hannah Yang, Princeton University, United States</i>	
<b>WEP1-PO.6: A SEMI-EMPIRICAL MODEL TO ESTIMATE BIOPHYSICAL PARAMETERS IN SOUTHERN MEXICO</b>	<b>5344</b>
<i>Daniel Enrique Constantino Recillas, Alejandro Monsivais-Huertero, José Carlos Jiménez Escalona, Enrique Zempoaltecatl Ramirez, Instituto Politécnico Nacional, ESIME Ticoman, Mexico; Ramata Magagi, Kalifa Goïta, Université de Sherbrooke, Canada</i>	
<b>WEP1-PO.9: AN IMPROVEMENT IN THE RELATION BETWEEN PALSAR-2 BACKSCATTER AND FOREST STAND VOLUME</b>	<b>5355</b>
<i>Min-Gee Hong, Choen Kim, Kookmin University, Republic of Korea</i>	

## **WEP2-PO: REMOTE SENSING FOR CROP GROWTH AND YIELD ESTIMATION**

### **WEP2-PO.1: COMPARISON OF SURFACE AIR TEMPERATURE PRODUCTS FROM ..... 5359 REANALYSIS OVER UNITED STATES AND UKRAINE: APPLICATION TO WHEAT YIELD FORECASTING**

*Andres Santamaria-Artigas, University of Maryland, United States; Belen Franch, Pierre Guillevic, Jean-Claude Roger, Eric Vermote, NASA, United States*

### **WEP2-PO.2: WHEAT GROWTH MONITORING USING THE RELATIONSHIP BETWEEN ..... 5363 HEIGHT AND INTERFEROMETRIC POLARIMETRIC DATA**

*Meriem Barbouchi, National Institute of Agronomic Research of Tunisia, Tunisia; Riadh Abdelfattah, Higher School of Communications of Tunis, Tunisia; Karem Chokmani, National Institute for Scientific Research, Canada; Nadhira Ben Aissa, Hatem Cheikh M'hammed, National Institute of Agronomic Research of Tunisia, Tunisia*

### **WEP2-PO.4: RESEARCH AND PRACTICE OF REMOTE SENSING AIDED SAMPLING YIELD ..... 5367 OF GRAIN CROPS BASED ON COUNTING PLANTS AND KERNELS**

*Xingsheng Xia, Xuechang Zheng, Guofeng Xiao, Xiufang Zhu, Yaozhong Pan, Zhangli Sun, Beijing Normal University, China*

### **WEP2-PO.5: THE EFFECTS OF SUGARCANE PRODUCTIVITY ANOMALIES ON L-BAND AND ..... 5371 C-BAND SAR SIGNALS**

*Ramses Molijn, Lorenzo Iannini, Delft University of Technology, Netherlands; Carlos Wachholz de Souza, Diego Della Justina, Jansle Vieira Rocha, State University of Campinas (Unicamp), Brazil; Ramon F. Hanssen, Delft University of Technology, Netherlands*

### **WEP2-PO.6: ENHANCING THE USDA FAS CROP FORECASTING SYSTEM USING SMAP L3 ..... 5375 SOIL MOISTURE OBSERVATIONS**

*Iliana Mladenova, John Bolten, NASA Goddard Space Flight Center, United States; Wade Crow, USDA HRSL, United States; Curt Reynolds, USDA FAS, United States*

### **WEP2-PO.7: AGRICULTURAL MONITORING: AN AUTOMATIC PROCEDURE FOR CROP ..... 5378 YIELD FORECASTING IN THE GREAT RIFT VALLEY OF KENYA**

*Roberto Luciani, Giovanni Laneve, Sapienza Università di Roma, Italy; Munzer Jahjah, Agenzia Spaziale Italiana, Italy*

### **WEP2-PO.8: CROP YIELD MODELLING APPLYING LEAF AREA INDEX ESTIMATED FROM ..... 5382 SENTINEL-2 AND PROBA-V DATA AT JECAM SITE IN POLAND**

*Katarzyna Dabrowska-Zielinska, Institute of Geodesy and Cartography, Poland; Maciej Bartold, Radoslaw Gurdak, Martyna Gatkowska, University of Warsaw, Poland; Wojciech Kiryla, Zbigniew Bochenek, Alicja Malinska, Institute of Geodesy and Cartography, Poland*

### **WEP2-PO.9: SATELITE BASED (PRE-)SYSTEM FOR ASSESSMENT OF LOST IN ..... 5386 AGRICULTURAL PRODUCTION DUE TO NEGATIVE OVERWINTERING PILOT STUDY FOR INSURANCE SECTOR IN POLAND**

*Martyna Gatkowska, University of Warsaw, Poland; Karolina Wrobel, Institute of Geodesy and Cartography, Poland*

## **WEP1-PP: OPTICAL AND INFRARED MONITORING OF FORESTS I**

### **WEP1-PP.1: TOWARD AN OPERATIONAL FOREST MONITORING USING COPERNICUS ..... 5390 DATA: A CASE STUDY IN CENTRAL GERMANY**

*Martyna A. Stelmaszczuk-Górska, Friedrich-Schiller University Jena, Germany; Herbert Sagischewski, Sergej Chmara, ThüringenForst - Institute under Public Law, Germany*

### **WEP1-PP.2: AN ASSESSMENT OF 3D MONTE CARLO SIMULATOR TO ESTIMATE FOREST ..... 5394 BIDIRECTIONAL REFLECTANCE FACTOR (BRF) WITH SLOPE GROUND CONDITION**

*Sheng-Ye Jin, Junichi Susaki, Ryota Miyagaki, Amane Kuriki, Kyoto University, Japan*

<b>WEP1-PP.3: USING NEAR-SURFACE OBSERVATIONS FOR OPTIMIZING THE TIMING OF OVERHEAD IMAGE ACQUISITION FOR APPLIED MAPPING OF WOODY VEGETATION SPECIES</b>	<b>5398</b>
<i>Gilad Weil, The Hebrew University of Jerusalem. Israel Nature and Parks Authority, Israel; Itamar Lensky, Bar Ilan University, Israel; Yehezkel Resheff, Noam Levin, The Hebrew University of Jerusalem, Israel</i>	
<b>WEP1-PP.4: APPLYING AN OBJECT-BASED SVM CLASSIFIER TO EXPLORE CANOPY CLOSURE OF MANGROVE FOREST IN THE MEKONG DELTA USING SENTINEL-2 MULTISPECTRAL IMAGES</b>	<b>5402</b>
<i>Hsiao-En Ma, Chinsu Lin, National Chiayi University, Taiwan; Pham Ngoc Hai, Forest Inventory and Planning Institute, Taiwan</i>	
<b>WEP1-PP.5: THE INFLUENCE OF SNOW COVER ON THE SEASONAL VARIATION OF GLOBAL CLUMPING INDEX PRODUCTS</b>	<b>5406</b>
<i>Yadong Dong, Ziti Jiao, Lei Cui, Siyang Yin, Yaxuan Chang, Xiaoning Zhang, Dandan He, Anxing Ding, Beijing Normal University, China</i>	
<b>WEP1-PP.9: ESTIMATION FOR A SAMPLE SIZE OF DEEP LEARNING USED IN HYPERSPECTRAL DATA APPLICATION</b>	<b>5418</b>
<i>Shinya Odagawa, Remote Sensing Technology Center of Japan, Japan; Tomomi Takeda, Japan Space Systems, Japan</i>	
 <b>WEP2-PP: REMOTE SENSING FOR ESTIMATION OF BIOPHYSICAL PARAMETERS I</b>	
<b>WEP2-PP.1: IMPROVED CROP RESIDUE COVER ESTIMATES FROM SATELITE IMAGES BY COUPLING RESIDUE AND WATER SPECTRAL INDICES</b>	<b>5425</b>
<i>Miguel Quemada, Universidad Politécnica de Madrid, Spain; W. Dean Hively, U.S. Geological Survey, United States; Craig S.T. Daughtry, Agriculture Research Service/USDA, United States; Brian T. Lamb, City University of New York, United States; Jacob Shermeyer, U.S. Geological Survey, United States</i>	
<b>WEP2-PP.2: POWER AND DIFFERENCE OF THE UP-AND-DOWNWARD SUN-INDUCED CHLOROPHYLL FLUORESCENCE ON DETECTING LEAF NITROGEN CONTENT IN WHEAT AT THE LEAF SCALE</b>	<b>5429</b>
<i>Min Jia, Jie Zhu, Chunchen Ma, Tao Cheng, Yongchao Tian, Yan Zhu, Weixing Cao, Xia Yao, Nanjing Agricultural University, China</i>	
<b>WEP2-PP.3: IMPROVING THE ESTIMATION OF LEAF AREA INDEX IN WINTER WHEAT AT REGIONAL SCALE</b>	<b>5433</b>
<i>Jiale Jiang, Tao Cheng, Nanjing Agricultural University, China; Jianxi Huang, China Agricultural University, China; Xia Yao, Yongchao Tian, Yan Zhu, Weixing Cao, Nanjing Agricultural University, China</i>	
<b>WEP2-PP.4: USING A MODIFIED WATER CLOUD MODEL TO RETRIVE LEAF AREA INDEX (LAI) FROM RADARSAT-2 SAR DATA OVER AN AGRICULTURE AREA</b>	<b>5437</b>
<i>Yichuan Ma, Minfeng Xing, University of Electronic Science and Technology of China, China; Xiliang Ni, Chinese Academy of Sciences, China; Jinfei Wang, University of Western Ontario, Canada; Jiali Shang, Agriculture and Agri-Food Canada, Canada; Junjie Zhou, University of Electronic Science and Technology of China, China</i>	
<b>WEP2-PP.5: OPTIMIZATION OF SPECTRAL INDICES FOR THE ESTIMATION OF LEAF AREA INDEX BASED ON SENTINEL-2 MULTISPECTRAL IMAGERY</b>	<b>5441</b>
<i>Zihao Wang, Yuanheng Sun, Tianyuan Zhang, Huazhong Ren, Qiming Qin, Peking University, China</i>	
<b>WEP2-PP.7: ON-BOARD BIOPHYSICAL PARAMETERS ESTIMATION USING HIGH PERFORMANCE COMPUTING</b>	<b>5445</b>
<i>Pratyush Talreja, Surya Durbha, Abhishek Potnis, Indian Institute of Technology Bombay, India</i>	
<b>WEP2-PP.8: ASSESSING RADIOMETRIC CORRECTIONS FOR UAS MULTI-SPECTRAL IMAGERY IN HORTICULTURAL ENVIRONMENTS</b>	<b>5449</b>
<i>Yu-Hsuan Tu, Stuart Phinn, The University of Queensland, Australia; Kasper Johansen, King Abdullah University of Science and Technology, Saudi Arabia; Andrew Robson, University of New England, Australia</i>	

**WEP2-PP.10: ACCURACY ASSESSMENT OF A 122 CLASSES LAND COVER MAP BASED ON SENTINEL-2, LANDSAT 8 AND DEIMOS-1 IMAGES AND ANCILLARY DATA ..... 5453**

*Vanessa Paredes Gómez, Vicente Del Blanco Medina, ITACYL, Agrotechnological Institute of Castile and León, Spain; José L. Bengoa, Junta de Castilla y León, Spain; David Alfonso Nafria García, ITACYL, Agrotechnological Institute of Castile and León, Spain*

**WEP1-PQ: REMOTE SENSING OF VEGETATION II**

**WEP1-PQ.1: ESTIMATION OF WILDFIRE SPREAD RATE FROM GEOSTATIONARY SATELLITE DATA ..... 5457**

*Xiangzhuo Liu, Binbin He, Xingwen Quan, Chongbo Wen, School of Resources and Environment, University of Electronic Science and Technology of China, China; Xiaofang Liu, School of Computer Science, Sichuan University of Science and Engineering, China*

**WEP1-PQ.4: NEXT GENERATION FIRE DETECTION FROM GEOSTATIONARY SATELLITES ..... 5465**

*Simon Jones, Bryan Hally, Karin Reinke, Chathura Wickramasinghe, Luke Wallace, Chermelle Engel, RMIT University, Australia*

**WEP1-PQ.5: HERBACEOUS VEGETATION HEIGHT MAP ON RIVERDIKE DERIVED FROM UAV LIDAR DATA ..... 5469**

*Naoko Miura, The University of Tokyo, Japan; Shigehiro Yokota, Tokyo City University, Japan; Tomoyo Koyanagi, Tokyo Gakugei University, Japan; Susumu Yamada, The University of Tokyo, Japan*

**WEP1-PQ.6: AN ASSESSMENT OF DROUGHT SEVERITY ON THE VEGETATION HEALTH IN THE JAGUARI-JACAREÍ WATERSHED ..... 5473**

*Fernando Carvalho, Universidade Estadual Paulista, Brazil; Enner Alcântara, UNESP, Brazil*

**WEP1-PQ.7: ESTABLISHING SHRUB POPULATION STRUCTURE USING HIGH-SPATIAL-RESOLUTION GOOGLE EARTH IMAGERY ..... 5477**

*Yu Liu, Xin Cao, Xihong Cui, Xuehong Chen, Beijing Normal University, China*

**WEP1-PQ.8: PREDICTION OF ABOVEGROUND BIOMASS APPLIED ARTIFICIAL NEURAL NETWORK OVER THREE-RIVERS HEADWATER REGIONS, QINGHAI, CHINA ..... 5481**

*Junbang Wang, Key Laboratory of Ecosystem Network Observation and Modeling, Institute of Geographic Sciences and Natural Resources, Chinese Academy of Science, China; Guangxin Lu, Qinghai University, China; Wei Cao, Shaoqiang Wang, Quanqin Shao, Key Laboratory of Ecosystem Network Observation and Modeling, Institute of Geographic Sciences and Natural Resources, Chinese Academy of Science, China; Guicai Li, National Satellite Meteorological Center, China Meteorological Administration, China; ArshadAli Shedayi, Department of Biological Sciences, Karakoram International University Gilgit, Pakistan; Jiangwen Fan, Key Laboratory of Ecosystem Network Observation and Modeling, Institute of Geographic Sciences and Natural Resources, Chinese Academy of Science, China*

**WEP1-PQ.9: EVALUATION THE CONTRIBUTION OF SCATTERING EFFECT TO THE DIRECTIONAL CANOPY EMISSIVITY AND BRIGHTNESS TEMPERATURE SIMULATION BASED ON CE-P MODEL ..... 5485**

*Mingzhu Guo, Institute of RS and GIS, Peking University, China; Biao Cao, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Wenjie Fan, Huazhong Ren, Yaokui Cui, Institute of RS and GIS, Peking University, China; Yongming Du, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Qinhuo Liu, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; Joint Center for Global Change Studies (JCGCS), China*

**WEP2-PQ: EARTHQUAKE, LANDSLIDE AND VOLCANO MONITORING FROM SPACE**

**WEP2-PQ.1: ALTERATION MINERALS MAPPING USING MTMF AND CEM BASED ON ASTER IN ZEDANG OREFIELD OF TIBET, CHINA ..... 5489**

*Zhaoqiang Huang, Institute of Mineral Resources, China Metallurgical Geological Bureau, China; Jianchun Zheng, Beijing Research Center of Urban System Engineering, China*

<b>WEP2-PQ.2: COLD BEHAVIOR OF MOON SURFACE DEMONSTRATED BY TYPICAL COPERNICAN CRATERS USING CE-2 CELMS DATA</b>	<b>5493</b>
<i>Zhiguo Meng, Cui Li, Jilin University, China; Tianxing Wang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Zhanchuan Cai, Macao University of Science and Technology, Macao SAR of China; Jinsong Ping, National Astronomical Observatory, CAS, China</i>	
<b>WEP2-PQ.3: A NEW METHOD FOR LITHOLOGICAL DISCRIMINATION AND MAPPING BY USING ASTER DATA IN DONG CO AREA, NORTHERN TIBET</b>	<b>5497</b>
<i>Jianguo Liu, China Aero Geophysical Survey and Remote Sensing Center for Land and Resources, China; Zhibo Liu, Chinese Academy of Geological Sciences, China; Li Chen, China Aero Geophysical Survey and Remote Sensing Center for Land and Resources, China; Genhou Wang, China University of Geosciences, China; Limin Jia, Hebei Institute of Regional Geological Survey, China</i>	
<b>WEP2-PQ.4: REFLECTANCE SPECTROSCOPY FOR RISK MINERALS ANALYSIS</b>	<b>5501</b>
<i>Belgacem Dkhala, Nouha Mezned, Saadi Abdeljaouad, Sciences Faculty of Tunis, University of Tunis El Manar, Tunisia; Zouhaier Ben Rabah, National Center for Cartography and Remote Sensing, Ministry of National Defense, Tunisia</i>	
<b>WEP2-PQ.5: USING REFLECTANCE SPECTROSCOPY TO CHARACTERIZE SURFACE LANDFORMS AND VOLCANIC DEPOSITS ON DECEPTION ISLAND (ANTARCTICA)</b>	<b>5505</b>
<i>Thomas Schmid, CIEMAT, Spain; Jerónimo López-Martínez, Ana Nieto, Universidad Autónoma de Madrid, Spain; Marta Pelayo, CIEMAT, Spain; Stéphane Guillaso, GFZ German Research Center for Geosciences, Germany</i>	
<b>WEP2-PQ.6: MICROWAVE THERMOPHYSICAL FEATURES OF APOLLO BASIN AND ITS GEOLOGIC SIGNIFICANCE</b>	<b>5509</b>
<i>Zhiguo Meng, Lele Hou, Guodong Yang, Jilin University, China; Tianxing Wang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Qian Huang, China University of Geosciences, China; Zhanchuan Cai, Macao University of Science and Technology, Macao SAR of China</i>	
 <b>WEP1-PR: SOIL MOISTURE PRODUCT EVALUATION AND APPLICATIONS</b>	
<b>WEP1-PR.1: MONITORING OF SOIL MOISTURE DYNAMICS IN THE SEMI-ARID TROPICS BY MEANS OF ALOS-2/PALSAR-2 DUAL-POLARIZATION SCANSAR DATA</b>	<b>5513</b>
<i>Christian Koyama, Manabu Watanabe, Masanobu Shimada, Tokyo Denki University, Japan</i>	
<b>WEP1-PR.2: SPATIO-TEMPORAL REQUIREMENTS OF A GEOSYNCHRONOUS SAR SOIL MOISTURE PRODUCT FOR HYDROLOGICAL APPLICATIONS</b>	<b>5517</b>
<i>Luca Cenci, Sapienza Università di Roma, Italy; Giorgio Boni, Luca Pulvirenti, Flavio Pignone, Alessandro Masoero, Valerio Basso, Simone Gabellani, CIMA Research Foundation, Italy; Nazzeno Pierdicca, Sapienza Università di Roma, Italy</i>	
<b>WEP1-PR.3: SEASONAL ANALYSIS OF SURFACE SOIL MOISTURE DRY-DOWNS IN A LAND-ATMOSPHERE HOTSPOT AS SEEN BY LSM AND SATELLITE PRODUCTS</b>	<b>5521</b>
<i>Mercedes Salvia, Institute for Astronomy and Space Physics, Argentina; Romina Ruscica, Anna Sörensson, Centro de Investigaciones del Mar y la Atmosfera, Argentina; Jan Polcher, Laboratoire de Météorologie Dynamique, France; María Piles, Universitat de València, Spain; Haydee Karszenbaum, Institute for Astronomy and Space Physics, Argentina</i>	
<b>WEP1-PR.4: VEGETATION OPTICAL DEPTH AND SOIL MOISTURE RETRIEVAL USING L-BAND RADIOMETRY OVER THE ENTIRE GROWING SEASON OF A WINTER WHEAT STAND</b>	<b>5525</b>
<i>Thomas Meyer, Forschungszentrum Jülich, Germany; François Jonard, Forschungszentrum Jülich, Université catholique de Louvain, Belgium; Lutz Weihermüller, Forschungszentrum Jülich, Germany</i>	
<b>WEP1-PR.5: MULTISCALE COMPARISON OF EIGHT SATELLITE SOIL MOISTURE DATA SETS OVER TWO CALIBRATION SITES</b>	<b>5529</b>
<i>Jiangyuan Zeng, Kun-Shan Chen, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Chenyang Cui, Hohai University, China; Haiyun Bi, Institute of Geology, China Earthquake Administration, China</i>	



<b>WEP1-PR.7: COUPLING SENTINEL-1 AND SENTINEL-2 IMAGES FOR OPERATIONAL SOIL MOISTURE MAPPING</b>	<b>5537</b>
<i>Mohammad El Hajj, Nicolas Baghdadi, Irstea-UMR TETIS (National Research Institute of Science and Technology for Environment and Agriculture), France; Mehrez Zribi, CNRS, CESBIO, France; Hassan Bazzi, Irstea-UMR TETIS (National Research Institute of Science and Technology for Environment and Agriculture), France</i>	
<b>WEP1-PR.8: EVALUATION OF SEVERAL REMOTE SENSING SOIL MOISTURE PRODUCTS ACROSS CHINA</b>	<b>5541</b>
<i>Jingjing Sun, Wen Wang, Hohai University, China; Dui Huang, Nanjing Hydraulic Research Institute, China; Xiaoju Wang, Yuyao Water Conservancy Bureau, China</i>	
<b>WEP1-PR.10: SMOS NEURAL NETWORK SOIL MOISTURE DATA ASSIMILATION</b>	<b>5548</b>
<i>Nemesio Rodríguez-Fernández, CNRS, France; Patricia de Rosnay, ECMWF, France; Clément Albergel, Filipe Aires, Catherine Prigent, CNRS, France; Philippe Richaume, Université Paul Sabatier, France; Yann Kerr, CNES, France; Matthias Drusch, European Space Agency, Netherlands</i>	
 <b>WEP2-PR: SCIENCE AND TECHNIQUES IN ATMOSPHERIC SOUNDING II</b>	
<b>WEP2-PR.1: PROLONGED COLD-AIR OUTBREAKS OVER THE CHUKCHI SEA: SYNTHESIS OF MULTISENSOR SATELLITE MEASUREMENTS AND REANALYSIS DATASET</b>	<b>5552</b>
<i>Mikhail Pichugin, Irina Gurvich, V.I. Il'ichev Pacific Oceanological Institute, Russian Federation; Elizaveta Zabolotskikh, Russian State Hydrometeorological University, Russian Federation</i>	
<b>WEP2-PR.2: SUDDEN STRATOSPHERIC WARMING IN 2015-2016: STUDY WITH SATELLITE PASSIVE MICROWAVE DATA AND ERA5 REANALYSIS</b>	<b>5556</b>
<i>Leonid Mitnik, Vladimir Kuleshov, Mikhail Pichugin, Maia Mitnik, V.I. Il'ichev Pacific Oceanological Institute FEB RAS, Russian Federation</i>	
<b>WEP2-PR.3: THE USE OF THE WEATHER RESEARCH AND FORECASTING MODEL TO ESTIMATE THE VERTICAL PROFILE OF METEOROLOGICAL DATA</b>	<b>5560</b>
<i>Bibiana Salvador Cabral da Costa, Nájila Souza da Rocha, Suzianny Cristia Salazar da Silva, Ricardo Antônio Molmann Júnior, Gabriel Bonow Münchow, Viliam Cardoso da Silveira, Silvia Beatriz Alves Rolim, Rita de Cássia Marques Alves, Adriana Coromoto Becerra-Rondón, Pâmela Suélen Käfer, Lucas Ribeiro Diaz, Federal University of Rio Grande do Sul (UFRGS), Brazil</i>	
<b>WEP2-PR.4: ATMOSPHERIC GRAVITY WAVE FEATURES RELATED TO STRATOSPHERIC MOISTENING DURING TROPICAL CYCLONES</b>	<b>5564</b>
<i>Animesh Maitra, Gargi Rakshit, Soumyajyoti Jana, University of Calcutta, India</i>	
<b>WEP2-PR.5: RAIN RADAR STUDIES OF BOUNDARY LAYER DYNAMICS AT A TROPICAL LOCATION</b>	<b>5568</b>
<i>Animesh Maitra, Soumyajyoti Jana, Gargi Rakshit, University of Calcutta, India</i>	
<b>WEP2-PR.6: REMOTELY SENSED CLEAR-SKY SURFACE LONGWAVE DOWNWARD RADIATION BY USING MULTIVARIATE ADAPTIVE REGRESSION SPLINES METHOD</b>	<b>5571</b>
<i>Wang Zhou, Tianxing Wang, Jiancheng Shi, State Key Laboratory of Remote Sensing Science, Jointly Sponsored by Institute of Remote Sensing and Digital Earth of Chinese Academy of Sciences and Beijing Normal University, China; Bin Peng, National Center for Supercomputing Applications and Department of Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign, Urbana, IL 61801, USA, United States; Rui Zhao, Yuechi Yu, State Key Laboratory of Remote Sensing Science, Jointly Sponsored by Institute of Remote Sensing and Digital Earth of Chinese Academy of Sciences and Beijing Normal University, China</i>	
<b>WEP2-PR.7: MATHEMATICAL TOOL FOR A CLOSURE STUDY OF AEROSOL MICROPHYSICAL PROPERTY RETRIEVAL USING LIDAR AND PHOTOMETER DATA</b>	<b>5575</b>
<i>Christine Boeckmann, University of Potsdam, Germany; Christoph Ritter, Alfred Wegener Institute for Polar and Marine Research, Germany; David Cappelletti, Università Degli Studi Di Perugia, Italy</i>	

## WEP1-PS: OCEAN SURFACE WINDS AND CURRENTS IV

### WEP1-PS.1: SPECTRAL PROPERTIES OF SURFACE OCEAN WAVES FROM REAL-APERTURE RADAR OBSERVATIONS ..... 5579

*Eva Le Merle, CNES, France; Danièle Hauser, CNRS, France; Céline Tison, CNES, France; Lotfi Aouf, Meteo-France, France*

### WEP1-PS.3: RETRIEVAL OF HIGH RESOLUTION SEA SURFACE WIND FROM SENTINEL-1A/B IW MODE DATA IN COASTAL REGION AROUND THE KOREAN PENINSULA ..... 5583

*Jae-Cheol Jang, Student/Seoul National University, Republic of Korea; Kyung-Ae Park, Seoul National University, Republic of Korea; Jae-Jin Park, Student/Seoul National University, Republic of Korea*

### WEP1-PS.4: WIND FIELD RETRIEVING FOR SCAT ONBOARD CFOSAT BASED ON PCA METHOD ..... 5587

*Xingou Xu, Xiaolong Dong, The CAS Key Laboratory of Microwave Remote Sensing, National Space Science Center, Chinese Academy of Sciences, China; Wenming Lin, School of Marine Sciences, Nanjing University of Information Science and Technology, China; Risheng Yun, Di Zhu, The CAS Key Laboratory of Microwave Remote Sensing, National Space Science Center, Chinese Academy of Sciences, China*

### WEP1-PS.5: MICROWAVE ACTIVE/PASSIVE MEASUREMENTS OF DIURNAL OCEAN WIND VECTOR FROM TRMM ..... 5591

*Alamgir Hossain, Central Florida remote Sensing Laboratory (CFRSL), University of Central Florida, United States; Maria Jacob, Facultad de Matematica, Astronomia y Fisica, Universidad Nacional de Cordoba, United States; W. Linwood Jones, Central Florida remote Sensing Laboratory (CFRSL), University of Central Florida, United States*

### WEP1-PS.6: C-BAND CROSS-POLARIZATION OCEAN SURFACE OBSERVATIONS IN HURRICANE MATTHEW ..... 5595

*Joseph Sapp, Zorana Jelenak, Paul Chang, National Oceanic and Atmospheric Administration/National Environmental Satellite, Data, and Information Service, United States; Stephen Frasier, University of Massachusetts Amherst, United States*

### WEP1-PS.7: VALIDATION OF THE SEA SURFACE WIND MODEL AGAINST WINDSAT DATA..... 5599

*Chuntao Chen, Jianhua Zhu, National Ocean Technology Center, China; Jianyong Xing, National Marine Environmental Forecasting Center, China; Qian Feng, National Satellite Ocean Application Service, State Oceanic Administration, China; Yili Zhao, Jiajia Liu, Longhao Yan, Xiaohu Huang, National Ocean Technology Center, China*

### WEP1-PS.8: INTRUSION OF THE KUROSHIO INTO NORTHEAST OF TAIWAN ..... 5602

*Yun Chan Tsai, Ming Chee Wu, Yi Chang, National Cheng-Kung University, Taiwan*

### WEP1-PS.9: EONAV – COPERNICUS DATA IN SUPPORT OF MARITIME ROUTE OPTIMIZATION ..... 5606

*Leif E.B. Eriksson, Yufang Ye, Lars Jonasson, Waqas Qazi, Wengang Mao, Helong Wang, Chalmers University of Technology, Sweden; Joakim Möller, Molflow, Sweden; Kris Lemmens, Offshore Navigation Ltd, Anguilla; Sverre Dokken, O.M. Offshore Monitoring Ltd, Cyprus*

## WEP2-PS: OCEAN TEMPERATURE AND SALINITY II

### WEP2-PS.1: NEAR-REAL TIME DETECTION OF THE RE-OPENING OF THE WEDDELL POLYNYA, ANTARCTICA, FROM SPACEBORNE INFRARED IMAGERY ..... 5613

*Céline Heuzé, University of Gothenburg, Sweden; Wiebke Aldenhoff, Chalmers University of Technology, Sweden*

### WEP2-PS.2: INTERANNUAL VARIATIONS OF SEA SURFACE TEMPERATURE IN THE BLACK SEA ..... 5617

*Nevin Betül Avsar, Bulent Ecevit University, Turkey; Shuanggen Jin, Chinese Academy of Sciences, China; Senol Hakan Kutoglu, Bulent Ecevit University, Turkey*

### WEP2-PS.3: COMPARISON OF SUOMI NPP VIIRS SST PRODUCT WITH SHIPBOARD SKIN SST MEASUREMENTS IN THE NORTHWEST PACIFIC ..... 5621

*Minglun Yang, Lei Guan, Liqin Qu, Kailin Zhang, Ocean University of China, China*

<b>WEP2-PS.5: SEA SURFACE TEMPERATURE PREDICTION AND RECONSTRUCTION USING PATCH-LEVEL NEURAL NETWORK REPRESENTATIONS</b>	<b>5628</b>
<i>Said Ouala, IMT Atlantique, France; Cédric Herzet, IMT Atlantique, INRIA Bretagne-Atlantique, France; Ronan Fablet, IMT Atlantique, France</i>	
<b>WEP2-PS.6: AUTONOMOUS INFRARED RADIOMETER FOR SEA SURFACE SKIN TEMPERATURE MEASUREMENTS</b>	<b>5632</b>
<i>Kailin Zhang, Lei Guan, Minglun Yang, Liqin Qu, Ocean University of China, China</i>	
<b>WEP2-PS.7: BASIN SCALE PCO2 DISTRIBUTION IN CASE 1 WATERS: AN INVESTIGATION FROM BAY OF BENGAL, INDIA</b>	<b>5636</b>
<i>Abhishek Dixit, Lekshmi K, Rishikesh Bharti, Chandan Mahanta, Indian Institute of Technology Guwahati, India</i>	
<b>WEP2-PS.8: REVISED MITIGATION OF SYSTEMATIC ERRORS IN SMOS SEA SURFACE SALINITY</b>	<b>5640</b>
<i>Jacqueline Boutin, CNRS, France; Jean-Luc Vergely, ACRI-ST, France; Stéphane Marchand, LOCEAN, France; Nicolas Kolodziejczyk, LOPS, France; Nicolas Reul, IFREMER, France</i>	
<b>WEP2-PS.9: SEAWATER DIELECTRIC MEASUREMENTS AT L-BAND WITH LATEST IMPROVEMENTS</b>	<b>5644</b>
<i>Yiwen Zhou, Roger Lang, George Washington University, United States; Emmanuel Dinnat, David Le Vine, NASA Goddard Space Flight Center, United States</i>	
<b>WEP2-PS.10: INVESTIGATING THE UTILITY AND LIMITATION OF SMAP SEA SURFACE SALINITY IN MONITORING THE ARCTIC FRESHWATER SYSTEM</b>	<b>5647</b>
<i>Wenqing Tang, Simon Yueh, Jet Propulsion Laboratory, United States; Daqing Yang, Environment and Climate Change Canada, United States; Alexander Fore, Akiko Hayashi, Jet Propulsion Laboratory, United States</i>	
<b>WEP2-PT: ACTIVE MICROWAVE SENSORS AND MISSIONS</b>	
<b>WEP2-PT.1: OBSERVATION STRATEGY AND FLIGHT CONFIGURATION FOR MONITORING EARTH DYNAMICS WITH THE TANDEM-L MISSION</b>	<b>5651</b>
<i>Daniela Borla Tridon, Francescopaolo Sica, Francesco De Zan, Markus Bachmann, Gerhard Krieger, German Aerospace Center (DLR), Germany</i>	
<b>WEP2-PT.2: PERFORMANCE SIMULATOR FOR BISTATIC SAR MISSIONS</b>	<b>5655</b>
<i>Simone Mancon, Davide Giudici, Daniele Mapelli, Antonio Valentino, Aresys s.r.l., Italy; Björn Rommen, Bernardo Carnicero, European Space Agency/ESTEC, Netherlands</i>	
<b>WEP2-PT.3: END-TO-END SIMULATOR OF GEOSYNCHRONOUS SAR DATA FOR SYSTEM PERFORMANCE ASSESSMENT</b>	<b>5659</b>
<i>Davide Giudici, Aresys s.r.l., Italy; Antonio Leanza, Andrea Monti-Guarnieri, Politecnico di Milano, Italy; Andrea Recchia, Aresys s.r.l., Italy</i>	
<b>WEP2-PT.4: ON THE ASSIMILATION OF MULTI-SOURCE OF DIRECTIONAL WAVE SPECTRA FROM SENTINEL-1A AND 1B, AND CFOSAT IN THE WAVE MODEL MFWAM : TOWARD AN OPERATIONAL USE IN CMEMS-MFC</b>	<b>5663</b>
<i>Lotfi Aouf, Meteo-France, France; Danièle Hauser, ATMOS/IPSL, France; Céline Tison, CNES, France; Bertrand Chapron, IFREMER, France</i>	
<b>WEP2-PT.5: SPACEBORNE P-BAND MIMO SAR FOR PLANETARY APPLICATIONS</b>	<b>5667</b>
<i>Rafael Rincon, NASA Goddard Space Flight Center, United States; Lynn Carter, University of Arizona, United States; Daniel Lu, Martin Perrine, Cornelis Du Toit, NASA Goddard Space Flight Center, United States</i>	
<b>WEP2-PT.7: RESEARCH ON HIGH RESOLUTION THERMAL INFRARED SATELLITE TECHNOLOGY AND APPLICATIONS</b>	<b>5674</b>
<i>Fan Mo, Beijing Institute of Spacecraft System Engineering, China; Hua Li, Chinese Academy of Sciences, China; Quan Jing, Xinwei Zhang, Beijing Institute of Spacecraft System Engineering, China; Biao Cao, Qinhua Liu, Chinese Academy of Sciences, China</i>	

**WEP2-PT.8: QUANTITATIVE INTER-COMPARISON BETWEEN GPM DUAL-FREQUENCY ..... 5678  
PRECIPITATION RADAR OBSERVATIONS AND POLARIMETRIC GROUND RADAR  
MEASUREMENTS**

*Sounak Biswas, V. Chandrasekar, Colorado State University, United States*

**WEP2-PU: UAV AND AIRBORNE PLATFORMS I**

**WEP2-PU.1: 3D VISUALIZATION OF LANDSLIDE AFFECTED AREA DUE TO HEAVY ..... 5685  
RAINFALL IN JAPAN FROM UAV FLIGHTS AND SFM**

*Fumio Yamazaki, Shuntaro Miyazaki, Wen Liu, Chiba University, Japan*

**WEP2-PU.3: ANALYSIS OF POSITIONAL AND GEOMETRIC ACCURACY OF OBJECTS IN ..... 5693  
SURVEY WITH UNMANNED AERIAL VEHICLE (UAV)**

*Gabriel Soares, Leonardo Campos Inocencio, Maurício Roberto Veronez, Luiz Gonzaga da Silveira Jr., Fabiane Bordin,  
Fernando Pinho Marson, UNISINOS University, Brazil*

**WEP2-PU.4: AXIS: AN AIRBORNE X-BAND INTERFEROMETRIC FMCW SAR SYSTEM..... 5697**

*Carmen Esposito, Antonio Natale, Paolo Berardino, IREA-CNR, Italy; Gianfranco Palmese, Elettra Microwave S.r.l., Italy;  
Riccardo Lanari, IREA-CNR, Italy; Stefano Perna, Università degli Studi di Napoli "Parthenope", Italy*

**WEP2-PU.5: GPU ACCELERATION OF UAV IMAGE SPLICING USING ORIENTED FAST AND ..... 5700  
ROTATED BRIEF COMBINED WITH PCA**

*Chia-Cheng Yeh, National Taipei University of Technology & National Science and Technology Center for Disaster Reduction,  
Taiwan; Yang-Lang Chang, National Taipei University of Technology, Taiwan; Pai-Hui Hsu, National Taiwan University, Taiwan;  
Cheng-Huan Hsien, National Taipei University of Technology, Taiwan*

**WEP2-PU.6: VIGNETTING CORRECTION OF POST-EARTHQUAKE UAV IMAGES ..... 5704**

*Xiaoxiang Yuan, Xiaoqing Wang, Aixia Dou, Xiang Ding, Institute of Earthquake Forecasting, China Earthquake Administration,  
China*

**WEP2-PU.7: HIGH PRECISION CONTROL OF AN INERTIALLY STABILIZED PLATFORM ..... 5708  
FOR AERIAL REMOTE SENSING APPLICATIONS**

*XiangYang Zhou, Hao Gao, Beilei Zhao, Beihang University, China; Ruifang Yu, Institute of Geophysics, China Earthquake  
Administration, China; Libo Zhao, Xi'an Jiaotong University, China*

**WEP2-PU.8: FAST 3D MAP RECONSTRUCTION USING DENSE VISUAL SIMULTANEOUS ..... 5712  
LOCALIZATION AND MAPPING BASED ON UNMANNED AERIAL VEHICLE**

*Siyuan Peng, Fang Huang, University of Electronic Science and Technology of China, China; Jian Tao, Texas A&M University,  
United States; Bo Tie, Jun Lu, Xiaodong Zhang, University of Electronic Science and Technology of China, China*

**WEP2-PU.9: AN AIRBORNE LARGE SCALE FACILITY FOR GEOSCIENCE APPLICATIONS: ..... 5716  
ICTS-PAI**

*José A. Gómez, Jesús Ortiz, Ana Corrales, Benito Calvo, Neves Seoane, Bartolomé Marqués, National Institute for Aerospace  
Technology - INTA, Spain*

**WEP2-PU.10: A METHOD OF RAPID DISTORTION CORRECTION FOR UAV IMAGE BASED ..... 5720  
ON GPU-CPU CO-PROCESSING TECHNOLOGY**

*Penglong Li, Yi Ding, Songjiang Duan, Ding Luo, Ziwei Jiang, Yong Xiao, Chongqing Geomatics Center, China*

**TH1-R1: HYPERSPECTRAL IMAGE CLASSIFICATION II**

**TH1-R1.1: MULTI-SCALE STRUCTURE EXTRACTION FOR HYPERSPECTRAL IMAGE ..... 5724  
CLASSIFICATION**

*Puhong Duan, Xudong Kang, Shutao Li, Hunan University, China; Jon Atli Benediktsson, University of Iceland, Iceland*

**TH1-R1.3: THE EFFECT OF GROUND TRUTH ON ACCURACY INDEXES IN ..... 5732  
HYPERSPECTRAL IMAGE CLASSIFICATION**

*Qiaobo Hao, Shutao Li, Xudong Kang, Hunan University, China*

<b>TH1-R1.4: COLLABORATIVE SPARSE PRIORS FOR INFRARED IMAGE MULTI-VIEW ATR.....</b>	<b>5736</b>
<i>Xuelu Li, Vishal Monga, The Pennsylvania State University - University Park, United States</i>	
<b>TH1-R1.5: SUBSPACE MULTINOMIAL LOGISTIC REGRESSION ENSEMBLE FOR ..... CLASSIFICATION OF HYPERSPECTRAL IMAGES</b>	<b>5740</b>
<i>Mahdi Khodadadzadeh, Helmholtz-Zentrum Dresden-Rossendorf, Helmholtz Institute Freiberg for Resource Technology, Germany; Pedram Ghamisi, German Aerospace Center (DLR), Germany; Cecilia Contreras, Richard Gloaguen, Helmholtz-Zentrum Dresden-Rossendorf, Helmholtz Institute Freiberg for Resource Technology, Germany</i>	
<b>TH2-R1: HYPERSPECTRAL DATA PROCESSING III</b>	
<b>TH2-R1.1: SPECTRAL-SPATIAL HYPERSPECTRAL IMAGE CLASSIFICATION VIA LOCALITY ..... AND STRUCTURE CONSTRAINED LOW-RANK REPRESENTATION</b>	<b>5744</b>
<i>Xiang He, Qi Wang, Northwestern Polytechnical University, China; Xuelong Li, Chinese Academy of Sciences, China</i>	
<b>TH2-R1.2: A NOVEL ANT COLONY OPTIMIZATION BASED TRAINING SUBSET SELECTION ..... ALGORITHM FOR HYPERSPECTRAL IMAGE CLASSIFICATION</b>	<b>5748</b>
<i>Shakti Sharma, Krishna Mohan Buddhiraju, Indian Inst of Technology Bombay, India</i>	
<b>TH2-R1.3: CAN WE GENERATE GOOD SAMPLES FOR HYPERSPECTRAL CLASSIFICATION? ..... ---A GENERATIVE ADVERSARIAL NETWORK BASED METHOD</b>	<b>5752</b>
<i>Yonghao Xu, Bo Du, Liangpei Zhang, Wuhan University, China</i>	
<b>TH2-R1.4: SEMI-SUPERVISED CLASSIFICATION OF HYPERSPECTRAL DATA BASED ON ..... GENERATIVE ADVERSARIAL NETWORKS AND NEIGHBORHOOD MAJORITY VOTING</b>	<b>5756</b>
<i>Ying Zhan, Kang Wu, Wei Liu, Jin Qin, Zhaoying Yang, Yasmine Medjadba, Guian Wang, Xianchuan Yu, Beijing Normal University, China</i>	
<b>TH2-R1.5: ROBUST SPARSE HYPERSPECTRAL UNMIXING BASED ON MULTI-OBJECTIVE ..... OPTIMIZATION</b>	<b>5760</b>
<i>Xia Xu, Beihang University, China; Liming Wang, Institute of Information Engineering Chinese Academy of Sciences, China; Bin Pan, Zhenwei Shi, Beihang University, China</i>	
<b>TH3-R1: DATA ANALYSIS METHODS III</b>	
<b>TH3-R1.1: EVALUATION OF HYPERSPECTRAL CLASSIFICATION MAPS IN ..... HETEROGENEOUS ECOSYSTEM</b>	<b>5764</b>
<i>Eduarne Ibarrola-Ulzurrun, Javier Marcello, Universidad de Las Palmas de Gran Canaria, ULPGC, Spain; Consuelo Gonzalo-Martín, Universidad Politécnica de Madrid, Spain; Jocelyn Chanussot, University of Grenoble Alpes, CNRS, France</i>	
<b>TH3-R1.2: TEMPORAL DIMENSIONALITY REDUCTION FOR LAND COVER MAP ..... PRODUCTION USING HIGH RESOLUTION IMAGE TIME SERIES</b>	<b>5768</b>
<i>Jordi Inglada, Cédric Traizet, CNES/CESBIO, France</i>	
<b>TH3-R1.3: FULLY SUPERVISED NON-NEGATIVE MATRIX FACTORIZATION FOR FEATURE ..... EXTRACTION</b>	<b>5772</b>
<i>Woody Austin, UT Austin, United States; Dylan Anderson, Sandia National Laboratories, United States; Joydeep Ghosh, UT Austin, United States</i>	
<b>TH3-R1.4: USE OF GUIDED REGULARIZED RANDOM FOREST FOR BIOPHYSICAL ..... PARAMETER RETRIEVAL</b>	<b>5776</b>
<i>Emma Izquierdo-Verdiguier, Universitat de València, Spain; Raúl Zurita-Milla, University of Twente, Netherlands</i>	
<b>TH3-R1.5: NONLINEAR COMPLEX PCA FOR SPATIO-TEMPORAL ANALYSIS OF GLOBAL ..... SOIL MOISTURE</b>	<b>5780</b>
<i>Diego Bueso, María Piles, Gustau Camps-Valls, Universitat de València, Spain</i>	

## **TH4-R1: PROCESSING OF SAR/POLSAR DATA**

### **TH4-R1.1: NORMALIZED COMPRESSION DISTANCE FOR SAR IMAGE CHANGE DETECTION ..... 5784**

*Mihai Coca, Military Technical Academy, Romania; Andrei Anghel, University Politehnica of Bucharest, Romania; Mihai Datcu, German Aerospace Center (DLR), Romania*

### **TH4-R1.2: TWO-DIMENSIONAL LOCAL SAMPLE DIRECTIONAL DISCRIMINANT PROJECTION FOR SAR AUTOMATIC TARGET RECOGNITION ..... 5788**

*Xian Liu, Yulin Huang, Junjie Wu, Jianyu Yang, University of Electronic Science and Technology of China, China*

### **TH4-R1.3: ADAPTIVE WEIGHTED MULTI-TASK SPARSE REPRESENTATION CLASSIFICATION IN SAR IMAGE RECOGNITION ..... 5792**

*Zhi Zhou, Zongjie Cao, Yiming Pi, Ting Jiang, University of Electronic Science and Technology of China, China*

### **TH4-R1.4: LOCAL EDGINESS MEASURES IN POLSAR IMAGERY BY USING STOCHASTIC DISTANCES ..... 5796**

*Luis Gomez, Luis Alvarez, CTIM/University of Las Palmas de Gran Canaria, Spain; Alejandro C. Frery, Laboratório de Computacao Científica e Análise Numérica (LaCCAN)/ Universidade Federal de Alagoas, Brazil*

### **TH4-R1.5: OIL SPILL CANDIDATE DETECTION FROM SAR IMAGERY USING THRESHOLDING-GUIDED MAXIMALLY STABLE EXTREMAL REGIONS ALGORITHM ..... 5800**

*Qian Zhang, Yunlin Huang, Weibo Huo, Qin Gu, Jifang Pei, Jianyu Yang, University of Electronic Science and Technology of China, China*

## **TH1-R2: SAR INTERFEROMETRY / GMTI**

### **TH1-R2.1: TOWARDS THE RETRIEVAL OF 2-D VESSEL VELOCITIES WITH SINGLE-PLATFORM SPACEBORNE SAR: EXPERIMENTAL RESULTS WITH THE TERRASAR-X 2-LOOKS TOPS MODE ..... 5804**

*Nestor Yague-Martinez, Pau Prats-Iraola, Wollstadt Steffen, Marc Rodriguez-Cassola, Maria J. Sanjuan-Ferrer, DLR - German Aerospace Center, Germany*

### **TH1-R2.2: FIRST GMTI RESULTS OF THE MIRANDA-35 SENSOR..... 5808**

*Emiliano Casalini, Daniel Henke, University of Zürich, Switzerland*

### **TH1-R2.3: TOWARDS ON-BOARD ELEVATION MEASUREMENT USING INTERFEROMETRY AND RADARGRAMMETRY FROM SINGLE-PASS SAR IMAGES ..... 5812**

*Koichi Ito, Shota Hishinuma, Takafumi Aoki, Tohoku University, Japan; Jyunpei Uemoto, Seiho Uratsuka, National Institute of Information and Communications Technology, Japan*

### **TH1-R2.4: MULOG: A GENERIC VARIANCE-STABILIZATION APPROACH FOR SPECKLE REDUCTION IN SAR INTERFEROMETRY AND SAR POLARIMETRY ..... 5816**

*Charles-Alban Deledalle, CNRS, France; Loïc Denis, Univ Lyon, France; Florence Tupin, Télécom ParisTech, France*

### **TH1-R2.5: SAR IMAGE RESTORATION VIA A NL APPROACH BASED ON THE KS TEST..... 5820**

*Giampaolo Ferraioli, Bilel Kanoun, Vito Pascazio, Gilda Schirnzi, Università di Napoli Parthenope, Italy*

## **TH2-R2: SAR CLASSIFICATION**

### **TH2-R2.1: LAND USE ANALYSIS USING A COMPACT PARAMETRIZATION OF MULTI-TEMPORAL SAR DATA ..... 5823**

*Francesco Asaro, Claudio M. Prati, Barbara Belletti, Simone Bizzi, Politecnico di Milano, Italy; Patrice Carbonneau, Durham University, United Kingdom*

<b>TH2-R2.2: SAR CROSS-SPECTRAL ANALYSIS OF RADIAL INTERMEDIATE WAVES: DIRECTIONAL PROPERTIES</b>	<b>5827</b>
<i>Huimin Li, Bertrand Chapron, Alexis Mouche, University of Brest, CNRS, IRD, Ifremer, Laboratoire d’Oceanographie Physique et Spatiale (LOPS), IUEM, France</i>	
<b>TH2-R2.3: OPERATIONAL AGRICULTURAL FLOOD MONITORING WITH SENTINEL-1 SYNTHETIC APERTURE RADAR</b>	<b>5831</b>
<i>Claire Boryan, Zhengwei Yang, Avery Sandborn, Patrick Willis, National Agricultural Statistics Service, United States; Barry Haack, George Mason University, United States</i>	
 <b>TH3-R2: SAR SIMULATIONS / SYSTEMS</b>	
<b>TH3-R2.1: FULLY ADAPTIVE REMOTE SENSING OBSERVING SYSTEM SIMULATION EXPERIMENTS</b>	<b>5839</b>
<i>Graeme Smith, Adam Mitchell, Christopher Ball, Andrew O’Brien, Joel Johnson, The Ohio State University, United States</i>	
<b>TH3-R2.2: TOPOLOGY DESIGN FOR GEO SPACEBORNE-AIRBORNE MULTISTATIC SAR USING MULTIOBJECTIVE OPTIMIZATION ALGORITHMS</b>	<b>5843</b>
<i>Hongyang An, Junjie Wu, Zhichao Sun, Jianyu Yang, Yulin Huang, Haiguang Yang, University of Electronic Science and Technology of China, China</i>	
<b>TH3-R2.3: QUADRATURE COMPRESSIVE SAMPLING SAR IMAGING</b>	<b>5847</b>
<i>Huizhang Yang, Shengyao Chen, Feng Xi, Zhong Liu, Nanjing University of Science and Technology, China</i>	
<b>TH3-R2.4: A NEW IMAGING METHOD FOR GEOSTATIONARY SAR CONSTELLATION USING DOPPLER FILTERING</b>	<b>5851</b>
<i>Yukun Guo, Ze Yu, Shusen Wang, Jingwen Li, Beihang University, China</i>	
<b>TH3-R2.5: MACHINE LEARNING FRAMEWORK FOR MAPPING OF MISSISSIPPI RIVER LEVEES AND DAMAGE ASSESSMENT USING TERRASAR-X DATA</b>	<b>5855</b>
<i>Lalitha Dabhiru, James V. Aanstoos, John Ball, Nicolas H. Younan, Mississippi State Univeristy, United States</i>	
 <b>TH4-R2: ADVANCED POLARIMETRIC SAR METHODS</b>	
<b>TH4-R2.1: INDEPENDENT COMPONENT ANALYSIS BASED INCOHERENT TARGET DECOMPOSITIONS FOR POLARIMETRIC SAR DATA - PRACTICAL ASPECTS</b>	<b>5859</b>
<i>Gabriel Vasile, National Center for Scientific Research (CNRS), France</i>	
<b>TH4-R2.2: A STUDY ON PHYSICAL MEANINGS OF A UNITARY TRANSFORMATION USED IN POLARIMETRIC DECOMPOSITION</b>	<b>5863</b>
<i>Wentao An, Mingsen Lin, Juhong Zou, National Satellite Ocean Application Service, China</i>	
<b>TH4-R2.3: A NEW MODEL FOR P-BAND POL-INSAR BASED ON GAMMA DISTRIBUTION</b>	<b>5867</b>
<i>Xiaofan Sun, Liangjiang Zhou, Chinese Academy of Sciences/University of Chinese Academy of Sciences, China; Bingnan Wang, Chinese Academy of Sciences, China; Wenmei Li, Nanjing University of Posts and Telecommunications, China; Maosheng Xiang, Chinese Academy of Sciences/University of Chinese Academy of Sciences, China; Shuai Jiang, Chinese Academy of Sciences/ University of Chinese Academy of Sciences, China</i>	
<b>TH4-R2.4: EVALUATION OF COHERENT SCATTERERS IN HIGH-RESOLUTION POLARIMETRIC SAR IMAGERY</b>	<b>5871</b>
<i>Yanting Wang, Thomas Ainsworth, Jong-Sen Lee, Naval Research Laboratory, United States</i>	
<b>TH4-R2.5: THE EFFECT OF FOREST FOLIAGE ON L-BAND POLARIMETRIC SAR DATA</b>	<b>5875</b>
<i>Hiroshi Kimura, Gifu University, Japan</i>	

## **TH1-R3: FOREST MONITORING USING MICROWAVE INSTRUMENTS**

### **TH1-R3.1: OPEN-SOURCING OF A SOOP SIMULATOR WITH BISTATIC VEGETATION SCATTERING MODEL ..... 5879**

*Orhan Eroglu, Dylan Boyd, Mehmet Kurum, Mississippi State University, United States*

### **TH1-R3.2: EVALUATION OF THE VEGETATION OPTICAL DEPTH INDEX ON MONITORING FIRE RISK IN THE MEDITERRANEAN REGION ..... 5883**

*Lei Fan, Jean-Pierre Wigneron, Amen Al-Yaari, Nicolas Martin-StPaul, Jean-Luc Dupuy, François Pimont, Institut National de la Recherche Agronomique, France; Yann Kerr, CESBIO, CNES/CNRS/IRD/UPS, France*

### **TH1-R3.3: ESTIMATING LIVE FUEL MOISTURE IN SOUTHERN CALIFORNIA USING REMOTE SENSING VEGETATION WATER CONTENT PROXIES ..... 5887**

*Shenyue Jia, Seung Hee Kim, Chapman University, United States; Son V. Nghiem, Jet Propulsion Laboratory, United States; Wonhee Cho, Korea Soongsil Cyber University, Republic of Korea; Menas Kafatos, Chapman University, United States*

### **TH1-R3.4: SMOS VEGETATION OPTICAL DEPTH AND ECOSYSTEM FUNCTIONAL PROPERTIES: EXPLORING THEIR RELATIONSHIPS IN TROPICAL FORESTS ..... 5891**

*Gaia Vaglio Laurin, Tuscia University, Italy; Cristina Vittucci, Tor Vergata University, Italy; Gianluca Tramontana, Tuscia University, Italy; Paul Bodesheim, Max Planck Institute, Germany; Paolo Ferrazzoli, Leila Guerriero, Tor Vergata University, Italy; Martin Jung, Miguel Mahecha, Max Planck Institute, Germany; Dario Papale, Tuscia University, Italy*

## **TH2-R3: FOREST MONITORING USING LIDAR II**

### **TH2-R3.1: INFLUENCE OF LIDAR FULL-WAVEFORM DENSITY AND VOXEL SIZE ON FOREST STAND ESTIMATES ..... 5895**

*Pablo Crespo-Peremarch, Luis Ángel Ruiz, Geo-Environmental Cartography and Remote Sensing Group (CGAT), Spain*

## **TH3-R3: VEGETATION MONITORING USING MODIS**

### **TH3-R3.1: MAPPING LIVE FUEL MOISTURE CONTENT AND FLAMMABILITY FOR CONTINENTAL AUSTRALIA USING OPTICAL REMOTE SENSING ..... 5903**

*Marta Yebra, Australian National University, Australia; Xingwen Quan, University of Electronic Science and Technology of China, China; David Riaño, University of California, Davis, United States; Pablo Rozas Larraondo, Albert van Dijk, Geoff Cary, Australian National University, Australia*

### **TH3-R3.2: DROUGHT DYNAMICS AND IMPACTS ON CHINA SHRUBLANDS VEGETATION ACTIVITIES ..... 5907**

*Yalin Wang, Yi Ding, Yan Hu, Jing Chen, Wenwu Fan, Chongqing Geomatics Center, China*

### **TH3-R3.3: FOREST VERTICAL STRUCTURE FROM MODIS BRDF SHAPE INDICATORS ..... 5911**

*Lei Cui, Ziti Jiao, Yadong Dong, Xiaoning Zhang, Mei Sun, Siyang Yin, Yaxuan Chang, Dandan He, Anxing Ding, Beijing Normal University, China*

### **TH3-R3.4: A MODIS-DERIVED PRIMARY PRODUCTIVITY DATASET FOR NORTH AMERICA BASED ON TOPOGRAPHICALLY-AWARE WEATHER DATA AND LIGHT-USE EFFICIENCY ..... 5915**

*Sergio Bernardes, University of Georgia, United States*



**TH3-R3.5: APPLICATION OF PHOTON RECOLLISION PROBABILITY THEORY FOR ..... 5918**  
**COMPATIBILITY CHECK BETWEEN FOLIAGE CLUMPING AND LEAF AREA INDEX**  
**PRODUCTS OBTAINED FROM EARTH OBSERVATION DATA**  
*Jan Pisek, Tartu Observatory, Estonia; Henning Buddenbaum, Trier University, Germany; Fernando Camacho, EOLAB, Spain; Joachim Hill, Trier University, Germany; Jennifer Jensen, Texas State University, United States; Holger Lange, Norwegian Institute of Bioeconomy Research, Norway; Zhili Liu, Northeast Forestry University, China; Arndt Piayda, Thünen Institute of Climate-Smart Agriculture, Germany; Yonghua Qu, Beijing Normal University, China; Olivier Roupsard, CIRAD-Persyst, France; Shawn Serbin, Brookhaven National Laboratory, United States; Svein Solberg, Norwegian Institute of Bioeconomy Research, Norway; Oliver Sonnentag, Université de Montréal, Canada; Anne Thimonier, WSL-Swiss Federal Institute for Forest, Snow and Landscape Research, Switzerland; Francesco Vuolo, Institute of Surveying, Remote Sensing and Land Information, Austria*

**TH4-R3: OPTICAL AND INFRARED MONITORING OF VEGETATION I**

**TH4-R3.2: SENTINEL 2 AND 3 FOR TEMPERATURE MONITORING OVER THE AMAZON ..... 5925**  
*Juan Carlos Jimenez, José Gomis-Cebolla, José Antonio Sobrino, Guillem Sòria, Drazen Skokovic, Yves Julien, Susana García-Monteiro, University of Valencia, Spain; Cristian Mattar, Universidad de Aysén, Chile; Andrés Santamaría-Artigas, University of Maryland, United States; José Jesús Pasapera-Gonzales, CONIDA, Peru*

**TH4-R3.3: THE VEGETATION STRUCTURE PERPENDICULAR INDEX FOR WILDFIRE ..... 5929**  
**SEVERITY AND FOREST RECOVERY MONITORING**  
*Andrea Massetti, Christoph Rüdiger, Monash University, Australia; Marta Yebra, Australian National University, Australia; James Hilton, CSIRO, Australia*

**TH1-R4: REMOTE SENSING FOR AGRICULTURAL MONITORING**

**TH1-R4.1: ESA’S SMOS MISSION – SUPPORTING AGRICULTURAL APPLICATIONS..... 5933**  
*Susanne Mecklenburg, Matthias Drusch, European Space Agency, Italy; Yann Kerr, Ahmad Albitar, Nemesio Rodríguez-Fernández, CESBIO, France; Maria Jose Escorihuela, isardSAT, Spain; María Piles, Universitat de València, Spain; Roberto Sabia, European Space Agency, Italy*

**TH1-R4.2: REMOTE SENSING TO UAV-BASED DIGITAL FARMLAND..... 5936**  
*Nicola Falco, Haruko Wainwright, Craig Ulrich, Baptiste Dafflon, Susan Hubbard, Lawrence Berkeley National Laboratory, United States; Malcolm Williamson, Jackson Cothren, Richard Ham, University of Arkansas, United States; Jay McEntire, McClain McEntire, M2 Capital Partners LLC, United States*

**TH1-R4.3: INTER-COMPARISON OF ATMOSPHERIC CORRECTION METHODS ON ..... 5940**  
**SENTINEL-2 IMAGES APPLIED TO CROPLANDS**  
*Ion Sola, Jesús Álvarez-Mozos, María González-Audicana, Public University of Navarre, Spain*

**TH1-R4.4: RELATIONSHIPS OF PHENOLOGICAL AND INTER-ANNUAL LANDSCAPE ..... 5944**  
**DYNAMICS WITH BIODIVERSITY IN FARMLANDS**  
*Niloofer Alavi, Doug King, Carleton University, Canada*

**TH2-R4: REMOTE SENSING FOR ESTIMATION OF BIOPHYSICAL PARAMETERS IV**

**TH2-R4.1: LEAF WATER STATUS FROM LAB ESTIMATES OF VIS-NIR REFLECTANCE AND ..... 5948**  
**TRANSMITTANCE**  
*Vern Vanderbilt, NASA, United States; Craig S.T. Daughtry, United States Department of Agriculture, United States; Robert Dahlgren, CSUMB / NASA Ames Research Center, United States*

**TH2-R4.2: COMBINATION OF OPTICAL AND SAR SENSORS FOR MONITORING BIOMASS ..... 5952**  
**OVER CORN FIELDS**  
*Mehdi Hosseini, Carleton University, Canada; Heather McNairn, Agriculture and Agri-Food Canada, Canada; Scott Mitchell, Carleton University, Canada; Andrew Davidson, Laura Dingle Robertson, Agriculture and Agri-Food Canada, Canada*

<b>TH2-R4.3: A NONLINEAR HIERARCHICAL MODEL FOR FORECASTING CROP GROWTH IN THE US CORN BELT</b>	<b>5956</b>
<i>Colin Lewis-Beck, Petruta Caragea, Jarad Niemi, Brian K. Hornbuckle, Victoria Walker, Iowa State University, United States</i>	
<b>TH2-R4.4: DERIVATION OF HIGH SPATIO-TEMPORAL RESOLUTION LEAF AREA INDEX AND UNCERTAINTY MAPS BY COMBINING LAINET, CACAO AND GPR</b>	<b>5960</b>
<i>Gaofei Yin, Ainong Li, Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, China</i>	
<b>TH2-R4.5: WINTER WHEAT YIELD ASSESSMENT USING LANDSAT 8 AND SENTINEL-2 DATA</b>	<b>5964</b>
<i>Sergii Skakun, Belen Franch, University of Maryland, United States; Eric Vermote, NASA, United States; Jean-Claude Roger, Christopher Justice, University of Maryland, United States; Jeffrey Masek, NASA, United States; Emilie Murphy, University of Maryland, United States</i>	
 <b>TH3-R4: LINKING CHLOROPHYLL FLUORESCENCE MEASUREMENTS AND RADIATIVE TRANSFER MODELLING I: STATE OF THE ART</b>	
<b>TH3-R4.1: MODELLING REFLECTANCE, FLUORESCENCE AND PHOTOSYNTHESIS: DEVELOPMENT OF THE SCOPE MODEL</b>	<b>5968</b>
<i>Christiaan van der Tol, Nastassia Vilfan, Peiqi Yang, Bagher Bayat, Wouter Verhoef, University of Twente, Netherlands</i>	
<b>TH3-R4.3: ASSESSING THE USE OF MULTIPLE CONSTRAINTS AND ANCILLARY DATA TO SUPPORT SCOPE MODEL INVERSION IN A EXPERIMENTAL GRASSLAND</b>	<b>5975</b>
<i>Javier Pacheco-Labrador, Nuno Carvalhais, Oscar Perez-Priego, Tarek S. El-Madany, Max Planck Institute for Biogeochemistry, Germany; Micol Rossini, Tommaso Julitta, University of Milano Bicocca, Italy; Gerardo Moreno, Universidad de Extremadura, Spain; Rosario González-Cascón, Spanish National Institute for Agricultural and Food Research and Technology (INIA), Spain; Maria Pilar Martín, Spanish National Research Institute (CSIC), Spain; Markus Reichstein, Max Planck Institute for Biogeochemistry, Germany; Arnaud Carrara, Fundación Centro de Estudios Ambientales del Mediterráneo (CEAM), Spain; Luis Guanter, Helmholtz Centre Potsdam, Germany; Mirco Migliavacca, Max Planck Institute for Biogeochemistry, Germany</i>	
<b>TH3-R4.4: PHOTOSYNTHESIS-SUN INDUCED FLUORESCENCE RELATIONSHIP IN A MEDITERRANEAN GRASSLAND</b>	<b>5979</b>
<i>David Martini, Javier Pacheco-Labrador, Oscar Perez-Priego, Max Planck Institute for Biogeochemistry, Germany; Christiaan van der Tol, University of Twente, Netherlands; Tarek S. El-Madany, Max Planck Institute for Biogeochemistry, Germany; Tommaso Julitta, JB Hyperspectral Devices, Germany; Micol Rossini, University of Milano Bicocca, Italy; Anatoly Gitelson, University of Nebraska - Lincoln, United States; Markus Reichstein, Mirco Migliavacca, Max Planck Institute for Biogeochemistry, Germany</i>	
<b>TH3-R4.5: TOWARDS ADVANCED RETRIEVALS OF PLANT TRANSPIRATION USING SUN-INDUCED CHLOROPHYLL FLUORESCENCE: FIRST CONSIDERATIONS</b>	<b>5983</b>
<i>Alexander Damm, Sebastian Roethlin, Liv Fritsche, University of Zürich, Switzerland</i>	
 <b>TH4-R4: LINKING CHLOROPHYLL FLUORESCENCE MEASUREMENTS AND RADIATIVE TRANSFER MODELLING II: NEW PROSPECTS</b>	
<b>TH4-R4.1: PHOTOPROTECTION DYNAMICS OBSERVED AT LEAF LEVEL FROM FAST TEMPORAL REFLECTANCE CHANGES</b>	<b>5987</b>
<i>Shari Van Wittenberghe, Luis Alonso, University of Valencia, Spain; Zbyněk Malenovský, University of Tasmania, Australia; José Moreno, University of Valencia, Spain</i>	
<b>TH4-R4.2: RETRIEVING PHOTOSYNTHETIC CAPACITY PARAMETER FROM LEAF PHOTOCHEMICAL REFLECTANCE AND CHLOROPHYLL FLUORESCENCE</b>	<b>5991</b>
<i>Nastassia Vilfan, Christiaan van der Tol, Peiqi Yang, Wouter Verhoef, ITC, University of Twente, 7500AE Enschede, The Netherlands, Netherlands</i>	

**TH4-R4.3: SIMULATION OF CHLOROPHYLL FLUORESCENCE FOR SUN- AND SHADE-ADAPTED LEAVES OF 3D CANOPIES WITH THE DART MODEL ..... 5995**

*Jean-Philippe Gastellu-Etchegorry, University of Toulouse, France; Zbyněk Malenovský, University of Tasmania, Australia; Nuria Duran-Gomez, Jean Meynier, Nicolas Lauret, University of Toulouse, France; Tiangang Yin, NASA, United States; Jianbo Qi, Jordan Guilleux, Eric Chavanon, University of Toulouse, France; Bruce Cook, Douglas C. Morton, NASA, United States*

**TH4-R4.4: MONITORING FOREST HEALTH WITH SUN-INDUCED CHLOROPHYLL FLUORESCENCE OBSERVATIONS AND 3-D RADIATIVE TRANSFER MODELING ..... 5999**

*Rocío Hernández-Clemente, Peter North, Alberto Hornero, Swansea University, United Kingdom; Pablo Jesús Zarco-Tejada, European Commission, Joint Research Centre (JRC), Italy*

**TH4-R4.5: A MODEL TO SIMULATE THE RADIATIVE TRANSFER OF SOLAR-INDUCED FLUORESCENCE FOR THREE-DIMENSIONAL CANOPIES ..... 6003**

*Feng Zhao, Rong Li, Beihang University, China; Wenhan Qin, Science Systems and Applications, Inc, United States; Wenjuan Ding, Beihang University, China*

**TH1-R5: MICROWAVE ATMOSPHERIC SOUNDING**

**TH1-R5.2: END TO END SIMULATION STUDY OF GEOSTATIONARY PASSIVE MICROWAVE ATMOSPHERIC SOUNDING ..... 6010**

*Ke Chen, Huazhong University of Science and Technology, China; Albin J. Gasiewski, Kun Zhang, University of Colorado Boulder, United States; Liang Lang, Liangqi Gui, Qingxia Li, Ye He, Huazhong University of Science and Technology, China*

**TH1-R5.3: RETRIEVAL OF TEMPERATURE AND WATER VAPOR VERTICAL PROFILE FROM ATMS MEASUREMENTS WITH RANDOM FORESTS TECHNIQUE ..... 6014**

*Francesco Di Paola, Angela Cersosimo, Institute of Methodologies for Environmental Analysis - National Research Council, Italy; Domenico Cimini, Institute of Methodologies for Environmental Analysis - National Research Council / Centro di Eccellenza per l'integrazione di Tecniche di di Telerilevamento e Modellistica Numerica per la Previsione di Eventi Meteorologici Severi, Department of Physics, University of L'Aquila, Italy; Donatello Gallucci, Institute of Methodologies for Environmental Analysis - National Research Council, Italy; Sabrina Gentile, Institute of Methodologies for Environmental Analysis - National Research Council / Centro di Eccellenza per l'integrazione di Tecniche di di Telerilevamento e Modellistica Numerica per la Previsione di Eventi Meteorologici Severi, Department of Physics, University of L'Aquila, Italy; Edoardo Gerdaldi, Institute of Methodologies for Environmental Analysis - National Research Council, Italy; Saverio Teodosio Nilo, Institute of Methodologies for Environmental Analysis - National Research Council / School of Engineering, University of Basilicata, Italy; Elisabetta Ricciardelli, Filomena Romano, Mariassunta Viggiano, Institute of Methodologies for Environmental Analysis - National Research Council, Italy*

**TH1-R5.4: ESTIMATING THE TROPOSPHERIC WATER VAPOR CONTENT ALONG A TRANSMITTER-RECEIVER LINK: THE SWAMM PROJECT ..... 6018**

*Luca Facheris, University of Florence, Italy; Fabrizio Cuccoli, RaSS CNIT laboratory, Pisa, Italy; Ugo Cortesi, Samuele Del Bianco, Gianluca Di Natale, Giovanni Macelloni, CNR-IFAC, Italy; Samantha Melani, Alberto Ortolani, Luca Rovai, CNR - IBIMET, Italy*

**TH2-R5: AEROSOL AND PARTICULATE SENSING**

**TH2-R5.1: MAPPING SPECIATED AMBIENT PARTICULATE MATTER CONCENTRATIONS WITH THE MULTI-ANGLE IMAGER FOR AEROSOLS (MAIA) ..... 6022**

*David Diner, Kevin Burke, John Pearson, Feng Xu, Michael Garay, Olga Kalashnikova, Abigail Nastan, Jet Propulsion Laboratory, California Institute of Technology, United States; Yang Liu, Emory University, United States; Randall Martin, Dalhousie University, Canada; Jun Wang, University of Iowa, United States; Bart Ostro, University of California, United States; Sina Hasheminassab, South Coast Air Quality Management District, United States*

**TH2-R5.2: AEROSOL RETRIEVALS FROM DSCOVER MEASUREMENTS ..... 6026**

*Vijay Natraj, Jonathan Jiang, Jet Propulsion Laboratory, United States; Pushkar Kopparla, Yuk Yung, California Institute of Technology, United States; Adrian Doicu, Diego Loyola, German Aerospace Center (DLR), Germany*

**TH2-R5.3: AEROSOL PLUME CHARACTERISATION FROM MULTI-TEMPORAL ..... 6029  
HYPERSPECTRAL ANALYSIS**

*Pierre-Yves Foucher, Philippe Déliot, Laurent Poutier, ONERA, France; Olivier Duclaux, TOTAL/LQA, France; Valentin Raffort, Yelva Roustan, CEREENPC, France*

**TH2-R5.4: A 1-D RADIATIVE TRANSFER STUDY OF MINERAL DUST DURING ..... 6033  
CHARMEX/ADRIMED 2013 CAMPAIGN**

*María José Granados Muñoz, Michaël Sicard, Universitat Politècnica de Catalunya, Spain; Roberto Román, University of Valladolid, Spain; José Antonio Benavent-Oltra, University of Granada, Spain; Rubén Barragán, Universitat Politècnica de Catalunya, Spain; Gérard Brogniez, University of Lille, France; Cyrielle Denjean, CNRM, Centre National de la Recherche Météorologique, France; Lucas Alados-Arboledas, University of Granada, Spain; Constantino Muñoz Porcar, Alejandro Rodríguez Gómez, Adolfo Comerón, Universitat Politècnica de Catalunya, Spain*

**TH2-R5.5: FIRST FORECASTS OF AIRBORNE PLATANUS AND PINUS POLLEN IN ..... 6037  
CATALONIA, NE SPAIN: USE OF A GROUND-BASED LIDAR TO ESTIMATE THE MODEL SCORE**

*Michaël Sicard, Universitat Politècnica de Catalunya, Spain; Oriol Jorba, Barcelona Supercomputing Center, Spain; Rebeca Izquierdo, Marta Alarcón, Universitat Politècnica de Catalunya, Spain; Jordina Belmonte, Universitat Autònoma de Barcelona, Spain; Adolfo Comerón, Universitat Politècnica de Catalunya, Spain; Concepción De Linares, Universitat Autònoma de Barcelona, Spain; Jose Maria Baldasano, Universitat Politècnica de Catalunya, Spain*

**TH3-R5: NEW REMOTE SENSING TECHNIQUES AND METHODS FOR EXTREME WEATHER  
AND OCEAN EVENTS MONITORING I**

**TH3-R5.1: ON THE USE OF SAR IN STUDIES OF UPWELLING..... 6041**  
*Werner Alpers, University of Hamburg, Germany*

**TH3-R5.2: A STUDY OF BOUNDARY LAYER ROLLS UNDER VARIOUS STORM ..... 6045  
CONDITIONS**

*Lanqing Huang, Shanghai Jiao Tong University, Shanghai Key Laboratory of Intelligent Sensing and Recognition, China; Xiaofeng Li, GST, National Oceanic and Atmospheric Administration/Satellite and Information Service, United States; Bin Liu, Shanghai Jiao Tong University, Shanghai Key Laboratory of Intelligent Sensing and Recognition, China; Jun A Zhang, National Oceanic and Atmospheric Administration/Atlantic Oceanographic and Meteorological Laboratory, Hurricane Research Division, Cooperative Institute for Marine and Atmospheric Studies, University of Miami, United States; Dongliang Shen, Shanghai Ocean University, China; Zenghui Zhang, Wenxian Yu, Shanghai Jiao Tong University, Shanghai Key Laboratory of Intelligent Sensing and Recognition, China*

**TH3-R5.3: DEVELOPMENT AND VALIDATION OF EMPIRICAL WAVE RETRIEVAL ..... 6049  
ALGORITHMS FOR SENTINEL-1 SYNTHETIC APERTURE RADAR IN HH-POLARIZATION**

*Weizeng Shao, Zhejiang Ocean University, China; Xiaofeng Li, National Oceanic and Atmospheric Administration (NOAA), United States; Zhanfeng Sun, Juncheng Zuo, Zhejiang Ocean University, China*

**TH3-R5.4: ON THE EFFECTS OF ACQUISITION PARAMETERS AND SURFACE PROPERTIES ..... 6053  
IN SEA OIL SEEP OBSERVATION BY MEANS OF HIGH-RESOLUTION SAR**

*Ferdinando Nunziata, Carina R. De Macedo, Andrea Buono, Università di Napoli Parthenope, Italy; Domenico Velotto, DLR - German Aerospace Center, Germany; Maurizio Migliaccio, Università di Napoli Parthenope, Italy*

**TH4-R5: NEW REMOTE SENSING TECHNIQUES AND METHODS FOR EXTREME WEATHER  
AND OCEAN EVENTS MONITORING II**

**TH4-R5.1: A NEW AZIMUTH CUT-OFF PROCEDURE TO RETRIEVE SIGNIFICANT WAVE ..... 6057  
HEIGHT UNDER HIGH WIND REGIMES**

*Valeria Corcione, Università degli Studi di Napoli Parthenope, Italy; Giuseppe Grieco, Koninklijk Nederlands Meteorologisch Instituut (KNMI), Netherlands; Marcos Portabella, Institut de Ciències del Mar (ICM-CSIC), Spain; Ferdinando Nunziata, Maurizio Migliaccio, Università degli Studi di Napoli Parthenope, Netherlands*

<b>TH4-R5.2: ASSIMILATION OF SAR-DERIVED SEA SURFACE WINDS INTO TYPHOON FORECAST MODEL</b>	<b>6060</b>
<i>Xiaofeng Yang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Valeria Corcione, Ferdinando Nunziata, Università degli Studi di Napoli Parthenope, Italy; Marcos Portabella, The institute of Marine Sciences, Spain; Maurizio Migliaccio, Università degli Studi di Napoli Parthenope, Italy</i>	
<b>TH4-R5.3: UPPER OCEAN RESPONSE TO SUPER TYPHOON SOUDELOR REVEALED BY DIFFERENT SST PRODUCTS</b>	<b>6063</b>
<i>Jue Ning, Qing Xu, Tao Wang, Shuangshang Zhang, Hohai University, China</i>	
<b>TH4-R5.4: ICEBERG DETECTION WITH L-BAND ALOS-2 DATA USING THE DUAL-POL RATIO ANOMALY DETECTOR</b>	<b>6067</b>
<i>Armando Marino, The University of Stirling, United Kingdom</i>	
<b>TH4-R5.5: PERFORMANCE ANALYSIS OF TIME-FREQUENCY TECHNIQUE FOR THE DETECTION OF SMALL SHIPS IN SAR IMAGERY AT LARGE GRAZING ANGLE AND MODERATE METEOCEAN CONDITIONS</b>	<b>6071</b>
<i>Domenico Velotto, Björn Tings, German Aerospace Center (DLR), Germany</i>	
<b>TH1-R6: MONITORING URBAN AREAS WITH SAR: NEW APPLICATIONS I</b>	
<b>TH1-R6.2: A SCATTERING POWER FACTORIZATION FRAMEWORK USING A GEODESIC DISTANCE IN RADAR POLARIMETRY</b>	<b>6075</b>
<i>Debashu Ratha, Avik Bhattacharya, Indian Institute of Technology Bombay, India; Alejandro C. Frery, Universidade Federal de Alagoas, Maceio, Brazil, Brazil</i>	
<b>TH1-R6.3: POSSIBILITIES AND LIMITS OF URBAN CHANGE DETECTION USING POLARIMETRIC SAR DATA</b>	<b>6079</b>
<i>Meiqin Che, Paolo Gamba, University of Pavia, Italy</i>	
<b>TH1-R6.4: URBAN FOOTPRINT FROM VHR SAR IMAGES: TOWARD A FULLY OPERATIONAL PROCEDURE</b>	<b>6083</b>
<i>Andrea Garzelli, Claudia Zopetti, University of Siena, Italy</i>	
<b>TH1-R6.5: FULL 3D DEM GENERATION IN URBAN AREA BY IMPROVING ESTIMATION FROM SAR TOMOGRAPHY</b>	<b>6087</b>
<i>Hossein Aghababae, Alessandra Budillon, Giampaolo Ferraioli, Vito Pascazio, Gilda Schirinzi, Università di Napoli Parthenope, Italy</i>	
<b>TH2-R6: MONITORING URBAN AREAS WITH SAR: NEW APPLICATIONS II</b>	
<b>TH2-R6.1: SAR TOMOGRAPHY USING NON-LOCAL SPARSE RECONSTRUCTION</b>	<b>6091</b>
<i>Yilei Shi, Technical University of Munich (TUM), Germany; Xiao Xiang Zhu, Richard Bamler, Technical University of Munich (TUM) / German Aerospace Center (DLR), Germany</i>	
<b>TH2-R6.2: SAR TOMOGRAPHY OF URBAN AREAS: 3D REGULARIZED INVERSION IN THE SCENE GEOMETRY</b>	<b>6095</b>
<i>Clément Rambour, Télécom ParisTech, France; Loïc Denis, UJM-Telecom Saint Etienne, CNRS, Institut d'Optique Graduate School, Laboratoire Hubert Curien UMR 5516, France; Florence Tupin, Jean-Marie Nicolas, Télécom ParisTech, France; Hélène Oriot, ONERA, France</i>	
<b>TH2-R6.3: SAR TOMOGRAPHY FOR SPATIO-TEMPORAL INVERSION OF COHERENT SCATTERERS IN VILLAGES OF ALPINE REGIONS</b>	<b>6099</b>
<i>Muhammad Adnan Siddique, ETH Zurich, Switzerland; Tazio Strozzi, GAMMA Remote Sensing AG, Switzerland; Irena Hajnsek, ETH Zurich / German Aerospace Center - DLR, Oberpfaffenhofen, Switzerland; Othmar Frey, ETH Zurich / Gamma Remote Sensing AG, Switzerland</i>	

<b>TH2-R6.4: DEFORMATION MONITORING USING PERSISTENT SCATTERER INTERFEROMETRY AND SENTINEL-1 DATA IN URBAN AREAS</b>	<b>6103</b>
<i>Nuria Devanthery, Michele Crosetto, Oriol Monserrat, Maria Cuevas-Gonzalez, Centre Tecnològic de Telecomunicacions de Catalunya, Spain; Bruno Crippa, University of Milan, Italy</i>	
<b>TH2-R6.5: DINSAR DATA INTEGRATION IN VULNERABILITY ANALYSES OF BUILDINGS EXPOSED TO SLOW-MOVING LANDSLIDES</b>	<b>6107</b>
<i>Gianfranco Nicodemo, Dario Peduto, Settimio Ferlisi, University of Salerno, Italy; Giovanni Gullà, National Research Council of Italy (CNR) - IRPI, Italy; Diego Reale, Gianfranco Fornaro, National Research Council of Italy (CNR) - IREA, Italy</i>	
<b>TH3-R6: FIELD SCALE SOIL MOISTURE RETRIEVAL I</b>	
<b>TH3-R6.1: FIELD-SCALE ASSESSMENT OF MULTI-SENSOR SOIL MOISTURE RETRIEVAL UNDER GRASSLAND</b>	<b>6111</b>
<i>Thomas Jagdhuber, German Aerospace Center (DLR), Germany; Benjamin Fersch, Karlsruhe Institute of Technology, Germany; Martin Schrön, Helmholtz Centre of Environmental Research GmbH - UFZ, Germany; Marc Jäger, German Aerospace Center (DLR), Germany; Kaupo Voormansik, Tartu Observatory, Estonia; Carlos López-Martínez, Luxembourg Institute of Science and Technology, Luxembourg</i>	
<b>TH3-R6.2: INVERSION OF PHYSICAL MODELS USING L-BAND AIRBORNE SAR DATA FOR SOIL MOISTURE ESTIMATES AT FIELD SCALE</b>	<b>6115</b>
<i>Seungbum Kim, Jet Propulsion Laboratory, United States; Huanting Huang, Univ Michigan, United States; Tienhao Liao, California Institute of Technology, United States</i>	
<b>TH3-R6.3: SOIL SURFACE MOISTURE ESTIMATION USING THE SYNERGY S1/S2 DATA</b>	<b>6119</b>
<i>Mehrez Zribi, CNRS, France; Nicolas Baghdadi, IRSTEA, France; Safa Bousbih, IRD/INAT, France; Mohammad El Hajj, IRSTEA, France; Qi Gao, CESBIO/ISARDSAT, France; Maria Jose Escorihuela, isardSAT, Spain; Sekhar Muddu, Indian Institute of Science, India</i>	
<b>TH3-R6.4: CROSS-COMPARISON OF THREE SAR SOIL MOISTURE RETRIEVAL ALGORITHMS USING SYNTHETIC AND EXPERIMENTAL DATA</b>	<b>6123</b>
<i>Anna Balenzano, Giuseppe Satalino, Francesco Paolo Lovergine, Francesco Mattia, Consiglio Nazionale delle Ricerche (CNR), Italy; Oliver Cartus, GAMMA Remote Sensing Research and Consulting AG, Switzerland; Malcolm J. M. Davidson, European Space Agency/ESTEC, Netherlands; Mohammad Al-Khaldi, Joel Johnson, The Ohio State University, Dept. of Elec. &amp; Comp. Eng, United States</i>	
<b>TH3-R6.5: CONTRIBUTIONS OF GEOPHYSICAL AND C-BAND SAR DATA FOR ESTIMATION OF FIELD SCALE SOIL MOISTURE</b>	<b>6127</b>
<i>Aaron Berg, Mitchell Krafczek, University of Guelph, Canada; Daniel Clewley, Plymouth Marine Laboratory, United Kingdom; Jane Whitcomb, University of Southern California, United States; Ruzbeh Akbar, Massachusetts Institute of Technology, United States; Mahta Moghaddam, University of Southern California, United States; Heather McNarin, Agriculture and Agri-Food Canada, Canada</i>	
<b>TH4-R6: FIELD SCALE SOIL MOISTURE RETRIEVAL II</b>	
<b>TH4-R6.1: FIELD OBSERVATIONS OF TEMPORAL VARIATIONS OF SURFACE SOIL MOISTURE: COMPARISON WITH INSAR SENTINEL-1 DATA</b>	<b>6131</b>
<i>Vasco Conde, João Catalao, University of Lisbon, Portugal; Giovanni Nico, Consiglio Nazionale delle Ricerche (CNR), Italy</i>	
<b>TH4-R6.2: RETRIEVAL OF FIELD-SCALE SOIL MOISTURE USING COMPACT POLARIMETRY: PREPARING FOR THE RADARSAT-CONSTELLATION</b>	<b>6135</b>
<i>Heather McNairn, Amine Merzouki, Agriculture and Agri-Food Canada, Canada; Yifeng Li, George Lampropoulos, A.U.G. Signals Ltd., Canada; Weikai Tan, AUG Signals Ltd., Canada; Jarrett Powers, Matthew Friesen, Agriculture and Agri-Food Canada, Canada</i>	

<b>TH4-R6.3: SOIL MOISTURE RETRIEVAL OVER AGRICULTURAL FIELDS FROM TIME SERIES MULTI-ANGULAR L-BAND RADAR DATA</b>	<b>6139</b>
<i>Liujun Zhu, Jeffrey Walker, Monash University, Australia; Leung Tsang, Huanting Huang, The University of Michigan, United States; Nan Ye, Christoph Rüdiger, Monash University, Australia</i>	
<b>TH4-R6.4: SENTINEL-1 &amp; SENTINEL-2 FOR SOIL MOISTURE RETRIEVAL AT FIELD SCALE</b>	<b>6143</b>
<i>Francesco Mattia, Anna Balenzano, Giuseppe Satalino, Francesco Paolo Lovergine, Consiglio Nazionale delle Ricerche (CNR), Italy; Jian Peng, Ludwig-Maximilian University of Munich, Germany; Urs Wegmuller, Oliver Cartus, GAMMA Remote Sensing, Switzerland; Malcolm J. M. Davidson, European Space Agency, Netherlands; Seungbum Kim, Jet Propulsion Laboratory, California Institute of Technology, United States; Joel Johnson, The Ohio State University, United States; Jeffrey Walker, Xiaoling Wu, Valentijn R. N. Pauwels, Monash University, Australia; Heather McNairn, Agriculture and Agri-Food Canada, Canada; Todd Caldwell, The University of Texas at Austin, United States; Michael H. Cosh, Tom Jackson, USDA-ARS, United States</i>	
<b>TH4-R6.5: PARAMETRIZATION OF A DIELECTRIC MIXTURE MODEL TO RETRIEVE SOIL MOISTURE AT FIELD SCALE USING SENTINEL-1 DATA AND IN SITU SOIL MOISTURE MEASUREMENTS</b>	<b>6147</b>
<i>Chiara Pratola, Victor Diego Navarro-Sanchez, Camille Pelloquin, Starlab, Spain</i>	
<b>TH1-R7: ESTIMATION AND REGRESSION IN HYPERSPECTRAL DATA II</b>	
<b>TH1-R7.1: INTRODUCING A FRAMEWORK OF SELF-ORGANIZING MAPS FOR REGRESSION OF SOIL MOISTURE WITH HYPERSPECTRAL DATA</b>	<b>6151</b>
<i>Felix M. Riese, Sina Keller, Karlsruhe Institute of Technology, Germany</i>	
<b>TH1-R7.2: LINEAR SPECTRAL UNMIXING VIA MATRIX FACTORIZATION: IDENTIFIABILITY CRITERIA FOR SPARSE ABUNDANCES</b>	<b>6155</b>
<i>Chia-Hsiang Lin, Jose Bioucas-Dias, University of Lisbon, Taiwan</i>	
<b>TH1-R7.3: FAST SAMPLE GENERATION WITH VARIATIONAL BAYESIAN FOR LIMITED DATA HYPERSPECTRAL IMAGE CLASSIFICATION</b>	<b>6159</b>
<i>AmirAbbas Davari, Hasan Can Özkan, Andreas Maier, Christian Riess, Friedrich-Alexander University, Germany</i>	
<b>TH1-R7.4: PATCH-BASED RESIDUAL NETWORKS FOR COMPRESSIVELY SENSED HYPERSPECTRAL IMAGES RESTRUCTION</b>	<b>6163</b>
<i>Xiaowei Hu, Yang Xu, Zhihui Wei, Hongyi Liu, Ling Qian, Nanjing University of Science and Technology, China</i>	
<b>TH2-R7: ESTIMATION AND REGRESSION METHODS</b>	
<b>TH2-R7.1: A NOVEL APPROACH FOR ABUNDANCE ESTIMATION USING DISCONTINUITY PRESERVING PRIOR</b>	<b>6167</b>
<i>Jignesh Patel, Manjunath Joshi, Dhirubhai Ambani Institute of Information and Communication Technology, India; Jignesh Bhatt, Indian Institute of Information Technology Vadodara, India</i>	
<b>TH2-R7.2: A VARIATIONAL MODE DECOMPOSITION BASED NOVEL PREPROCESSING METHOD FOR RESERVOIR CHARACTERIZATION USING SUPPORT VECTOR REGRESSION</b>	<b>6171</b>
<i>Soumi Chaki, Aurobinda Routray, William K. Mohanty, Indian Institute of Technology Kharagpur, India</i>	
<b>TH2-R7.3: DEEP GAUSSIAN PROCESSES FOR GEOPHYSICAL PARAMETER RETRIEVAL</b>	<b>6175</b>
<i>Daniel Heestermans Svendsen, University of Valencia, Spain; Pablo Morales-Álvarez, Rafael Molina, University of Granada, Spain; Gustau Camps-Valls, University of Valencia, Spain</i>	
<b>TH2-R7.4: A SIMULATION BASED APPROACH TO ESTIMATING THE THREE DIMENSIONAL STRUCTURE OF THE HARVARD FOREST WITH MULTI-MODAL REMOTE SENSING</b>	<b>6179</b>
<i>Michael Benson, Leland Pierce, Kamal Sarabandi, University of Michigan, United States</i>	

**TH2-R7.5: A FAST PARAMETRIC MODEL OF ESTIMATING ATMOSPHERIC PARAMETERS FOR ..... 6183  
LANDSAT 8 THERMAL INFRARED SENSOR**

*Hua Wu, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China; Li Ni, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Zhao-Liang Li, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China*

**TH3-R7: SEGMENTATION**

**TH3-R7.1: SEMANTIC SEGMENTATION FOR URBAN PLANNING MAPS BASED ON U-NET ..... 6187**

*Zhiling Guo, Hiroaki Shengoku, Guangming Wu, Qi Chen, Wei Yuan, Xiaodan Shi, Xiaowei Shao, Yongwei Xu, Ryosuke Shibasaki, University of Tokyo, Japan*

**TH3-R7.2: SEGMENTATION OF IMBALANCED CLASSES IN SATELLITE IMAGERY USING ..... 6191  
ADAPTIVE UNCERTAINTY WEIGHTED CLASS LOSS**

*Benjamin Bischke, Patrick Helber, Damian Borth, Andreas Dengel, German Research Center for Artificial Intelligence, Germany*

**TH3-R7.3: SUPERPIXEL SEGMENTATION WITH BOUNDARY CONSTRAINTS FOR ..... 6195  
POLARIMETRIC SAR IMAGES**

*Huiping Lin, Junliang Bao, Tsinghua University, China; Junjun Yin, University of Science and Technology Beijing, China; Jian Yang, Tsinghua University, China*

**TH3-R7.4: SUPERPIXEL CONTEXT DESCRIPTION BASED ON VISUAL WORDS ..... 6199  
CO-OCCURRENCE MATRIX**

*Tiago M. H. C. Santana, Universidade Federal de Minas Gerais, Brazil; Ricardo da S. Torres, University of Campinas, Brazil; Jefersson Alex dos Santos, Universidade Federal de Minas Gerais, Brazil*

**TH3-R7.5: CLASS SELECTION METHODS FOR LAND COVER MAPPING WITHOUT ..... 6203  
REFERENCE DATA OF THE CORRESPONDING PERIOD**

*Benjamin Tardy, Jordi Inglada, CESBIO, France; Julien Michel, CNES, France*

**TH4-R7: DATA FUSION AND MULTIMODALITY II**

**TH4-R7.1: INTEGRATION OF WORLDVIEW-2 AND LIDAR DATA TO MAP A SUBTROPICAL .....6207  
FOREST AREA: COMPARISON OF MACHINE LEARNING ALGORITHMS**

*Camile Sothe, Cláudia Maria de Almeida, National Institute for Space Research - INPE, Brazil; Marcos Benedito Schimalski, Veraldo Liesenberg, Santa Catarina State University, Brazil*

**TH4-R7.2: CLASSIFICATION OF ACTIVE MICROWAVE AND PASSIVE OPTICAL DATA BASED ..... 6211  
ON BAYESIAN THEORY AND MRF**

*Yongmin Xu, National Quality Inspection and Testing Center for Surveying and Mapping Products, China; Fan Yu, Chinese Academy of Surveying and Mapping, China; Yousong Zhao, Yu Dang, National Quality Inspection and Testing Center for Surveying and Mapping Products, China*

**TH4-R7.3: DEEP GENERATIVE MATCHING NETWORK FOR OPTICAL AND SAR IMAGE ..... 6215  
REGISTRATION**

*Dou Quan, Shuang Wang, Xuefeng Liang, Ruoqing Wang, Shuai Fang, Biao Hou, Licheng Jiao, Key Laboratory of Intelligent Perception and Image Understanding of Ministry of Education, School of Artificial Intelligence, Xidian University, China*

**TH4-R7.4: DEEP SEMANTIC SEGMENTATION OF AERIAL IMAGERY BASED ON ..... 6219  
MULTI-MODAL DATA**

*Kaiqiang Chen, Kun Fu, Xian Sun, Chinese Academy of Sciences, China; Michael Weinmann, University of Bonn, Germany; Stefan Hinz, Boris Jutzi, Martin Weinmann, Karlsruhe Institute of Technology, Germany*



## **TH1-R8: MONITORING AND UNDERSTANDING CRYOSPHERE DYNAMICS AT DIFFERENT SCALES I**

### **TH1-R8.1: SNOW COVER MONITORING IN HARDANGERVIDDA AND SIERRA NEVADA ..... 6227 PROTECTED AREAS BY USING SENTINEL-1 TIME SERIES**

*Chiara Pratola, Victor Diego Navarro-Sanchez, Starlab, Spain*

### **TH1-R8.2: COSMO SKYMED IMAGES FOR THE MONITORING OF CRYOSPHERE IN ..... 6231 ALPINE AREAS**

*Simone Pettinato, Simonetta Paloscia, Emanuele Santi, IFAC-CNR, Italy; Claudia Notarnicola, Mattia Callegari, Carlo Marin, EURAC, Italy*

### **TH1-R8.3: COMBINING REMOTE SENSING AND TERRESTRIAL PHOTOGRAPHY IN A ..... 6235 SNOWMELT MODELING FRAMEWORK TO RETRIEVE SNOW EVOLUTION IN A SEMI- ARID REGION**

*María José Polo, Javier Herrero, University of Cordoba, Spain; Rafael Pimentel, Swedish Meteorology and Hydrology Institute, Sweden; María José Pérez-Palazón, Ana Gilabert, Pedro Torralbo, University of Cordoba, Spain*

### **TH1-R8.4: INTEGRATION OF REMOTE SENSING WITH A HYDROCLIMATOLOGICAL ..... 6239 MODEL FOR AN IMPROVED MONITORING OF ALPINE GLACIERS**

*Mattia Callegari, Carlo Marin, EURAC Research, Italy; Daniel Günther, University of Innsbruck, Austria; Philipp Rastner, University of Zürich, Switzerland; Lorenzo Bruzzone, Begum Demir, University of Trento, Italy; Thomas Marke, Ulrich Strasser, University of Innsbruck, Austria; Marc Zebisch, Claudia Notarnicola, EURAC Research, Italy*

### **TH1-R8.5: TERRESTRIAL RADAR INTERFEROMETRY TO MONITOR GLACIERS WITH ..... 6243 COMPLEX ATMOSPHERIC SCREEN**

*Guido Luzzi, Centre Tecnològic de Telecomunicacions de Catalunya, Spain; Niccolò Dematteis, Research Institute for Hydro-Geological Protection, National Council of Research of Italy, Italy; Francesco Zucca, University of Pavia, Italy; Oriol Monserrat, Centre Tecnològic de Telecomunicacions de Catalunya, Spain; Daniele Giordan, Research Institute for Hydro-Geological Protection, National Council of Research of Italy, Italy; Juan Ignacio Lopez Moreno, Consejo Superior de Investigaciones Científicas (CSIC), Spain*

## **TH2-R8: MONITORING AND UNDERSTANDING CRYOSPHERE DYNAMICS AT DIFFERENT SCALES II**

### **TH2-R8.1: A NOVEL DATA FUSION TECHNIQUE FOR SNOW PARAMETER RETRIEVAL..... 6247**

*Ludovica De Gregorio, Mattia Callegari, Carlo Marin, Marc Zebisch, EURAC Research, Italy; Lorenzo Bruzzone, Begum Demir, University of Trento, Italy; Ulrich Strasser, Daniel Günther, Thomas Marke, University of Innsbruck, Italy; Claudia Notarnicola, EURAC Research, Italy*

### **TH2-R8.2: THE PAN-EUROPEAN YEARLY SNOW MELT-OFF DAY DERIVED FROM ..... 6251 OPTICAL AND MICROWAVE RADIOMETER DATA**

*Sari Metsämäki, Kristin Böttcher, Finnish Environment Institute, Finland; Jouni Pulliainen, Kari Luojus, Juval Cohen, Matias Takala, Finnish Meteorological Institute, Finland; Olli-Pekka Mattila, Finnish Environment Institute, Finland; Gabriele Schwaizer, ENVEO Environmental Earth Observation IT GmbH, Austria; Chris Derksen, Environment and Climate Change Canada, Canada; Sampsa Koponen, Finnish Environment Institute, Finland*

### **TH2-R8.3: ASSESSMENT OF SEASONAL SNOW COVER MASS IN NORTHERN ..... 6255 HEMISPHERE DURING THE SATELLITE-ERA**

*Kari Luojus, Juval Cohen, Jaakko Ikonen, Jouni Pulliainen, Matias Takala, Katriina Veijola, Juha Lemmetyinen, Finnish Meteorological Institute, Finland; Thomas Nagler, ENVEO IT GmbH, Austria; Chris Derksen, Ross Brown, Environment and Climate Change Canada, Canada*

### **TH2-R8.4: KU AND X-BAND SCATTEROMETER OBSERVATIONS OF DEEP SNOW AT ..... 6259 SNOWEX 2017: POLARIMETRIC RESPONSES TO MICROSTRUCTURE CONTROLS**

*Richard Kelly, Aaron Thompson, University of Waterloo, Canada*

## **TH3-R8: SEASONAL SNOW GROUND-BASED REMOTE SENSING I**

### **TH3-R8.1: SEASON -LENGTH OBSERVATIONS OF ACTIVE AND PASSIVE MICROWAVE SIGNATURES OF SNOW COVER IN A BOREAL FOREST ENVIRONMENT ..... 6262**

*Juha Lemmetyinen, Anna Kontu, Leena Leppänen, Juho Vehviläinen, Risto Vehmas, Finnish Meteorological Institute, Finland; Qinghuan Li, University of Waterloo, Canada; Kimmo Rautiainen, Jouni Pulliainen, Finnish Meteorological Institute, Finland*

### **TH3-R8.2: NASA SNOWEX'17 IN SITU MEASUREMENTS AND GROUND-BASED REMOTE SENSING ..... 6266**

*Ludovic Brucker, NASA Goddard Space Flight Center, United States; Christopher Hiemstra, Army Corps of Engineers, Engineering Research and Development Center (ERDC), United States; Hans-Peter Marshall, Boise Sate University, Department of Geosciences, United States; Kelly Elder, US Forest Service (USDA), United States; Roger De Roo, Mohammad Mousavis, University of Michigan, United States; Larry Bliven, NASA Wallops Flight Facility, United States; Walter Peterson, NASA Marshall Space Flight Center, United States; Jeffrey Deems, NSIDC, United States; Peter Gadowski, Army Corps of Engineers, Engineering Research and Development Center (ERDC), United States; Arthur Gelvin, CRREL, United States; Lucas Spaete, Boise Sate University, United States; Theodore Barnhart, University of Colorado, United States; Ty Brandt, University of California, Santa Barbara, United States; John Burkhart, University of Oslo, Norway; Christopher Crawford, USGS, United States; Tri Datta, Columbia University, United States; Havard Erikstrod, University of Oslo, Norway; Nancy Glenn, Boise Sate University, United States; Katherine Hale, University of Colorado, United States; Brent Holben, NASA Goddard Space Flight Center, United States; Paul Houser, George Mason University, United States; Keith Jennings, University of Colorado, United States; Richard Kelly, University of Waterloo, Canada; Jason Kraft, NASA Goddard Space Flight Center, United States; Alexandre Langlois, University of Sherbrooke, Canada; Dan McGrath, Colorado State University, United States; Chelsea Merriman, Boise Sate University, United States; Noah Molotch, University of Colorado, United States; Anne Nolin, Oregon State Uni., United States; Chris Polashenski, Dartmouth College, United States; Mark Raleigh, Karl Rittger, University of Colorado, United States; Chago Rodriguez, Boise Sate University, United States; Alexandre Roy, University of Sherbrooke, Canada; S. McKenzie Skiles, Utah State Uni., United States; Eric Small, University of Colorado, United States; Marco Tedesco, Columbia University, United States; Christopher Tennant, Berkeley, United States; Aaron Thompson, University of Waterloo, Canada; Zach Uhlmann, Boise Sate University, United States; Ryan Webb, University of Colorado, United States; Matt Wingo, NASA Marshall Space Flight Center, United States*

### **TH3-R8.3: MULTI-FREQUENCY TOMOGRAPHY RADAR OBSERVATIONS OF SNOW STRATIGRAPHY AT FRASER DURING SNOWEX ..... 6269**

*Xiaolan Xu, Chad Baldi, Jan-Willem De Bleser, Yang Lei, Simon Yueh, Daniel Esteban-Fernandez, Jet Propulsion Laboratory, United States*

### **TH3-R8.4: SNOWEX 2017 IN-SITU PASSIVE MICROWAVE MEASUREMENTS: ANALYSIS OF WET SNOW MICROWAVE EMISSION ..... 6273**

*Alexandre Roy, Université de Montréal, Canada; Alexandre Langlois, Caroline Dolant, Université de Sherbrooke, Canada; Ludovic Brucker, NASA Goddard Space Flight Center, United States; Alain Royer, Université de Sherbrooke, Canada*

### **TH3-R8.5: A NEW ACTIVE/PASSIVE MICROWAVE RADIATIVE TRANSFER MODEL FOR SNOW (SMRT) TO FOSTER INTER-COMPARISONS OF MODEL COMPONENTS ..... 6276**

*Ghislain Picard, Université Grenoble Alpes, France; Melody Sandells, CORES Science and Engineering Limited, United Kingdom; Henning Löwe, WSL Institute for Snow and Avalanche Research SLF, Switzerland*

## **TH4-R8: SEASONAL SNOW GROUND-BASED REMOTE SENSING II**

### **TH4-R8.1: EXPERIMENTAL RESULTS OF SNOW MEASUREMENT USING P-BAND SIGNALS OF OPPORTUNITY ..... 6280**

*Rashmi Shah, Simon Yueh, Xiaolan Xu, Jet Propulsion Laboratory, California Institute of Technology, United States; Kelly Elder, USDA Forest Service, United States; Huanting Huang, Leung Tsang, University of Michigan, United States*

### **TH4-R8.2: RESOLVING THE INFLUENCE OF FOREST-CANOPY STRUCTURE ON SNOW DEPTH DISTRIBUTIONS WITH TERRESTRIAL LASER SCANNING ..... 6284**

*Zach Uhlmann, Nancy Glenn, Lucas Spaete, Boise Sate University, United States; Christopher Hiemstra, US Army Corps of Engineers, United States; Christopher Tennant, University of California, Berkeley, United States; James McNamara, Boise Sate University, United States*

**TH4-R8.3: GROUND VALIDATION OF AIRBORNE SNOW OBSERVATORY SPECTRAL AND ..... 6287  
BROADBAND SNOW ALBEDO DURING SNOWEX '17**

*S. McKenzie Skiles, Jewell Lund, University of Utah, United States; Thomas H. Painter, NASA Jet Propulsion Laboratory, United States*

**TH4-R8.4: SNOW-COVERED AREA USING MACHINE LEARNING TECHNIQUES ..... 6291**

*Charles Gatebe, USRA & NASA GSFC, United States; Wei Li, Nan Chen, Yongzhen Fan, Stevens Institute of Technology, United States; Rajesh Poudyal, SSAI & NASA/GSFC, United States; Ludovic Brucker, USRA & NASA GSFC, United States; Knut Stammes, Stevens Institute of Technology, United States*

**TH4-R8.5: SNOW ESTIMATION UNDER A VEGETATION GRADIENT USING SATELLITE ..... 6294  
REMOTE SENSING DATA AND LAND SURFACE MODELING DURING SNOWEX 2017**

*Gabrielle De Lannoy, Anouck Vanrykel, Hans Lievens, KU Leuven (University of Leuven), Belgium; Edward Kim, Ludovic Brucker, NASA, United States*

**TH1-R9: INSTRUMENT TECHNOLOGIES TO ENABLE SMALL SATELLITE REMOTE  
SENSING MISSIONS I**

**TH1-R9.1: THE RADAR-IN-A-CUBESAT (RAINCUBE) AND MEASUREMENT RESULTS. .... 6297**

*Eva Peral, Shannon Statham, Eastwood Im, Simone Tanelli, Travis Imken, Douglas Price, Jonathan Sauder, Nacer Chahat, Jet Propulsion Laboratory, United States; Austin Williams, Tyvak Nano-Satellite Systems, Inc, United States*

**TH1-R9.2: AN EARTH VENTURE IN-SPACE TECHNOLOGY DEMONSTRATION MISSION ..... 6301  
FOR TEMPORAL EXPERIMENT FOR STORMS AND TROPICAL SYSTEMS (TEMPEST)**

*Steven C. Reising, Colorado State University, United States; Todd C. Gaier, Sharmila Padmanabhan, Boon H. Lim, Cate Heneghan, California Institute of Technology, United States; Christian D. Kummerow, Wesley Berg, V. Chandrasekar, C. Radhakrishnan, Colorado State University, United States; Shannon Brown, California Institute of Technology, United States; John Carvo, Matthew Pallas, Blue Canyon Technologies, United States*

**TH1-R9.3: THE HARP HYPERANGULAR IMAGING POLARIMETER AND THE NEED FOR ..... 6304  
SMALL SATELLITE PAYLOADS WITH HIGH SCIENCE PAYOFF FOR EARTH SCIENCE  
REMOTE SENSING**

*J. Vanderlei Martins, Roberto Fernandez-Borda, Brent McBride, Lorraine Remer, University of Maryland, Baltimore County, United States; Henrique Barbosa, University of Maryland, Baltimore County and University of Sao Paulo, United States*

**TH1-R9.4: CUBESAT RADIOMETER RADIO FREQUENCY INTERFERENCE TECHNOLOGY ..... 6308  
(CUBERT) VALIDATION MISSION: ENABLING FUTURE RESOURCE-CONSTRAINED  
SCIENCE MISSIONS**

*Sidharth Misra, Shannon Brown, Robert Jarnot, Carl Felten, Rudi Bendig, Jet Propulsion Laboratory, California Institute of Technology, United States; Jonathan Kocz, California Institute of Technology, United States; Christa McKelvey, Christopher Ball, Chi-Chih Chen, Andrew O'Brien, Graeme Smith, Mark Andrews, J. Landon Garry, Joel Johnson, Ohio State University, United States; Priscilla Mohammed, Jared Lucey, Kevin Horgan, Quenton Bonds, Carlos Duran-Aviles, Michael Solly, Jinzheng Peng, Jeffrey Piepmeier, NASA Goddard Space Flight Center, United States; Doug Laczowski, Matthew Pallas, Ervin Krauss, Blue Canyon Technologies, United States*

**TH1-R9.5: DEVELOPMENT OF THE MULTI-ANGLE STRATOSPHERIC AEROSOL ..... 6312  
RADIOMETER (MASTAR)**

*Matthew DeLand, Science Systems and Applications, Inc., United States; Peter Colarco, NASA Goddard Space Flight Center, United States; Matthew Kowalewski, Universities Space Research Association, United States; Nick Gorkavyi, Science Systems and Applications, Inc, United States; Luis Ramos-Izquierdo, NASA Goddard Space Flight Center, United States*

**TH2-R9: INSTRUMENT TECHNOLOGIES TO ENABLE SMALL SATELLITE REMOTE  
SENSING MISSIONS II**

**TH2-R9.1: PRELAUNCH PERFORMANCE OF THE 118.75 GHZ POLARCUBE 3U CUBESAT ..... 6316  
TEMPERATURE SOUNDING RADIOMETER**

*Lavanya Periasamy, Albin J. Gasiewski, University of Colorado Boulder, United States*

<b>TH2-R9.2: NANOSATELLITE HIGH-PRECISION MAGNETIC MISSIONS ENABLED BY ADVANCES IN A STAND-ALONE SCALAR/VECTOR ABSOLUTE MAGNETOMETER</b>	<b>6320</b>
<i>Gauthier Hulot, Institut de Physique du Globe de Paris, Sorbonne Paris Cité, Université Paris Diderot, France; Jean-Michel Léger, CEA, France; Pierre Vigneron, Institut de Physique du Globe de Paris, Sorbonne Paris Cité, Université Paris Diderot, France; Thomas Jager, François Bertrand, CEA, France; Pierdavide Coïsson, Pierre Deram, Institut de Physique du Globe de Paris, Sorbonne Paris Cité, Université Paris Diderot, France; Axel Boness, CEA, France; Linda Tomasini, Benoit Faure, Centre National d'Etudes Spatiales, France</i>	
<b>TH2-R9.3: DEVELOPMENTS BY TNO FOR SMALL ATMOSPHERIC CHEMISTRY SPACE INSTRUMENTS: CURRENT STATUS AND FUTURE PROSPECTS</b>	<b>6324</b>
<i>Andrew Court, Bryan de Goeij, Oana van der Togt, Ad Verlaan, TNO, Netherlands</i>	
<b>TH2-R9.4: HYPERSPECTRAL DATA PROCESSING: AN OPPORTUNITY FOR END-TO-END PROCESSING</b>	<b>6328</b>
<i>Marge Cole, SGT, Inc., United States; Dr. Anne Wilson, LASP, United States; Michael Little, NASA Earth Science Technology Office, United States</i>	
<b>TH3-R9: INNOVATIVE TECHNOLOGIES TO ENABLE LAND IMAGING FROM SMALL SATELLITES</b>	
<b>TH3-R9.1: REMOTE SENSING USING VNIR/SWIR DISPERSIVE IMAGING SPECTROMETERS: HISTORICAL DEVELOPMENT, CURRENT STATE-OF-THE-ART, AND FUTURE TRENDS</b>	<b>6332</b>
<i>Ronald Lockwood, Michael Chrisp, Lalitha Parameswaran, MIT Lincoln Laboratory, United States; Kurtis Thome, Sachidananda Babu, NASA Goddard Space Flight Center, United States</i>	
<b>TH3-R9.2: LANDSAT MISSIONS TO SUSTAINABLE LAND IMAGING TECHNOLOGY PROGRAM</b>	<b>6336</b>
<i>Nahal Kardan, Prime Science &amp; Technology, Inc., United States; Philip Dabney, NASA, United States; Sachidananda Babu, NASA ESTO, United States</i>	
<b>TH3-R9.3: DEVELOPMENT OF HIGH PERFORMANCE DETECTOR TECHNOLOGY FOR UV AND NEAR IR APPLICATIONS</b>	<b>6338</b>
<i>Ashok Sood, John Zeller, Magnolia Optical Technologies Inc., United States; Parminder Ghuman, Sachidananda Babu, NASA Earth Science Technology Office, United States; Nibir Dhar, U.S. Army Night Vision and Electronic Sensors Directorate, Fort Belvoir, VA 22060, United States</i>	
<b>TH3-R9.4: HIGH DYNAMIC RANGE INFRARED SENSORS FOR REMOTE SENSING APPLICATIONS</b>	<b>6342</b>
<i>Sarath Gunapala, David Ting, Alexander Soibel, Arezou Khoshakhlagh, Sam Keo, Sir Rafol, Cory Hill, Anita Fisher, Edward Luong, John Liu, Jason Mumolo, Brian Pepper, NASA Jet Propulsion Laboratory, United States; Kwong-Kit Choi, Army Research Laboratory, United States; Arvind D'souza, Christopher Masterjohn, DRS Network &amp; Imaging Systems, Inc., United States</i>	
<b>TH3-R9.5: ADVANCED TECHNOLOGY LAND IMAGING SPECTRORADIOMETER (ATLIS)</b>	<b>6346</b>
<i>Jeffery Puschell, Raytheon Space and Airborne Systems, United States</i>	
<b>TH4-R9: SAR CALIBRATION</b>	
<b>TH4-R9.1: POLARIMETRIC SAR DISTORTIONS INDUCED BY TOPOGRAPHY: AN ANALYTICAL FORMULATION FOR COMPENSATION IN THE IMAGING DOMAIN</b>	<b>6349</b>
<i>Pasquale Imperatore, Antonio Pepe, Riccardo Lanari, National Research Council of Italy (CNR), Italy</i>	
<b>TH4-R9.2: ON POLINSAR SYSTEM REQUIREMENTS FOR FOREST HEIGHT MAPPING</b>	<b>6353</b>
<i>Xiao Wang, Feng Xu, Ya-Qiu Jin, Fudan University, China</i>	

<b>TH4-R9.3: RECENT FINDINGS ON THE SENTINEL-1 GEOLOCATION ACCURACY USING THE AUSTRALIAN CORNER REFLECTOR ARRAY</b>	<b>6356</b>
<i>Christoph Gisinger, Ulrich Balss, Helko Breit, German Aerospace Center (DLR), Germany; Adrian Schubert, University of Zürich (UZH), Switzerland; Matthew Garthwaite, Geoscience Australia, Australia; David Small, University of Zürich (UZH), Switzerland; Thomas Gruber, Technical University of Munich (TUM), Germany; Michael Eineder, Thomas Fritz, German Aerospace Center (DLR), Germany; Nuno Miranda, European Space Agency/ESRIN, Germany</i>	
<b>TH4-R9.4: SENTINEL-1 RADIOMETRIC ACCURACY ENHANCEMENT EXPLOITING ANTENNA MODEL REFINEMENT TECHNIQUE</b>	<b>6360</b>
<i>Andrea Recchia, Davide Giudici, Riccardo Piantanida, Aresys s.r.l., Italy; Nuno Miranda, European Space Agency, Italy; Andrea Monti-Guarnieri, Politecnico di Milano, Italy</i>	
<b>TH4-R9.5: AN EXPERIMENTAL CAR-BORNE SAR SYSTEM: MEASUREMENT SETUP AND POSITIONING ERROR ANALYSIS</b>	<b>6364</b>
<i>Roberto Coscione, Irena Hajnsek, Othmar Frey, Swiss Federal Institute of Technology ETHZ, Switzerland</i>	
 <b>TH1-R10: TARGET DETECTION IV</b>	
<b>TH1-R10.1: ANOMALY PRESERVING CONTENT-AWARE HYPERSPECTRAL IMAGE SIZE REDUCTION</b>	<b>6368</b>
<i>Alp Ertürk, Sarp Ertürk, Kocaeli University, Turkey</i>	
<b>TH1-R10.2: HYPERSPECTRAL ANOMALY DETECTION USING COMPRESSED COLUMNWISE ROBUST PRINCIPAL COMPONENT ANALYSIS</b>	<b>6372</b>
<i>Weiwei Sun, Gang Yang, Jialin Li, Dianfa Zhang, Ningbo University, China</i>	
<b>TH1-R10.4: SENSE-THROUGH-FOLIAGE TARGET DETECTION BASED ON SPARSE REPRESENTATION AND GAUSSIAN MIXTURE MODELS</b>	<b>6376</b>
<i>Wenling Xue, Ting Jiang, Beijing University of Posts and Telecommunications, China</i>	
<b>TH1-R10.5: HYPER-LAPLACIAN REGULARIZED LOW-RANK TENSOR DECOMPOSITION FOR HYPERSPECTRAL ANOMALY DETECTION</b>	<b>6380</b>
<i>Xiaoxiao Ma, Xiangrong Zhang, Ning Huyan, Xu Tang, Biao Hou, Licheng Jiao, Xidian University, China</i>	
 <b>TH2-R10: SPECTRAL UNMIXING TECHNIQUES IV</b>	
<b>TH2-R10.1: SUPERPIXEL-BASED HYPERSPECTRAL UNMIXING WITH REGIONAL SEGMENTATION</b>	<b>6384</b>
<i>Mohammed Alkhatib, Abu Dhabi Polytechnic, United Arab Emirates; Miguel Velez-Reyes, University of Texas at El Paso, United States</i>	
<b>TH2-R10.2: UNSUPERVISED HYPERSPECTRAL UNMIXING VIA KERNELIZED CORRELATIONS</b>	<b>6388</b>
<i>Kazi Tanzeem Shahid, Ioannis Dimitrios Schizas, The University of Texas at Arlington, United States</i>	
<b>TH2-R10.3: SUPERPIXEL-BASED NONNEGATIVE TENSOR FACTORIZATION FOR HYPERSPECTRAL UNMIXING</b>	<b>6392</b>
<i>Fengchao Xiong, Jingzhou Chen, Zhejiang University, China; Jun Zhou, Griffith University, Australia; Yuntao Qian, Zhejiang University, China</i>	
<b>TH2-R10.5: DEEP AUTO-ENCODER NETWORK FOR HYPERSPECTRAL IMAGE UNMIXING</b>	<b>6400</b>
<i>Yuanchao Su, Jun Li, Sun Yat-sen University, China; Antonio Plaza, University of Extremadura, Spain; Andrea Marinoni, Paolo Gamba, Università degli Studi di Pavia, Italy; Yuancheng Huang, College of Geomatics, China</i>	

### TH3-R10: GEOGRAPHIC INFORMATION SCIENCE IV

**TH3-R10.1: POLYGONIZATION OF BINARY CLASSIFICATION MAPS USING MESH ..... 6404**  
**APPROXIMATION WITH RIGHT ANGLE REGULARITY**

*Onur Tasar, Emmanuel Maggiori, Pierre Alliez, Yuliya Tarabalka, INRIA, France*

**TH3-R10.2: CLASSIFICATION OF SETTLEMENT TYPES FROM TWEETS USING LDA AND ..... 6408**  
**LSTM**

*Rong Huang, Technical University of Munich (TUM) / German Aerospace Center (DLR), Germany; Hannes Taubenböck, German Aerospace Center (DLR), Germany; Lichao Mou, Xiao Xiang Zhu, Technical University of Munich (TUM) / German Aerospace Center (DLR), Germany*

**TH3-R10.3: A COMPARISON OF MACHINE LEARNING TECHNIQUES TO EXTRACT HUMAN ..... 6412**  
**SETTLEMENTS FROM HIGH RESOLUTION IMAGERY**

*Jeanette Weaver, Brian Moore, Andrew Reith, Jacob McKee, Dalton Lunga, Oak Ridge National Laboratory, United States*

**TH3-R10.4: VIRTUALOT - A FRAMEWORK ENABLING REAL-TIME COORDINATE ..... 6416**  
**TRANSFORMATION & OCCLUSION SENSITIVE TRACKING USING UAS PRODUCTS, DEEP**  
**LEARNING OBJECT DETECTION & TRADITIONAL OBJECT TRACKING TECHNIQUES**

*Bradley J. Koskovich, Maryam Rahnemoonfar, Michael Starek, Texas A&M University-Corpus Christi, United States*

**TH3-R10.5: CLASSIFYING TERRESTRIAL BASED FOREST PHOTOGRAPHY WITH ..... 6420**  
**GEOGRAPHIC INFORMATION SYSTEMS TO MODEL SIGNAL LOSS**

*William Wright, United States Military Academy, United States; Benjamin Wilkinson, Wendell Cropper, University of Florida, United States; Christopher Oxendine, United States Military Academy, United States*

### TH4-R10: GEOGRAPHIC INFORMATION SCIENCE V

**TH4-R10.1: MULTI-OBSERVATION BLOCK ADJUSTMENT BY RATIONAL FUNCTION ..... 6424**  
**MODEL WITHOUT GROUND CONTROL POINTS**

*Xinghui Yao, Feng Wang, Hongjian You, University of Chinese Academy of Sciences, China*

**TH4-R10.2: A GRID-BASED IDENTIFICATION CODE FOR BUILDINGS: PERSPECTIVE ..... 6428**  
**FROM SPATIAL FAULT TOLERANCE**

*Kun Qi, Weixin Zhai, Yi'na Hu, Peking University, China; Tao Hu, Huazhong Agricultural University, China; Mengke Yang, Chengqi Cheng, Peking University, China*

**TH4-R10.4: IMPROVING SEVIRI BASED HOT SPOTS DETECTION BY USING MULTIPLE ..... 6436**  
**SIMULTANEOUS OBSERVATIONS**

*Giovanni Laneve, Sapienza Università di Roma, Italy; Giancarlo Santilli, Universidade de Brasília, Brazil; Roberto Luciani, Sapienza Università di Roma, Italy*

**TH4-R10.5: ANALYSIS OF SPATIO-TEMPORAL PATTERN EVOLUTION OF SSH IN ..... 6440**  
**ZHOUSHAN SEA AREA**

*Jiaoqi Fu, Chao Chen, Xu Lu, Zhejiang Ocean University, China*

### TH1-R11: RADIOMETRIC AND GEOMETRIC CALIBRATION

**TH1-R11.1: NEW RADCALNET SITE AT GOBABEB, NAMIBIA: INSTALLATION OF THE ..... 6444**  
**INSTRUMENTATION AND FIRST SATELLITE CALIBRATION RESULTS**

*Sébastien Marcq, Aimé Meygret, CNES, France; Marc Bouvet, European Space Agency, Netherlands; Nigel Fox, Claire Greenwell, Barry Scott, NPL, United Kingdom; Béatrice Berthelot, Magellium, France; Bruno Besson, CNES, France; Nicolas Guillemot, Thales Services, France; Bahaidin Damiri, CIMEL, France*

**TH1-R11.2: ASSESSMENT OF VIIRS GEOLOCATION AT SUBPIXEL LEVEL USING MODIS ..... 6448**  
**IMAGERY**

*Alexander Trishchenko, Canada Centre for Remote Sensing, Canada*

<b>TH1-R11.3: SPECTRALLY ADJUSTED SURFACE REFLECTANCE AND ITS DEPENDENCE WITH NDVI FOR PASSIVE OPTICAL SENSORS</b>	<b>6452</b>
<i>Jose Luis Villaescusa Nadal, Belen Franch, Jean-Claude Roger, Sergii Skakun, University of Maryland, United States; Eric Vermote, NASA, United States; Christopher Justice, University of Maryland, United States</i>	
<b>TH1-R11.4: THE DEVELOPMENT OF A STANDARDISED VALIDATION APPROACH FOR SURFACE REFLECTANCE DATA</b>	<b>6456</b>
<i>Cindy Ong, Timothy Malthus, Ian Lau, CSIRO, Australia; Medhavy Thankappan, Guy Byrne, Geoscience Australia, Australia</i>	
<b>TH1-R11.5: A SECOND VERSION OF THE RADIOMETRIC UNCERTAINTY TOOL FOR THE SENTINEL-2 MISSION</b>	<b>6460</b>
<i>Javier Gorroño, National Physical Laboratory, United Kingdom; Marco Peters, Norman Fomferra, Brockmann Consult, Germany; Nigel Fox, National Physical Laboratory, United Kingdom; Ferran Gascon, European Space Agency, Italy</i>	
<b>TH2-R11: UAV &amp; MULTI/HYPERSPECTRAL SENSORS</b>	
<b>TH2-R11.1: BRDF EFFECT ON THE ESTIMATION OF CANOPY CHLOROPHYLL CONTENT IN PADDY RICE FROM UAV-BASED HYPERSPECTRAL IMAGERY</b>	<b>6464</b>
<i>Dong Li, Hengbiao Zheng, Xiaqing Xu, Ning Lu, Xia Yao, Jiale Jiang, Xue Wang, Yongchao Tian, Yan Zhu, Weixing Cao, Tao Cheng, Nanjing Agricultural University, China</i>	
<b>TH2-R11.2: REFINING THE GEOMETRIC CALIBRATION OF A HIPERSPECTRAL FRAME CAMERA WITH PRELIMINARY BANDS COREGISTRATION</b>	<b>6468</b>
<i>Antonio Tommaselli, Lucas Santos, São Paulo State University - Unesp, Brazil; Raquel Oliveira, Eija Honkavaara, National Land Survey of Finland, Finnish Geospatial Research Institute (FGI), Finland</i>	
<b>TH2-R11.3: TOWARDS FAST 3D RECONSTRUCTION OF URBAN AREAS FROM AERIAL NADIR IMAGES FOR A NEAR REAL-TIME REMOTE SENSING SYSTEM</b>	<b>6472</b>
<i>Nayeli Espinosa, Andreas Lenz, Wolfgang Gross, Wolfgang Middelman, Fraunhofer Institute of Optronics, System Technologies and Image Exploitation (IOSB), Germany</i>	
<b>TH2-R11.4: TEXTURE CLASSIFICATION OF VERY HIGH RESOLUTION UAS IMAGERY USING A GRAPHICS PROCESSING UNIT</b>	<b>6476</b>
<i>Sathishkumar Samiappan, Mississippi State University, United States; Luan Casagrande, Gustavo Machado, Universidade Federal de Santa Catarina, Ararangua, SC, Brazil; Gray Turnage, Lee Hathcock, Robert Moorhead, John Ball, Mississippi State University, United States</i>	
<b>TH2-R11.5: CONTROL SYSTEM FOR A LIGHT AND SMALL PAN-TILT BASED ON MULTIROTOR UAV FOR AERIAL REMOTE SENSING APPLICATIONS</b>	<b>6480</b>
<i>Yating Li, XiangYang Zhou, Beihang University, China; Ruifang Yu, Institute of Geophysics, China Earthquake Administration, China</i>	
<b>TH3-R11: UAV &amp; AIRBORNE MICROWAVE SENSORS</b>	
<b>TH3-R11.1: FORWARD-LOOKING ANGULAR SUPER-RESOLUTION FOR MOVING RADAR PLATFORM WITH COMPLEX DECONVOLUTION</b>	<b>6484</b>
<i>Yang Wu, Yin Zhang, Deqing Mao, Yulin Huang, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
<b>TH3-R11.2: HINOTORI-X1 MISSION : X BAND WALR-SAR ONBOARD BOEING 737-200 AIRCRAFT</b>	<b>6488</b>
<i>Josaphat Tetuko Sri Sumantyo, Chiba University, Japan; K. Tsushima, R. Katoh, T. Kobori, Japan Radio Company, Japan; F.D. Sri Sumantyo, Universitas Bhayangkara Jakarta Raya, Indonesia; S. Gao, University of Kent, United Kingdom; E.T. Rahardjo, G. Wibisono, Universitas Indonesia, Indonesia; K. Sasmita, A. Mardianto, P. Edi, Tentara Nasional Indonesia Angkatan Udara, Indonesia; K. Ito, Chiba University, Japan</i>	

<b>TH3-R11.3: AIRSHIP BASED MIMO RADAR: ANALYSIS OF IMAGING AND INTERFEROMETRIC PERFORMANCES</b>	<b>6492</b>
<i>Weike Feng, Tohoku University, Japan; Giovanni Nico, Consiglio Nazionale delle Ricerche (CNR), Italy; Olimpia Masci, DIAN srl, Italy; Motoyuki Sato, Tohoku University, Japan</i>	
<b>TH3-R11.4: HIGH SPATIAL SOIL MOISTURE MAPPING USING SMALL UNMANNED AERIAL SYSTEM</b>	<b>6496</b>
<i>Eryan Dai, Aravind Venkitasubramony, Albin J. Gasiewski, University of Colorado Boulder, United States; Maciej Stachura, Jack Elston, Black Swift Technology, United States</i>	
<b>TH4-R11: GROUND BASED SYSTEMS II</b>	
<b>TH4-R11.1: FULLY POLARIMETRIC L-BAND BRIGHTNESS TEMPERATURE SIGNATURES OF AZIMUTHAL PERMITTIVITY PATTERNS – MEASUREMENTS AND MODEL SIMULATIONS</b>	<b>6500</b>
<i>Sten Schmidl Søjbjerg, Technical University of Denmark, Denmark; Moritz Link, Thomas Jagdhuber, German Aerospace Center (DLR), Germany; Carsten Montzka, François Jonard, Forschungszentrum Jülich, Germany; Stephan Dill, Markus Peichl, German Aerospace Center (DLR), Germany; Thomas Meyer, Forschungszentrum Jülich, Germany</i>	
<b>TH4-R11.2: GEOSTATISTICAL ANALYSIS AND MITIGATION OF ATMOSPHERIC PHASE SCREENS IN KU-BAND TERRESTRIAL RADAR INTERFEROMETRY</b>	<b>6504</b>
<i>Simone Baffelli, ETH Zurich, Switzerland; Othmar Frey, ETH Zurich / Gamma Remote Sensing AG, Switzerland; Irena Hajnsek, ETH Zurich / German Aerospace Center - DLR, Oberpfaffenhofen, Switzerland</i>	
<b>TH4-R11.3: A CAR-BORNE SAR SYSTEM FOR INTERFEROMETRIC MEASUREMENTS: DEVELOPMENT STATUS AND SYSTEM ENHANCEMENTS</b>	<b>6508</b>
<i>Othmar Frey, GAMMA Remote Sensing / ETH Zurich, Switzerland; Charles Werner, GAMMA Remote Sensing, Switzerland; Irena Hajnsek, Roberto Coscione, ETH Zurich, Switzerland</i>	
<b>TH4-R11.4: TOMOGRAPHIC PROFILING WITH SNOWSCAT WITHIN THE ESA SNOWLAB CAMPAIGN: TIME SERIES OF SNOW PROFILES OVER THREE SNOW SEASONS</b>	<b>6512</b>
<i>Othmar Frey, GAMMA Remote Sensing /ETH Zurich, Switzerland; Charles Werner, Rafael Caduff, Andreas Wiesmann, GAMMA Remote Sensing, Switzerland</i>	
<b>TH1-R12: DATA MANAGEMENT AND SYSTEMS</b>	
<b>TH1-R12.1: A COMPREHENSIVE INFORMATION MODEL FOR SAR DATA</b>	<b>6516</b>
<i>Leland Pierce, The University of Michigan, United States; Betty Evans, Digital Globe, Inc, United States; Siri Jodha Khalsa, National Snow and Ice Data Center, United States</i>	
<b>TH1-R12.2: CODE-DE - THE GERMAN OPERATIONAL ENVIRONMENT FOR ACCESSING AND PROCESSING COPERNICUS SENTINEL PRODUCTS</b>	<b>6520</b>
<i>Tobias Storch, Christoph Reck, Stefanie Holzwarth, Vanessa Keuck, DLR - German Aerospace Center, Germany</i>	
<b>TH1-R12.3: HIGH THROUGHPUT IMAGE CODEC FOR HIGH-RESOLUTION SATELLITE IMAGES</b>	<b>6524</b>
<i>Carlos de Cea Dominguez, Universitat Autònoma de Barcelona, Spain; Pablo Enfedaque, Lawrence Berkeley National Laboratory, Spain; Juan Carlos Moure Lopez, Joan Bartrina Rapesta, Francesc Auli Llinas, Universitat Autònoma de Barcelona, Spain</i>	
<b>TH1-R12.4: ASSESSING A CENTRAL SATELLITE DATA REPOSITORY AND ITS USAGE STATISTICS</b>	<b>6528</b>
<i>Weiguo Han, University Corporation for Atmospheric Research, United States; Matthew Jochum, National Oceanic and Atmospheric Administration, United States</i>	
<b>TH1-R12.5: A BIG EARTH DATA PLATFORM EXPLOITING TRANSPARENT MULTIMODAL PARALLELIZATION</b>	<b>6532</b>
<i>Kwo-Sen Kuo, Bayesics, LLC, United States; Yu Pan, Feiyu Zhu, Jin Wang, University of Nebraska - Lincoln, United States; Michael Rilee, Rilee Systems Technologies, LLC, United States; Hongfeng Yu, University of Nebraska - Lincoln, United States</i>	



## **TH2-R12: REMOTE SENSING DATA AND POLICY DECISIONS I**

**TH2-R12.1: RADARSAT CONSTELLATION MISSION DATA POLICY** ..... 6536  
*Jill Smyth, Guennadi Kroupnik, Steve Iris, Magdalena Wierus, Canadian Space Agency, Canada*

**TH2-R12.2: DLR'S CONTRIBUTIONS TO EMERGENCY RESPONSE WITHIN THE INTERNATIONAL CHARTER 'SPACE AND MAJOR DISASTERS'** ..... 6540  
*Sandro Martinis, André Twele, Simon Plank, Jens Danzeglocke, Hendrik Zwenzner, Günter Strunz, Hans-Peter Lüttenberg, Stefan Dech, German Aerospace Center (DLR), Germany*

**TH2-R12.3: SPATIOTEMPORAL VARIATIONS OF THE CORRELATION BETWEEN THE ARCTIC ATMOSPHERIC OZONE AND TEMPERATURE** ..... 6544  
*Fuxiang Huang, Suling Ren, Shuangshuang Han, National Satellite Meteorological Center, China; Xiangdong Zheng, Chinese Academy of Meteorological Sciences, China; Xuejiao Deng, Guangzhou Tropical Marine Meteorological Institute of China Meteorological Administration, China*

**TH2-R12.4: ADDRESSING MANGROVE PROTECTION IN AUSTRALIA: THE CONTRIBUTION OF EARTH OBSERVATION TECHNOLOGIES** ..... 6548  
*Graciela Isabel Metternicht, University of New South Wales, Australia; Richard Lucas, Peter Bunting, Aberystwyth University, United Kingdom; Alex Held, CSIRO, Australia; Leo Lymburner, Geoscience Australia, Australia; Catherine Ticehurst, CSIRO, Australia*

**TH2-R12.5: URBANIZATION AND ITS IMPACT ON STORMWATER RUNOFF POTENTIAL USING GEOSPATIAL TOOLS** ..... 6552  
*Shray Pathak, Chandra Shekhar Prasad Ojha, Rahul Dev Garg, Indian Institute of Technology Roorkee, India; Venkat Lakshmi, University of South Carolina, United States*

## **TH3-R12: EDUCATION AND REMOTE SENSING**

**TH3-R12.1: SATELLITE-BORNE AND ISS-BORNE REMOTE SENSING IN SCHOOL LESSONS: LESSONS LEARNED AND NEW MEDIATION WAYS** ..... 6556  
*Andreas Rienow, Henryk Hodam, Claudia Lindner, Annette Ortwein, Johannes Schultz, Fabian Selg, Ruhr-University Bochum, Germany*

**TH3-R12.2: A REMOTE SENSING UNDERGRADUATE RESEARCH INTERNSHIP IN A GEOSCIENCE WORKFORCE PROGRAM FOR UNDERREPRESENTED STEM STUDENTS** ..... 6560  
*Reginald Blake, Janet Liou-Mark, Hamid Norouzi, Laura Yuen-Lau, New York City College of Technology, United States*

**TH3-R12.4: POLSARPRO-BIO: AN ESA EDUCATIONAL TOOLBOX USED FOR SELF-EDUCATION IN THE FIELD OF POLSAR, POL-INSAR AND POL-TOMOSAR DATA ANALYSIS** ..... 6568  
*Eric Pottier, Laurent Ferro-Famil, IETR - UMR 6164, University of Rennes 1, France; Magdalena Fitrzyk, RSAC c/o ESA-ESRIN, Italy; Yves-Louis Desnos, European Space Agency/ESRIN, Italy*

**TH3-R12.5: SPATIO-TEMPORAL ASSESSMENT OF FIRE SEVERITY IN A PROTECTED AND MOUNTAINOUS ECOSYSTEM** ..... 6572  
*Efosa Adagbasa, Samuel Adelabu, Tom Okello, University of the Free State, South Africa*

## **TH4-R12: ADVANCED FLOOD MONITORING AND PREDICTION FOR GLOBAL DISASTER RISK REDUCTION I**

**TH4-R12.1: AN AUTOMATIC FLOOD MONITORING SERVICE FROM SENTINEL-1 SAR PRODUCTS, DELIVERY PIPELINES, AND PERFORMANCE ASSESSMENT** ..... 6576  
*Franz J Meyer, Olaniyi Ajadi, University of Alaska Fairbanks, United States; Lori Schultz, Jordan Bell, University of Alabama Huntsville, United States; Kenneth Arnoult, Rudiger Gens, Jeremy Nicoll, University of Alaska Fairbanks, United States*

<b>TH4-R12.3: BLENDING MODIS AND AMSR2 TO PREDICT DAILY GLOBAL INUNDATION MAP IN 1KM RESOLUTION</b>	<b>6580</b>
<i>Wataru Takeuchi, The University of Tokyo, Japan; Young-Joo Kwak, ICHARM-UNESCO, Japan</i>	
<b>TH4-R12.4: A SENTINEL-1 TIMES SERIES-BASED EXCLUSION LAYER FOR IMPROVED FLOOD MAPPING IN ARID AREAS</b>	<b>6584</b>
<i>Sandro Martinis, German Aerospace Center (DLR), Germany</i>	
<b>TH4-R12.5: MONITORING OF INUNDATION DYNAMICS IN THE NORTH-AMERICAN PRAIRIE POTHOLE REGION USING SENTINEL-1 TIME SERIES</b>	<b>6588</b>
<i>Stefan Schlaffer, American University of Armenia, Armenia; Marco Chini, Luxembourg Institute of Science and Technology, Luxembourg; Ronald Pöppl, University of Vienna, Austria; Renaud Hostache, Patrick Matgen, Luxembourg Institute of Science and Technology, Luxembourg</i>	
<b>TH4-R12.6: L-BAND SAR INTERFEROMETRIC ANALYSIS FOR FLOOD DETECTION IN URBAN AREA – A CASE STUDY IN 2015 JOSO FLOOD, JAPAN</b>	<b>6592</b>
<i>Ryo Natsuaki, Akira Hirose, The University of Tokyo, Japan</i>	
<b>TH1-R13: BIODIVERSITY AND REMOTE SENSING I</b>	
<b>TH1-R13.1: CAPABILITIES OF LIDAR- AND SATELLITE DATA IN ASSESSING THE DRIVERS OF AVIAN DIVERSITY IN A FRAGMENTED LANDSCAPE</b>	<b>6596</b>
<i>Markus Melin, Bournemouth University, United Kingdom; Shelley Hinsley, Richard Broughton, Centre for Ecology and Hydrology, United Kingdom; Paul Bellamy, The Royal Society for the Protection of Birds (RSPB), United Kingdom; Ross Hill, Bournemouth University, United Kingdom</i>	
<b>TH1-R13.2: LANDSCAPE STRUCTURE ESTIMATION USING FOURIER-BASED TEXTURAL ORDINATION OF HIGH RESOLUTION AIRBORNE OPTICAL IMAGE</b>	<b>6600</b>
<i>Marc Lang, Samuel Alleaume, Sandra Luque, Nicolas Baghdadi, Jean-Baptiste Féret, IRSTEA, France</i>	
<b>TH1-R13.3: SATELLITE REMOTE SENSING OF ECOSYSTEM FUNCTIONS: OPPORTUNITIES AND CHALLENGES FOR REPORTING OBLIGATIONS OF THE EU HABITAT DIRECTIVE</b>	<b>6604</b>
<i>Javier Cabello, University of Almería, Spain; Paola Mairota, University of Bari, Italy; Domingo Alcaraz-Segura, University of Granada, Spain; Salvador Arenas-Castro, University of Porto, Portugal; Paula Escribano, University of Almería, Spain; Pedro Leitão, Technische Universität Braunschweig, Germany; Javier Martínez-López, BC3—Basque Centre for Climate Change, Spain; Adrián Regos, University of Porto, Portugal; Juan M Requena-Mullor, University of Almería, Spain</i>	
<b>TH1-R13.4: LIVING WALES – NATIONAL LEVEL MAPPING AND MONITORING THROUGH EARTH OBSERVATIONS, GROUND DATA AND MODELS</b>	<b>6608</b>
<i>Richard Lucas, Peter Bunting, Aberystwyth University, United Kingdom; Claire Horton, Welsh Government, United Kingdom</i>	
<b>TH2-R13: COMPUTATIONAL METHODS AND APPLICATIONS FOR AGRICULTURE USING SARI</b>	
<b>TH2-R13.1: CROP BIOPHYSICAL PARAMETERS ESTIMATION WITH A MULTI-TARGET INVERSION SCHEME USING THE SENTINEL-1 SAR DATA</b>	<b>6611</b>
<i>Dipankar Mandal, Vineet Kumar, Avik Bhattacharya, Y. S. Rao, Indian Institute of Technology Bombay, India; Heather McNairn, Agriculture and Agri-Food Canada, Canada</i>	
<b>TH2-R13.2: OBSERVING CROP GROWTH AND VITALITY WITH THE COPERNICUS MISSION</b>	<b>6615</b>
<i>Onur Yuzugullu, AgriCircle AG, Switzerland; Frank Liebisch, ETH Zurich, Switzerland</i>	
<b>TH2-R13.3: MONITORING AGRICULTURAL FIELDS USING AN OPTIMISATION OF THE DIFFERENCE OF COVARIANCE MATRICES FOR POLSAR</b>	<b>6619</b>
<i>Cristian Silva, The Open University, United Kingdom; Armando Marino, The University of Stirling, United Kingdom; Juan M. Lopez-Sanchez, The University of Alicante, Spain; Iain Cameron, Environment Systems,</i>	

<b>TH2-R13.4: CROP TYPE MAPPING BASED ON SENTINEL-1 BACKSCATTER TIME SERIES.....</b>	<b>6623</b>
<i>María Arias, Miguel Ángel Campo-Bescós, Jesús Álvarez-Mozos, Public University of Navarre, Spain</i>	
<b>TH2-R13.5: SENTINEL-1 &amp; SENTINEL-2 DATA FOR SOIL TILLAGE CHANGE DETECTION.....</b>	<b>6627</b>
<i>Giuseppe Satalino, Francesco Mattia, Anna Balenzano, Francesco Paolo Lovergine, Consiglio Nazionale delle Ricerche (CNR), Italy; Michele Rinaldi, Angelo Pio Desantis, Sergio Ruggieri, Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria (CREA), Italy; David Alfonso Nafria García, Vanessa Paredes Gómez, Instituto Tecnológico Agrario de Castilla y León, Spain; Eric Ceschia, Milena Planells, Thuy Le Toan, Université Paul Sabatier – Centre d'Etudes Spatiales de la Biosphère, France; Antonio Ruiz, José Moreno, University of Valencia, Spain</i>	
<b>TH3-R13: COMPUTATIONAL METHODS AND APPLICATIONS FOR AGRICULTURE USING SAR II</b>	
<b>TH3-R13.1: SINCOHMAP: LAND-COVER AND VEGETATION MAPPING USING MULTI-TEMPORAL SENTINEL-1 INTERFEROMETRIC COHERENCE .....</b>	<b>6631</b>
<i>Fernando Vicente-Guijalba, Dares Technology, Spain; Alexander Jacob, EURAC Research, Italy; Juan M. Lopez-Sanchez, University of Alicante, Spain; Carlos López-Martínez, LIST, Luxembourg; Javier Duro, Dares Technology, Spain; Claudia Notarnicola, EURAC Research, Italy; Dariusz Ziolkowski, Institute of Geodesy and Cartography, Poland; Alejandro Mestre-Quereda, University of Alicante, United States; Eric Pottier, University of Rennes 1, France; Jordi J. Mallorqui, Universitat Politècnica de Catalunya, Spain; Marco Lavallo, Jet Propulsion Laboratory, California Institute of Technology, United States; Marcus Engdahl, European Space Agency, Italy</i>	
<b>TH3-R13.2: FULLY CONVOLUTIONAL NETWORKS FOR MULTI-TEMPORAL SAR IMAGE CLASSIFICATION .....</b>	<b>6635</b>
<i>Adugna Mullissa, Claudio Persello, Valentyn Tolpekin, University of Twente, Netherlands</i>	
<b>TH3-R13.3: MONITORING KEY AGRICULTURAL CROPS IN THE NETHERLANDS USING SENTINEL-1 .....</b>	<b>6639</b>
<i>Susan Steele-Dunne, Saeed Khabbazan, Paul Vermunt, Lexy Ratering Arntz, Caterina Marinetti, Lorenzo Iannini, Delft University of Technology, Netherlands; Kees Westerdijk, Aeres Hogeschool, Netherlands; Corne Van der Sande, NEO bv, Netherlands</i>	
<b>TH3-R13.4: FUSION OF SENTINEL-1 AND SENTINEL-2 IMAGES FOR CLASSIFICATION OF AGRICULTURAL AREAS USING A NOVEL CLASSIFICATION APPROACH .....</b>	<b>6643</b>
<i>Pouya Hedayati, Damian Bargiel, Technische Universität Darmstadt, Germany</i>	
<b>TH4-R13: GCOM STATUS</b>	
<b>TH4-R13.1: GCOM SCIENCE OVERVIEW AND THE INITIAL RESULTS OF GCOM-C .....</b>	<b>6647</b>
<i>Haruhisa Shimoda, Tokai University, Japan</i>	
<b>TH4-R13.2: PRE-LAUNCH CHARACTERISATION AND IN-ORBIT CALIBRATION OF GCOM-C/SGLI .....</b>	<b>6651</b>
<i>Yoshihiko Okamura, Taichiro Hashiguchi, Tomoyuki Urabe, Kazuhiro Tanaka, Japan Aerospace Exploration Agency, Japan; Jun Yoshida, Takashi Sakashita, Takahiro Amano, NEC Corporation, Japan</i>	
<b>TH4-R13.3: STUDY ON ABOVE GROUND BIOMASS PRODUCTS FROM GCOM-C / SGLI.....</b>	<b>6655</b>
<i>Yoshiaki Honda, Koji Kajiwara, Chiba University, Japan</i>	
<b>TH4-R13.4: EVALUATION OF ALL-WEATHER SEA SURFACE WIND SPEED PRODUCT FROM GCOM-W/AMSR2 MICROWAVE RADIOMETER .....</b>	<b>6659</b>
<i>Naoto Ebuchi, Hokkaido University, Japan</i>	
<b>TH4-R13.5: PRECIPITABLE WATER VAPOR RETRIEVAL OVER LAND FROM GCOM-W/AMSR2 AND ITS APPLICATION TO NUMERICAL WEATHER PREDICTION .....</b>	<b>6663</b>
<i>Masahiro Kazumori, Japan Meteorological Agency, Japan</i>	

## THP1-PA: POLARIMETRIC SAR

### THP1-PA.1: POLARIMETRIC PHASE DIFFERENCE AIDED NETWORK FOR POLSAR IMAGE CLASSIFICATION ..... 6667

*Xinlong Liu, Mingxia Tu, Yan Wang, Chu He, Electronic Information School, Wuhan University, China*

### THP1-PA.2: A CLASSIFICATION METHOD FOR POLSAR IMAGES USING SLIC SUPERPIXEL SEGMENTATION AND DEEP CONVOLUTION NEURAL NETWORK ..... 6671

*Feng Gu, Hong Zhang, Chao Wang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China*

### THP1-PA.3: REMOVING THE IMPACT OF MAN-MADE TARGETS ON TREE HEIGHT RETRIEVAL USING THREE-STAGE ALGORITHM ..... 6675

*Dingfeng Duan, Yong Wang, University of Electronic Science and Technology of China, China; Hong Li, East Carolina University, United States*

## THP2-PA: SAR IMAGE PROCESSING 1

### THP2-PA.1: TWO-DIMENSIONAL SPECTRUM FOR DIVING STAGE SAR PROCESSING WITH HIGH-ORDER EQUIVALENT RANGE MODEL ..... 6683

*Yi Liao, University of Electronic Science and Technology of China, China; Wen-Qin Wang, UESTC, China*

### THP2-PA.2: NOVEL ALGORITHM FOR HIGH RESOLUTION PASSIVE RADAR IMAGING WITH ISDB-T DIGITAL TV SIGNAL ..... 6687

*Weike Feng, Graduate School of Environmental Studies, Tohoku University, Japan; Jean-Michel Friedt, FEMTO-ST, Time & Frequency department, France; Grigory Cherniak, Graduate School of Environmental Studies, Tohoku University, Japan; Motoyuki Sato, Center for Northeast Asian Studies, Tohoku University, Japan*

### THP2-PA.4: PROCESSING SPACEBORNE INTERRUPTED FMCW SAR DATA WITH MODIFIED APERTURE INTERPOLATION TECHNIQUE ..... 6695

*Ning Li, Shilin Niu, Zhengwei Guo, Lin Wu, Zhiwei Cao, Henan University, China*

### THP2-PA.5: FULLY FOCUSED SAR PROCESSING FOR RADAR ALTIMETER: A FREQUENCY DOMAIN APPROACH ..... 6699

*Michele Scagliola, Aresys s.r.l., Italy; Pietro Guccione, Politecnico di Bari, Italy; Davide Giudici, Aresys s.r.l., Italy*

### THP2-PA.6: THE FPGA IMPLEMENTATION OF REAL-TIME SPOTLIGHT SAR IMAGING ..... 6703

*Wei Li, Zhiwei Xu, Daiyin Zhu, Nanjing University of Aeronautics and Astronautics, China*

### THP2-PA.7: OMEGA-K ALGORITHM BASED ON SERIES REVERSION AND LEAST SQUARE FOR HIGH-RESOLUTION SPACEBORNE SAR ..... 6707

*Mingdong Yang, Daiyin Zhu, Fan Xu, Nanjing University of Aeronautics and Astronautics, China*

### THP2-PA.8: A NOVEL COMPENSATION APPROACH FOR THE RANGE-DEPENDENT MOTION ERROR BASED ON TIME SCALING ..... 6711

*Qianrong Lu, Yesheng Gao, Xingzhao Liu, Shanghai Jiao Tong University, China; Qi Chen, China Centre for Resources and Satellite Data and Application, China*

### THP2-PA.9: EFFICIENT SIMULATION OF EXTENDED-SCENE SAR RAW SIGNALS WITH ANY ACQUISITION MODE ..... 6715

*Domenico Dell'Aglio, Gerardo Di Martino, Antonio Iodice, Daniele Riccio, Giuseppe Ruello, University of Naples Federico II, Italy*

### THP2-PA.10: SAR IMAGE SIMULATION AND SIMILARITY EVALUATION BASED ON BASIC STRUCTURE OF BUILDINGS ..... 6719

*Miaomiao Ren, University of Chinese Academy of Sciences, Institute of Electronics of Chinese Academy of Sciences, China; Zhuo Pan, Institute of Electronics, Chinese Academy of Sciences, China; Zelong Wang, University of Chinese Academy of Sciences, Institute of Electronics of Chinese Academy of Sciences, China; Xianghui Xu, Xin Fang, Institute of Electronics, Chinese Academy of Sciences, China*

## **THP1-PB: TOMOGRAPHY AND 3D MAPPING I**

### **THP1-PB.2: L-BAND UAVSAR TOMOGRAPHIC IMAGING IN DENSE FOREST: AFRISAR ..... 6723 RESULTS**

*Ibrahim Moussawi, Dinh Ho Tong Minh, Nicolas Baghdadi, Irstea, France; Chadi Abdallah, CNRS-L, Lebanon; Jalal Jomaah, Lebanese University, Lebanon; Olivier Strauss, University of Montpellier, France*

### **THP1-PB.3: EXPERIMENTAL VALIDATION OF COMPACT TOMOSAR FOR VEGETATION ..... 6727 CHARACTERIZATION**

*Naveen Ramachandran, Onkar Dikshit, Indian Institute of Technology Kanpur, India*

### **THP1-PB.5: HEIGHT ESTIMATION OF ELECTRIC POWER TRANSMISSION TOWER BASED ..... 6735 ON TOMOGRAPHY SAR IMAGING METHOD USING STARRING SPOTLIGHT MODE TERRASAR-X DATA**

*Shaochun Su, Yiyu Gong, Songhai Fan, State Grid Sichuan Electric Power Research Institute, China; Baolong Wu, Yan Chen, Ling Tong, University of Electronic Science and Technology of China, China*

### **THP1-PB.7: FEATURE DESIGN FOR CLASSIFICATION FROM TOMOSAR DATA..... 6739**

*Olivier D'Hondt, Ronny Hänsch, Olaf Hellwich, Technische Universität Berlin, Germany*

### **THP1-PB.8: PHASE ERROR COMPENSATION IN MULTI-BASELINE SAR TOMOGRAPHY ..... 6743**

*Hossein Aghababae, Alessandra Budillon, Giampaolo Ferraioli, Università di Napoli Parthenope, Italy; Gianfranco Fornaro, Electromagnetic Sensing of the Environment (IREA), Italy; Vito Pascazio, Gilda Schirinzi, Università di Napoli Parthenope, Italy*

### **THP1-PB.9: STATISTICAL ANALYSIS FOR IMPROVEMENT OF DOUBLE PERSISTENT ..... 6746 SCATTERERS DETECTION IN SAR TOMOGRAPHY**

*Cosmin Danisor, University Politehnica of Bucharest, Romania; Gianfranco Fornaro, Antonio Pauciullo, National Research Council of Italy (CNR), Italy; Mihai Detcu, German Aerospace Center (DLR), Germany*

## **THP2-PB: TOMOGRAPHY AND 3D MAPPING II**

### **THP2-PB.3: CHINA DSM GENERATION AND ACCURACY ASSESSMENT USING ZY3 IMAGES ..... 6757**

*Xinming Tang, Qingxing Yue, Xiaoming Gao, Satellite Surveying and Mapping Application Center, NASG, China*

## **THP1-PC: SUBSURFACE SENSING AND GROUND PENETRATING RADAR I**

### **THP1-PC.1: DISTRIBUTED RADAR SOUNDER SYSTEM: A NOVEL APPROACH TO ..... 6765 ACROSS-TRACK RESOLUTION ENHANCEMENT AND CLUTTER REDUCTION**

*Leonardo Carrer, Christopher Gerekos, Lorenzo Bruzzone, University of Trento, Italy*

### **THP1-PC.3: DETECTION AND IDENTIFICATION OF BURIED EXPLOSIVE HAZARDS USING ..... 6769 HIGH FREQUENCY EMI SENSING**

*Fridon Shubitidze, Dartmouth College, United States; Benjamin Barrowes, USA Army ERDC-CRREL, United States; Irma Shamatava, Dartmouth College/WRT.inc, United States*

### **THP1-PC.4: GROUND PENETRATING RADAR SIGNAL ENHANCEMENT BY SURFACE ..... 6773 COVERING METHOD**

*Alper Genc, Murat Koray Akkaya, ASELSAN INC., Turkey; Asim Egemen Yilmaz, Ankara University, Turkey*

### **THP1-PC.5: P-BAND RADAR RETRIEVAL OF PERMAFROST ACTIVE LAYER PROPERTIES: ..... 6777 TIME-SERIES APPROACH AND VALIDATION WITH IN-SITU OBSERVATIONS**

*Richard Chen, Alireza Tabatabaenejad, Mahta Moghaddam, University of Southern California, United States*

### **THP1-PC.7: ESTIMATING AZIMUTH OF SUBSURFACE LINEAR TARGETS BY ..... 6784 POLARIMETRIC GPR**

*Hai Liu, Guangzhou University, China; Xiaoyun Huang, Bangan Xing, Xiamen University, China; Jie Cui, Guangzhou University, China; Billie Spencer, University of Illinois at Urbana-Champaign, United States; Qing-Huo Liu, Duke University, United States*

<b>THP1-PC.8: THE SPATIOTEMPORAL DISTRIBUTION OF MICROWAVE BRIGHTNESS</b> .....	<b>6788</b>
<b>TEMPERATURE IN THE VON KÁRMÁN CRATER BASED ON FILED THEORY</b>	
<i>Yi Lian, Long He, Tianjin Normal University, China; Jinsong Ping, National Astronomical Observatories Of China, China; Zhiguo Meng, Jilin University, China; Xiaoming Zeng, Pengfei Chen, Tiejun Cui, Tianjin Normal University, China</i>	
<b>THP1-PC.9: EXTRACTION OF STATISTICAL FEATURES FOR IMPROVED AUTOMATIC</b> .....	<b>6792</b>
<b>DETECTION OF SUBGLACIAL LAKES IN RADAR SOUNDER DATA</b>	
<i>Ana-Maria Ilisei, Mahdi Khodadadzadeh, Lorenzo Bruzzone, University of Trento, Italy</i>	
 <b>THP2-PC: SUBSURFACE SENSING AND GROUND PENETRATING RADAR II</b>	
<b>THP2-PC.1: A THREE-DIMENSIONAL INTEGRAL METHOD FOR COMPUTING THE</b> .....	<b>6796</b>
<b>RELAXATION FREQUENCIES OF EDDY CURRENTS IN CONDUCTING MEDIA</b>	
<i>Jonathan Gabbay, Waymond Scott, Georgia Institute of Technology, United States</i>	
<b>THP2-PC.2: QUANTIFYING SUBSURFACE PROPAGATION LOSSES FOR VHF RADAR</b> .....	<b>6800</b>
<b>SOUNDING WAVES IN HYPER-ARID TERRAINS</b>	
<i>Giovanni Scabbia, HBKU-Qatar Foundation / University of Southern California, Qatar; Essam Heggy, University of Southern California / NASA Jet Propulsion Laboratory, United States</i>	
<b>THP2-PC.3: BURIED OBJECT DETECTION FROM B-SCAN GROUND PENETRATING RADAR</b> .....	<b>6804</b>
<b>DATA USING FASTER-RCNN</b>	
<i>Minh-Tan Pham, Sébastien Lefèvre, Université Bretagne Sud - IRISA, France</i>	
<b>THP2-PC.4: MEASURING COMPLEX PERMITTIVITY OF SOILS BY COAXIAL</b> .....	<b>6808</b>
<b>TRANSMISSION LINE METHOD AND FDTD</b>	
<i>Kazunori Takahashi, OYO Corporation, Japan; Markus Loewer, Jan Igel, Leibniz Institute for Applied Geophysics, Germany; Chisato Konishi, OYO Corporation, Japan</i>	
<b>THP2-PC.5: A RANDOM MODELING APPROACH FOR THE DESCRIPTION OF</b> .....	<b>6812</b>
<b>UNDERGROUND LAYERS</b>	
<i>Murat Koray Akkaya, Alper Genç, ASELSAN INC., Turkey; Asim Egemen Yilmaz, Ankara University, Turkey</i>	
<b>THP2-PC.7: COMPARATIVE STUDY OF CLASSIFICATION ALGORITHMS TO DETECT</b> .....	<b>6820</b>
<b>INTERLAYER DEBONDINGS WITHIN PAVEMENT STRUCTURES FROM STEP-FREQUENCY</b>	
<b>RADAR DATA</b>	
<i>Shreedhar Savant Todkar, Cédric Le Bastard, Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement (CEREMA), France; Vincent Baltazart, Institut français des sciences et technologies des transports, de l'aménagement et des réseaux (IFSTTAR), France; Amine Ihamouten, Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement (CEREMA), France; Xavier Dérobert, Institut français des sciences et technologies des transports, de l'aménagement et des réseaux (IFSTTAR), France</i>	
 <b>THP1-PD: DATA ANALYSIS METHODS II</b>	
<b>THP1-PD.1: PRELIMINARY ASSESSMENT OF FACTORS AFFECTING ACCURACY OF SNOW</b> .....	<b>6828</b>
<b>LAYER THICKNESS ESTIMATION USING BI-STATIC, UP-LOOKING RADARS IN AN</b>	
<b>AVALANCHE RISK ASSESSMENT CONTEXT</b>	
<i>Farzana Kulsoom, Fabio Dell'Acqua, Marco Pasian, University of Pavia, Italy</i>	
<b>THP1-PD.2: SAR IMAGE MATCHING IMPROVEMENT USING IMAGE TEXTURE ANALYSIS</b> .....	<b>6832</b>
<i>Mohammad Amin Ghannadi, Mohammad Saadatseresht, Mahdi Hasanlou, University of Tehran, Iran</i>	
<b>THP1-PD.3: SENTINEL-1 GLOBAL COVERAGE FORESHORTENING MASK EXTRACTION:</b> .....	<b>6836</b>
<b>AN OPEN SOURCE IMPLEMENTATION BASED ON GOOGLE EARTH ENGINE</b>	
<i>Mohammad Kakooei, Babol Noshirvani University of Technology, KTH Royal Institute of Technology, Iran; Andrea Nascetti, Yifang Ban, KTH Royal Institute of Technology, Sweden</i>	

<b>THP1-PD.4: THE SARPTICAL DATASET FOR JOINT ANALYSIS OF SAR AND OPTICAL IMAGE IN DENSE URBAN AREA</b>	<b>6840</b>
<i>Yuanyuan Wang, Technical University of Munich (TUM), Germany; Xiao Xiang Zhu, German Aerospace Center (DLR) / Technical University of Munich (TUM), Germany</i>	
<b>THP1-PD.5: VERY HIGH RESOLUTION IMAGE SCENE CLASSIFICATION WITH SEMANTIC FISHER VECTORS</b>	<b>6844</b>
<i>Souleyman Chaib, Yanfeng Gu, Hongxun Yao, Harbin Institute of Technology, China; Khaled Belkadi, University of Science and Technology of Oran Mohamed Boudiaf (USTO-MB), Algeria</i>	
<b>THP1-PD.8: ADVANCED LOCAL BINARY PATTERNS FOR REMOTE SENSING IMAGE RETRIEVAL</b>	<b>6855</b>
<i>Issayas Tekeste, University of Trento, Italy; Begum Demir, Technische Universität Berlin, Germany</i>	
<b>THP1-PD.9: SENTINEL-2 CHANGE DETECTION BASED ON DEEP FEATURES</b>	<b>6859</b>
<i>Andrea Pomente, Matteo Picchiani, Fabio Del Frate, Tor Vergata University, Italy</i>	
<b>THP1-PD.10: WINTER WHEAT YIELD ESTIMATION WITH GROUND BASED SPECTRAL INFORMATION</b>	<b>6863</b>
<i>Yao Zhang, Qiming Qin, Institute of Remote Sensing and Geographic Information System, School of Earth and Space Sciences, Peking University, China</i>	
 <b>THP2-PD: DATA ANALYSIS METHODS IV</b>	
<b>THP2-PD.1: PRECISE EXTRACTION OF BUILT-UP AREA USING DEEP FEATURES</b>	<b>6867</b>
<i>Yihua Tan, Shengzhou Xiong, Yaming Li, Huazhong University of Science and Technology, China</i>	
<b>THP2-PD.2: SEMI-SUPERVISED DEEP ATTRIBUTE NETWORKS FOR FINE-GRAINED SHIP CATEGORY RECOGNITION</b>	<b>6871</b>
<i>Quentin Oliveau, Télécom ParisTech, France; Hichem Sahbi, CNRS, University of Pierre and Marie Curie, Sorbonne University, France</i>	
<b>THP2-PD.3: USE OF SENTINEL-1 AND SENTINEL-2 FOR MONITORING ILLEGAL FISHING OFF GHANA</b>	<b>6875</b>
<i>Andrey Kurekin, Benjamin Loveday, Oliver Clements, Graham Quartly, Peter Miller, Plymouth Marine Laboratory, United Kingdom; George Wiafe, Kwame Adu Agyekum, University of Ghana, Ghana</i>	
<b>THP2-PD.4: CLEAR-AIR ANOMALY DETECTION USING MODIFIED KALMAN TEMPORAL FILTER FROM GEOSTATIONARY MULTISPECTRAL DATA</b>	<b>6879</b>
<i>Luca Milani, Sapienza Università di Roma, Italy; Mauro Arcorace, Roberto Cuccu, Giancarlo Rivolta, Progressive Systems Srl, Italy; Frank S. Marzano, Sapienza Università di Roma, Italy</i>	
<b>THP2-PD.5: EXTRACTION OF AURORAL OVAL REGIONS USING SUPPRESSED FUZZY C MEANS CLUSTERING</b>	<b>6883</b>
<i>Yu Lei, Jiao Shi, Ying Zhou, Mingliang Tao, Northwestern Polytechnical University, China; Jiaji Wu, Xidian University, China</i>	
<b>THP2-PD.6: OCEAN EDDY IDENTIFICATION AND TRACKING USING NEURAL NETWORKS</b>	<b>6887</b>
<i>Katharina Franz, Ribana Roscher, Andres Milioto, Susanne Wenzel, Jürgen Kusche, University of Bonn, Germany</i>	
<b>THP2-PD.8: ON THE EXTRACTION OF TRAINING IMAGERY FROM VERY LARGE REMOTE SENSING DATASETS FOR DEEP CONVOLUTIONAL SEGMENTATION NETWORKS</b>	<b>6895</b>
<i>Bohao Huang, Daniel Reichman, Leslie Collins, Kyle Bradbury, Jordan Malof, Duke University, United States</i>	
<b>THP2-PD.9: DEEP CONVOLUTIONAL SEGMENTATION OF REMOTE SENSING IMAGERY: A SIMPLE AND EFFICIENT ALTERNATIVE TO STITCHING OUTPUT LABELS</b>	<b>6899</b>
<i>Bohao Huang, Leslie Collins, Kyle Bradbury, Jordan Malof, Duke University, United States</i>	

**THP2-PD.10: DEEP LEARNING HYPERSPECTRAL IMAGE CLASSIFICATION USING MULTIPLE CLASS-BASED DENOISING AUTOENCODERS, MIXED PIXEL TRAINING AUGMENTATION, AND MORPHOLOGICAL OPERATIONS** ..... 6903

*John Ball, Pan Wei, Mississippi State Univeristy, United States*

**THP1-PE: PROCESSING AND ANALYSIS OF OPTICAL IMAGES**

**THP1-PE.1: ROAD EXTRACTION FROM REMOTE SENSING IMAGES BY MULTIPLE FEATURE PYRAMID NETWORK** .....6907

*Xun Gao, Xian Sun, Menglong Yan, Hao Sun, Kun Fu, Yue Zhang, Zhipeng Ge, Institute of Electronics, Chinese Academy of Sciences, China*

**THP1-PE.2: SHIPNET FOR SEMANTIC SEGMENTATION ON VHR MARITIME IMAGERY** ..... 6911

*Shihao Sun, Zexin Lu, Wenjie Liu, Wei Hu, Ruirui Li, Beijing University of Chemical Technology, China*

**THP1-PE.3: A NOVEL HARBOR DETECTION METHOD BASED ON PATTERN CODING ALGORITHM** ..... 6915

*Guanqun Wang, Yin Zhuang, He Chen, Liang Chen, Beijing Institute of Technology, China*

**THP1-PE.4: THE EFFECT OF FOCAL LOSS IN SEMANTIC SEGMENTATION OF HIGH RESOLUTION AERIAL IMAGE** ..... 6919

*Kento Doi, Akira Iwasaki, The University of Tokyo, Japan*

**THP1-PE.5: RECOGNITION OF WINDMILLS IN REMOTE SENSING IMAGE BY SVM AND MORPHOLOGICAL ATTRIBUTE FILTERS** ..... 6923

*Hongbo Li, Jian Zhao, Yun Zhang, Harbin Institute of Technology, China; Yunling Zhang, Highway Engineering Consulting Corporation, China*

**THP1-PE.6: STACKED ENCODER-DECODERS FOR ACCURATE SEMANTIC SEGMENTATION OF VERY HIGH RESOLUTION SATELLITE DATASETS** ..... 6927

*Maria Papadomanolaki, National Technical University of Athens, Greece; Maria Vakalopoulou, Nikos Paragios, CentraleSupélec, Inria, Université Paris-Saclay, France; Konstantinos Karantzas, National Technical University of Athens, Greece*

**THP1-PE.7: MULTILEVEL SEMANTIC LABELING OF MOBILE HOMES FROM OVERHEAD IMAGERY** ..... 6931

*Dalton Lunga, Matthew Seals, Budhendra Bhaduri, Oak Ridge National Laboratory, United States*

**THP1-PE.8: ROAD SEGMENTATION OF UAV RS IMAGE USING ADVERSARIAL NETWORK WITH MULTI-SCALE CONTEXT AGGREGATION** ..... 6935

*Bo Peng, Yuxia Li, University of Electronic Science and Technology of China, China; Lei He, Chengdu University of Information Technology, China; Kunlong Fan, Ling Tong, University of Electronic Science and Technology of China, China*

**THP1-PE.9: CLOUD DETECTION FROM RGB COLOR REMOTE SENSING IMAGES WITH DEEP PYRAMID NETWORKS** ..... 6939

*Savas Ozkan, Mehmet Efendioglu, Caner Demirpolat, TUBITAK UZAY, Turkey*

**THP1-PE.10: A COMPARISON OF DEEP LEARNING ARCHITECTURES FOR SEMANTIC MAPPING OF VERY HIGH RESOLUTION IMAGES** ..... 6943

*Qinghui Liu, Norwegian Computer Center, Norway; Arnt-Børre Salberg, Norwegian Computing Center, Norway; Robert Jenssen, UiT The Arctic University of Norway, Norway*



## THP2-PE: CLASSIFICATION

### THP2-PE.1: LARGE-SCALE SEMANTIC CLASSIFICATION: OUTCOME OF THE FIRST YEAR ..... 6947 OF INRIA AERIAL IMAGE LABELING BENCHMARK

*Bohao Huang, Duke University, United States; Kangkang Lu, NUS, Singapore; Nicolas Audebert, ONERA, France; Andrew Khaleel, Raisa energy, Egypt; Yuliya Tarabalka, UCA, Inria, France; Jordan Malof, Duke University, United States; Alexandre Boulch, Bertrand Le Saux, ONERA, France; Leslie Collins, Kyle Bradbury, Duke University, United States; Sébastien Lefèvre, University of Bretagne-Sud, IRISA, France; Motaz El-Saban, Raisa energy, Egypt*

### THP2-PE.2: MAPPING HIGHLY HETEROGENEOUS IMPERVIOUS SURFACE IN THE ..... 6951 URBAN-RURAL FRINGE USING INTEGRATED HARD AND SOFT CLASSIFICATION FROM INCORPORATING SPECTRAL AND TEXTURE FEATURES

*Shuang Zhu, Beijing Polytechnic College, China; Jinshui Zhang, State Key Laboratory of Earth Surface Processes and Resource Ecology, Beijing Normal University, China; Xiaohe Gu, Beijing Research Center for Information Technology in Agriculture, China; Junwen Yang, State Key Laboratory of Earth Surface Processes and Resource Ecology, Beijing Normal University, China; Baolin Xian, Ningxia University, China*

### THP2-PE.3: BAG-OF-VISUAL WORDS AND ERROR-CORRECTING OUTPUT CODES FOR ..... 6955 MULTILABEL CLASSIFICATION OF REMOTE SENSING IMAGES

*Anamaria Radoi, University Politehnica of Bucharest, Romania; Mihai Datcu, German Aerospace Center (DLR), Germany*

### THP2-PE.4: EXTENDING K-MEANS TO PRESERVE SPATIAL CONNECTIVITY..... 6959

*Sampriti Soor, Aditya Challa, Sravan Danda, Daya Sagar B. S., Indian Statistical Institute, India; Laurent Najman, University Paris-Est, France*

### THP2-PE.6: TABULAR K-MEANS CLUSTERING ON REMOTE SENSING IMAGES ..... 6967

*Victor J. D. Tsai, C. K. Tsui, National Chung Hsing University, Taiwan*

### THP2-PE.8: HUMAN GAIT CLASSIFICATION USING MICRO-MOTION AND ENSEMBLE ..... 6971 LEARNING

*Li Sun, Yan-Xin Yuan, Qun Zhang, Air Force Engineering University, China; Yi-cheng Wu, Air Force Early Warning Academy, China*

### THP2-PE.9: AN OPTIMUM LAND COVER MAPPING ALGORITHM FOR ..... 6975 CLOUD-CONTAMINATED REMOTE SENSING IMAGES

*Teerasit Kasetkasem, Sorasak Khoomboon, Kasetsart University, Thailand; Preesan Rakwatin, Digital Economy Promotion Agency, Thailand*

### THP2-PE.10: HIGH RESOLUTION IMAGE CLASSIFICATION BASED ON SPATIO-TEMPORAL ..... 6979 CONTEXT MODEL OF CRF

*Aiying Zhang, Ping Tang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China*

## THP1-PF: PROCESSING AND ANALYSIS OF SAR DATA

### THP1-PF.2: A GEOMETRIC ACTIVE CONTOUR MODEL USING SYMMETRICAL ..... 6983 KULLBACK-LEIBLER DISTANCE FOR SAR IMAGE SEGMENTATION

*Na Li, Tian Hui Satellite Center of China, China; Fang Liu, National University of Defense Technology, China; Lei Qiu, Beijing Institute of Tracking and Telecommunication Technology, China; Xiangchenyang Su, National University of Defense Technology, China*

### THP1-PF.3: RELAXATION LABELLING BASED LAND MASKING IN SAR IMAGES..... 6987

*Zongxu Pan, Lei Liu, Bin Lei, Institute of Electronics, Chinese Academy of Sciences, China*

### THP1-PF.5: COMPARATIVE STUDY OF FEATURE EXTRACTION APPROACHES FOR SHIP ..... 6995 CLASSIFICATION IN MODERATE-RESOLUTION SAR IMAGERY

*Shreya Sharma, Kenta Senzaki, Hirofumi Aoki, NEC Corporation, Japan*

<b>THP1-PF.6: A FAST SPARSE REPRESENTATION METHOD FOR SAR TARGET CONFIGURATION RECOGNITION</b>	<b>6999</b>
<i>Ming Liu, Shaanxi Normal University, China; Shichao Chen, Fugang Lu, Jun Wang, Xi'an Modern Control Technology Research Institute, China; Jie Wu, Shaanxi Normal University, China; Taoli Yang, University of Electronic Science and Technology of China, China</i>	
<b>THP1-PF.7: FEATURE LEARNING FOR SAR IMAGES USING CONVOLUTIONAL NEURAL NETWORK</b>	<b>7003</b>
<i>Qi Liu, Shaohui Li, Shaohui Mei, Ruoqiao Jiang, Northwestern Polytechnical University, China; Jieqi Li, China Academy of Launch Vehicle Technology, China</i>	
<b>THP1-PF.8: FEATURE MODELING OF SAR IMAGES FOR AIRCRAFTS BASED ON TYPICAL STRUCTURES</b>	<b>7007</b>
<i>Yueting Zhang, Chibiao Ding, Bin Lei, Fangfang Li, Xiaolan Qiu, Institute of Electronics, Chinese Academy of Sciences, China</i>	
<b>THP2-PF: DATA FUSION III</b>	
<b>THP2-PF.1: A NEW REGISTRATION ALGORITHM FOR MULTIMODAL REMOTE SENSING IMAGES</b>	<b>7011</b>
<i>Xunwei Xie, Yongjun Zhang, Xiao Ling, Xiang Wang, School of Remote Sensing and Information Engineering, China</i>	
<b>THP2-PF.2: THE USE OF MULTIFREQUENCY SAR DATA FOR ASSESSING LEVELS OF FOREST DISTURBANCE IN BAJO CALIMA COLOMBIA</b>	<b>7015</b>
<i>Ana Maria Pacheco-Pascagaza, University of Leicester, United Kingdom; Mariano Garcia, University of Alcalá, Spain; Pedro Rodríguez-Veiga, Heiko Balzter, University of Leicester, United Kingdom</i>	
<b>THP2-PF.3: CAN SAR IMAGES AND OPTICAL IMAGES TRANSFER WITH EACH OTHER?</b>	<b>7019</b>
<i>Lei Liu, Bin Lei, Institute of Electronics, Chinese Academy of Sciences, China</i>	
<b>THP2-PF.4: A COMPARISON OF TWO SPATIO-TEMPORAL DATA FUSION SCHEMES TO INCREASE THE SPATIAL RESOLUTION OF MAPPING ACTUAL EVAPOTRANSPIRATION</b>	<b>7023</b>
<i>Tong Wang, Ronglin Tang, State Key Laboratory of Resources and Environment Information System, China; Zhao-Liang Li, Key Laboratory of Agri-informatics, China; Bo-Hui Tang, Hua Wu, State Key Laboratory of Resources and Environment Information System, China; Yazhen Jiang, University of Chinese Academy of Sciences, China; Meng Liu, State Key Laboratory of Resources and Environment Information System, China</i>	
<b>THP2-PF.6: A REMOTE SENSING SPATIOTEMPORAL FUSION MODEL OF LANDSAT AND MODIS DATA VIA DEEP LEARNING</b>	<b>7030</b>
<i>Peiyu Dai, Hongyan Zhang, Liangpei Zhang, Huanfeng Shen, Wuhan University, China</i>	
<b>THP2-PF.7: HYPERSPECTRAL AND MULTISPECTRAL IMAGE FUSION WITH DUAL-SOURCE SPATIAL-SPECTRAL DICTIONARY</b>	<b>7034</b>
<i>Jin Tian, Yifan Zhang, Yang Lu, Shaohui Mei, Northwestern Polytechnical University, China</i>	
<b>THP2-PF.8: MULTITEMPORAL MID-INFRARED IMAGERY BASED CALIBRATION AND SUPER RESOLUTION FOR GAOFEN-4</b>	<b>7038</b>
<i>Feng Li, Lei Xin, Qian Xuesen Laboratory of Space Technology, China; Yi Guo, Western Sydney University, Australia; Xiuping Jia, University of New South Wales, Australia</i>	
<b>THP2-PF.10: PAN-SHARPENING BASED ON MULTILEVEL COUPLED DEEP NETWORK</b>	<b>7046</b>
<i>Wanting Cai, Yang Xu, Zebin Wu, Nanjing University of Science and Technology, China; Hongyi Liu, School of Science, China; Ling Qian, Zhihui Wei, Nanjing University of Science and Technology, China</i>	

## THP1-PG: OBJECT DETECTION METHODS

### THP1-PG.1: AN AUTOMATIC DETECTION METHOD FOR TENSILE DEFORMATIONS IN ..... 7050 OPTICAL SATELLITE ORTHOPHOTO

*Penglong Li, Yan Hu, Yi Ding, Chongqing Geomatics Center, China; Yichu Dong, Chongqing Center for Productivity Development, China; Ding Luo, Ziwei Jiang, Chongqing Geomatics Center, China*

### THP1-PG.2: OBJECT DETECTION IN REMOTE SENSING IMAGES WITH CENTER ONLY ..... 7054

*Adrien Chan-Hon-Tong, Nicolas Audebert, ONERA, France*

### THP1-PG.3: OBJECT-BASED POSTPROCESSING METHOD FOR CROP CLASSIFICATION ..... 7058 MAPS

*Mykola Lavreniuk, Nataliia Kussul, Andrii Shelestov, Space Research Institute NASU-SSAU, Ukraine; Olena Dubovyk, Center for Remote Sensing of Land Surfaces (ZFL), Germany; Fabian Löw, MapTailor Geospatial Consulting GbR, Germany*

### THP1-PG.4: BRIDGING THE GAP: SIMULTANEOUS FINE TUNING FOR DATA ..... 7062 RE-BALANCING

*John McKay, Isaac Gerg, Vishal Monga, Pennsylvania State University, United States*

### THP1-PG.5: A WEAK MOVING POINT TARGET DETECTION METHOD BASED ON HIGH ..... 7066 FRAME RATE IMAGE SEQUENCES

*Yong Wu, University of Chinese Academy of Sciences, China; Zheng Yang, National Space Science Center, Chinese Academy of Sciences, China; Wenlong Niu, University of Chinese Academy of Sciences, China; Wei Zheng, National Space Science Center, Chinese Academy of Sciences, China*

### THP1-PG.6: A GRAPH BASED MODEL FOR SUB-PIXEL OBJECTS RECOGNITION ..... 7070

*Bouthayna Msellmi, National School of Computer Science, Tunisia; Zouhaier Ben Rabah, National Center of Mapping and Remote sensing, Tunisia; Imed Riadh Farah, National School of Computer Science, Tunisia*

### THP1-PG.7: AN EFFECTIVE ZOOM-IN APPROACH FOR DETECTING DIM AND SMALL ..... 7074 TARGET PROPOSALS IN SATELLITE IMAGERY

*Junpeng Zhang, Xiuping Jia, Jiankun Hu, The University of New South Wales, Australia*

### THP1-PG.9: GAUSSIAN ATTRACTIVE FORCE-BASED ALTERNATIVE PARAMETRIC ACTIVE ..... 7082 CONTOUR MODEL FOR 3D LUNAR CRATER DETECTION

*Shangbin Huang, Jihao Yin, Hongmei Zhu, Beihang University, China; Zhe Cao, Beijing Institute of Spacecraft System Engineering, China*

### THP1-PG.10: DIM MOVING TARGET DETECTION USING SPATIO-TEMPORAL ANOMALY ..... 7086 DETECTION FOR HYPERSPECTRAL IMAGE SEQUENCES

*Yang Li, Jinshen Wang, Beihang University, China; Xiang Liu, Aerospace Control Technology Institute, China; Ning Xian, Beihang University, China; Changsheng Xie, Aerospace Control Technology Institute, China*

## THP2-PG: SEA ICE II

### THP2-PG.1: BIAS ASSESSMENT OF NASA TEAM AND ASI SUMMER SEA ICE ..... 7090 CONCENTRATIONS IN THE CHUKCHI SEA USING KOMPSAT-5 SAR

*Hyangsun Han, Hyun-Cheol Kim, Korea Polar Research Institute, Republic of Korea*

### THP2-PG.2: RETRIEVAL AND VALIDATION OF SEA ICE CONCENTRATION FROM ..... 7093 AMSR-E/AMSR2 IN POLAR REGIONS

*Qian Shi, Jie Su, Physical Oceanography Laboratory/CIMST, Ocean University of China and Qingdao National Laboratory for Marine Science and Technology, China*

### THP2-PG.3: A COMPARISON OF ICE FREEBOARD MEASUREMENT BY ICESAT AND ..... 7097 ENVISAT ALTIMETERS

*Weiya Ye, Jonathan Li, University of Waterloo, Canada*

<b>THP2-PG.4: SEA-ICE IMAGE CLASSIFICATION FOR CHANNEL NAVIGATION IN POLAR APPLICATION</b> .....	<b>7101</b>
<i>Nan Su, Chunming Zhang, Yiming Yan, Chunhui Zhao, Zhichao Tan, Harbin Engineering University, China</i>	
<b>THP2-PG.6: EFFECT OF A THIN DRY SNOW LAYER ON THE LAKE ICE THICKNESS MEASUREMENT USING WIDEBAND AUTOCORRELATION RADIOMETRY</b> .....	<b>7109</b>
<i>Seyedmohammad Mousavi, Roger De Roo, Kamal Sarabandi, University of Michigan, Ann Arbor, United States; Anthony W. England, University of Michigan, Dearborn, United States</i>	
<b>THP2-PG.7: POTENTIAL OF COMPACT POLARIMETRY FOR OPERATIONAL SEA ICE MONITORING OVER ARCTIC AND ANTARCTIC REGION</b> .....	<b>7113</b>
<i>Suman Singha, German Aerospace Center (DLR), Germany</i>	
<b>THP2-PG.8: ANALYSIS OF RADAR BACKSCATTERING FROM FIRST-YEAR SEA ICE WITH C-SHAPED PROFILES</b> .....	<b>7117</b>
<i>Xu Xu, Camilla Brekke, Anthony Paul Doulgeris, Frank Melandsø, UiT The Arctic University of Norway, Norway</i>	
<b>THP2-PG.9: SEA-ICE SCENE CLASSIFICATION USING AERIAL IMAGES IN ARCTIC BASED ON TRANSFER LEARNING</b> .....	<b>7121</b>
<i>Yiming Yan, Zhichao Tan, Nan Su, Harbin Engineering University, China</i>	
<b>THP2-PG.10: SEA ICE CLASSIFICATION WITH CONVOLUTIONAL NEURAL NETWORKS USING SENTINEL-1 SCANSAR IMAGES</b> .....	<b>7125</b>
<i>Chao Wang, Hong Zhang, Yuanyuan Wang, Bo Zhang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
 <b>THP1-PH: MACHINE LEARNING</b>	
<b>THP1-PH.1: INVERSION OF DEEP NETWORKS FOR MODELLING VARIATIONS IN SPATIAL DISTRIBUTIONS OF LAND COVER CLASSES ACROSS SCALES</b> .....	<b>7129</b>
<i>Arun P. V., Krishna Mohan Buddhiraju, Alok Porwal, Indian Institute of Technology Bombay, India</i>	
<b>THP1-PH.3: CLASSIFYING HIGH RESOLUTION REMOTE SENSING IMAGES BY FINE-TUNED VGG DEEP NETWORKS</b> .....	<b>7137</b>
<i>Xuan Liu, Mingmin Chi, Yunfeng Zhang, Yiqing Qin, Fudan University, China</i>	
<b>THP1-PH.4: ACCELERATING THE TRAINING PROCESS OF CONVOLUTIONAL NEURAL NETWORKS FOR CLASSIFICATION BY DROPPING TRAINING SAMPLES OUT</b> .....	<b>7141</b>
<i>Naisen Yang, Hong Tang, Jianwei Yue, Xin Yang, Beijing Normal University, China; Zhihua Xu, China University of Mining and Technology, Beijing, China</i>	
<b>THP1-PH.6: WIDE CONTEXTUAL RESIDUAL NETWORK WITH ACTIVE LEARNING FOR REMOTE SENSING IMAGE CLASSIFICATION</b> .....	<b>7145</b>
<i>Shengjie Liu, Haowen Luo, Ying Tu, Zhi He, Jun Li, Sun Yat-sen University, China</i>	
<b>THP1-PH.7: SYNTACTIC PATTERN RECOGNITION FOR WAVELET CLUSTERING IN SEISMOGRAM</b> .....	<b>7149</b>
<i>Kou-Yuan Huang, National Chiao Tung University, Taiwan; Dar-Ren Leu, University of Houston, United States Virgin Islands</i>	
<b>THP1-PH.8: AN APPROACH FOR ROAD MATERIAL IDENTIFICATION BY DUAL-STAGE CONVOLUTIONAL NETWORKS</b> .....	<b>7153</b>
<i>Wei Xia, Transport Telecommunications &amp; Information Center, China; Zhao Chen, Donghua University, China; Yuze Zhang, Jian Liu, Transport Telecommunications &amp; Information Center, China</i>	

## THP2-PH: PERMAFROST I

### THP2-PH.1: MONITORING FREEZING AND THAWING OF SHALLOW LAKES IN NORTHERN ALASKA USING SENTINEL-1 DATA ..... 7157

*Hiroyuki Wakabayashi, Kazushige Motohashi, Nihon University, Japan*

### THP2-PH.2: RESEARCH ON THE IMPROVEMENT OF PASSIVE MICROWAVE FREEZING AND THAWING DISCRIMINANT ALGORITHMS FOR COMPLICATED SURFACE CONDITIONS ..... 7161

*Xiaokang Kou, Shijiazhuang Tiedao University, China; Lingmei Jiang, Beijing Normal University, China; Shuang Yan, Hebei Academy of Sciences, China; Jian Wang, Beijing Normal University, China; Liyou Gao, Shijiazhuang Institute of Railway Technology, China*

### THP2-PH.3: THE HIGH TEMPORAL DETECTION OF LAND SURFACE FREEZE AND THAW STATES VIA A COMBINATION OF PASSIVE MICROWAVE ESTIMATES ..... 7165

*Hamid Norouzi, The City University of New York - City Tech, United States; Satya Prakash, Indian Institute of Science, India; Marzi Azarderakhsh, Fairleigh Dickinson University, United States; Christopher Beale, Reginald Blake, The City University of New York - City Tech, United States*

### THP2-PH.4: VERIFICATION OF DOWNSCALING METHOD FOR NEAR-SURFACE FREEZE/THAW STATE MONITORING IN GENHE AREA OF CHINA ..... 7168

*Jian Wang, Lingmei Jiang, Beijing Normal University, China; Xiaokang Kou, Shijiazhuang Tiedao University, China; Huizhen Cui, Shirui Hao, Beijing Normal University, China*

### THP2-PH.6: SIGNATURES OF SENTINEL-1 RADAR AND SMAP RADIOMETER DEPENDING ON THE TEMPERATURE OF FROZEN ARCTIC SOIL IN THE COOLING AND HEATING PROCESS OF THE ACTIVE LAYER ..... 7176

*Konstantin Muzalevskiy, Zdenek Ruzicka, Kirensky Institute of Physics, Russian Federation*

### THP2-PH.7: DIELECTRIC MODEL FOR THAWED AND FROZEN ORGANIC SOILS AT 1.4 GHZ ..... 7180

*Valery Mironov, Liudmila Kosolapova, Sergey Fomin, Igor Savin, Konstantin Muzalevskiy, Kirensky Institute of Physics, Russian Federation*

## THP1-PI: PANSHARPENING AND SUPERRESOLUTION II

### THP1-PI.1: PANSHARPENING BASED ON JOINT GAUSSIAN GUIDED UPSAMPLING ..... 7184

*Xu Li, Yu Pan, Ang Gao, Lixin Li, Shaohui Mei, Northwestern Polytechnical University, China; Shigang Yue, University of Lincoln, United Kingdom*

### THP1-PI.2: MULTIVARIATE REGRESSION-BASED PAN-SHARPENING WITH LOW RANK REGULARIZATION ..... 7188

*Yufei Zhang, Heng Li, Liang Xiao, Nanjing University of Science and Technology, China*

### THP1-PI.3: HYPERSPECTRAL PANSHARPENING VIA MULTITASK JOINT SPARSE REPRESENTATION ..... 7192

*Jianjun Liu, Jiangnan University, China; Zebin Wu, Nanjing University of Science and Technology, China; Zhiyong Xiao, Jinlong Yang, Jiangnan University, China*

### THP1-PI.4: A NEW HYPERSPECTRAL PANSHARPENING METHOD WITH INTRINSIC IMAGE DECOMPOSITION ..... 7196

*Wenqian Dong, Song Xiao, Jiahui Qu, Xidian University, China*

### THP1-PI.5: EFFECTS OF PANSHARPENING METHODS ON DISCRIMINATION OF TROPICAL CROP AND FOREST USING VERY HIGH-RESOLUTION SATELLITE IMAGERY ..... 7200

*Mohamed Abadi, ICAM Engineering School, France; Enguerran Grandchamp, Université des Antilles et Guyane, France; Artur Gil, University of the Azores, Portugal*

<b>THP1-PI.6: FUSION OF HYPERSPECTRAL AND PANCHROMATIC IMAGES BASED ON MATTING MODEL</b>	<b>7204</b>
<i>Wenqian Dong, Xiao Song, Jiahui Qu, Hongping Gan, Xidian University, China</i>	
<b>THP1-PI.7: A SIMPLE FUSION APPROACH OF CHLOROPHYLL IMAGES AND SEA SURFACE TEMPERATURE IMAGES FOR IMPROVING THE DETECTION OF MOROCCAN COASTAL UPWELLING</b>	<b>7208</b>
<i>Zineb Elabidi, Khalid Minaoui, Mohammed V University, Morocco; Ayoub Tamim, Higher Institute of Marine Fisheries, Morocco; Hicham Laanaya, Mohammed V University, Morocco</i>	
<b>THP1-PI.8: INCREMENT INFORMATION ACQUISITION TECHNOLOGY FOR REMOTE SENSING</b>	<b>7212</b>
<i>Zhiang Peng, Xingquan Zheng, Jiping Wang, Kaizhi Wang, Shanghai Jiao Tong University, China</i>	
<b>THP1-PI.9: FUSION OF HYPERSPECTRAL AND PANCHROMATIC IMAGES USING STRUCTURE TENSOR</b>	<b>7216</b>
<i>Jiahui Qu, Yunsong Li, Wenqian Dong, Xidian University, China</i>	
<b>THP1-PI.10: COMPARATIVE ANALYSIS OF SINGLE AND MULTI FRAME SUPER RESOLUTION IN SATELLITE IMAGERY</b>	<b>7220</b>
<i>Shubham Rana, Hemant Singh, Anil Kumar, Indian Institute of Remote Sensing, India</i>	
 <b>THP2-PI: REMOTE SENSING DATA AND POLICY DECISIONS II</b>	
<b>THP2-PI.1: DEVELOPMENT OF POPULATION DISTRIBUTION MAP AND AUTOMATED HUMAN SETTLEMENT MAP USING HIGH RESOLUTION REMOTE SENSING IMAGES</b>	<b>7224</b>
<i>Uttam Dwivedi, Zhiling Guo, Hiroyuki Miyazaki, Mohamed Batran, Ryosuke Shibasaki, University of Tokyo, Japan</i>	
<b>THP2-PI.3: TRAFFIC FLOW PREDICTION BASED ON CASCADED ARTIFICIAL NEURAL NETWORK</b>	<b>7232</b>
<i>Shaokun Zhang, Zejian Kang, Zhiyou Hong, Zheming Zhang, Cheng Wang, Jonathan Li, Xiamen University, China</i>	
<b>THP2-PI.4: TRENDS IN SATELLITE-BASED CRISIS MANAGEMENT IN GERMANY</b>	<b>7236</b>
<i>Iris Heine, Guido Riembauer, Michael Hovenbitzer, Federal Agency for Cartography and Geodesy, Germany</i>	
<b>THP2-PI.5: ENRICHMENT OF THE SATELLITESCENEONTOLOGY WITH HYPERSPECTRAL IMAGES/ CROPS AND FEATURE VECTORS OF RADIOMETRIC INDICES</b>	<b>7239</b>
<i>Khitem Amiri, Mohamed Farah, SIIVT, Tunisia</i>	
 <b>THP1-PJ: DATA FUSION V</b>	
<b>THP1-PJ.1: CLASSIFICATION OF HIGH RESOLUTION URBAN REMOTE SENSING IMAGES USING DEEP NETWORKS BY INTEGRATION OF SOCIAL MEDIA PHOTOS</b>	<b>7243</b>
<i>Yiqing Qin, Mingmin Chi, Xuan Liu, Yunfeng Zhang, Fudan University, China; Yijian Zeng, University of Twente, Netherlands; Zhiming Zhao, University of Amsterdam, Netherlands</i>	
<b>THP1-PJ.2: ASSESSMENT OF PREDICTIVE ABILITY OF STARFM BASED ON DIFFERENT MODIS-LANDSAT IMAGE PAIR DATE</b>	<b>7247</b>
<i>Donghui Xie, Beijing Normal University, China; Feng Gao, USDA, United States; Linyuan Li, Beijing Normal University, China</i>	
<b>THP1-PJ.3: URBAN TANDEM-X RAW DEM FUSION BASED ON TV-L1 AND HUBER MODELS</b>	<b>7251</b>
<i>Hossein Bagheri, Michael Schmitt, Xiao Xiang Zhu, Technical University of Munich (TUM), Germany</i>	
<b>THP1-PJ.4: A NEW SELF-ADAPTIVE APPROACH FOR PRODUCING CLEAR-SKY VIIRS COMPOSITES AT CONTINENTAL SCALE FOR THE STUDIES OF BELT AND ROAD INITIATIVE</b>	<b>7255</b>
<i>Jinhu Bian, Ainong Li, Guangbin Lei, Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, China</i>	

<b>THP1-PJ.5: A NOVEL SPECTRUM ELABORATION METHOD FOR MOVING TARGETS BASED ON EMPIRICAL MODE DECOMPOSITION</b>	<b>7259</b>
<i>Miao Zhang, Ruilin Yuan, Yi Shen, Harbin Institute of Technology, China</i>	
<b>THP1-PJ.6: GENERATION OF TRAINING EXAMPLES USING OSM DATA APPLIED FOR REMOTE SENSED LANDCOVER CLASSIFICATION</b>	<b>7263</b>
<i>Gisela Häufel, Dimitri Bulatov, Melanie Pohl, Lukas Lucks, Fraunhofer Institute of Optronics, System Technologies and Image Exploitation (IOSB), Germany</i>	
<b>THP1-PJ.7: OUTLINE RECONSTRUCTION FOR RADAR FORWARD-LOOKING IMAGING BASED ON TOTAL VARIATION FUNCTIONAL DECONVOLUTION METHOD</b>	<b>7267</b>
<i>Yang Wu, Yin Zhang, Yongchao Zhang, Yulin Huang, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
<b>THP1-PJ.8: FENGYUN-3 SATELLITE MICROWAVE DATA REMAP AND ITS APPLICATION</b>	<b>7271</b>
<i>Xiaoqing Li, Chengli Qi, Qifeng Lu, Ruixia Liu, Hui Liu, Yang Guo, Chunqiang Wu, National Satellite Meteorological Center, China Meteorological Administration, China</i>	
<b>THP1-PJ.9: MULTISTATIC SAR INFORMATION FUSION BASED ON IMAGE REGISTRATION AND FAKE COLOR SYNTHESIS</b>	<b>7275</b>
<i>Wenjing Wang, Junjie Wu, Xiaqing Yang, Yuxuan Miao, Jianyu Yang, Haiguang Yang, University of Electronic Science and Technology of China, China</i>	
<b>THP1-PJ.10: FOREST STAND EXTRACTION: WHICH OPTIMAL REMOTE SENSING DATA SOURCE(S)?</b>	<b>7279</b>
<i>Clément Dechesne, Clément Mallet, Arnaud Le Bris, Valérie Gouet, IGN-ENSG, Univ. Paris Est, France</i>	
 <b>THP2-PJ: DISASTER MONITORING AND EARLY WARNING</b>	
<b>THP2-PJ.1: THE INTRAPLATE 2016 MW 6.0 AUSTRALIA EARTHQUAKE STUDIED BY INSAR DATA</b>	<b>7283</b>
<i>Marco Polcari, Matteo Albano, Simone Atzori, Christian Bignami, Salvatore Stramondo, Istituto Nazionale di Geofisica e Vulcanologia, Italy</i>	
<b>THP2-PJ.2: APPLICATION OF LANDSAT-8 AND SENTINEL-1 IMAGES FOR DROUGHT MONITORING OVER THE KOREAN PENINSULA</b>	<b>7286</b>
<i>Dalgeun Lee, Jongpil Kim, Mi Hee Lee, Soo Bong Lee, Jinyoung Kim, NDMI, Republic of Korea</i>	
<b>THP2-PJ.3: CHARACTERISTICS OF THE DISTRIBUTION OF TEXTURES IN THE RECONSTRUCTION OF DAMAGED BUILDINGS IN THE KUMAMOTO EARTHQUAKE</b>	<b>7289</b>
<i>Masashi Sonobe, Hideki Hashiba, Nihon University, Japan</i>	
<b>THP2-PJ.4: APPLICATION OF THE GF SATELLITE DATA IN FLOOD DISASTER MONITORING</b>	<b>7293</b>
<i>Xiaotao Li, Jingxuan Lu, China Institute of Water Resources and Hydropower Research, China; Xiaoning Song, University of Chinese Academy of Sciences, China; Yayong Sun, Lin Li, Tianjie Lei, Wei Qu, China Institute of Water Resources and Hydropower Research, China</i>	
<b>THP2-PJ.5: EARLY WARNING OF CONSTRUCTION LAND IN VILLAGES AND TOWNS BASED ON FUZZY EXTENSION MATTER ELEMENT MODEL</b>	<b>7297</b>
<i>Hongga Li, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China; Ze Liu, Ministry of Housing and Urban-Rural Development of the People's Republic of China, China; Xiaoxia Huang, Xia Li, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China</i>	
<b>THP2-PJ.6: THE WHOLE PROCESS REMOTE SENSING MONITORING OF RIVER BASIN FLOOD-TAKING THE 2013 HEILONGJIANG RIVER FLOOD AS AN EXAMPLE</b>	<b>7301</b>
<i>Lin Li, Xiaotao Li, Jingxuan Lu, Tianjie Lei, Tao Sun, Wei Qu, China Institute of Water Resources and Hydropower Research, China</i>	

<b>THP2-PJ.7: QUANTITATIVE TYPICAL LAND COVER REMOTE SENSING AND ITS APPLICATION IN EARTHQUAKE EVALUATION</b> .....	<b>7304</b>
<i>Dan Yin, Xiuwan Chen, Peking University, China; Shihu Zhao, Satellite Surveying and Mapping Center, China</i>	
<b>THP2-PJ.9: COMPARISON OF LAND COVER MAPS USING HIGH RESOLUTION MULTISPECTRAL AND HYPERSPECTRAL IMAGERY</b> .....	<b>7312</b>
<i>Javier Marcello, Dionisio Rodríguez-Esparragón, Daniel Moreno, Universidad de Las Palmas de Gran Canaria, Spain</i>	
<b>THP2-PJ.10: LAND-USE CLASSIFICATION USING FINITE ELEMENT MACHINES</b> .....	<b>7316</b>
<i>Danillo Pereira, Joao Papa, Sao Paulo State University, Brazil; Luciene Papa, Faculty Southwest Paulista, Brazil; Rodrigo Pisani, University of Alfenas, Brazil</i>	
 <b>THP1-PK: SEA ICE I</b>	
<b>THP1-PK.1: SEA ICE CHANGE DETECTION IN SAR IMAGES BASED ON COLLABORATIVE REPRESENTATION</b> .....	<b>7320</b>
<i>Yunhao Gao, Feng Gao, Junyu Dong, Shengke Wang, Ocean University of China, China</i>	
<b>THP1-PK.2: SEA ICE CLASSIFICATION FROM HYPERSPECTRAL IMAGES BASED ON SELF-PACED BOOST LEARNING</b> .....	<b>7324</b>
<i>Dong Wang, Feng Gao, Junyu Dong, Yang Yang, Shengke Wang, Ocean University of China, China</i>	
<b>THP1-PK.3: AUTOMATED SEA ICE CLASSIFICATION OVER THE BALTIC SEA USING MULTIPARAMETRIC FEATURES OF TANDEM-X INSAR IMAGES</b> .....	<b>7328</b>
<i>Marjan Marbouti, University of Helsinki, Finland; Oleg Antropov, Aalto University, Finland; Patrick Eriksson, Finnish Meteorological Institute, Finland; Jaan Praks, Vahid Arabzadeh, Aalto University, Finland; Eero Rinne, Finnish Meteorological Institute, Finland; Matti Leppäranta, University of Helsinki, Finland</i>	
<b>THP1-PK.5: UP-SCALING FROM QUAD-POLARIMETRIC TO DUAL-POLARIMETRIC SAR DATA USING MACHINE LEARNING GAUSSIAN PROCESS REGRESSION</b> .....	<b>7332</b>
<i>Katalin Blix, Martine M. M. Espeseth, Torbjørn Eltoft, UiT The Arctic University of Norway, Norway</i>	
<b>THP1-PK.6: COMPARISON OF RETRIEVAL METHODS OF ARCTIC POLYNYA AREA</b> .....	<b>7336</b>
<i>Xiaolei Xie, Yongliang Wei, Yu Zhang, Shanghai Ocean University, China</i>	
<b>THP1-PK.7: MULTI-POLARIZATION SAR MEASUREMENTS TO OBSERVE COASTAL AREAS IN ANTARCTICA</b> .....	<b>7340</b>
<i>Ferdinando Nunziata, Andrea Buono, Università di Napoli Parthenope, Italy; M Moctezuma, Universidad Nacional Autonoma de Mexico, Mexico; Flavio Parmiggiani, Consiglio Nazionale delle Ricerche (CNR), Italy; Maurizio Migliaccio, Università di Napoli Parthenope, Italy</i>	
<b>THP1-PK.8: VERIFICATION OF SEA ICE DRIFT DATA OBTAINED FROM REMOTE SENSING INFORMATION</b> .....	<b>7344</b>
<i>Ruslan May, Krylov State Research Centre, Russian Federation</i>	
<b>THP1-PK.9: THRESHOLD VALUES FOR WEATHER FILTERS IN AMSR2 SEA ICE CONCENTRATION RETRIEVAL ALGORITHMS</b> .....	<b>7348</b>
<i>Elizaveta Zabolotskikh, RSHU, Russian Federation; Bertrand Chapron, IFREMER, France</i>	
<b>THP1-PK.10: ASSESSMENT OF SEASONAL SEA ICE TYPE AND ROUGHNESS REGIME DISCRIMINATION USING A UNIQUE C- AND L-BAND SAR DATABASE</b> .....	<b>7352</b>
<i>Randall Scharien, Torsten Geldsetzer, Sasha Nasonova, Silvie Cafarella, Aikaterini Tavri, University of Victoria, Canada</i>	
 <b>THP2-PK: REMOTE SENSING OF CROP AND SOIL PARAMETERS</b>	
<b>THP2-PK.1: A MODIFIED RATIO VEGETATION INDEX: A NOVEL METHOD FOR REMOTE ESTIMATION OF LEAF CHLOROPHYLL CONTENT FOR WINTER WHEAT</b> .....	<b>7354</b>
<i>Juan Sui, Qiming Qin, Huazhong Ren, Yuanheng Sun, Hui Yuan, Tianyuan Zhang, Peking University, China</i>	



**THP2-PK.5: USING A COSMIC-RAY NEUTRON SENSOR (CRNS) TO MONITOR VEGETATION ..... 7365**

*Kaitlin Togliatti, Brian K. Hornbuckle, Iowa State University, United States*

**THP2-PK.6: EVALUATION OF SENTINEL-1A C-BAND SYNTHETIC APERTURE RADAR FOR CITRUS CROP CLASSIFICATION IN FLORIDA, UNITED STATES ..... 7369**

*Claire Boryan, Zhengwei Yang, National Agricultural Statistics Service, United States; Barry Haack, George Mason University, United States*

**THP2-PK.9: SEBAL BASED EVAPOTRANSPIRATION ESTIMATION FOR UPPER TAPI BASIN (INDIA) ..... 7380**

*Lalit Pal, Indian Institute of Technology Roorkee, India; Amit Kumar, National Institute of Hydrology Roorkee, India; Csp Ojha, Indian Institute of Technology Roorkee, India; Surendra Kumar Chandniha, National Institute of Hydrology, India*

**THP2-PK.10: A NOVEL APPROACH TO SELECT ANCHOR PIXELS IN SEBAL MODEL BY USING INPUTS FROM SAR IMAGES ..... 7383**

*Prakash Mohan M M, Rajitha K, Murari R R Varma, BITS Pilani Hyderabad Campus, India*

**THP1-PL: DATA MANAGEMENT AND SYSTEMS II**

**THP1-PL.1: OPPORTUNITIES HIGHLIGHTED BY THE NSOSA STUDY..... 7387**

*Karen St. Germain, Frank Gallagher, National Oceanic and Atmospheric Administration, United States; Mark Maier, The Aerospace Corporation, United States*

**THP1-PL.3: SPECTRAL LIBRARY: A PROPOSAL FOR DATA MODEL ..... 7395**

*Carlos Alberto Stelle, Brazilian Army Geographic Service, Brazil; Francisco Javier Ariza-López, Manuel Antonio Ureña-Cámara, University of Jaén, Spain*

**THP1-PL.4: SCIENTIFIC OPPORTUNITIES AND CHALLENGES FOR MULTI-PLATFORM REMOTE SENSING ..... 7399**

*Pedro Jurado, MOLTEK C/O ESA/ESTEC, Netherlands; Amanda Regan, European Space Agency/ESTEC, Netherlands*

**THP1-PL.5: TOWARDS AN INTEGRAL MODEL-BASED SIMULATOR FOR AUTONOMOUS EARTH OBSERVATION SATELLITE NETWORKS ..... 7403**

*Joan Adria Ruiz-de-Azúa, Carles Araguz, Anna Calveras, Eduard Alarcón, Adriano Camps, Technical University of Catalonia - UPC BarcelonaTech, Spain*

**THP1-PL.6: CEOS ANALYSIS READY DATA FOR LAND (CARD4L) OVERVIEW .....7407**

*Adam Lewis, Geoscience Australia, Australia; Jennifer Lacey, USGS EROS, United States; Susanne Mecklenburg, European Space Agency, Italy; Jonathon Ross, Andreia Siqueira, Geoscience Australia, Australia; Brian Killough, NASA Langley Research Center, United States; Zoltan Szantoi, European Commission, Joint Research Centre (JRC), Italy; Takeo Tadono, Japan Aerospace Exploration Agency, Japan; Ake Rosenqvist, solo Earth Observation, Japan; Philippe Goryl, Nuno Miranda, Steven Hosford, European Space Agency, Italy*

**THP2-PL: SURFACE CHARACTERIZATION AND MINERAL MAPPING FROM REMOTE SENSING**

**THP2-PL.1: STUDY AND ANALYSIS OF THE DRAINAGE NETWORK IN THE EASTERN ANTI-Atlas AND THE ROLE OF GEOLOGY AND GEOMORPHOLOGY ON ITS EVOLUTION USING REMOTE SENSING AND GIS DATA ..... 7411**

*Tarik Bouramtane, Ilias Kacimi, Mohammed V University, Morocco; Amal Saidi, Scientific Institut, Mohammed V University, Morocco; Abdessamad El Adraoui, Moad Morarech, Mohammed V University, Morocco; Abdelfatah Tahiri, Scientific Institut, Mohammed V University, Morocco*

**THP2-PL.2: AN INVESTIGATION OF THE FLUVIAL GEOMORPHOLOGY AND ASSOCIATED MINERALS IN THE SYRTIS MAJOR, MARS ..... 7415**

*Vidhya Ganesh Rangarajan, Rishikesh Bharti, Subashisa Dutta, Indian Institute of Technology Guwahati, India*

<b>THP2-PL.3: RURAL ROAD NETWORKS MATCHING VIA EXTENDING LINE.....</b>	<b>7419</b>
<i>Xiaofang Wang, Yu Zang, Yiping Chen, Cheng Wang, Jonathan Li, Xiamen University, China</i>	
<b>THP2-PL.5: FAST AND EASY INTEGRATION AND CLASSIFICATION OF HYPERSPECTRAL OPTICAL AND THERMAL DATA: A MINERAL MAPPING CASE STUDY .....</b>	<b>7426</b>
<i>Veronika Kopačková, Lucie Koucká, Jan Jelének, Czech Geological Survey, Czech Republic; Jan Hanuš, Global Change Research Institute CAS CzechGlobe, Czech Republic</i>	
<b>THP2-PL.6: THE NEED FOR MULTI-SOURCE, MULTI-SCALE HYPERSPECTRAL IMAGING TO BOOST NON-INVASIVE MINERAL EXPLORATION. ....</b>	<b>7430</b>
<i>Richard Gloaguen, Helmholtz-Zentrum Dresden-Rossendorf, Germany; Pedram Ghamisi, German Aerospace Center (DLR), Germany; Sandra Lorenz, Moritz Kirsch, Robert Zimmermann, Helmholtz-Zentrum Dresden-Rossendorf, Germany; René Booyesen, University of the Witwatersrand, South Africa; Louis Andreani, Robert Jackisch, Erik Hermann, Laura Tusa, Gabriel Unger, Cecilia Contreras, Mahdi Khodadadzadeh, Margret Fuchs, Helmholtz-Zentrum Dresden-Rossendorf, Germany</i>	
<b>THP2-PL.7: APPLICATION OF MULTI-SOURCE DATA ON STRUCTURAL FRAMEWORK STUDY IN THE WESTERN BEISHAN OROGENIC BELT, NORTHWEST CHINA .....</b>	<b>7434</b>
<i>Jianyu Liu, China Aero Geophysical Survey and Remote Sensing Center for Land and Resources, China; Ling Chen, Wei Li, China Aero Geophysical Survey and Remote Sensing Center for Land and Resources, China; Genhou Wang, China University of Geosciences, China; Xiao Xiao, Pengxin International Mining Co., LTD., China</i>	
<b>THP2-PL.8: DERIVATION OF RELIABLE SURFACE ELEVATION MEASUREMENTS FROM ICESAT/GLAS WAVEFORMS BY INCORPORATING SPATIAL CONTEXTUAL INFORMATION .....</b>	<b>7438</b>
<i>Hongxing Liu, Song Shu, University of Cincinnati, United States</i>	
<b>THP2-PL.9: FILLING SRTM VOID DATA VIA CONDITIONAL ADVERSARIAL NETWORKS .....</b>	<b>7441</b>
<i>Guoshuai Dong, Fang Chen, Peng Ren, China University of Petroleum (East China), China</i>	
<b>THP1-PM: VEGETATED AREA AND ECOLOGICAL APPLICATIONS</b>	
<b>THP1-PM.1: HYPERSPECTRAL IMAGE REFINED PLANT CLASSIFICATION BY GRAPH BASED COMPOSITE KERNEL .....</b>	<b>7444</b>
<i>Yanling Liu, Ye Zhang, Harbin Institute of Technology, China</i>	
<b>THP1-PM.2: DEVELOPMENT OF FUSION APPROACH FOR ESTIMATION OF VEGETATION FRACTION COVER WITH DRONE AND SENTINEL-2 DATA .....</b>	<b>7448</b>
<i>Ajay Kumar Maurya, Dharmendra Singh, Indian Institute of Technology Roorkee, India; K P Singh, Indian Institute of Technology (BHU) Varanasi, India</i>	
<b>THP1-PM.3: ANALYZING LAND USE LAND COVER AND DEFORESTATION IN REDD+ AREA, CENTRAL KALIMANTAN PROVINCE, INDONESIA .....</b>	<b>7452</b>
<i>Norida Maryantika, Chinsu Lin, National Chiayi University, Indonesia</i>	
<b>THP1-PM.4: CROP CLASSIFICATION USING FULLY POLARIMETRIC SAR IMAGERY .....</b>	<b>7456</b>
<i>Gangqiang An, Minfeng Xing, University of Electronic Science and Technology of China, China; Xiliang Ni, Chinese Academy of Sciences, China; Junjie Zhou, University of Electronic Science and Technology of China, China</i>	
<b>THP1-PM.5: DENSE FULLY CONVOLUTIONAL NETWORKS FOR CROP RECOGNITION FROM MULTITEMPORAL SAR IMAGE SEQUENCES .....</b>	<b>7460</b>
<i>Laura Elena Cué La Rosa, Patrick Nigri Happ, Raul Queiroz Feitosa, Pontifical Catholic University of Rio de Janeiro, Brazil</i>	
<b>THP1-PM.6: BIODIVERSITY FUNCTION ASSESSMENT OF TYPICAL COUNTY - A CASE STUDY OF QINGCHUAN COUNTY .....</b>	<b>7464</b>
<i>Yanling Chen, Adu Gong, Jingmei Wang, Tingting Zeng, Yuqing Yang, Jing Li, Yunhao Chen, Beijing Normal University, China; Xingling Wang, Tianrong Yang, Information Center of Ministry of Civil Affairs of the People's Republic of China, China</i>	

<b>THP1-PM.7: CONSTRUCTION OF ECOLOGICAL SECURITY PATTERNS BASED ON ECOLOGICAL PROTECTION REDLINES IN JIANGXI PROVINCE, CHINA</b>	<b>7468</b>
<i>Changxin Zou, Xin Ye, Nanjing Institute of Environmental Sciences, Ministry of Environmental Protection, China; Shanshan Yang, Nanjing University of Information Science and Technology, China</i>	
<b>THP1-PM.8: EVALUATION AND CALIBRATION OF AN AGENT BASED LAND USE MODEL USING REMOTELY SENSED LAND COVER AND PRIMARY PRODUCTIVITY DATA</b>	<b>7472</b>
<i>Bumsuk Seo, Calum Brown, Mark Rounsevell, Karlsruhe Institute of Technology, Germany</i>	
<b>THP1-PM.9: OBJECT-ORIENTED CLASSIFICATION FOR ECOLOGICALLY SOUND LAND BASED ON HIGH-RESOLUTION IMAGES</b>	<b>7476</b>
<i>Jing Wang, Wuhan University, China; Xiaoxiang Zhang, Hohai University, China; Yingkun Du, Wuhan University, China; Xue Jia, Hohai University, China; Yifan Lin, Peking University, China</i>	
<b>THP1-PM.10: RELATIONSHIP BETWEEN BISTATIC RADAR SCATTERING CROSS SECTIONS AND GPS REFLECTOMETRY DELAY-DOPPLER MAPS OVER VEGETATED LAND IN SUPPORT OF SOIL MOISTURE RETRIEVAL</b>	<b>7480</b>
<i>Amir Azemati, Mahta Moghaddam, University of Southern California, United States; Arvind Bhat, Intelligent Automation INC. (IAI), United States</i>	
 <b>THP2-PM: SOIL PARAMETERS FROM MICROWAVE AND OTHER FREQUENCIES II</b>	
<b>THP2-PM.1: SOIL MOISTURE RETRIEVAL FOR PERIODIC FIELDS BY THE USE OF RADARSAT-2 POLARIMETRIC SAR IMAGERY</b>	<b>7483</b>
<i>Lingli Zhao, Jie Yang, Pingxiang Li, Wuhan University, China; Wenjun Han, State Grid, China; Xiaoli Ding, The Hong Kong Polytechnic University, China; Weidong Sun, Lei Shi, Wuhan University, China</i>	
<b>THP2-PM.2: SOIL MOISTURE RETRIEVAL BY COMBINING USING ACTIVE AND PASSIVE MICROWAVE DATA</b>	<b>7487</b>
<i>Shangnan Li, Jilin University, China; Tianjie Zhao, Jiancheng Shi, Lu Hu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Rui Zhao, Jilin University, China</i>	
<b>THP2-PM.3: UNMIXING OF MINERALOGICAL CLAY INTIMATE MIXTURES WITH LABORATORY HYPERSPECTRAL IMAGES</b>	<b>7491</b>
<i>Etienne Ducasse, ONERA, France; Audrey Hohmann, BRGM, France; Karine Adeline, Rosa Oltra-Carrió, ONERA, France; Anne Bourguignon, BRGM, France; Philippe Déliot, Xavier Briottet, ONERA, France; Gilles Grandjean, BRGM, France</i>	
<b>THP2-PM.7: ESTIMATING POTENTIAL ANNUAL SOIL LOSS OF WATERSHED IN NIGERIA USING RULSE IN A GIS AND REMOTE SENSING ENVIRONMENT</b>	<b>7504</b>
<i>Akintunde Vincent Akinmolayan, Obafemi Awolowo University, Nigeria; Kayode Adepoju, Samuel Adelabu, University of the Free State, QwaQwa Campus, South Africa; Abiodun Osunmadewa, Obafemi Awolowo University, Nigeria</i>	
<b>THP2-PM.9: INTERCOMPARISON OF MULTIPLY SOIL SURFACE ROUGHNESS DATA SETS OVER THE TIBETAN PLATEAU</b>	<b>7512</b>
<i>Menglei Han, Hui Lu, Kun Yang, Tsinghua University, China</i>	
<b>THP2-PM.10: POTENTIAL OF SENTINEL-1 FOR ESTIMATING THE SOIL ROUGHNESS OVER AGRICULTURAL SOILS</b>	<b>7516</b>
<i>Nicolas Baghdadi, Mohammad El Hajj, Mohammad Choker, IRSTEA, University of Montpellier, France; Mehrez Zribi, CNRS, CESBIO, France; Hassan Bazzi, IRSTEA, University of Montpellier, France; Emmanuelle Vaudour, Jean-Marc Gilliot, AgroParisTech, France; Safa Bousbih, CESBIO, France; Dav Ebengo Mwampongo, AgroParisTech, France</i>	
 <b>THP1-PN: FOREST MONITORING USING LIDAR I</b>	
<b>THP1-PN.1: SEGMENTATION OF INDIVIDUAL TREES BASED ON A POINT CLOUD CLUSTERING METHOD USING AIRBORNE LIDAR DATA</b>	<b>7520</b>
<i>Shihua Li, Lian Su, Yuhan Liu, Ze He, University of Electronic Science and Technology of China, China</i>	

<b>THP1-PN.2: A MULTILEVEL SLICING BASED CODING METHOD FOR TREE DETECTION .....</b>	<b>7524</b>
<i>Chien-Yu Lin, University of Maryland, Baltimore County, United States; Chinsu Lin, National Chiayi University, Taiwan; Chein-I Chang, University of Maryland, Baltimore County, United States</i>	
<b>THP1-PN.3: PREDICTION OF FOREST ATTRIBUTES WITH MULTISPECTRAL LIDAR DATA .....</b>	<b>7528</b>
<i>Dalponte Michele, Fondazione Edmund Mach, Italy; Liviu Theodor Ene, Swiss Federal Research Institute WSL, Switzerland; Terje Gobakken, Erik Næsset, Norwegian University of Life Sciences, Norway; Damiano Gianelle, Fondazione Edmund Mach, Italy</i>	
<b>THP1-PN.4: FUSION OF MULTIPLE LOW-RESOLUTION NASA AIRBORNE SNOW .....</b>	<b>7532</b>
<b>OBSERVATORY (ASO) LIDAR DATA FOR FOREST VEGETATION STRUCTURE CHARACTERIZATION</b>	
<i>Antonio Ferraz, Sassan Saatchi, Kat J. Bormann, Thomas H. Painter, NASA Jet Propulsion Laboratory, United States</i>	
<b>THP1-PN.5: RETRIEVING THE LEAF AREA INDEX OF INDIVIDUAL TREES AND STANDS .....</b>	<b>7536</b>
<b>USING SINGLE-SCAN DATA FROM A TERRESTRIAL LASER SCANNER</b>	
<i>Yumei Li, Qinghua Guo, Yanjun Su, Institute of Botany, Chinese Academy of Sciences, China</i>	
<b>THP1-PN.6: ASSESSMENT OF FOREST STRUCTURAL DIVERSITY DIFFERENCES IN .....</b>	<b>7540</b>
<b>MEDITERRANEAN LANDSCAPES AFFECTED BY FIRES USING ALS DATA</b>	
<i>Pere Joan Gelabert, Antonio Luis Montealegre, Universidad de Zaragoza, Spain; María Teresa Lamelas, Centro Universitario de la Defensa de Zaragoza, Spain; Darío Domingo, Universidad de Zaragoza, Spain</i>	
<b>THP1-PN.7: TOWARDS EXTRACTION OF LIANAS FROM TERRESTRIAL LIDAR SCANS OF .....</b>	<b>7544</b>
<b>TROPICAL FORESTS</b>	
<i>Yunfei Bao, BISMÉ, China; Sruthi Moorthy, Hans Verbeeck, University Gent, Belgium</i>	
<b>THP1-PN.8: DETECTION AND HEALTH ANALYSIS OF INDIVIDUAL TREE IN URBAN .....</b>	<b>7548</b>
<b>ENVIRONMENT WITH MULTI-SENSOR PLATFORM</b>	
<i>Yunhe Feng, Chenglu Wen, Pengdi Huang, Cheng Wang, Jonathan Li, Xiamen University, China</i>	
<b>THP1-PN.9: ESTIMATING FOREST RESIDUAL BIOMASS IN MEDITERRANEAN PINUS .....</b>	<b>7552</b>
<b>HALEPENSIS FOREST USING LOW POINT DENSITY ALS DATA</b>	
<i>Darío Domingo, Antonio Luis Montealegre, University of Zaragoza, Spain; María Teresa Lamelas, Alberto García-Martín, Academia General Militar, Spain; Juan de la Riva, University of Zaragoza, Spain</i>	
 <b>THP2-PN: AEROSOLS AND ATMOSPHERIC CHEMISTRY I</b>	
<b>THP2-PN.1: ESTIMATE OF ATMOSPHERIC COLUMNAR AEROSOL COMPOSITION BASED .....</b>	<b>7556</b>
<b>ON REMOTE SENSING MEASUREMENTS</b>	
<i>Yisong Xie, Zhengqiang Li, Donghui Li, Kaitao Li, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>THP2-PN.2: AEROSOL RETRIEVALS OVER BRIGHT URBAN SURFACES USING LANDSAT 8 .....</b>	<b>7560</b>
<b>IMAGES</b>	
<i>Muhammad Bilal, Zhongfeng Qiu, Nanjing University of Information Science and Technology, China</i>	
<b>THP2-PN.3: INTEGRATED AEROSOL EXTINCTION PROFILES FROM CEILOMETER AND .....</b>	<b>7564</b>
<b>SUNPHOTOMETER COMBINATION AGAINST SUNPHOTOMETER MEASUREMENTS AT VARIOUS HEIGHTS</b>	
<i>Marcos Herrerías, Roberto Román, Atmospheric Optics Group (GOA), University of Valladolid, Spain; Alberto Cazorla, Department of Applied Physics, University of Granada, Spain; Carlos Toledano, Atmospheric Optics Group (GOA), University of Valladolid, Spain; Hassan Lyamani, Department of Applied Physics, University of Granada, Spain; Benjamin Torres, Laboratoire d'Optique Atmosphérique, University of Lille 1, France, France; Victoria Cachorro, Atmospheric Optics Group (GOA), University of Valladolid, Spain; Francisco Jose Olmo, Lucas Alados-Arboledas, Department of Applied Physics, University of Granada, Spain; Ángel Maximo de Frutos, Atmospheric Optics Group (GOA), University of Valladolid, Spain</i>	

**THP2-PN.4: STUDY OF HAZE POLLUTION DURING WINTER IN WUHAN, CHINA..... 7568**  
*Boming Liu, Yingying Ma, Wei Gong, Tianhao Zhang, Yifan Shi, State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing (LIESMARS), Wuhan University, China*

**THP2-PN.5: CÆLIS: A SYSTEM FOR AEROSOL MEASUREMENT NETWORK..... 7572**  
*David Fuertes, Carlos Toledano, Ramiro Gonzalez, Alberto Berjon, Group of Atmospheric Optics, Spain; Benjamín Torres, GRASP SAS, France; Victoria Cachorro, Ángel Maximo de Frutos, Group of Atmospheric Optics, Spain*

**THP2-PN.7: NEW EXPERIMENTS ON AEROSOL HYGROSCOPIC GROWTH IN A TROPICAL ENVIRONMENT ..... 7578**  
*Li Tan, Daniel M. Kalbermatter, Santo V. Salinas, National University of Singapore, Singapore*

**THP2-PN.8: DEEP LEARNING FOR GROUND-LEVEL PM2.5 PREDICTION FROM SATELLITE REMOTE SENSING DATA ..... 7581**  
*Tongwen Li, Huanfeng Shen, Qiangqiang Yuan, Liangpei Zhang, Wuhan University, China*

**THP2-PN.9: ESTIMATING PM 2.5 IN BRITISH COLUMBIA BEFORE AND AFTER WILDFIRES USING 3 KM MODIS AOD PRODUCTS FROM FEBRUARY TO AUGUST 2017 ..... 7585**  
*Mengge Chen, Yue Gu, Ming Liu, Jonathan Li, University of Waterloo, Canada*

## **THP1-PO: MICROWAVE REMOTE SENSING OF VEGETATION**

**THP1-PO.2: EXPLOITATION OF COPERNICUS SENTINELS DATA FOR SENSING FIRE-DISTURBED VEGETATED AREAS ..... 7589**  
*Antonio Pepe, Daniela Stroppiana, Fabiana Calò, Pasquale Imperatore, Institute for the Electromagnetic Sensing of the Environment (IREA), National Research Council (CNR), Italy; Luigi Boschetti, University of Idaho, United States; Christian Bignami, INGV, Italy; Pietro Alessandro Brivio, Institute for the Electromagnetic Sensing of the Environment (IREA), National Research Council (CNR), Italy; Riccardo Lanari, Institute for the Electromagnetic Sensing of the Environment (IREA), National Research Council (CNR), Italy*

**THP1-PO.3: STUDY OF SENTINEL-1 DATA FOR MONITORING VEGETATED AREAS ASSISTED WITH LANDSAT 8 DATA ..... 7593**  
*Shiyu Luo, Kamal Sarabandi, University of Michigan, United States*

**THP1-PO.4: VEGETATION WATER CONTENT ESTIMATION FOR CORN BY MEANS OF INVERSE MODELING FROM SIMULATIONS OF THE FIRST-ORDER SCATTERING MODEL ..... 7597**  
*Wenxing Hu, Linna Chai, Shaojie Zhao, Beijing Normal University, China*

**THP1-PO.5: AN EXTENSION OF MICROWAVE VEGETATION INDICES FOR SHORT VEGETATION COVERED SURFACES USING FY-3B/MWRI DATA ..... 7601**  
*Yunqing Li, Jiancheng Shi, Beijing City University, China*

## **THP2-PO: OCEAN ALTIMETRY II**

**THP2-PO.2: HY-2A SATELLITE PRECISE ORBIT DETERMINATION METHODS AND VALIDATION ..... 7605**  
*Hailong Peng, Mingsen Lin, Xiaohui Wang, Juhong Zou, National Satellite Ocean Application Service, China*

**THP2-PO.3: CALIBRATION AND VALIDATION OF HY-2A DERIVED SIGNIFICANT WAVE HEIGHT USING TRIPLE COLLOCATION ..... 7609**  
*He Wang, National Ocean Technology Center, China; Jing Wang, Zhejiang Ocean University, China; Jianhua Zhu, Chuntao Chen, Xiaoqi Huang, Wanlin Zhai, National Ocean Technology Center, China*

**THP2-PO.4: DOPPLER AMBIGUITIES MASKING FOR ALTIMETER WAVEFORMS: A MODEL BASED APPROACH ..... 7613**  
*Lisa Recchia, Michele Scagliola, Davide Giudici, Aresys s.r.l., Italy*

<b>THP2-PO.5: VALIDATION OF WAVE AND WIND PRODUCT OF THE NEW PHASE SARAL USING BUOYS DATA</b>	<b>7617</b>
<i>Chuntao Chen, Yili Zhao, Jianhua Zhu, He Wang, Xiaoqi Huang, Weiwei Yang, Wanlin Zhai, National Ocean Technology Center, China; Chaofei Ma, National Satellite Ocean Application Service, State Oceanic Administration, China</i>	
<b>THP2-PO.6: EFFECTS OF SEA STATE BIAS ON GLOBAL MEAN SEA LEVEL TREND</b>	<b>7621</b>
<i>Yongcun Cheng, Shanghai Ocean University, China; Qing Xu, Hohai University, China; Xiaofeng Li, GST Inc., NESDIS/NOAA, United States</i>	
<b>THP2-PO.7: THE ENHANCEMENT OF UPPER OCEAN NUTRIENTS CONCENTRATION IN THE PERIPHERIES OF TWO ANTI-CYCLONIC EDDIES</b>	<b>7624</b>
<i>Tao Wang, Jue Ning, Qing Xu, Hohai University, China</i>	
<b>THP2-PO.8: THE VALIDATION OF WET ZENITH DELAY OF GROUND GPS STATIONS BASED ON JASON-2 AMR</b>	<b>7628</b>
<i>Wanlin Zhai, Jianhua Zhu, Chuntao Chen, He Wang, Xiaoqi Huang, Longhao Yan, National Ocean Technology Center, China</i>	
<b>THP2-PO.9: INTERCOMPARISON AND ANOMALY ANALYSIS OF WET TROPOSPHERIC CORRECTIONS FROM JASON-3 AND SARAL</b>	<b>7632</b>
<i>Xiaoqi Huang, National Ocean Technology Center, China; Xinyue Liu, Tianjin University of Technology and Education, China; Jianhua Zhu, Chuntao Chen, He Wang, Wanlin Zhai, National Ocean Technology Center, China</i>	
 <b>THP1-PP: REMOTE SENSING OF VEGETATION III</b>	
<b>THP1-PP.1: RECONSTRUCTING THE VEGETATION DISTURBANCE HISTORY OF A BIODIVERSITY HOTSPOT IN CENTRAL CHILE USING LANDSAT, BFASST AND LANDTRENDR</b>	<b>7636</b>
<i>Julián Cabezas, Fabian Ewald Fassnacht, Karlsruhe Institute of Technology, Germany</i>	
<b>THP1-PP.2: MODELLING LANDSURFACE TIME-SERIES WITH RECURRENT NEURAL NETS</b>	<b>7640</b>
<i>Markus Reichstein, Simon Besnard, Nuno Carvalhais, Fabian Gans, Martin Jung, Basil Kraft, Miguel Mahecha, Max Planck Institute for Biogeochemistry, Germany</i>	
<b>THP1-PP.3: WILDFIRE RISK ASSESSMENT USING MULTI-SOURCE REMOTE SENSE DERIVED VARIABLES</b>	<b>7644</b>
<i>Chongbo Wen, Binbin He, Xingwen Quan, Xiangzhuo Liu, University of Electronic Science and Technology of China, China; Xiaofang Liu, School of Computer Science, Sichuan University of Science and Engineering, China</i>	
<b>THP1-PP.4: A GLOBAL MULTIMODEL ANALYSIS OF PREDICTED CHANGES IN PLANT WATER USE EFFICIENCY AND PRIMARY PRODUCTIVITY IN THE 21ST CENTURY</b>	<b>7648</b>
<i>Sergio Bernardes, University of Georgia, United States</i>	
<b>THP1-PP.5: ESTIMATION OF VEGETATION FUNCTIONING IN A DROUGHT EPISODE FROM OPTICAL AND THERMAL REMOTE SENSING</b>	<b>7652</b>
<i>Bagher Bayat, Christiaan van der Tol, Wouter Verhoef, University of Twente, Netherlands</i>	
<b>THP1-PP.7: MONITORING EVAPOTRANSPIRATION WITH REMOTE SENSING DATA AND GROUND DATA USING ENSEMBLE MODEL AVERAGING</b>	<b>7656</b>
<i>Albert Olioso, INRA, France; Aubin Allies, Gilles Boulet, Emilie Delogu, Jérôme Demarty, IRD, France; Belen Gallego Elvira, Maria Mira, Olivier Marloie, INRA, France; Philippe Chauvelon, Olivier Boutron, Tour du Valat, France; Samuel Buis, Marie Weiss, Cecile Velluet, Malik Bahir, INRA, France</i>	
<b>THP1-PP.8: RETRIEVAL OF FUEL MOISTURE CONTENT FROM HIMAWARI-8 PRODUCT: TOWARDS REAL-TIME WILDFIRE RISK ASSESSMENT</b>	<b>7660</b>
<i>Xingwen Quan, Binbin He, University of Electronic Science and Technology of China, China; Marta Yebra, The Australian National University, Australia; Xiangzhuo Liu, University of Electronic Science and Technology of China, China; Xiaofang Liu, School of Computer Science, Sichuan University of Science and Engineering, China; Xiaodong Zhang, University of Electronic Science and Technology of China, China; Hui Cao, School of Computer Science, Sichuan University of Science and Engineering, China</i>	

<b>THP1-PP.9: AUTOMATIC FOREST EXTRACTION METHOD BASED ON SELF-ORGANIZING MAP ALGORITHM USING GF-2 IMAGES</b>	<b>7664</b>
<i>Qian Zhan, Shufang Tian, China University of Geosciences Beijing, China</i>	
<b>THP2-PP: OCEAN ALTIMETRY III</b>	
<b>THP2-PP.1: HY-2A SATELLITE ALTIMETRY ADVANCED WAVEFORM PROCESSING OFFSHORE HONG KONG</b>	<b>7668</b>
<i>Xi-Yu Xu, Ke Xu, NSSC, CAS, China; Florence Birol, LEGOS, France; Shuang-Bao Yang, NSSC, CAS, China</i>	
<b>THP2-PP.2: ANALYSIS OF THE DEPENDENCE ON RETRACKERS OF THE JASON SATELLITES ALTIMETRY PRODUCTS</b>	<b>7672</b>
<i>He-Guang Liu, Xi-Yu Xu, NSSC, CAS, China; Le Yang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>THP2-PP.3: COASTAL APPLICATION OF SEA SURFACE HEIGHT MEASUREMENT USING DIRECT BROADCAST SATELLITE SIGNALS</b>	<b>7676</b>
<i>Rashmi Shah, Jet Propulsion Laboratory, California Institute of Technology, United States; James Garrison, Purdue University, United States; Zhijin Li, Jet Propulsion Laboratory, California Institute of Technology, United States; Soon Chye Ho, Purdue University, United States</i>	
<b>THP2-PP.4: MOUNTAINTOP OCEAN REFLECTOMETRY WITH DUAL FREQUENCY GPS SIGNALS: EXPERIMENT AND PRELIMINARY RESULTS</b>	<b>7680</b>
<i>Yunxiang Liu, Ian Collett, Yu Morton, Sara Hrbek, Dennis Akos, University of Colorado Boulder, United States</i>	
<b>THP2-PP.5: ANALOG DATA ASSIMILATION FOR ALONG-TRACK NADIR AND SWOT ALTIMETRY DATA IN THE WESTERN MEDITERRANEAN SEA</b>	<b>7684</b>
<i>Manuel Lopez-Radcenco, IMT Atlantique, France; Ananda Pascual, Mediterranean Institute for Advanced Studies, Spain; Laura Gomez-Navarro, Université Grenoble Alpes, France; Abdeldjalil Aissa-El-Bey, Ronan Fablet, IMT Atlantique, France</i>	
<b>THP1-PQ: REMOTE SENSING FOR ESTIMATION OF BIOPHYSICAL PARAMETERS III</b>	
<b>THP1-PQ.1: MONITORING RICE PHENOLOGY BASED ON FREEMAN-DURDEN DECOMPOSITION OF MULTI-TEMPORAL RADARSAT-2 DATA</b>	<b>7691</b>
<i>Ze He, Shihua Li, Sen Lin, Leiyu Dai, University of Electronic Science and Technology of China, China</i>	
<b>THP1-PQ.3: QUANTITATIVE MONITORING OF COMPLETE RICE GROWING SEASONS USING SENTINEL 2 TIME SERIES IMAGES</b>	<b>7699</b>
<i>Emma Madigan, Yiqing Guo, Mark Pickering, The University of New South Wales, Australia; Alex Held, Commonwealth Scientific and Industrial Research Organisation, Australia; Xiuping Jia, The University of New South Wales, Australia</i>	
<b>THP1-PQ.5: THE INTEGRATED USE OF LANDSAT, SENTINEL-2 AND PLANETSCOPE SATELLITE DATA FOR CROP MONITORING</b>	<b>7707</b>
<i>Dorj Ichikawa, Koji Wakamori, Japan Manned Space Systems Corporation, Japan</i>	
<b>THP1-PQ.6: HEIGHT AND BIOMASS INVERSION OF WINTER WHEAT BASED ON CANOPY HEIGHT MODEL</b>	<b>7711</b>
<i>Haikuan Feng, Li Pan, Fan Yang, Haojie Pei, Beijing Research Center for Information Technology In Agriculture, China; Huifang Wang, Beijing Municipal Climate Center, China; Guijun Yang, Mingxing Liu, Zhichao Wu, Beijing Research Center for Information Technology In Agriculture, China</i>	
<b>THP1-PQ.7: THE COMBINED USE OF SENTINEL-1, SENTINEL-2 AND LANDSAT 7&amp;8 DATA FOR ESTIMATING HEADING DATE OF PADDY RICE</b>	<b>7715</b>
<i>Koji Wakamori, Dorj Ichikawa, JAMSS, Japan</i>	

<b>THP1-PQ.8: SORGHUM BIOMASS PREDICTION USING UAV-BASED REMOTE SENSING DATA AND CROP MODEL SIMULATION</b>	7719
<i>Ali Masjedi, Purdue University Civil Engineering, United States; Jieqiong Zhao, Addie Thompson, Kai-Wei Yang, John Flatt, Melba Crawford, David Ebert, Mitchell Tuinstra, Purdue University, United States; Graeme Hammer, Scott Chapman, The University of Queensland, Australia</i>	
<b>THP1-PQ.9: CROP LODGING ANALYSIS FROM UAS ORTHOPHOTO MOSAIC, SENTINEL-2 IMAGE AND CROP YIELD MONITOR DATA</b>	7723
<i>Teemu Kumpumäki, Petri Linna, Tarmo Lipping, Tampere University of Technology, Finland</i>	
<b>THP1-PQ.10: RESEARCH ON THE OPTIMAL THRESHOLDS FOR CROP START AND END OF SEASON RETRIEVAL FROM REMOTELY SENSED TIME-SERIES DATA BASED ON GROUND OBSERVATIONS</b>	7727
<i>Xin Huang, Jianhong Liu, Northwest University, China; Clement Atzberger, University of Natural Resources and Life Sciences, Austria; Qiufeng Liu, National Climate Center, China</i>	
 <b>THP2-PQ: OPTICAL SENSORS AND MISSIONS</b>	
<b>THP2-PQ.1: IMAGE SIMULATIONS FOR THE ADVANCED OPTICAL SATELLITE (ALOS-3)</b>	7731
<i>Takeo Tadono, Ayano Oka, Hidenori Watarai, Japan Aerospace Exploration Agency, Japan; Junichi Takaku, Fumi Ohgushi, Masanori Doutsu, Remote Sensing Technology Center of Japan, Japan</i>	
<b>THP2-PQ.2: SENTINEL-2 LEVEL-1 RADIOMETRY VALIDATION USING VICARIOUS METHODS FROM DIMITRI DATABASE</b>	7735
<i>Bahjat Alhammoud, Jan Jackson, Sebastien Clerc, Manuel Arias, ARGANS Ltd., United Kingdom; Catherine Bouzinac, CSSI, France; Ferran Gascon, Enrico G. Cadau, Rosario Iannone, European Space Agency/ESRIN, Italy</i>	
<b>THP2-PQ.3: CERES FM-6 ON NOAA-20 ENABLING CONTINUITY OF EARTH RADIATION BUDGET MEASUREMENTS INITIAL RESULTS</b>	7739
<i>Kory Priestley, NASA Langley Research Center, United States; Susan Thomas, Lou Smith, Science Systems and Applications, Inc, United States</i>	
<b>THP2-PQ.4: LEVERAGING THE STRENGTHS OF DEDICATED, GRUAN AND CONVENTIONAL RADIOSONDES FOR SATELLITE HYPERSPECTRAL GEOPHYSICAL SOUNDING ASSESSMENT</b>	7743
<i>Bomin Sun, IMSG at NOAA/NESDIS/Center for Satellite Applications and Research, United States; Anthony Reale, NOAA/NESDIS/Center for Satellite Applications and Research, United States; Michael Pettey, Ryan Smith, Nicholas R. Nalli, IMSG at NOAA/NESDIS/Center for Satellite Applications and Research, United States; Lihang Zhou, NOAA/NESDIS/Center for Satellite Applications and Research, United States</i>	
<b>THP2-PQ.5: FLEX/S3 TANDEM MISSION PERFORMANCE ASSESSMENT: EVOLUTION OF THE END-TO-END SIMULATOR FLEX-E</b>	7746
<i>Carolina Tenjo, Antonio Ruiz-Verdú, Neus Sabater, Universitat de València, Spain; Jorge Vicent, Magellium S.A.S., France; Juan Pablo Rivera-Caicedo, Universidad Autónoma de Nayarit, Mexico; Luis Alonso, Jochem Verrelst, Universitat de València, Spain; Raffaella Franco, European Space Agency, Netherlands; Ana María Sanchez, GMV Aerospace and Defence Space S.A.U., Spain; Sofia Freitas, Deimos Engenharia S.A, Portugal; José Moreno, Universitat de València, Spain</i>	
<b>THP2-PQ.6: MONITORING ATMOSPHERIC COMPOSITION BY GEO-KOMPSAT-2 : GOCI-2, AMI AND GEMS</b>	7750
<i>Jhoon Kim, Myungje Choi, Mijin Kim, Hyungwang Lim, Seoyoung Lee, Yonsei University, Republic of Korea; Kyung Jung Moon, Won Joon Choi, Jong Min Yoon, Sang-kyoon Kim, National Institute of Environmental Research, Republic of Korea; Dai Ho Ko, Seung Hoon Lee, Korea Aerospace Research Institute, Republic of Korea; Young-Je Park, Korea Institute of Ocean Science and Technology, Republic of Korea; Chu-Yong Chung, Korea Meteorological Administration, Republic of Korea; GEMS Science Team, NIER, Yonsei Univ, Ewha Womans Univ, GIST, Gangneung Wonju Nat'l Univ, Pusan Nat'l Univ, Pukyong Nat'l Univ, Seoul Nat'l Univ, UNIST, Republic of Korea</i>	



**THP2-PQ.8: VENμS: PERFORMANCES AND FIRST RESULTS AFTER 11 MONTHS IN ORBIT ..... 7756**  
*Gérard Dedieu, Olivier Hagolle, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France; Arnon Karnieli, Ben-Gurion University of the Negev, Israel; Pierric Ferrier, Philippe Crébassol, Philippe Gamet, Camille Desjardins, Centre National d'Etudes Spatiales, France; Moti Yakov, Merav Cohen, Ehud Hayun, Israel Aircraft Industries Ltd., Israel*

**THP2-PQ.9: PRELIMINARY EVALUATION OF SENTINEL-2 BOTTOM OF ATMOSPHERE ..... 7760**  
**REFLECTANCE USING THE 6SV CODE IN BEIJING AREA**  
*Jing Chen, Yingjie Li, Qingmiao Ma, Xiaoqi Shen, Anjing Zhao, Jiasheng Li, Jiangsu Normal University, China*

**THP2-PQ.10: ENMAP-BOX 3 A FREE AND OPEN SOURCE PYTHON PLUG-IN FOR QGIS..... 7764**  
*Andreas Rabe, Benjamin Jakimow, Fabian Thiel, Patrick Hostert, Sebastian van der Linden, Humboldt-Universität zu Berlin, Germany*

## **THP1-PR: HYDROLOGY APPLICATIONS WITH REMOTELY SENSED SOIL MOISTURE**

**THP1-PR.2: FIRST-ORDER WATER BALANCE STUDIES USING SMAP SOIL MOISTURE ..... 7771**  
*Ruzbeh Akbar, Daniel Short Gianotti, Massachusetts Institute of Technology, United States; Kaighin A. McColl, Harvard University, United States; Erfan Haghighi, Massachusetts Institute of Technology, United States; Guido D. Salvucci, Boston University, United States; Dara Entekhabi, Massachusetts Institute of Technology, United States*

**THP1-PR.3: INTEGRATED SURFACE DROUGHT INDEX (ISDI) APPLICATION IN CHINA FOR ..... 7775**  
**DROUGHT MONITORING**  
*Lei Zhou, Jiayun Fu, Beijing University of Civil Engineering and Architecture, China; Jianjun Wu, Xinyi Han, Beijing Normal University, China; Qiang Chen, Mingyi Du, Changfeng Jing, Beijing University of Civil Engineering and Architecture, China*

**THP1-PR.4: ANALYSIS OF SOIL FREEZE/THAW SIGNATURES DURING SLAPEX F/T ..... 7779**  
**CAMPAIGN**  
*Edward Kim, NASA Goddard Space Flight Center, United States; Tracy Rowlandson, Aaron Berg, University of Guelph, Canada; Alexandre Roy, University of Sherbrooke, Canada; Renato Pardo, University of Guelph, Canada; Jarrett Powers, Agriculture and Agri-Food Canada, Canada; Paul Houser, George Mason University, United States; Kyle McDonald, City College of New York, United States; Peter Toose, Environment and Climate Change Canada, Canada; Albert Wu, Eugenia De Marco, NASA and ATA Aerospace, United States; Chris Derksen, Environment and Climate Change Canada, Canada; Yiwen Zhou, Roger Lang, George Washington University, United States; Jared Entin, Kristin Lewis, NASA Headquarters, United States*

**THP1-PR.5: SOIL PERMITTIVITY AND SOIL FROST RETRIEVALS USING A SYNERGISTIC ..... 7782**  
**METHOD FOR ACTIVE AND PASSIVE MICROWAVE INSTRUMENTS**  
*Tuomo Smolander, Juha Lemmetyinen, Kimmo Rautiainen, Finnish Meteorological Institute, Finland; Mike Schwank, Gamma Remote Sensing, Switzerland; Jouni Pulliainen, Finnish Meteorological Institute, Finland*

**THP1-PR.6: TEMPORAL AND SPATIAL DYNAMICS OF SOIL EROSION IN NORTH-SOUTH ..... 7785**  
**PAN RIVER WATERSHED IN 2000-2010**  
*Wei Cao, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China; Lulu Liu, Chengdu University, China; Dan Wu, Nanjing Institute of Environmental Sciences, Ministry of Environmental Protection, China; Jun Zhai, Satellite Environment Center, MEP, China; Yunfeng Hu, Duanyang Xu, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China*

**THP1-PR.7: INVESTIGATING THE RELATIONSHIP BETWEEN SHALLOW GROUNDWATER, ..... 7789**  
**SOIL MOISTURE AND LAND SURFACE TEMPERATURE USING REMOTELY SENSED DATA**  
*Saeid Hamzeh, Mohammad Mehrabi, Seyed Kazem Alavipanah, Majid Kiavar Moghadam, University of Tehran, Iran*

**THP1-PR.8: TOWARDS MONITORING GROUNDWATER TABLE DEPTH IN PEATLANDS ..... 7793**  
**FROM SENTINEL-1 RADAR DATA**  
*Tina Asmuß, Johann Heinrich von Thünen Institute, Germany; Michel Bechtold, KU Leuven (University of Leuven), Belgium; Bärbel Tiemeyer, Johann Heinrich von Thünen Institute, Germany*

## **THP2-PR: CLOUDS AND PRECIPITATION: RADAR TECHNIQUES**

### **THP2-PR.1: MONTE CARLO ANALYSIS OF ORBITAL STATION MOTION PARAMETER ..... 7805 ERRORS INFLUENCE ON SAR AZIMUTH RESOLUTION DEGRADATION**

*Xiaoyu Yan, Jie Chen, Wei Yang, Beihang University, China*

### **THP2-PR.2: DOPPLER ESTIMATION WITH “NON-STOP-AND-GO” ASSUMPTION IN ..... 7809 MOON-BASED SAR IMAGING**

*Zhen Xu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China; Kun-Shan Chen, Huadong Guo, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China*

### **THP2-PR.3: IMPACTS OF AZIMUTH ANTENNA STEERING ANGLE QUANTIZATION ON TOPS ..... 7813 AND SLIDING SPOTLIGHT SAR IMAGE**

*Hong-Cheng Zeng, Jie Chen, Wei Yang, Beihang University, China; Hao-Jie Zhang, Beijing Institute of Electronic System Engineering, China*

### **THP2-PR.4: MULTI-CAPABILITY SAR FOR GEOSCIENCE RESEARCH..... 7817**

*Evan Zaugg, Joshua Bradley, ARTEMIS, Inc., United States*

### **THP2-PR.5: DEVELOPMENT AND EXPERIMENT OF L-BAND SAR FOR RANGING AND ..... 7821 IMAGING TARGET**

*Kyeong-Rok Kim, Ajou University, Republic of Korea; Sang Burm Ryu, Hyeon-Cheol Lee, Sang-Gyu Lee, Korea Aerospace Research Institute, Republic of Korea; Jae-Hyun Kim, Ajou University, Republic of Korea*

### **THP2-PR.6: DEVELOPMENT AND PRELIMINARY RESULTS OF SMALL-SIZE UAV-BORNE ..... 7825 FMCW SAR**

*Xiangkun Zhang, Zelong Shao, Jiawei Ren, Yingsong Li, Jingshan Jiang, Key Laboratory of Microwave Remote Sensing, National Space Science Center, China*

### **THP2-PR.7: CROSSTALK ESTIMATION AND CORRECTION USING QUEGAN AND ..... 7829 AINSWORTH METHODS**

*Abdullah Algafsh, KACST, Saudi Arabia*

### **THP2-PR.9: GICAL: GEO-MORPHOMETRIC INVERSE CYLINDRICAL METHOD FOR ..... 7836 RADIOMETRIC CALIBRATION OF SAR IMAGES**

*Pasquale Imperatore, Riccardo Lanari, Antonio Pepe, National Research Council of Italy (CNR), Italy*

## **THP1-PS: REMOTE SENSING OF COASTAL AREAS I**

### **THP1-PS.1: UAV-BASED PHOTOGRAMMETRY FOR THE APPLICATION ON GEOMORPHIC ..... 7840 CHANGE- THE CASE STUDY OF PENGHU KUIBISHAN GEOPARK, TAIWAN**

*Cheng-Hao Lu, National Penghu University, Taiwan*

### **THP1-PS.2: GENERATION OF A TSUNAMI HAZARD MAP FOR THE COAST OF MANZANILLO, ..... 7843 COLIMA IN MEXICO USING NUMERICAL SIMULATION AND WAVE MODELING**

*Yair Evangelista, César Castrejón, Daniela Villa, Katia Trujillo, Alejandro Monsivais-Huertero, Alejandro Mendoza, Instituto Politécnico Nacional, Mexico*

### **THP1-PS.4: DISTRIBUTION OF SEDIMENTS ASSOCIATED WITH DREDGING ..... 7851 ACTIVITIES ON SOUTH CHINA SEA DETECTED BY VIIRS ON SUOMI-NPP**

*Ichio Asanuma, Jonggeol Park, Takashi Yamaguchi, Daisuke Hasegawa, Kenneth Mackin, Tokyo University of Information Sciences, Japan*

### **THP1-PS.7: WATER DEPTH ESTIMATION FROM WORLDVIEW-2 IMAGE WITH BACK ..... 7863 PROPAGATION NEURAL NETWORK IN COASTAL AREA**

*Hsuan Ren, Shin-Ya Huang, National Central University, Taiwan*

<b>THP1-PS.8: DETECTION THE EXPANSION OF MARINE AQUACULTURE IN SANSHA BAY BY REMOTE SENSING</b>	<b>7866</b>
<i>Mei Xue, YunZhi Chen, Fuzhou University, China; Xin Tian, Min Yan, ZhaoPeng Zhang, Chinese Academy of Forestry, China</i>	
<b>THP1-PS.9: APPLICATION OF ENVISAT-ASAR WAVE MODE DATA IN ANALYSIS OF FISHING SHIPWRECK ACCIDENTS</b>	<b>7870</b>
<i>Zeyan Tang, East China Sea Prediction Center, State Oceanic Administration of China, China; Zhiyi Gao, National Marine Environmental Forecasting Center of China, China; Yongliang Wei, Shanghai Ocean University, China; Yindong Zeng, Fujian Marine Forecasts, China</i>	
<b>THP1-PS.10: RETRIEVAL OF SUSPENDED SOLIDS FROM LANDSAT-8 AND SENTINEL-2: A TOOL FOR COASTAL MONITORING IN EXTREMELY TURBID WATERS</b>	<b>7874</b>
<i>Isabel Caballero, Gabriel Navarro, Institute of Marine Sciences of Andalusia (ICMAN), Spain</i>	
 <b>THP2-PS: UAV AND AIRBORNE PLATFORMS II</b>	
<b>THP2-PS.1: GEODETIC IMAGING OF FAULT SYSTEMS FROM AIRBORNE PLATFORMS</b>	<b>7878</b>
<i>Andrea Donnellan, Joseph Green, Adnan Ansar, Ronald Muellerschoen, Jay Parker, Alan Tanner, Yunling Lou, Michael Heflin, Jet Propulsion Laboratory, California Institute of Technology, United States; Ramon Arrowsmith, Arizona State University, United States; John Rundle, University of California, Davis, United States; Yehuda Ben-Zion, University of Southern California, United States; Stephen DeLong, United States Geological Survey, United States; Lisa Grant Ludwig, University of California, Irvine, United States</i>	
<b>THP2-PS.2: AN EXPERIMENT OF GEOTHERMAL EXPLORATION WITH AN UAS-TIR IN XIAOYOUKENG AREA OF TATUN VOLCANOES, TAIWAN</b>	<b>7882</b>
<i>Chun-Jung Lai, Jin-King Liu, Wei-Chen Hsu, LIDAR Technology, Taiwan; Ke-Shu Li, ITRI RAISE project at LIDAR Technology Co., Ltd., Taiwan; Ming Chee Wu, National Cheng-Kung University, Taiwan; Kuan-Tsung Chang, Minghsin University of Science and Technology, Taiwan</i>	
<b>THP2-PS.3: MODELING MORPHODYNAMIC PROCESSES IN MEANDERING RIVERS WITH UAV-BASED MEASUREMENTS</b>	<b>7886</b>
<i>Orkan Ozcan, Istanbul Technical University, Turkey; Semih Sami Akay, Istanbul Arel University, Turkey</i>	
<b>THP2-PS.4: SPATIAL NULL ESTIMATION IN BEAM-SPACE POST-DOPPLER STAP FOR AIRBORNE COLLOCATED MIMO RADAR</b>	<b>7890</b>
<i>Xiang Zhao, Zishu He, Xu Wang, Jun Li, Wen Sun, University of Electronic Science and Technology of China, China</i>	
<b>THP2-PS.5: THE INFLUENCE OF REDUNDANT IMAGES IN UAV PHOTOGRAMMETRY APPLICATIONS</b>	<b>7894</b>
<i>Edson Mitishita, Niarkios Graça, Federal University of Paraná – UFPR, Brazil</i>	
<b>THP2-PS.6: UAV-BASED INTEGRATED MULTISENSOR PAYLOAD FOR HIGH RESOLUTION IMAGING</b>	<b>7898</b>
<i>K. Olaf Niemann, Afzal Suleman, University of Victoria, Canada; Roger Stephen, Fabio Visintini, CARMS Inc., Canada; Geoffrey Quinn, University of Victoria, Canada</i>	
<b>THP2-PS.7: RADAR SOUNDER PLATFORMS AND SENSORS AT CRESIS</b>	<b>7902</b>
<i>Emily Arnold, Mark Ewing, Richard Hale, Shawn Keshmiri, Carl Leuschen, Jilu Li, John Paden, Fernando Rodriguez-Morales, Victor Berger, University of Kansas, United States</i>	
<b>THP2-PS.8: IDENTIFICATION AND CLASSIFICATION OF DROP ZONES AND HELICOPTER LANDING ZONES IN IMAGES OBTAINED BY SMALL SIZE REMOTELY PILOTED AIRCRAFT SYSTEMS</b>	<b>7906</b>
<i>Marielcio Lacerda, Angelo Paulino, Elcio Shiguemori, Alvaro Damiao, Lamartine Guimaraes, Institute for Advanced Studies (IEAv), Brazil; Camila Anjos, Federal Institute of Education, Science and Technology of South of Minas Gerais - IFSULDEMINAS, Brazil</i>	

<b>THP2-PS.9: AIRBORNE RADAR FORWARD-LOOKING SUPER-RESOLUTION IMAGING USING AN ITERATIVE ADAPTIVE APPROACH</b>	<b>7910</b>
<i>Changlin Li, Yongchao Zhang, Yin Zhang, Yulin Huang, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
<b>THP2-PS.10: USE OF DRONES FOR REMOTE MANAGEMENT OF THE CLOSE MEASURE OF RADIOACTIVITY SOURCES</b>	<b>7914</b>
<i>Juan Baeza, David Valencia, Antonio Baeza, LARUEX, Spain</i>	
 <b>THP1-PT: REMOTE SENSING OF COASTAL AREAS II</b>	
<b>THP1-PT.3: OIL SLICKS FROM NATURAL HYDROCARBON SEEPS IN THE SOUTHEASTERN BLACK SEA, THEIR DRIFT AND FATE AS OBSERVED VIA REMOTE SENSING</b>	<b>7926</b>
<i>Marina Mityagina, Olga Lavrova, Space Research Institute of Russian Academy of Sciences, Russian Federation</i>	
<b>THP1-PT.5: ADAPTATION AND VALIDATION OF THE SWIRE ALGORITHM FOR SENTINEL-3 OVER COMPLEX WATERS OF PEARL RIVER ESTUARY</b>	<b>7933</b>
<i>Huizeng Liu, Qiming Zhou, Hong Kong Baptist University, China; Guofeng Wu, Shuibo Hu, Qingquan Li, Shenzhen University, China</i>	
<b>THP1-PT.6: INTERNAL WAVES ON RIVER PLUMES</b>	<b>7937</b>
<i>Olga Lavrova, Ksenia Nazirova, Space Research Institute of Russian Academy of Sciences, Russian Federation; Dmitry Soloviev, Marine Hydrophysical Institute of Russian Academy of Science, Russian Federation</i>	
<b>THP1-PT.7: COMPARISON OF X-BAND SAR AND COAMPS MODEL WIND FIELDS AND OTHER AIR-SEA INTERACTION PARAMETERS IN MONTEREY BAY</b>	<b>7941</b>
<i>Samantha Ballard, Hans Graber, Michael Caruso, Roland Romeiser, University of Miami, United States</i>	
<b>THP1-PT.8: EVALUATION OF GF-3 QUAD-POLARIZED SAR IMAGERY FOR COASTAL ZONE OBSERVATION</b>	<b>7945</b>
<i>Xiaochen Wang, Yun Shao, Wei Tian, Zhongke Academy of Satellite Applications in Deqing, China; Yue Duan, Marine Environmental Monitoring Centre of Ningbo, State Oceanic Administration, China; Kun Li, Long Liu, Zhongke Academy of Satellite Applications in Deqing, China</i>	
<b>THP1-PT.9: TOPOGRAPHIC MAPPING OF THE SUBEI BANK TIDAL FLATS USING SENTINEL-1A SAR IMAGES</b>	<b>7949</b>
<i>Shuangshang Zhang, Qing Xu, Zheng Gong, Hohai University, China; Kaiguo Fan, Linyi University, China</i>	
 <b>THP2-PT: GROUND BASED SYSTEMS I</b>	
<b>THP2-PT.4: COMPARISON OF IN SITU LAND SURFACE TEMPERATURES MEASURED WITH RADIOMETERS AND PYRGEOMETERS: CONSEQUENCES FOR CALIBRATION AND VALIDATION OF THERMAL INFRARED SENSORS</b>	<b>7961</b>
<i>Enric Valor, University of Valencia, Spain; Juan Manuel Sánchez, University of Castilla-La Mancha, Spain; Raquel Niclòs, University of Valencia, Spain; Rubén Moya, Cranfield University, United Kingdom; Maria Jesús Barberà, Vicente Caselles, Cesar Coll, University of Valencia, Spain</i>	
<b>THP2-PT.5: MICROWAVE IMAGING OF NON-RIGID MOVING TARGET USING 2D SPARSE MIMO ARRAY</b>	<b>7965</b>
<i>Zhanyu Zhu, Feng Xu, Haipeng Wang, Fudan University, China</i>	
<b>THP2-PT.6: OCEAN COLOR ALGORITHM DEVELOPMENT ENVIRONMENT FOR HIGH-SPEED DATA PROCESSING OF GOCI-II</b>	<b>7968</b>
<i>Hyun Yang, Hee-Jeong Han, Jae-Moo Heo, Jaehoon Jeong, Korea Institute of Ocean Science and Technology, Republic of Korea; Taekyung Lee, Woong Hu, Sunghee Kwak, Satrec Initiative, Republic of Korea</i>	

<b>THP2-PT.7: ANALYSIS OF DIFFERENTIAL CORRECTION TECHNIQUES FOR ORBIT DETERMINATION INTERFEROMETRY</b>	<b>7972</b>
<i>Marc Fernandez, Roger M. Fuster, Antoni Broquetas, Universitat Politècnica de Catalunya, Spain</i>	
<b>THP2-PT.9: NASA D3R: 2.0, ENHANCED RADAR WITH NEW DATA AND CONTROL FEATURES</b>	<b>7978</b>
<i>Mohit Kumar, Shashank Joshil, Colorado State University, United States; Manuel A. Vega, NASA Goddard Space Flight Center, United States; V. Chandrasekar, Colorado State University, United States; John Zebley, NASA Goddard Space Flight Center, United States</i>	
<b>THP2-PT.10: STRUCTURAL HEALTH MONITORING WITH 94 GHZ RADAR</b>	<b>7982</b>
<i>Antoni Broquetas, Albert Agasca, Arturo Martínez, Universitat Politècnica de Catalunya, Spain; Roberto Tomás, Universidad de Alicante (UA), Spain</i>	
 <b>THP1-PU: NEW REMOTE SENSING TECHNIQUES AND METHODS VII</b>	
<b>THP1-PU.1: AUTOMATIC MAPPING OF IRRIGATED AREAS IN MEDITERANEAN CONTEXT USING LANDSAT 8 TIME SERIES IMAGES AND RANDOM FOREST ALGORITHM</b>	<b>7986</b>
<i>Zouhair Benbahria, Royal Center for Remote Sensing, Morocco; Imane Sebari, Hicham Hajji, School of Geomatic Sciences and Surveying Engineering, Morocco; Mohamed Faouzi Smiej, Royal Center for Remote Sensing, Morocco</i>	
<b>THP1-PU.2: IMPROVING THE SPATIAL RESOLUTION OF IMAGING INSTRUMENTS USING SOFTWARE</b>	<b>7990</b>
<i>Manohar Mareboyana, Bowie State University and ASRC at NASA Goddard Space Flight Center, United States; Jacqueline Le Moigne, Philip Dabney, NASA Goddard Space Flight Center, United States</i>	
<b>THP1-PU.3: PROGRESS ON A NEW ANALYTICAL ALGORITHM TO RETRIEVE INHERENT OPTICAL PROPERTIES FROM OCEAN COLOR REMOTE SENSING</b>	<b>7994</b>
<i>Michael Twardowski, Harbor Branch Oceanographic Institute, United States; Alberto Tonizzo, Sunstone Scientific LLC, United States</i>	
<b>THP1-PU.4: ROBUST SENSOR LOCALIZATION BASED ON EUCLIDEAN DISTANCE MATRIX</b>	<b>7998</b>
<i>Dehong Liu, Hassan Mansour, Petros Boufounos, Mitsubishi Electric Research Laboratories, United States; Ulugbek Kamilov, Washington University in St. Louis, United States</i>	
<b>THP1-PU.5: GEOSTATIONARY MICROWAVE IMAGING USING COMPRESSIVE REFLECTOR ANTENNA</b>	<b>8002</b>
<i>Jiwen Geng, Ze Yu, Liwei Sun, Chunsheng Li, Beihang University, China</i>	
<b>THP1-PU.6: MULTI-CHANNEL AND MIMO SAR ANTI-JAMMING ANALYSIS</b>	<b>8006</b>
<i>Ruijia Wang, Air Force Engineering University, China; Sun Bing, Beihang University, China; Chengsi Yi, Air Force Engineering University, China; Jie Chen, Beihang University, China; Zhou Yipeng, Air Force Engineering University, China</i>	
<b>THP1-PU.8: SINGLE FRAME SUPER RESOLUTION WITH CONVOLUTIONAL NEURAL NETWORK FOR REMOTE SENSING IMAGERY</b>	<b>8014</b>
<i>Jie Fu, YuHong Liu, Lanzhou Jiaotong University, China; Feng Li, Qian Xuesen Laboratory of Space Technology, China</i>	
<b>THP1-PU.9: THE RECOVERY ALGORITHM OF SATURATED SAR RAW DATA BASED ON COMPRESSED SENSING</b>	<b>8018</b>
<i>Wenjiao Chen, Beihang University, China; Peng Xiao, Qian Xuesen Laboratory of Space Technology, China; Ze Yu, Chunsheng Li, Beihang University, China</i>	
 <b>THP2-PU: NEW REMOTE SENSING TECHNIQUES AND METHODS VIII</b>	
<b>THP2-PU.1: FEASIBILITY OF PASSIVE BISTATIC GEOSYNCHRONOUS RADAR USING COMSAT TRANSMISSIONS</b>	<b>8026</b>
<i>Stephen Hobbs, Carlo Convevole, Cranfield University, United Kingdom; Marina Gashinova, Mikhail Cherniakov, Scott Cassidy, University of Birmingham, United Kingdom</i>	

**THP2-PU.2: SNOW DEPTH ESTIMATION WITH GNSS-R DUAL-RECEIVER OBSERVATION ..... 8030**  
*Shuyao Wang, School of Geodesy and Geomatics and Collaborative Innovation Center for Geospatial Technology, Wuhan University, China; Kegen Yu, School of Environmental Science and Spatial Informatics, China University of Mining and Technology, Xuzhou, China*

**THP2-PU.3: HYPERSPECTRAL MIXED DENOISING VIA SUBSPACE LOW RANK LEARNING ..... 8034 AND BM4D FILTERING**  
*Le Sun, Nanjing University of Information Science and Technology, China; Byeungwoo Jeon, Sungkyunkwan University, Republic of Korea*

**THP2-PU.4: NEAR REAL-TIME SAR IMAGE FOCUSING ONBOARD SPACECRAFT ..... 8038**  
*Yohei Sugimoto, Satoru Ozawa, Noriyasu Inaba, Japan Aerospace Exploration Agency, Japan*

**THP2-PU.5: TOWARDS THE OPERATIONAL SPATIALIZATION OF THE SINGLE BAND ..... 8042 THERMAL ATMOSPHERIC CORRECTION. APPLICATION TO LANDSAT 7 ETM+**  
*J. M. Galve, Juan Manuel Sánchez, Julio Villodre, José González-Piqueras, University of Castilla-La Mancha, Spain; Cesar Coll, University of Valencia, Spain*

### **FR1-R1: PANSHARPENING AND SUPERRESOLUTION III**

**FR1-R1.1: A NEW PANSHARPENING METHOD WITH MULTI-SCALE STRUCTURE ..... 8046 PERCEPTION**  
*Yu Pan, Xu Li, Ang Gao, Lixin Li, Shaohui Mei, Northwestern Polytechnical University, China; Shigang Yue, University of Lincoln, United Kingdom*

**FR1-R1.2: ROBUST SUPER-RESOLUTION IMAGE RECONSTRUCTION METHOD FOR ..... 8050 GEOMETRICALLY DEFORMED REMOTE SENSING IMAGES**  
*Jing Qin, Montana State University, United States; Igor Yanovsky, California Institute of Technology, United States*

**FR1-R1.3: BLOCK-BASED AND SEGMENTATION-BASED APPROACHES FOR COMPONENT ..... 8054 SUBSTITUTION BASED HYPERSPECTRAL PANSHARPENING**  
*Sevcan Kahraman, Gozdenur Yesilyurt, Alp Ertürk, Sarp Ertürk, Kocaeli University, Turkey*

**FR1-R1.4: SPATIAL RESOLUTION ENHANCEMENT OF OPTICAL IMAGES BASED ON ..... 8058 TENSOR DECOMPOSITION**  
*Kuniaki Uto, Tokyo Institute of Technology, Japan; Mauro Dalla Mura, Jocelyn Chanussot, Grenoble Institute of Technology, France*

**FR1-R1.5: FEATURE-LEVEL LOSS FOR MULTISPECTRAL PAN-SHARPENING WITH ..... 8062 MACHINE LEARNING**  
*Xun Liu, Chenwei Deng, Baojun Zhao, Beijing Institute of Technology, China; Jocelyn Chanussot, University of Grenoble Alpes, China*

### **FR2-R1: DATA FUSION TECHNIQUES I**

**FR2-R1.1: MRF-BASED DECISION FUSION FOR HYPERSPECTRAL IMAGE CLASSIFICATION ..... 8066**  
*Vera Andrejchenko, Rob Heylen, University of Antwerp, Belgium; Wenzhi Liao, Wilfried Philips, University of Gent, Belgium; Paul Scheunders, University of Antwerp, Belgium*

**FR2-R1.2: HYPERSPECTRAL AND MULTISPECTRAL IMAGE FUSION BASED ON SPECTRAL ..... 8070 MATCHING IN THE SHEARLET DOMAIN**  
*Hossein Rezaei, Azam Karami, Shahid Bahonar University of Kerman, Iran; Paul Scheunders, University of Antwerp, Belgium*

**FR2-R1.5: WEIGHTS BASED DECISION LEVEL DATA FUSION OF LANDSAT-8 AND ..... 8078 SENTINEL-1 FOR SOIL MOISTURE CONTENT ESTIMATION**  
*Oualid Yahia, Raffaella Guida, Pasquale Iervolino, University of Surrey, United Kingdom*

## **FR1-R2: POLARIMETRY AND POLINSAR**

### **FR1-R2.1: ASSESSMENT OF THE GROUND POLARIMETRY IN CROPS ESTIMATED USING ..... 8082 MB SAR INTERFEROMETRY AT C-BAND**

*Hannah Joerg, Matteo Pardini, Alberto Alonso-Gonzalez, Kostas Papathanassiou, German Aerospace Center (DLR), Germany;  
Irena Hajnsek, ETH Zurich, Switzerland*

### **FR1-R2.2: SNOW COVER MAPPING WITH POINCARÉ SPHERE PARAMETERS FROM ..... 8086 POLARSAR IMAGES USING AN AUTO-ENCODER NETWORK**

*Shaunak De, Arnab Muhuri, Indian Institute of Technology Bombay, India; Surendar Manickam, Friedrich-Alexander-Universitat  
Erlangen-Nurnberg, Germany; Avik Bhattacharya, Indian Institute of Technology Bombay, India*

### **FR1-R2.3: FOREST STRUCTURE PARAMETER ESTIMATION BY MEANS OF ..... 8090 MULTI-BASELINE POL-INSAR TECHNIQUES: STATUS AND CHALLENGES**

*Konstantinos Papathanassiou, Matteo Pardini, Jun-Su Kim, Marivi Tello-Alonso, Victor Cazcarra-Bes, German Aerospace Center  
(DLR), Germany*

### **FR1-R2.4: POLARIMETRIC ANGLE UTILIZATION FOR GRASPING STATE OF DAMAGED ..... 8092 BRIDGE**

*Ryoichi Sato, Toshiya Nebu, Takanori Ishikuro, Yoshio Yamaguchi, Hiroyoshi Yamada, Niigata University, Japan*

### **FR1-R2.5: OIL SLICK DETECTION IN THE OFFSHORE DOMAIN: EVALUATION OF ..... 8096 POLARIZATION-DEPENDENT SAR PARAMETERS**

*Sébastien Angelliaume, Pascale Dubois-Fernandez, ONERA, France; Cathleen Jones, Benjamin Holt, NASA Jet Propulsion  
Laboratory, United States; Brent Minchew, British Antarctic Survey, United Kingdom; Emna Amri, ONERA, France; Véronique  
Miegebielle, TOTAL, France*

## **FR2-R2: TOPICS ON POLSAR APPLICATIONS AND ANALYSIS**

### **FR2-R2.3: MACHINE-LEARNING FUSION OF POLSAR AND LIDAR DATA FOR TROPICAL .....8108 FOREST CANOPY HEIGHT ESTIMATION**

*Maryam Pourshamsi, University of Leicester, United Kingdom; Mariano Garcia, University of Alcala, Spain; Marco Lavallo,  
NASA Jet Propulsion Laboratory, United States; Eric Pottier, University de Rennes 1, France; Heiko Balzter, University of  
Leicester, United Kingdom*

### **FR2-R2.4: COMPARISON OF GAOFEN-3 AND RADARSAT-2 DATA FOR POLARIMETRIC SAR .....8112 IMAGE CLASSIFICATION**

*Junjun Yin, University of Science and Technology Beijing, China; Jian Yang, Tsinghua University, China*

### **FR2-R2.5: EFFECT OF ANISOTROPY ON IONOSPHERIC SCINTILLATIONS OBSERVED BY ..... 8116 SYNTHETIC APERTURE RADAR (SAR)**

*Shradha Mohanty, Indian Institute of Technology Bombay, India; Charles Carrano, Boston College, United States; Gulab Singh,  
Indian Institute of Technology Bombay, India*

## **FR3-R2: SAR POLARIMETRY: THEORY AND APPLICATIONS I IN MEMORIAM OF WOLFGANG MARTIN BOERNER**

### **FR3-R2.2: MODEL-BASED POLSAR DECOMPOSITIONS: VIRTUES AND VICES ..... 8120**

*Thomas Ainsworth, Naval Research Laboratory, United States; Jong-Sen Lee, Computational Physics, Inc., United States;  
Yanting Wang, Naval Research Laboratory, United States*

### **FR3-R2.3: ANALYSIS OF POLARIMETRIC FEATURE COMBINATION BASED ON POLSAR ..... 8124 IMAGE CLASSIFICATION PERFORMANCE WITH MACHINE LEARNING APPROACH**

*Qiang Yin, Beijing University of Chemical Technology, China; Wen Hong, Institute of Electronics, Chinese Academy of Sciences,  
China; Fan Zhang, Beijing University of Chemical Technology, China; Eric Pottier, University of Rennes 1, France*

<b>FR3-R2.4: POLARIMETRIC COHERENCE OPTIMIZATION AS A MULTIDIMENSIONAL POLARIMETRIC SAR SIGNAL PROCESSING TOOL</b>	<b>8128</b>
<i>Laurent Ferro-Famil, Yue Huang, University of Rennes 1, France</i>	
<b>FR3-R2.5: POLARIMETRIC AND MULTITEMPORAL INFORMATION EXTRACTED FROM SENTINEL-1 SAR DATA TO MAP BUILDINGS</b>	<b>8132</b>
<i>Marco Chini, Ramona Pelich, Renaud Hostache, Patrick Matgen, Carlos López-Martínez, Luxembourg Institute of Science and Technology, Luxembourg</i>	
<b>FR4-R2: SAR POLARIMETRY: THEORY AND APPLICATIONS II IN MEMORIAM OF WOLFGANG MARTIN BOERNER</b>	
<b>FR4-R2.1: POLARIMETRIC RESPONSE FROM CONIFER AND BROAD-LEAF TREE AT KU-BAND IN ANECHOIC CHAMBER</b>	<b>8135</b>
<i>Yoshio Yamaguchi, Yuto Minetani, Hiroyoshi Yamada, Niigata University, Japan</i>	
<b>FR4-R2.2: POLARIZATION ORIENTATION ANGLE AND SCATTERING CHARACTERISTICS OF STEEP TERRAIN</b>	<b>8139</b>
<i>Jong-Sen Lee, Thomas Ainsworth, Yanting Wang, Naval Research Laboratory, United States</i>	
<b>FR4-R2.3: ANALYSIS OF THE RADAR VEGETATION INDEX AND ASSESSMENT OF POTENTIAL FOR IMPROVEMENT</b>	<b>8143</b>
<i>Christoph Szigarski, University of Jena, Germany; Thomas Jagdhuber, German Aerospace Center (DLR), Germany; Martin Baur, University of Bayreuth, Germany; Christian Thiel, Mikhail Urbazaev, University of Jena, Germany; Marie Parrens, CESBIO, France; Jean-Pierre Wigneron, INRA, France; María Piles, University of Valencia, Spain; Kaighin A. McColl, University of Harvard, United States; Dara Entekhabi, Massachusetts Institute of Technology, United States</i>	
<b>FR4-R2.4: TEMPORAL VARIABILITY OF SOIL AND VEGETATION BACKSCATTERING OBSERVED IN DENSE L-BAND TIME-SERIES</b>	<b>8147</b>
<i>Marco Lavallo, Gustavo H.X. Shiroma, Paul A. Rosen, Scott Hensley, NASA Jet Propulsion Laboratory, United States</i>	
<b>FR4-R2.5: OPTIMUM POLARIMETRIC PALSAR INFORMATION EXTRACTION FOR PEATLAND CLASSIFICATION AND FIRE DAMAGE ASSESSMENT</b>	<b>8151</b>
<i>Ridha Touzi, Khalid Omari, Canada Centre for Remote Sensing, Canada; Bob Sleep, Alberta Environment and Sustainable Resource Development, Canada</i>	
<b>FR1-R3: LAND PHYSICAL PROCESSES MONITORING WITH SOLAR AND THERMAL SENSORS SUPPORTING GEOGLAM I</b>	
<b>FR1-R3.1: GEOGLAM: A GEO INITIATIVE ON GLOBAL AGRICULTURAL MONITORING</b>	<b>8155</b>
<i>Inbal Becker-Reshef, Christopher Justice, Alyssa Whitcraft, University of Maryland, United States; Ian Jarvis, GEO Secretariat, Switzerland</i>	
<b>FR1-R3.2: SATELLITE MAPPING OF LAND DEGRADATION IN SENEGAL, UGANDA, KENYA, AND TANZANIA</b>	<b>8158</b>
<i>Compton Jim Tucker, Jorge Pinzon, NASA Goddard Space Flight Center, United States</i>	



**FR1-R3.3: HIGH SPATIO-TEMPORAL RESOLUTION LAND SURFACE TEMPERATURE ..... 8160**  
**MISSION – A COPERNICUS CANDIDATE MISSION IN SUPPORT OF AGRICULTURAL**  
**MONITORING**

*Benjamin Koetz, European Space Agency, Italy; Wim Bastiaanssen, UNESCO IHE Delft, Netherlands; Michael Berger, European Space Agency, Netherlands; Pierre Defourny, Université Catholique de Louvain, Belgium; Umberto Del Bello, Matthias Drusch, Mark Drinkwater, Ricardo Duca, Valerie Fernandez, European Space Agency, Netherlands; Darren Ghent, University of Leicester, Netherlands; Radoslaw Guzinski, European Space Agency, Italy; Jippe Hoogeveen, UN Food and Agriculture Organization, Italy; Simon Hook, Jet Propulsion Laboratory, United States; Jean-Pierre Lagouarde, INRA, UMR 1391 ISPA, France; Guido Lemoine, European Commission, Italy; Ilias Manolis, Philippe Martimort, European Space Agency, Netherlands; Jeffrey Masek, NASA, United States; Michel Massart, European Commission, Belgium; Claudia Notarnicola, EURAC, Italy; José Antonio Sobrino, University of Valencia, Spain; Thomas Udelhoven, University of Trier, Germany*

**FR1-R3.4: HARMONIZED LANDSAT/SENTINEL-2 PRODUCTS FOR LAND MONITORING ..... 8163**

*Jeffrey Masek, NASA Goddard Space Flight Center, United States; Junchang Ju, Jean-Claude Roger, Sergii Skakun, University of Maryland, United States; Martin Claverie, UC Louvain, France; Jennifer Dungan, NASA ARC, France*

**FR1-R3.5: SENTINEL-2 FOR AGRICULTURAL MONITORING ..... 8166**

*Ferran Gascon, European Space Agency, Italy*

**FR2-R3: LAND PHYSICAL PROCESSES MONITORING WITH SOLAR AND THERMAL**  
**SENSORS SUPPORTING GEOGLAM II**

**FR2-R3.1: A SURFACE ALBEDO PRODUCT AT HIGH SPATIAL RESOLUTION FROM A ..... 8169**  
**COMBINATION OF SENTINEL-2 AND LANDSAT-8 OBSERVATIONS**

*Jean-Louis Roujean, CNRS, France; Albert Oliso, INRA, France; Eric Ceschia, University Paul Sabatier Toulouse III, France; Olivier Hagolle, CNES, France; Marie Weiss, INRA, France*

**FR2-R3.2: LASRC (LAND SURFACE REFLECTANCE CODE): OVERVIEW, APPLICATION AND ..... 8173**  
**VALIDATION USING MODIS, VIIRS, LANDSAT AND SENTINEL 2 DATA'S**

*Eric Vermote, NASA Goddard Space Flight Center, United States; Jean-Claude Roger, Belen Franch, Sergii Skakun, UMCP and NASA/GSFC, United States*

**FR2-R3.3: ENHANCING REMOTE SENSING BASED YIELD FORECASTING: APPLICATION ..... 8177**  
**TO WINTER WHEAT IN UNITED STATES**

*Belen Franch, University of Maryland / NASA Goddard Space Flight Center, United States; Eric Vermote, NASA Goddard Space Flight Center, United States; Sergii Skakun, Jean-Claude Roger, University of Maryland / NASA Goddard Space Flight Center, United States; Inbal Becker-Reshef, Chris Justice, University of Maryland, United States*

**FR2-R3.4: CLOUD BASED CROPWATCHGLOBAL REMOTE SENSING MONITORING ..... 8181**  
**ONLINE SYSTEM**

*Bingfang Wu, Miao Zhang, Nana Yan, Qiang Xing, Weiwei Zhu, Xin Zhang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China*

**FR2-R3.5: GEOGLAM BEST AVAILABLE CROP-SPECIFIC GLOBAL MAPS: STRENGTHS AND ..... 8183**  
**LIMITATIONS**

*Patricia Oliva, Universidad Mayor, Chile; Brian Barker, Inbal Becker-Reshef, University of Maryland, United States*

**FR3-R3: ESSENTIAL URBAN VARIABLES FROM SATELLITE OBSERVATIONS I**

**FR3-R3.1: ESSENTIAL URBAN VARIABLES FROM SATELLITE OBSERVATIONS: AN ..... 8187**  
**INTRODUCTION**

*Qihao Weng, Xiamen University; Indiana State University, China*

**FR3-R3.2: ANALYSIS OF DIFFERENT SENSOR PERFORMANCES IN IMPERVIOUS SURFACE ..... 8189**  
**MAPPING**

*George Xian, U.S. Geological Survey Earth Resources Observation and Science Center, United States; Hua Shi, ASRC Federal InuTeq/USGS EROS, United States; Jon Dewitz, USGS Earth Resources Observation and Science Center, United States; Zhuoting Wu, USGS Flagstaff Science Campus, United States*

<b>FR3-R3.3: NEW PROSPECTS IN ANALYSING BIG DATA FROM SPACE - THE URBAN THEMATIC EXPLOITATION PLATFORM</b>	<b>8193</b>
<i>Thomas Esch, Hubert Asamer, Felix Bachofer, German Aerospace Center (DLR), Germany; Jakub Balhar, GISAT s.r.o., Czech Republic; Martin Boettcher, Brockmann Consult GmbH, Germany; Enguerran Boissier, Terradue Srl, Italy; Andreas Hirner, German Aerospace Center (DLR), Germany; Emmanuel Mathot, Terradue Srl, Italy; Mattia Marconcini, Annkatrin Metz-Marconcini, German Aerospace Center (DLR), Germany; Hans Permana, Brockmann Consult GmbH, Germany; Tomas Soukup, GISAT s.r.o., Czech Republic; Vaclav Svaton, IT4Innovations, VSB-Technical University of Ostrava, Czech Republic; Soner Ureyen, Julian Zeidler, German Aerospace Center (DLR), Germany</i>	
<b>FR3-R3.4: NASA'S BLACK MARBLE PRODUCT SUITE: VALIDATION STRATEGY</b>	<b>8197</b>
<i>Zhuosen Wang, Miguel Román, Qingsong Sun, Virginia Kalb, NASA Goddard Space Flight Center, United States; Kytt MacManus, CIESIN, Earth Institute at Columbia University, United States; Robert Ryan, Mary Pagnutti, Innovative Imaging &amp; Research, United States; Dennis Helder, South Dakota State University, United States</i>	
 <b>FR4-R3: ESSENTIAL URBAN VARIABLES FROM SATELLITE OBSERVATIONS II</b>	
<b>FR4-R3.1: BUILDING AREA EXTRACTION FROM HIGH-RESOLUTION SATELLITE IMAGERY BASED ON MORPHOLOGICAL BUILDING INDEX</b>	<b>8201</b>
<i>Chun Liu, Xin Huang, Huijun Chen, Jiansi Yang, Jianya Gong, Wuhan University, China</i>	
<b>FR4-R3.2: ANALYSIS OF THE SPATIO-TEMPORAL DYNAMIC OF POLYCENTRIC CITY USING NIGHT-TIME LIGHT REMOTE SENSING IMAGERY</b>	<b>8205</b>
<i>Qiming Zheng, Ke Wang, Zhejiang University, China</i>	
<b>FR4-R3.3: JOINTLY EXPLOITING SENTINEL-1 AND SENTINEL-2 FOR URBAN MAPPING</b>	<b>8209</b>
<i>Gianni Cristian Iannelli, Ticinum Aerospace, Italy; Paolo Gamba, University of Pavia, Italy</i>	
<b>FR4-R3.4: DEEP DOMAIN ADAPTATION FOR SINGLE-SHOT VEHICLE DETECTOR IN SATELLITE IMAGES</b>	<b>8213</b>
<i>Yohei Koga, Hiroyuki Miyazaki, Ryosuke Shibasaki, The University of Tokyo, Japan</i>	
 <b>FR1-R4: REMOTE SENSING FOR CROP AND SOIL PARAMETERS I</b>	
<b>FR1-R4.1: TESTING MULTI-SENSORS TIME SERIES OF LAI ESTIMATES TO MONITOR RICE PHENOLOGY: PRELIMINARY RESULTS</b>	<b>8221</b>
<i>Mirco Boschetti, Lorenzo Busetto, Luigi Ranghetti, Italian National Research Council, Italy; Francisco Javier García-Haro, Manuel Campos-Taberner, Universitat de València, Spain; Roberto Confalonieri, Università degli Studi di Milano, Italy</i>	
<b>FR1-R4.2: L-BAND VEGETATION OPTICAL DEPTH FOR CROP PHENOLOGY MONITORING AND CROP YIELD ASSESSMENT</b>	<b>8225</b>
<i>David Chaparro, Universitat Politècnica de Catalunya, Spain; María Piles, Universitat de València, Spain; Mercè Vall-llossera, Adriano Camps, Universitat Politècnica de Catalunya, Spain; Alexandra G. Konings, Stanford University, United States; Dara Entekhabi, Massachusetts Institute of Technology, United States; Thomas Jagdhuber, German Aerospace Center (DLR), Germany</i>	
<b>FR1-R4.3: MODELLING LEAF CHLOROPHYLL CONTENT IN COFFEE (COFFEA ARABICA) PLANTATIONS USING SENTINEL 2 MSI DATA</b>	<b>8228</b>
<i>Abel Chemura, Onesimo Mutanga, John Odindi, University of KwaZulu-Natal, South Africa</i>	
<b>FR1-R4.4: SPATIAL ENHANCEMENT OF MODIS LEAF AREA INDEX USING REGRESSION ANALYSIS WITH LANDSAT VEGETATION INDEX</b>	<b>8232</b>
<i>Georgios Ovakoglou, Thomas Alexandridis, Aristotle University of Thessaloniki, Greece; Jan G. P. W. Clevers, Wageningen University &amp; Research, Netherlands; Ines Cherif, Dimitrios Kasampalis, Ioannis Navrozidis, Charalampos Iordanidis, Dimitrios Moshou, Aristotle University of Thessaloniki, Greece; Giovanni Laneve, Sapienza Università di Roma, Italy; Juan Suarez Beltran, GMV Aerospace and Defence S.A.U., Spain</i>	

**FR1-R4.5: A STUDY ON THE INFLUENCE OF OIL PALM BIOPHYSICAL PARAMETERS ON BACKSCATTERING RETURNS WITH ALOS-PALSAR2 IMAGE ..... 8236**

*Chia Ming Toh, Hong Tat Ewe, Universiti Tunku Abdul Rahman, Malaysia; Seng Heng Tey, Applied Agricultural Resources Shd. Bhd, Malaysia; Yong Haur Tay, Universiti Tunku Abdul Rahman, Malaysia*

**FR2-R4: PLANT PHENOTYPING – PLATFORMS, SENSORS AND PROCESSING**

**FR2-R4.1: CHALLENGES AND BOTTLENECKS IN UAV PHENOTYPING ..... 8240**

*Shawn C. Kefauver, Isaac Araus-Serret, Omar Vergara-Díaz, Jordi Bort, University of Barcelona, Spain; Georges El-Haddad, Postlight, United States; Maria Teresa Nieto-Taladriz, National Institute for Agricultural and Food Research and Technology (INIA), Spain; Nieves Aparicio, Technological and Agricultural Institute of Castilla y León (ITACyL), Spain; José Luis Araus, University of Barcelona, Spain*

**FR2-R4.2: DETERMINING CROP GROWTH DYNAMICS IN SORGHUM BREEDING TRIALS THROUGH REMOTE AND PROXIMAL SENSING TECHNOLOGIES ..... 8244**

*Andries Potgieter, James Watson, Mark Eldridge, Kenneth Laws, Barbara George-Jaeggli, Colleen Hunt, Andrew Borrell, University of Queensland, Australia; Emma Mace, Agri-Science Queensland, Australia; Scott Chapman, David Jordan, Graeme Hammer, University of Queensland, Australia*

**FR2-R4.3: SUN INDUCED FLUORESCENCE CALIBRATION AND VALIDATION FOR FIELD PHENOTYPING ..... 8248**

*MaPi Cendrero-Mateo, University of Valencia, Spain; Simon Bennertz, Institute of Bio- and Geosciences, Plant Science, Germany; Andreas Burkart, Tommaso Julitta, JB Hyperspectral Devices, Germany; Sergio Cogliati, University of Milano Bicocca, Italy; Hanno Scharr, Patrick Rademske, Institute of Bio- and Geosciences, Plant Science, Germany; Luis Alonso, University of Valencia, Spain; Francisco Pinto, International Maize and Wheat Improvement Center (CIMMYT), Mexico; Uwe Rascher, Institute of Bio- and Geosciences, Plant Science, Germany*

**FR2-R4.4: FIELD PHENOTYPING AND AN EXAMPLE OF PROXIMAL SENSING OF PHOTOSYNTHESIS UNDER ELEVATED CO<sub>2</sub> ..... 8252**

*Onno Muller, Beat Keller, Lars Zimmermann, Christoph Jedmowski, Forschungszentrum Jülich, Germany; Einhard Kleist, Forschungszentrum Juelich GmbH, Germany; Vikas Pingle, Kelvin Acebron, Nicolas Zendonadi dos Santos, Angelina Steier, Laura Freiwald, Ines Munoz-Fernandez, Norman Wilke, Forschungszentrum Jülich, Germany; Thorsten Kraska, Campus Klein-Altendorf, Bonn University, Germany; Roland Pieruschka, Uli Schurr, Uwe Rascher, Forschungszentrum Jülich, Germany*

**FR3-R4: SOIL PARAMETERS FROM MICROWAVE AND OTHER FREQUENCIES III**

**FR3-R4.1: INFLUENCES OF SOIL LINE PARAMETERS ON SOIL BRIGHTNESS ESTIMATION WITH SOIL ISOLINE EQUATIONS IN RED-NIR REFLECTANCE SUBSPACE ..... 8255**

*Kenta Taniguchi, Yusuke Adachi, Aichi Prefectural University, Japan; Kenta Obata, National Institute of Advanced Industrial Science and Technology, Japan; Hiroki Yoshioka, Aichi Prefectural University, Japan*

**FR3-R4.2: GLOBAL ESTIMATION OF SOIL MOISTURE PERSISTENCE WITH LAND C-BAND MICROWAVE SENSORS ..... 8259**

*María Piles, Universitat de València, Spain; Robin van der Schalie, VanderSat B.V, Netherlands; Alexander Gruber, KU Leuven (University of Leuven), Belgium; Jordi Muñoz-Mari, Gustau Camps-Valls, Anna Mateo-Sanchis, Universitat de València, Spain; Wouter Dorigo, Vienna University of Technology, Austria; Richard de Jeu, VanderSat B.V, Netherlands*

**FR3-R4.3: USING VIS-NIR SPECTROSCOPY TO ESTIMATE SOIL ORGANIC CONTENT ..... 8263**

*Tao Hu, Huazhong Agricultural University, China; Kun Qi, Yi'na Hu, Peking University, China*

**FR3-R4.4: TIMING IS EVERYTHING – DROUGHT CLASSIFICATION FOR RISK ASSESSMENT ..... 8267**

*Valerie Graw, Gohar Ghazaryan, Jonas Schreier, Javier Gonzalez, Ayman Abdel-Hamid, University of Bonn, Germany; Yvonne Walz, Karen Dall, United Nations University, Germany; Joachim Post, German Aerospace Center (DLR), Germany; Andries Jordaan, University of the Free State, South Africa; Olena Dubovyk, University of Bonn, Germany*

## **FR4-R4: LAND USE APPLICATIONS II**

### **FR4-R4.1: IDENTIFICATION OF WINTER LAND USE IN TEMPERATE AGRICULTURAL LANDSCAPES BASED ON SENTINEL-1 AND 2 TIMES-SERIES. .... 8271**

*Julien Denize, IETR UMR CNRS 6164 and University of Rennes, France; Laurence Hubert-Moy, Samuel Corgne, LETG UMR CNRS 6554 and University of Rennes, France; Julie Betbeder, CIRAD, France; Eric Pottier, IETR UMR CNRS 6164 and University of Rennes, France*

### **FR4-R4.2: SMOS BASED HIGH RESOLUTION SOIL MOISTURE ESTIMATES FOR DESERT LOCUST PREVENTIVE MANAGEMENT ..... 8275**

*Maria Jose Escorihuela, isardSAT, Spain; Olivier Merlin, CESBIO, France; Vivien Georgiana Stefan, Gianfranco Indrio, isardSAT, Spain; Cyril Piou, CBGP/CIRAD, France*

### **FR4-R4.3: EVALUATION OF ABOVE STUDY REGION SITES FOR FUTURE CALIBRATION AND VALIDATION OF NISAR SCIENCE REQUIREMENTS ..... 8279**

*Bruce Chapman, California Institute of Technology, United States; Eric Kasischke, University of Maryland, United States*

### **FR4-R4.4: ONSHORE HYDROCARBON REMOTE SENSING ..... 8282**

*Dominique Dubucq, TOTAL, France; Véronique Achar, ONERA, France*

## **FR1-R5: ADVANCES IN REFLECTOMETRY WITH GNSS AND SIGNALS OF OPPORTUNITY (GNSS+R) I**

### **FR1-R5.1: FSSCAT, THE 2017 COPERNICUS MASTERS' "ESA SENTINEL SMALL SATELLITE CHALLENGE" WINNER: A FEDERATED POLAR AND SOIL MOISTURE TANDEM MISSION BASED ON 6U CUBESATS ..... 8285**

*Adriano Camps, Universitat Politècnica de Catalunya-BarcelonaTech & IEEC/CTE-UPC, Spain; Alessandro Golkar, Skolkovo Institute of Science and Technology & Universitat Politècnica de Catalunya-BarcelonaTech, Russian Federation; Antonio Gutierrez, Deimos Engenharia S.A, Portugal; Joan Adria Ruiz-de-Azúa, Juan Francisco Munoz-Martin, Universitat Politècnica de Catalunya-BarcelonaTech & IEEC/CTE-UPC, Spain; Lara Fernandez, Carlos Diez, Andrea Aguilera, Universitat Politècnica de Catalunya - BarcelonaTech, Spain; Simone Briatore, Rustam Akhymov, Nicola Garzaniti, Skolkovo Institute of Science and Technology & 5Golbriak Space Oü, Russian Federation*

### **FR1-R5.2: MODELING OF SEA STATE CONDITIONS FOR IMPROVEMENT OF CYGNSS L2 WIND SPEED RETRIEVALS ..... 8288**

*Tianlin Wang, University of Michigan, United States; Valery Zavorotny, NOAA Earth System Research Laboratory, United States; Joel Johnson, Ohio State University, United States; Christopher Ruf, University of Michigan, United States; Yuchan Yi, Ohio State University, United States*

### **FR1-R5.3: ASSESSING THE ALTIMETRIC MEASUREMENT FROM CYGNSS DATA ..... 8292**

*Cinzia Zuffada, Bruce Haines, George Hajj, Zhijin Li, Stephen Lowe, Rashmi Shah, Jet Propulsion Laboratory, California Institute of Technology, United States; Jake Mashburn, Penina Axelrad, University of Colorado Boulder, United States; Andrew O'Brien, Ohio State University, United States; Paolo Cipollini, University of Colorado Boulder, United States; Valery Zavorotny, Alexander Voronovich, NOAA, United States*

### **FR1-R5.4: ALTIMETRY OVER SEA ICE USING COHERENT GNSS REFLECTIONS ..... 8296**

*Weiqiang Li, Estel Cardellach, Fran Fabra, Serni Ribó, Antonio Rius, Institute of Space Sciences (ICE, CSIC), Spain; Manuel Martín-Neira, European Space Research and Technology Centre, European Space Agency, Netherlands*

## **FR2-R5: ADVANCES IN REFLECTOMETRY WITH GNSS AND SIGNALS OF OPPORTUNITY (GNSS+R) II**

### **FR2-R5.1: CONSIDERATIONS ON GNSS-R CARRIER PHASE ALTIMETRY ..... 8299**

*Manuel Martín-Neira, European Space Agency, Netherlands*

**FR2-R5.2: BI-STATIC REFLECTOMETRY USING SOOP FOR ATMOSPHERIC APPLICATIONS .....8302**  
*Serni Ribó, Víctor Moreno, Estel Cardellach, Fran Fabra, Weiqiang Li, Antonio Rius, Institute of Space Sciences (ICE, CSIC). Institut d'Estudis Espacials de Catalunya (IEEC), Spain*

**FR2-R5.3: REMOTE SENSING OF ROOT-ZONE SOIL MOISTURE USING I- AND P-BAND ..... 8305**  
**SIGNALS OF OPPORTUNITY: INSTRUMENT VALIDATION STUDIES**  
*James Garrison, Purdue University, United States; Mehmet Kurum, Mississippi State University, United States; Benjamin Nold, Purdue University, United States; Jeffrey Piepmeier; Manuel A. Vega, Rajat Bindlish, NASA Goddard Space Flight Center, United States; Garrett Pignotti, Purdue University, United States*

**FR2-R5.4: MONITORING LAND SURFACE HYDROLOGY USING CYGNSS..... 8309**  
*Clara Chew, University Corporation for Atmospheric Research, United States; Eric Small, University of Colorado Boulder, United States; Erika Podest, Jet Propulsion Laboratory, United States*

**FR2-R5.5: INVESTIGATION OF SPACEBORNE POLARIMETRIC GNSS-R OVER LAND USING ..... 8312**  
**THE SMAP RADAR RECEIVER**  
*Matthew Buchanan, Andrew O'Brien, Joel Johnson, The Ohio State University, United States*

## **FR3-R5: GLOBAL PRECIPITATION MEASUREMENT INSTRUMENTS AND ALGORITHMS II**

**FR3-R5.1: THE GLOBAL PRECIPITATION MEASUREMENT (GPM) MISSION STATUS: ..... 8316**  
**EMPHASIS ON FALLING SNOW RETRIEVALS**  
*Gail Skofronick-Jackson, Stephen (Joe) Munchak, NASA Goddard Space Flight Center, United States; Mark Kulie, Lisa Milani, Michigan Technological University, United States; Norm Wood, University of Wisconsin-Madison, United States; George Huffman, NASA Goddard Space Flight Center, United States*

**FR3-R5.2: RECENT PROGRESS ON THE GSMAP MULTI-SATELLITE ALGORITHM ..... 8320**  
*Tomoo Ushio, Tomoaki Mega, Tokyo Metropolitan University, Japan*

**FR3-R5.3: RESULTS OF THE KA-KU MATCHED BEAM EXPERIMENT ..... 8323**  
*Toshio Iguchi, National Institute of Information and Communications Technology, Japan; Kinji Furukawa, Takuji Kubota, Kosuke Yamamoto, Japan Aerospace Exploration Agency, Japan; Takeshi Masaki, Naofumi Yoshida, Remote Sensing Technology Center of Japan, Japan*

**FR3-R5.4: HYBRID ESTIMATES OF PATH ATTENUATION FOR THE DPR..... 8327**  
*Robert Meneghini, NASA Goddard Space Flight Center, United States; Liang Liao, Morgan State University, United States; Toshio Iguchi, National Institute of Information and Communications Technology, Japan; Hyokyung Kim, Morgan State University, United States*

**FR3-R5.5: SCAN PATTERN CHANGE TEST OPERATIONS OF THE DUAL-FREQUENCY ..... 8331**  
**PRECIPITATION RADAR ON THE GLOBAL PRECIPITATION MEASUREMENT CORE SPACECRAFT**  
*Kinji Furukawa, Kosuke Yamamoto, Takuji Kubota, Riko Oki, Japan Aerospace Exploration Agency, Japan; Toshio Iguchi, National Institute of Information and Communications Technology, Japan*

## **FR4-R5: GLOBAL PRECIPITATION MEASUREMENT INSTRUMENTS AND ALGORITHMS III**

**FR4-R5.1: CROSS VALIDATION OF RAINDROP SIZE DISTRIBUTION RETRIEVALS FROM ..... 8335**  
**GPM DUAL-FREQUENCY PRECIPITATION RADAR USING GROUND-BASED POLARIMETRIC RADAR**  
*V. Chandrasekar, Sounak Biswas, Minda Le, Haonan Chen, Colorado State University, United States*

**FR4-R5.2: A MODIFIED DUAL-WAVELENGTH TECHNIQUE FOR KU- AND KA-BAND RADAR ..... 8339**  
**RAIN RETRIEVAL**  
*Liang Liao, Morgan State University, United States; Robert Meneghini, NASA Goddard Space Flight Center, United States*

<b>FR4-R5.3: LATENT HEATING FROM TRMM AND GPM MEASUREMENT .....</b>	<b>8343</b>
<i>Wei-Kuo Tao, NASA, United States; Stephen Lang, Science Systems and Applications, Inc, United States; Takamichi Iguchi, University of Maryland, United States</i>	
<b>FR4-R5.4: DEVELOPMENT OF A STATISTICAL METHOD FOR REDUCING SIDELobe CLUTTER IN HIGH SENSITIVITY MODE OF GPM/KAPR .....</b>	<b>8347</b>
<i>Takuji Kubota, Japan Aerospace Exploration Agency, Japan; Toshio Iguchi, NICT, Japan; Takeshi Masaki, Naofumi Yoshida, Remote Sensing Technology Center of Japan, Japan; Riko Oki, Japan Aerospace Exploration Agency, Japan</i>	
<b>FR4-R5.5: DEPLOYMENT AND PERFORMANCE OF THE NASA D3R DURING THE ICE-POP 2018 FIELD CAMPAIGN IN SOUTH KOREA .....</b>	<b>8349</b>
<i>V. Chandrasekar, Colorado State University, United States; Manuel A. Vega, NASA Goddard Space Flight Center, United States; Shashank Joshil, Mohit Kumar, Colorado State University, United States; David Wolff, NASA Wallops Flight Facility, United States; Walter Petersen, NASA Marshall Space Flight Center, United States</i>	
 <b>FR1-R6: SENSOR AND PRODUCT DEVELOPMENTS: FROM REGIONAL MAPPING TO GLOBAL EARTH SCIENCE I</b>	
<b>FR1-R6.1: MAPPING MINERAL FOOTPRINTS THROUGH COVER USING SURFACE AND SUBSURFACE MINERALOGY AND GEOCHEMISTRY .....</b>	<b>8352</b>
<i>Carsten Laukamp, Alistair White, Andrew Rodger, CSIRO Mineral Resources Australia, Australia; Justin Gum, Southern Gold Ltd, Australia; Vasek Metelka, CSIRO Mineral Resources, Australia; Ian Lau, CSIRO Mineral Resources Australia, Australia; Georgina Gordon, Geological Survey of South Australia, Australia; Lionel Fonteneau, Corescan Pty Ltd, Australia</i>	
<b>FR1-R6.3: BAND PARAMETERIZATION FOR IMAGING SPECTROMETER SYSTEMS: LESSONS LEARNED FROM CRISM AT MARS .....</b>	<b>8356</b>
<i>Wendy Calvin, University of Nevada, Reno, United States</i>	
<b>FR1-R6.4: USE WHAT IS THERE: WHAT CAN SENTINEL-2 DO FOR GEOLOGICAL REMOTE SENSING? .....</b>	<b>8359</b>
<i>Harald van der Werff, Robert Hewson, Freek van der Meer, ITC, University of Twente, Netherlands</i>	
<b>FR1-R6.5: MULTISCALE – MULTISENSOR – MULTITEMPORAL APPROACH FOR A REGIONAL TO GLOBAL INVENTORY OF POTENTIAL MINERAL RESOURCES AND THEIR EXPLOITATION IMPACTS: A PROSPECTIVE VIEW .....</b>	<b>8363</b>
<i>Stephane Chevrel, MinPol GmbH, Austria; Robert Hewson, University of Twente, Netherlands</i>	
 <b>FR2-R6: SENSOR AND PRODUCT DEVELOPMENTS: FROM REGIONAL MAPPING TO GLOBAL EARTH SCIENCE II</b>	
<b>FR2-R6.1: MULTI-SCALE INVESTIGATION OF HYDROCARBON PLAYS: AN ASSESSMENT BASED ON ORBITAL MULTISPECTRAL, AIRBORNE AND CLOSE-RANGE HYPERSPECTRAL DATA .....</b>	<b>8366</b>
<i>Carlos Souza Filho, Saeid Asadzade, University of Campinas, Brazil</i>	
<b>FR2-R6.3: ENGEOMAP AND ENSOMAP: SOFTWARE INTERFACES FOR MINERAL AND SOIL MAPPING UNDER DEVELOPMENT IN THE FRAME OF THE ENMAP MISSION .....</b>	<b>8369</b>
<i>Christian Mielke, Sabine Chabrilat, Christian Rogass, Nina Kristine Boesche, Stéphane Guillaso, Saskia Foerster, Karl Segl, Luis Guanter, GFZ Potsdam, Germany</i>	
<b>FR2-R6.4: SUPPLEMENTING GEOLOGICAL MAPPING WITH ASTER IN EAST AFRICA.....</b>	<b>8373</b>
<i>Robert Hewson, Harald van der Werff, University of Twente, Netherlands; Elisante Mshiu, University of Dar es Salaam, United Republic of Tanzania; Dinand Alkema, Freek van der Meer, University of Twente, Netherlands</i>	
<b>FR2-R6.5: HIERARCHICAL BAND SELECTION USING THE N-DIMENSIONAL SOLID SPECTRAL ANGLE METHOD TO ADDRESS INTER- AND INTRA- CLASS SPECTRAL VARIABILITY .....</b>	<b>8377</b>
<i>Yaqian Long, Benoit Rivard, University of Alberta, Canada</i>	

## FR3-R6: REMOTE SENSING OF WETLANDS II

### FR3-R6.1: MAPPING PLANT COMMUNITIES IN THE INTERTIDAL ZONES USING SENTINEL-2 AND SENTINEL-1 DATA ..... 8381

*Tiejun Wang, Yansha Luo, Yiwen Sun, University of Twente, Netherlands; Xinhui Liu, Beijing Normal University, China*

### FR3-R6.2: OPTIMAL FEATURES SELECTION FOR WETLANDS CLASSIFICATION USING LANDSAT TIME SERIES ..... 8385

*Liwei Xing, Huabin Wang, Wenfeng Fan, Chen Chen, Tao Li, Guanghui Wang, Haoran Zhai, Satellite Surveying and Mapping Application Center, National Administration of Surveying, Mapping and Geoinformation, China*

### FR3-R6.3: SWAF-HR: A HIGH SPATIAL AND TEMPORAL RESOLUTION WATER SURFACE EXTENT PRODUCT OVER THE AMAZON BASIN ..... 8389

*Marie Parrens, CESBIO CNRS, E.I. Purpan, France; Yann Kerr, Ahmad Al Bitar, CESBIO CNRS, France*

### FR3-R6.4: POTENTIAL OF SWOT FOR MONITORING WATER VOLUMES IN SAHELIAN PONDS AND LAKES ..... 8393

*Manuela Grippa, Cyprien Rouzies, Géosciences Environnement Toulouse, France; Sylvain Biancamaria, Denis Blumstein, Jean-François Cretaux, Laboratoire d'études en géophysique et océanographie spatiales, France; Laetitia Gal, Laboratoire d'étude des Interactions entre Sol-Agrosystème-Hydrosystème, France; Marielle Gosset, Laurent Kergoat, Géosciences Environnement Toulouse, France*

## FR4-R6: REMOTE SENSING OF INLAND WATERS II

### FR4-R6.1: A COMPARISON OF RAPID DTM BASED APPROACHES FOR ON-DEMAND FLOOD INUNDATION MAPPING ..... 8397

*Heather Mcgrath, Geological Survey of Canada, Canada; Jean-Samuel Proulx-Bourque, Jean-François Bourgon, Canada Center for Mapping and Earth Observation, Canada; Miroslav Nastev, Ahmed Abo El Ezz, Geological Survey of Canada, Canada*

### FR4-R6.2: INSAR MEASUREMENTS OF SUBSIDENCE AND REBOUND IN CALIFORNIA..... 8401

*Tom Farr, Jet Propulsion Laboratory, United States*

### FR4-R6.3: RAINWATER HARVESTING IN INDIA: USING RADAR REMOTE SENSING OBSERVATIONS TO MONITOR WATER STORAGE ..... 8404

*Vicky Vanthof, Richard Kelly, University of Waterloo, Canada*

### FR4-R6.4: COMPARISON OF WATER LEVEL CHANGES IN THE MEKONG RIVER USING GNSS REFLECTOMETRY, SATELLITE ALTIMETRY AND IN-SITU TIDE/RIVER GAUGES ..... 8408

*Puong Lan Vu, Frédéric Frappart, José Darrozes, Minh-Cuong Ha, Observatoire Midi-Pyrénées, France; Thi-Bao-Hoa Dinh, Vietnam National University, Hanoi, Viet Nam; Guillaume Ramillien, Observatoire Midi-Pyrénées, France*

### FR4-R6.5: REMOTE ESTIMATION OF WATER STORAGE VARIATION OF LAKES IN TIBETAN PLATEAU OVER THE PAST 20 YEARS ..... 8412

*Hongyuan Zhang, Liaocheng University, China; Yanhong Wu, Liping Lei, Linan Guo, Institute of Remote Sensing & Digital Earth, Chinese Academy of Sciences, China*

## FR1-R7: SUBSURFACE SENSING AND GROUND PENETRATING RADAR III

### FR1-R7.1: MOTION INDUCED ERROR IN CONTINUOUS-WAVE ELECTROMAGNETIC INDUCTION SENSORS ..... 8416

*Waymond Scott, Georgia Institute of Technology, United States*

### FR1-R7.2: A MULTICOPTER-BASED FOCUSING METHOD FOR GROUND PENETRATING SYNTHETIC APERTURE RADARS ..... 8420

*Markus Schartel, Krishnendhu Prakasan, Philipp Hügler, Ulm University, Germany; Ralf Burr, Ulm University of Applied Sciences, Germany; Winfried Mayer, Endress+Hauser GmbH+Co. KG, Germany; Christian Waldschmidt, Ulm University, Germany*

<b>FR1-R7.3: AN APPROACH TO LAVA TUBE DETECTION IN RADAR SOUNDER DATA OF THE MOON</b>	<b>8424</b>
<i>Elena Donini, Francesca Bovolo, Fondazione Bruno Kessler, Italy; Christopher Gerekos, Leonardo Carrer, Lorenzo Bruzzone, University of Trento, Italy</i>	
<b>FR1-R7.4: DUAL SENSOR “ALIS “FOR HUMANITARIAN DEMINING</b>	<b>8428</b>
<i>Motoyuki Sato, Kazutaka Kikuta, Tohoku University, Japan</i>	
<b>FR1-R7.5: FEASIBILITY OF A MICROWAVE METER FOR WATER-CUT MEASUREMENTS AND PERMITTIVITY PROFILE</b>	<b>8432</b>
<i>Jose Oliverio Alvarez, Aramco Services Company - Aramco Research Center - Houston, United States</i>	
 <b>FR2-R7: CLASSIFICATION OF SAR/POLSAR DATA II</b>	
<b>FR2-R7.1: POLARIMETRIC INFORMATION FOR MULTI-FREQUENCY SAR CLASSIFICATION OF HETEROGENEOUS COASTAL REGIONS</b>	<b>8436</b>
<i>Andrea Buono, Ferdinando Nunziata, Maurizio Migliaccio, Università di Napoli Parthenope, Italy; Xiaofeng Yang, Chinese Academy of Sciences, China; Xiaofeng Li, National Oceanic and Atmospheric Administration/National Environmental Satellite, Data, and Information Service, United States</i>	
<b>FR2-R7.2: A COMPARATIVE EVALUATION OF POLARIMETRIC DISTANCE MEASURES WITHIN THE RANDOM FOREST FRAMEWORK FOR THE CLASSIFICATION OF POLSAR IMAGES</b>	<b>8440</b>
<i>Ronny Hänsch, Olaf Hellwich, Technische Universität Berlin, Germany</i>	
<b>FR2-R7.3: SHIP DISCRIMINATION WITH DEEP CONVOLUTIONAL NEURAL NETWORKS IN SAR IMAGES</b>	<b>8444</b>
<i>Yuanyuan Wang, Chao Wang, Hong Zhang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>FR2-R7.4: POLSAR IMAGE CLASSIFICATION BASED ON DBN AND TENSOR DIMENSIONALITY REDUCTION</b>	<b>8448</b>
<i>Biao Hou, Xianpeng Guo, Weidan Hou, Shuang Wang, Xiangrong Zhang, Licheng Jiao, Key Laboratory of Intelligent Perception and Image Understanding of Ministry of Education of China, Xidian University, China</i>	
<b>FR2-R7.5: EXPLORING CONVOLUTIONAL LSTM FOR POLSAR IMAGE CLASSIFICATION</b>	<b>8452</b>
<i>Lei Wang, Xin Xu, Hao Dong, Rong Gui, Rui Yang, Fangling Pu, Wuhan University, China</i>	
 <b>FR3-R7: ADVANCED PROCESSING OF SAR DATA</b>	
<b>FR3-R7.1: SUPER-RESOLUTION RECONSTRUCTION OF MULTI-POLARIZATION SAR IMAGES BASED ON PROJECTIONS ONTO CONVEX SETS ALGORITHM</b>	<b>8456</b>
<i>Jin Huang, Bo Gao, Yan Chen, Yunping Chen, Ling Tong, School of Automation Engineering, University of Electronic Science and Technology of China, China</i>	
<b>FR3-R7.2: DISCRIMINANT NEIGHBORHOOD PRESERVING PROJECTIONS USING L1-NORM MAXIMIZATION FOR SAR TARGET RECOGNITION</b>	<b>8460</b>
<i>Haohao Ren, Xuelian Yu, Xuegang Wang, University of Electronic Science and Technology of China, China</i>	
<b>FR3-R7.3: A LINE SEGMENT DETECTOR FOR SAR IMAGES WITH CONTROLLED FALSE ALARM RATE</b>	<b>8464</b>
<i>Chenguang Liu, Télécom ParisTech, France; Rémy Abergel, Université Paris Descartes, France; Yann Gousseau, Florence Tupin, Télécom ParisTech, France</i>	
<b>FR3-R7.4: A GROUND SLOW MOVING TARGET DETECTION METHOD FOR HIGH-SPEED MANEUVERING SAR VIA BIDIRECTIONAL IMAGING MODE</b>	<b>8468</b>
<i>Xinxin Tang, Xiaoling Zhang, Jun Shi, Shunjun Wei, University of Electronic Science and Technology of China, China</i>	



## FR4-R7: SPATIAL-SPECTRAL APPROACHES FOR HYPERSPPECTRAL REMOTE SENSING

### FR4-R7.1: SPATIAL-SPECTRAL GRAPH-BASED NONLINEAR EMBEDDING DIMENSIONALITY ..... 8472 REDUCTION FOR HYPERSPPECTRAL IMAGE CLASSIFICATION

Xiangrong Zhang, Yaru Han, Ning Huyan, Xidian University, China; Chen Li, Xi'an Jiaotong University, China; Jie Feng, Xidian University, China; Li Gao, Research Center on Surveying And Mapping, China; Xiaoxiao Ma, Xidian University, China

### FR4-R7.2: A SUBPIXEL SPATIAL-SPECTRAL FEATURE MINING FOR HYPERSPPECTRAL ..... 8476 IMAGE CLASSIFICATION

Xiang Xu, Jun Li, the Guangdong Provincial Key Laboratory of Urbanization and Geosimulation, Center of Integrated Geographic Information Analysis, School of Geography and Planning, Sun Yat-sen University, China; Yanning Zhang, ShaanXi Provincial Key Laboratory of Speech and Image Information Processing, School of Computer Science, Northwestern Polytechnical University, Xi'an 710072, China, China; Shutao Li, College of Electrical and Information Engineering, Hunan University, China

### FR4-R7.3: DISCRIMINANT SPATIAL-SPECTRAL HYPERGRAPH LEARNING FOR ..... 8480 HYPERSPPECTRAL IMAGE CLASSIFICATION

Fulin Luo, Liangpei Zhang, State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing, Wuhan University, China; Bo Du, Lefei Zhang, School of Computer, Wuhan University, China; Yanni Dong, Institute of Geophysics and Geomatics, China University of Geosciences, China

### FR4-R7.4: AN ADAPTIVE SPATIAL AND SPECTRAL NEIGHBORHOOD FOR THE RX ANOMALY ..... 8484 DETECTOR

Manel Ben Salem, Research Unit: Sciences and Technologies of Image and Telecommunications, Tunisia; Karim Saheb Ettaba, IMT Atlantique, Tunisia; Med Salim Bouhleb, Research Unit: Sciences and Technologies of Image and Telecommunications, Tunisia

### FR4-R7.5: SPATIAL-SPECTRAL BASED MULTI-VIEW LOW-RANK SPARSE SUBSPACE ..... 8488 CLUSTERING FOR HYPERSPPECTRAL IMAGERY

Long Tian, Qian Du, Mississippi State University, United States; Ivica Kopriva, Rudjer Boskovic Institute, Croatia; Nicolas H. Younan, Mississippi State University, United States

## FR1-R8: SNOW COVER

### FR1-R8.1: ASSESSMENT OF UNCERTAINTIES IN THE COLLECTION-6 AND 6.1 MODIS ..... 8492 STANDARD CRYOSPHERE PRODUCTS

Dorothy Hall, University of Maryland, United States; George Riggs, Nicolo DiGirolamo, SSAI, United States

### FR1-R8.2: THE DETECTION OF MELTING SNOW AND ANALYSIS OF ..... 8496 MELTING-REFREEZING CYCLES USING MICROWAVE RADIOMETRY

Simonetta Paloscia, Paolo Pampaloni, Simone Pettinato, Emanuele Santi, Leandro Cara, CNR-IFAC, Italy

### FR1-R8.3: WET SNOW DEPTH FROM TANDEM-X SINGLE-PASS INSAR DEM ..... 8500 DIFFERENCING

Silvan Leinss, ETH Zurich, Switzerland; Oleg Antropov, Aalto University, Finland; Juho Vehviläinen, Juha Lemmetyinen, Finnish Meteorological Institute, Finland; Irena Hajsek, German Aerospace Center (DLR), Germany; Jaan Praks, Aalto University, Finland

### FR1-R8.4: COMPARISON OF EXPERIMENTAL BRIGHTNESS TEMPERATURES FOR SNOW ..... 8504 ON LAKE ICE WITH THOSE FOR SNOW ON TERRAIN

Martti Hallikainen, Matti Vaaja, Jaakko Seppänen, Jaan Praks, Aalto University, Finland

### FR1-R8.5: MODEL INVESTIGATION OF TIME-SERIES GROUND BASED SAR AND ..... 8508 MICROWAVE RADIOMETER EXPERIMENTAL DATA OF SNOW-COVERED SOIL

Chuan Xiong, Jiancheng Shi, Jinmei Pan, Haokui Xu, Tianjie Zhao, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Tao Che, The Northwest Institute of Eco-Environment and Resources (NIEER), CAS, China; Lu Hu, Xiang Ji, Wang Zhou, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China

## **FR2-R8: ICE SHEETS AND GLACIERS II**

### **FR2-R8.1: TANDEM-X DEM DERIVED ELEVATION CHANGES OF THE GREENLAND ICE SHEET ..... 8511**

*Christian Wohlfart, Birgit Wessel, Martin Huber, German Aerospace Center (DLR), Germany; Tobias Leichtle, Company for Remote Sensing and Environmental Research (SLU), Germany; Sahra Abdullahi, Silke Kerkhoff, Achim Roth, German Aerospace Center (DLR), Germany*

### **FR2-R8.3: FIRST ASSESSMENT OF HY-2A ALTIMETER DATA OVER ANTARCTICA AND GREENLAND USING CROSSOVER ANALYSIS ..... 8518**

*Maofei Jiang, Ke Xu, Yujing Xiong, Key Laboratory of Microwave Remote Sensing, National Space Science Center, Chinese Academy of Sciences, China*

### **FR2-R8.4: MASS BALANCE ESTIMATION USING SAR DATA IN CENTRAL HIMALAYA..... 8522**

*Debmata Bandyopadhyay, Gulab Singh, Indian Institute of Technology Bombay, India*

### **FR2-R8.5: MEASUREMENTS OF 0.5-2 GHZ THERMAL EMISSION SPECTRA FROM THE GREENLAND ICE SHEET, SEA ICE, AND PERMAFROST: RESULTS FROM SEPTEMBER 2017 CAMPAIGN ..... 8525**

*Joel Johnson, Kenneth Jezek, Mark Andrews, Hongkun Li, Alexandra Bringer, Caglar Yardim, Domenic Belgiovane, Julie Miller, Michael Durand, Yuna Duan, The Ohio State University, United States; Giovanni Macelloni, Marco Brogioni, CNR-IFAC, Italy; Lars Kaleschke, University of Hamburg, Germany; Shurun Tan, Leung Tsang, University of Michigan, United States*

## **FR3-R8: SEA ICE III**

### **FR3-R8.1: RIGOROUS ASSESSMENT OF MISSION IMPACT ON SEA ICE FORECAST QUALITY ..... 8528**

*Thomas Kaminski, The Inversion Lab, Germany; Frank Kauker, Ocean Atmosphere Systems, Germany; Leif Toudal Pedersen, eolab.dk, Denmark; Michael Vofßbeck, The Inversion Lab, Germany; Helmuth Haak, Laura Niederdrenk, Max Planck Institute for Meteorology, Germany; Stefan Hendricks, Robert Ricker, Alfred Wegener Institute, Germany; Michael Karcher, Ocean Atmosphere Systems, Germany; Hajo Eicken, University of Alaska Fairbanks, United States; Ola Gråbak, European Space Agency, Italy*

### **FR3-R8.2: REMOTE SENSING OF ANTARCTIC SEA ICE WITH COORDINATED AIRCRAFT AND SATELLITE DATA ACQUISITIONS ..... 8531**

*Son V. Nghiem, Jet Propulsion Laboratory, United States; Thomas Busche, Thomas Kraus, Markus Bachmann, German Aerospace Center (DLR), Germany; Nathan Kurtz, John Sonntag, John Woods, NASA Goddard Space Flight Center, United States; Stephen Ackley, Hongjie Xie, University of Texas at San Antonio, United States; Ted Maksym, Woods Hole Oceanographic Institution, United States; Kirsteen Tinto, Columbia University, United States; Wolfgang Rack, University of Canterbury, New Zealand; Pat Langhorne, University of Otago, New Zealand; Christian Haas, York University (also at Alfred Wegener Institute, Bremerhaven, Germany), Canada; Caryn Panowicz, NOAA/U.S. National Ice Center, United States; Ignatius Rigor, University of Washington, United States; Paul Morin, University of Minnesota, United States; Lisa Nguyen, Gregory Neumann, Jet Propulsion Laboratory, California Institute of Technology, United States*

### **FR3-R8.3: MEASURING ICE THICKNESS WITH CYGNSS ALTIMETRY ..... 8535**

*David Mayers, Christopher Ruf, University of Michigan, United States*

### **FR3-R8.5: INCORPORATING INCIDENCE ANGLE VARIATION INTO SAR IMAGE SEGMENTATION ..... 8543**

*Anthony Paul Doulgeris, Anca Cristea, UiT The Arctic University of Norway, Norway*

## **FR4-R8: PERMAFROST II**

### **FR4-R8.1: EMISSIVITY OF FROZEN REGIONS RETRIEVED FROM AQUARIUS ..... 8547 MEASUREMENTS**

*Yan Soldo, NASA Goddard Space Flight Center / USRA, United States; David Le Vine, NASA Goddard Space Flight Center, United States; Emmanuel Dinnat, NASA Goddard Space Flight Center / Chapman University, United States; Liang Hong, NASA Goddard Space Flight Center / SAIC, United States*

### **FR4-R8.2: CLASSIFICATION OF TUNDRA REGIONS WITH POLARIMETRIC TERRASAR-X ..... 8551 DATA**

*Barbara Widhalm, Annett Bartsch, ZAMG - Zentralanstalt für Meteorologie und Geodynamik, Austria; Achim Roth, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany; Marina Leibman, Earth Cryosphere Institute, Tyumen Scientific Center, Russian Academy of Sciences, Siberian Branch, Russian Federation*

### **FR4-R8.3: HIGH RESOLUTION FREEZE/THAW STATES DETECTION USING ..... 8555 COMBINATION OF PASSIVE MICROWAVE AND THERMAL INFRARED OBSERVATIONS**

*Tianjie Zhao, Jiancheng Shi, Tongxi Hu, Tianxing Wang, Dabin Ji, Rui Li, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China*

### **FR4-R8.4: ANALYSIS OF PERMAFROST ACTIVE LAYER SOIL HETEROGENEITY IN ..... 8559 SUPPORT OF RADAR RETRIEVALS**

*Richard Chen, Alireza Tabatabaeejad, Mahta Moghaddam, University of Southern California, United States*

## **FR1-R9: BIOMASS I**

### **FR1-R9.1: THE BIOMASS MISSION: OBJECTIVES AND REQUIREMENTS ..... 8563**

*Thuy Le Toan, Centre d'Etudes Spatiales de la Biosphère (CESBIO), France; Jerome Chave, Laboratoire EDB, France; Jørgen Dall, Technical University of Denmark, Denmark; Kostas Papathanassiou, German Aerospace Center (DLR), Germany; Philippe Paillou, Université de Bordeaux, France; Shaun Quegan, Centre for Terrestrial Carbon Dynamics, United Kingdom; Markus Reichstein, Max Planck Institute for Biogeochemistry, Germany; Sassan Saatchi, Jet Propulsion Laboratory, United States; Klaus Scipal, European Space Agency, Netherlands; Hank Shugart, University of Virginia, United States; Stefano Tebaldini, Politecnico di Milano, Italy; Lars M. H. Ulander, Chalmers University of Technology, Sweden; Mathew Williams, University of Edinburgh, United Kingdom*

### **FR1-R9.2: OVERVIEW OF THE BIOMASS SATELLITE..... 8567**

*Carl Warren, Chris Lloyd, Airbus Defence and Space Ltd, United Kingdom; Michael Fehringer, European Space Agency, Netherlands*

### **FR1-R9.3: THE BIOMASS SAR INSTRUMENT: DEVELOPMENT STATUS AND ..... 8571 PERFORMANCE OVERVIEW**

*Thomas Fügen, Eckhardt Sperlich, Christoph Heer, S. Riegger, Airbus Defence and Space GmbH, Germany; Carl Warren, Airbus Defence and Space Ltd, United Kingdom; Adriano Carbone, RHEA for ESA, Netherlands; Florence Hélière, European Space Agency/ESTEC, Netherlands*

### **FR1-R9.4: CALIBRATION CHALLENGES FOR THE BIOMASS P-BAND SAR INSTRUMENT ..... 8575**

*Shaun Quegan, Mark Lomas, University of Sheffield, United Kingdom; Kostas Papathanassiou, Jun-Su Kim, DLR - German Aerospace Center, Germany; Stefano Tebaldini, POLIMI, Italy; Davide Giudici, Michele Scagliola, Aresys s.r.l, Italy; Pietro Guccione, Politecnico di Bari, Italy; Jørgen Dall, Technical University of Denmark, Denmark; Pascale Dubois-Fernandez, ONERA, France; Philippe Paillou, University of Bordeaux, France*

### **FR1-R9.5: IONOSPHERE CORRECTION OF POLARIMETRIC INTERFEROMETRIC BIOMASS ..... 8579 SAR DATA**

*Konstantinos Papathanassiou, Jun-Su Kim, German Aerospace Center (DLR), Germany*

## **FR2-R9: BIOMASS II**

### **FR2-R9.1: THE RETRIEVAL CONCEPT OF THE BIOMASS FOREST BIOMASS PROTOTYPE PROCESSOR ..... 8582**

*Francesco Banda, Davide Giudici, Aresys s.r.l, Italy; Shaun Quegan, University of Sheffield, United Kingdom; Klaus Scipal, European Space Agency/ESTEC, Netherlands*

### **FR2-R9.2: POLINSAR AND TOMOGRAPHIC RESULTS OVER THE GABONESE FOREST ..... 8586**

*Valentine Wasik, Pascale Dubois-Fernandez, Office National d'Études et de Recherches Aérospatiales, France; Cédric Taillandier, TOTAL, France; Sassan Saatchi, Jet Propulsion Laboratory, United States*

### **FR2-R9.3: IMPROVED CHARACTERIZATION OF A TROPICAL FOREST USING POLARIMETRIC TOMOGRAPHIC SAR DATA ACQUIRED AT P BAND ..... 8590**

*Laurent Ferro-Famil, Bassam El Hajj Chehade, Ray Abdo, University of Rennes 1, France; Dinh Ho Tong Minh, IRSTEA, France; Stefano Tebaldini, Politecnico di Milano, Italy; Thuy Le Toan, CESBIO, France*

### **FR2-R9.4: LONG-TERM P-BAND TOMOSAR OBSERVATIONS FROM THE BOREALSCAT TOWER EXPERIMENT ..... 8594**

*Albert Monteith, Lars M. H. Ulander, Chalmers University of Technology, Sweden*

### **FR2-R9.5: RETRIEVAL OF TERRAIN TOPOGRAPHY IN TROPICAL FORESTS USING P-BAND SAR TOMOGRAPHY ..... 8598**

*Mauro Mariotti d'Alessandro, Stefano Tebaldini, Politecnico di Milano, Italy*

## **FR3-R9: OPTICAL SATELLITE CALIBRATION**

### **FR3-R9.1: THE FIRST YEAR OF ADVANCED BASELINE IMAGER..... 8601**

*Satya Kalluri, Jaime Daniels, NOAA/NESDIS/STAR, United States; Mathew Gunshor, CIMSS, University of Wisconsin at Madison, United States; Daniel Lindsey, Timothy Schmit, Xiangqian Wu, NOAA/NESDIS/STAR, United States*

### **FR3-R9.2: FLEX: A PARAMETRIC STUDY OF ITS TANDEM FORMATION WITH SENTINEL-3 ..... 8605**

*David Arnas, Centro Universitario de la Defensa at ESA/ESTEC, Spain; Pedro Jurado, MOLTEK C/O ESA/ESTEC, Netherlands; Itziar Barat, DEIMOS Space C/O ESA/ESTEC, Netherlands; Berthyl Duesmann, Ralf Bock, European Space Agency/ESTEC, Netherlands*

### **FR3-R9.3: FIREBIRD – SMALL SATELLITES FOR WILD FIRE ASSESSMENT ..... 8609**

*Winfried Halle, Sarah Asam, Erik Borg, Christian Fischer, Olaf Frauenberger, Eckehard Lorenz, Doris Klein, Michael Nolde, Carsten Paproth, Simon Plank, Rudolf Richter, Thomas Saeuberlich, Agnieszka Soszynska, Christian Strobl, German Aerospace Center (DLR), Germany*

## **FR4-R9: RADAR MISSIONS**

### **FR4-R9.1: 10 YEARS OF RADARSAT-2 FLIGHT OPERATIONS ..... 8613**

*Marielle Chabot, Neil Gibb, Casey Lambert, Chris Patterson, Philippe Rolland, MDA, Canada*

### **FR4-R9.2: MODEL-BASED ESTIMATION OF TROPICAL FOREST BIOMASS FROM NOTCH-FILTERED P-BAND SAR BACKSCATTER ..... 8617**

*Maciej Soja, Horizon Geoscience Consulting, Australia; Mauro d'Alessandro, Politecnico di Milano, Italy; Shaun Quegan, University of Sheffield, United Kingdom; Stefano Tebaldini, Politecnico di Milano, Italy; Lars M. H. Ulander, Chalmers University of Technology, Sweden*

### **FR4-R9.3: GEOSYNCHRONOUS CONTINENTAL LAND-ATMOSPHERE SENSING SYSTEM (G-CLASS): PERSISTENT RADAR IMAGING FOR EARTH SCIENCE ..... 8621**

*Stephen Hobbs, Cranfield University, United Kingdom; Andrea Monti-Guarnieri, Politecnico di Milano, Italy*

### **FR4-R9.4: SWOT MISSION PERFORMANCE AND ERROR BUDGET ..... 8625**

*Eva Peral, Daniel Esteban-Fernandez, Jet Propulsion Laboratory, United States*

## FR1-R10: OPEN DATA CUBE I

**FR1-R10.1: OVERVIEW OF THE OPEN DATA CUBE INITIATIVE ..... 8629**  
*Brian Killough, NASA, United States*

**FR1-R10.2: DIGITAL EARTH AUSTRALIA - FROM SATELLITE DATA TO BETTER DECISIONS ..... 8633**  
*David Gavin, Trevor Dhu, Stephen Sagar, Norman Mueller, Bex Dunn, Adam Lewis, Leo Lymburner, Stuart Minchin, Simon Oliver, Jonathon Ross, Medhavy Thankappan, Geoscience Australia, Australia*

**FR1-R10.3: ACCELERATING INDUSTRY INNOVATION USING THE OPEN DATA CUBE IN AUSTRALIA ..... 8636**  
*Robert Woodcock, Matt Paget, Peter Wang, Alex Held, CSIRO, Australia*

**FR1-R10.4: THE CEOS DATA CUBE PORTAL: A USER-FRIENDLY, OPEN SOURCE SOFTWARE SOLUTION FOR THE DISTRIBUTION, EXPLORATION, ANALYSIS, AND VISUALIZATION OF ANALYSIS READY DATA ..... 8639**  
*Syed R Rizvi, Analytical Mechanics Associates, United States; Brian Killough, NASA Langley Research Center, United States; Andrew Cherry, Sanjay Gowda, Analytical Mechanics Associates, United States*

**FR1-R10.5: LESSONS LEARNED AND COST ANALYSIS OF HOSTING A FULL STACK OPEN DATA CUBE (ODC) APPLICATION ON THE AMAZON WEB SERVICES (AWS) ..... 8643**  
*Syed R Rizvi, Analytical Mechanics Associates, United States; Brian Killough, NASA Langley Research Center, United States; Andrew Cherry, Sanjay Gowda, Analytical Mechanics Associates, United States*

## FR2-R10: OPEN DATA CUBE II

**FR2-R10.1: OPEN DATA CUBE PRODUCTS USING HIGH-DIMENSIONAL STATISTICS OF TIME SERIES ..... 8647**  
*Dale Roberts, Australian National University, Australia; Bex Dunn, Norman Mueller, Geoscience Australia, Australia*

**FR2-R10.2: RANDOM FOREST DATA CUBE BASED ALGORITHM FOR LAND COVER CLASSIFICATION: A COLOMBIAN CASE ..... 8651**  
*Indira Pachón, Salomón Ramírez, Diana Fonseca, Pilar Lozano-Rivera, IDEAM, Colombia; Christian Ariza, María Paula Mancipe, Mario Villamizar, Harold Castro, Los Andes University, Colombia; Edersson Cabrera, María Teresa Becerra, IDEAM, Colombia*

**FR2-R10.3: TESTING THE INTEROPERABILITY OF SENTINEL 1 ANALYSIS READY DATA OVER THE UNITED KINGDOM ..... 8655**  
*Daniel Wicks, Thomas Jones, Cristian Rossi, Satellite Applications Catapult, United Kingdom*

**FR2-R10.4: TOWARDS SENTINEL-2 ANALYSIS READY DATA: A SWISS DATA CUBE PERSPECTIVE ..... 8659**  
*Gregory Giuliani, Bruno Chatenoux, Erica Honeck, Jean-Philippe Richard, University of Geneva, Switzerland*

**FR2-R10.5: SNOW OBSERVATIONS FROM SPACE: AN APPROACH TO MAP SNOW COVER FROM THREE DECADES OF LANDSAT IMAGERY ACROSS SWITZERLAND ..... 8663**  
*Lorenzo Frau, University of Geneva, Institute for Environmental Sciences, GRID-Geneva, Switzerland; Syed R Rizvi, Analytical Mechanics Associates, Switzerland; Bruno Chatenoux, Charlotte Poussin, Jean-Philippe Richard, Gregory Giuliani, University of Geneva, Institute for Environmental Sciences, GRID-Geneva, Switzerland*

## FR3-R10: TOMOGRAPHY AND 3D MAPPING III

**FR3-R10.1: TANDEM-L: PROJECT STATUS AND MAIN FINDINGS OF THE PHASE B1 STUDY ..... 8667**  
*Alberto Moreira, Markus Bachmann, Wolfgang Balzer, Daniela Borla Tridon, Erhard Diedrich, Thomas Fritz, Christo Grigorov, Ralph Kahle, Gerhard Krieger, Irena Hajsek, Sigurd Huber, Hannah Jörg, Patrick Klenk, Marie Lachaise, Martin Maier, Edith Maurer, Kostas Papathanassiou, Alessandro Parizzi, Pau Prats-Iraola, Jens Reimann, Marc Rodriguez, Birgit Schättler, Maximilian Schwinger, Daniel Schulze, Ulrich Steinbrecher, Michelangelo Villano, Marwan Younis, Francesco De Zan, Manfred Zink, Mariantonietta Zonno, German Aerospace Center (DLR), Germany*

**FR3-R10.2: LINKING SAR TOMOGRAPHY AND POLARIZATION COHERENCE TOMOGRAPHY ..... 8671  
IN FOREST SCENARIOS**

*Matteo Pardini, Konstantinos Papathanassiou, German Aerospace Center (DLR), Germany*

**FR3-R10.3: AFRISAR-TROPISAR: FOREST BIOMASS RETRIEVAL BY P-BAND SAR ..... 8675  
TOMOGRAPHY**

*Yen-Nhi Ngo, Dinh Ho Tong Minh, Ibrahim Moussawi, IRSTEA, France; Ludovic Villard, CESBIO, France; Laurent Ferro-Famil, University of Rennes 1, France; Mauro Mariotti D’Alessandro, Stefano Tebaldini, POLIMI, Italy; Clement Albinet, ESRIN, Italy; Klaus Scipal, ESTEC, Netherlands; Thuy Le Toan, CESBIO, France*

**FR3-R10.4: UAVSAR L-BAND AND P-BAND TOMOGRAPHIC EXPERIMENTS IN BOREAL ..... 8679  
FORESTS**

*Scott Hensley, Bruce Chapman, Marco Lavallo, Brian Hawkins, Bryan Riel, Thierry Michel, Ronald Muellerschoen, Yunling Lou, Marc Simard, Jet Propulsion Laboratory, United States*

**FR3-R10.5: MULTI-BASELINE INSAR EXPERIMENTS IN NATURAL SCENARIOS WITH ..... 8683  
TANDEM-X STARING SPOTLIGHT DATA**

*Maria J. Sanjuan-Ferrer, Marc Rodriguez-Cassola, Pau Prats-Iraola, DLR - German Aerospace Center, Germany*

**FR4-R10: TOMOGRAPHY AND 3D MAPPING IV**

**FR4-R10.1: FEATURE ENHANCED SAR TOMOGRAPHY RECONSTRUCTION THROUGH ..... 8687  
ADAPTIVE NONPARAMETRIC ARRAY PROCESSING**

*Gustavo Daniel Martín del Campo Becerra, Andreas Reigber, Matteo Nannini, German Aerospace Center (DLR), Germany*

**FR4-R10.2: MULTIPLE SCATTERERS DETECTION BASED ON SIGNAL CORRELATION ..... 8691  
EXPLOITATION IN URBAN SAR TOMOGRAPHY**

*Hossein Aghababae, Alessandra Budillon, Giampaolo Ferraioli, Angel Caroline Johns, Vito Pascazio, Gilda Schirinzi, University of Naples Parthenope, Italy*

**FR4-R10.3: CROSS SENSOR SIMULATION OF TOMOGRAPHIC SAR DATA..... 8695**

*Mauro Mariotti d’Alessandro, Stefano Tebaldini, Politecnico di Milano, Italy*

**FR4-R10.4: 3D WET REFRACTIVITY MONITORING USING GNSS TOMOGRAPHY ..... 8699  
TECHNIQUE CONSTRAINED WITH AIRS DATA**

*Pedro Benevides, João Catalao, Instituto Dom Luiz (IDL), Faculdade de Ciências, Universidade Lisboa, Portugal; Giovanni Nico, Consiglio Nazionale delle Ricerche (CNR), Istituto per le Applicazioni del Calcolo, Italy; Pedro Ma Miranda, Instituto Dom Luiz (IDL), Faculdade de Ciências, Universidade Lisboa, Portugal*

**FR4-R10.5: MULTI-PASS SAR INTERFEROMETRY FOR 3D RECONSTRUCTION OF ..... 8703  
COMPLEX MOUNTAINOUS AREAS BASED ON ROBUST LOW RANK TENSOR  
DECOMPOSITION**

*Jian Kang, Yuanyuan Wang, Technical University of Munich (TUM), Germany; Xiao Xiang Zhu, German Aerospace Center (DLR), Germany*

**FR1-R11: SENTINEL-3: APPLICATIONS OF OLCI AND SLSTR DATA OVER LAND IN  
SYNERGY WITH OTHER SENSORS I**

**FR1-R11.1: EXTENDING THE SPOT/VEGETATION – PROBA-V ARCHIVE WITH .....8707  
SENTINEL-3: A PRELIMINARY EVALUATION**

*Carolien Toté, Else Swinnen, VITO, Belgium*

**FR1-R11.2: VALIDATION OF FINE RESOLUTION LAND-SURFACE ENERGY FLUXES ..... 8711  
DERIVED WITH COMBINED SENTINEL-2 AND SENTINEL-3 OBSERVATIONS**

*Radoslaw Guzinski, European Space Agency, Italy; Héctor Nieto, Research & Technology, Food and Agriculture IRTA, Spain; Tarek S. El-Madany, Mirco Migliavacca, Max Planck Institute for Biogeochemistry, Germany; Arnaud Carrara, Centro de Estudios Ambientales del Mediterraneo (CEAM), Germany*

<b>FR1-R11.3: LAND SURFACE PROCESSES ANALYSIS USING SENTINEL-3 OLCI AND MODIS DATA</b>	<b>8715</b>
<i>Jose Gómez-Dans, NCEO &amp; University College London, United Kingdom; Gerardo Lopez-Saldana, Assimila Ltd, United Kingdom; Philip Lewis, NCEO &amp; University College London, United Kingdom; Jonathan Styles, Assimila Ltd, United Kingdom; Pierre-Philippe Mathieu, European Space Agency, Italy</i>	
<b>FR1-R11.4: VALIDATION OF THE SENTINEL-3 OCEAN AND LAND COLOUR INSTRUMENT (OLCI) TERRESTRIAL CHLOROPHYLL INDEX (OTCI): SYNERGETIC EXPLOITATION OF THE SENTINEL-2 MISSIONS</b>	<b>8719</b>
<i>Luke Brown, Jadunandan Dash, University of Southampton, United Kingdom; Antonio Lidón, Universitat Politècnica de València, Spain; Ernesto Lopez-Baeza, University of Valencia, Spain; Steffen Dransfeld, European Space Agency, Italy</i>	
<b>FR1-R11.5: OLCI/SLSTR SYN L2 ALGORITHM AND PRODUCTS OVERVIEW</b>	<b>8723</b>
<i>Claire Henocq, ACRI-ST, France; Peter North, Andreas Heckel, Swansea University, United Kingdom; Stéphane Ferron, Nicolas Lamquin, ACRI-ST, France; Steffen Dransfeld, European Space Agency/ESRIN, Italy; Ludovic Bourg, ACRI-ST, France; Carolien Toté, VITO, Belgium; Didier Ramon, HYGEOS, France</i>	
 <b>FR2-R11: SENTINEL-3: APPLICATIONS OF OLCI AND SLSTR DATA OVER LAND IN SYNERGY WITH OTHER SENSORS II</b>	
<b>FR2-R11.1: SNOW COVER MONITORING BY SYNERGISTIC USE OF SENTINEL-3 SLSTR AND SENTINEL-1 SAR DATA</b>	<b>8727</b>
<i>Thomas Nagler, Helmut Rott, Joanna Ossowska, Gabriele Schwaizer, ENVEO Environmental Earth Observation IT GmbH, Austria; David Small, University of Zürich, Switzerland; Eirik Malnes, NORUT, Norway; Kari Luojus, Finnish Meteorological Institute, Finland; Sari Metsämäki, Finnish Environment Institute, Finland; Simon Pinnock, European Space Agency, United Kingdom</i>	
<b>FR2-R11.2: SYNERGIES BETWEEN SMOS AND SENTINEL-3</b>	<b>8731</b>
<i>Yann Kerr, CNES, France; Jean-Pierre Wigneron, INRA, France; Beatriz Molero-Rodenas, Nemesio Rodriguez-Fernández, Ahmad Al Bitar, Christophe Suere, CESBIO, France; Susanne Mecklenburg, European Space Agency, Italy</i>	
<b>FR2-R11.3: TERRA-P: A NEW GLOBAL MONITORING SYSTEM FOR PRIMARY PRODUCTION</b>	<b>8734</b>
<i>Iain Colin Prentice, Rebecca Thursa Thomas, Imperial College London, United Kingdom</i>	
 <b>FR3-R11: SINGLE PHOTON TO HYPERSPECTRAL: ENHANCED AIRBORNE MAPPING LIDAR TECHNOLOGIES AND THEIR APPLICATIONS I</b>	
<b>FR3-R11.1: MULTISPECTRAL TERRESTRIAL LASER SCANNING: NEW DEVELOPMENTS AND APPLICATIONS</b>	<b>8737</b>
<i>Sanna Kaasalainen, Tuomo Malkamäki, Julian Ilinca, Laura Ruotsalainen, Finnish Geospatial Research Institute, Finland</i>	
<b>FR3-R11.2: MULTIVARIATE GAUSSIAN DECOMPOSITION FOR MULTISPECTRAL AIRBORNE LIDAR DATA CLASSIFICATION</b>	<b>8741</b>
<i>Salem Morsy, Ahmed Shaker, Ahmed El-Rabbany, Ryerson University, Canada</i>	
<b>FR3-R11.3: INVESTIGATING MULTI-SPECTRAL LIDAR RADIOMETRY: AN OVERVIEW OF THE EXPERIMENTAL FRAMEWORK</b>	<b>8745</b>
<i>Maxim Okhrimenko, Craig Coburn, Chris Hopkinson, University of Lethbridge, Canada</i>	
<b>FR3-R11.4: TOWARDS A GENERALIZED METHOD FOR TREE SPECIES CLASSIFICATION USING MULTISPECTRAL AIRBORNE LASER SCANNING IN ONTARIO, CANADA</b>	<b>8749</b>
<i>Parvez Rana, University of Quebec at Montreal, Canada; Jean-François Prieur, University of Sherbrooke, Canada; Brindusa Cristina Budei, Benoît St-Onge, University of Quebec at Montreal, Canada</i>	

## **FR4-R11: SINGLE PHOTON TO HYPERSPECTRAL: ENHANCED AIRBORNE MAPPING LIDAR TECHNOLOGIES AND THEIR APPLICATIONS II**

### **FR4-R11.2: THE INTEGRATION OF UAV AND BACKPACK LIDAR SYSTEMS FOR FOREST INVENTORY ..... 8757**

*Yanjun Su, Hongcan Guan, Tianyu Hu, Qinghua Guo, Institute of Botany, Chinese Academy of Sciences, China*

### **FR4-R11.3: IMPLEMENTATION OF UAV-BASED LIDAR FOR HIGH THROUGHPUT PHENOTYPING ..... 8761**

*Radhika Ravi, Yun-Jou Lin, Tamer Shamseldin, Magdy Elbahnasawy, Melba Crawford, Ayman Habib, Purdue University, United States*

### **FR4-R11.4: EVALUATION OF A SURVEY-GRADE, LONG-RANGE UAS LIDAR SYSTEM: A CASE STUDY IN SOUTH TEXAS, USA ..... 8765**

*Michael Starek, Tianxing Chu, David Bridges, Texas A&M University-Corpus Christi, United States*

### **FR4-R11.5: BIAS IMPACT ANALYSIS AND CALIBRATION OF UAV-BASED MOBILE LIDAR SYSTEM ..... 8769**

*Tamer Shamseldin, Radhika Ravi, Magdy Elbahnasawy, Yun-Jou Lin, Ayman Habib, Purdue University, United States*

## **FR1-R12: ADVANCED FLOOD MONITORING AND PREDICTION FOR GLOBAL DISASTER RISK REDUCTION II**

### **FR1-R12.1: AN OPEN-SOURCE TOOL FOR THE INTEGRATION OF REMOTELY SENSED INFORMATION AND HYDRO-GEOMORPHIC PARAMETERS FOR PRECISE MONITORING OF INUNDATIONS ..... 8773**

*Alberto Refice, Annarita D'Addabbo, Guido Pasquariello, Francesco Paolo Lovergine, ISSIA-CNR, Italy*

### **FR1-R12.2: FLOOD-AREA DETECTION USING PALSAR-2 DATA FOR HEAVY RAINFALL DISASTERS IN JAPAN ..... 8777**

*Masato Ohki, Japan Aerospace Exploration Agency, Japan; Masanobu Shimada, Tokyo Denki University, Japan*

### **FR1-R12.3: NEAR REAL-TIME MODIS-DETECTED FLOOD MONITORING COUPLING WITH COMPOSITE WHITE-OBJECT INDEX ..... 8781**

*Jonggeol Park, Tokyo University of Information Sciences, Japan; Young-Joo Kwak, PWRI-ICHARM-UNESCO, Japan*

### **FR1-R12.4: MONITORING URBAN FLOODS USING SAR INTERFEROMETRIC OBSERVATIONS ..... 8785**

*Marco Chini, Luxembourg Institute of Science and Technology, Luxembourg; Luca Pulvirenti, CIMA Research Foundation, Italy; Ramona Pelich, Luxembourg Institute of Science and Technology, Luxembourg; Nazzareno Pierdicca, Sapienza Università di Roma, Italy; Renaud Hostache, Patrick Matgen, Luxembourg Institute of Science and Technology, Luxembourg*

## **FR2-R12: FOREST PARAMETERS ESTIMATION: TECHNIQUES AND APPLICATIONS**

### **FR2-R12.1: IMPROVING CARBON ESTIMATION OF LARGE TROPICAL TREES BY LINKING AIRBORNE LIDAR CROWN SIZE TO FIELD INVENTORY ..... 8789**

*Antonio Ferraz, Sassan Saatchi, NASA Jet Propulsion Laboratory, United States; James Kellner, Brown University, United States; David Clark, University of Missouri-St. Louis, United States*

### **FR2-R12.2: ASSESSMENT OF THE MAPPING OF ABOVEGROUND BIOMASS AND ITS UNCERTAINTIES USING FIELD MEASUREMENTS, AIRBORNE LIDAR AND SATELLITE DATA IN MEXICO ..... 8793**

*Mikhail Urbazaev, Christian Thiel, Felix Cremer, Christiane Schmullius, Friedrich-Schiller University Jena, Germany*



<b>FR2-R12.3: INTERFEROMETRIC GROUND NOTCHING OF SAR IMAGES FOR ESTIMATING FOREST ABOVE GROUND BIOMASS</b>	<b>8797</b>
<i>Mauro Mariotti d'Alessandro, Stefano Tebaldini, Politecnico di Milano, Italy; Shaun Quegan, University of Sheffield, United Kingdom; Maciej Soja, University of Tasmania, Australia; Lars M. H. Ulander, Chalmers University of Technology, Sweden</i>	
<b>FR2-R12.4: ESTIMATION OF FOREST PARAMETERS COMBINING MULTISENSOR HIGH RESOLUTION REMOTE SENSING DATA</b>	<b>8801</b>
<i>David Morin, Milena Planells, CESBIO, Université de Toulouse, CNES/CNRS/IRD/UT3, UMR 5126, France; Dominique Guyon, INRA, UMR ISPA, France; Ludovic Villard, Gérard Dedieu, CESBIO, Université de Toulouse, CNES/CNRS/IRD/UT3, UMR 5126, France</i>	
<b>FR2-R12.5: FOREST HEIGHT ESTIMATION FROM TANDEM-X IMAGES WITH SEMI-EMPIRICAL COHERENCE MODELS</b>	<b>8805</b>
<i>Jaan Praks, Oleg Antropov, Aalto University, Finland; Aire Olesk, Kaupo Voormansik, University of Tartu, Estonia</i>	
 <b>FR3-R12: UAV QUANTITATIVE REMOTE SENSING FOR ECOSYSTEM SCIENCE I</b>	
<b>FR3-R12.1: UAV SPECTROSCOPY: CURRENT SENSORS, PROCESSING TECHNIQUES AND THEORETICAL CONCEPTS FOR DATA INTERPRETATION</b>	<b>8809</b>
<i>Helge Aasen, Federal Institute of Technology Zürich (ETHZ), Switzerland</i>	
<b>FR3-R12.2: INVERSION OF THE PROSAIL MODEL FROM UAV DATA</b>	<b>8813</b>
<i>Enrico Tomelleri, Free University of Bozen/Bolzano, Italy; Abraham Meija Aguilar, EURAC Research, Italy</i>	
<b>FR3-R12.3: ESTIMATION OF SUGARCANE YIELD BY ASSIMILATING UAV AND GROUND MEASUREMENTS VIA ENSEMBLE KALMAN FILTER</b>	<b>8816</b>
<i>Liangsheng Shi, Shun Hu, Yuanyuan Zha, Wuhan University, China</i>	
<b>FR3-R12.4: UAV-BASED APPROACHES FOR CROP PARAMETER RETRIEVALS</b>	<b>8820</b>
<i>Andrew Revill, University of Edinburgh, United Kingdom; Anna Florence, Steve Hoad, Robert M Rees, Scotland's Rural University College, United Kingdom; Alasdair MacArthur, Mathew Williams, University of Edinburgh, United Kingdom</i>	
 <b>FR4-R12: UAV QUANTITATIVE REMOTE SENSING FOR ECOSYSTEM SCIENCE II</b>	
<b>FR4-R12.1: INFLUENCE OF COSINE CORRECTOR AND UAS PLATFORM DYNAMICS ON AIRBORNE SPECTRAL IRRADIANCE MEASUREMENTS</b>	<b>8822</b>
<i>Juliane Bendig, Deepak Gautam, Zbyněk Malenovský, Arko Lucieer, University of Tasmania, Australia</i>	
<b>FR4-R12.2: THE USE OF A QUADCOPTER-MOUNTED HYPER-SPECTRAL SPECTROMETER FOR EXAMINING REFLECTANCE IN SCOTTISH COASTAL WATERS.</b>	<b>8826</b>
<i>Rebecca Weeks, Philip Anderson, Keith Davidson, The Scottish Association for Marine Science (SAMS), United Kingdom; David McKee, University of Strathclyde, United Kingdom</i>	
<b>FR4-R12.3: INVESTIGATING FOREST PHOTOSYNTHETIC RESPONSE TO ELEVATED CO<sub>2</sub> USING UAV-BASED MEASUREMENTS OF SOLAR INDUCED FLUORESCENCE</b>	<b>8830</b>
<i>Kadmiel Maseyk, The Open University, United Kingdom; Jon Atherton, University of Helsinki, Finland; Rick Thomas, University of Birmingham, United Kingdom; Kieran Wood, University of Bristol, United Kingdom; Sabine Tausz-Posch, University of Birmingham, United Kingdom; Alasdair MacArthur, University of Edinburgh, United Kingdom; Albert Porcar-Castell, University of Helsinki, Finland; Michael Tausz, University of Birmingham, United Kingdom</i>	
<b>FR4-R12.4: DRONE MEASUREMENTS OF SOLAR-INDUCED CHLOROPHYLL FLUORESCENCE ACQUIRED WITH A LOW-WEIGHT DFOV SPECTROMETER SYSTEM</b>	<b>8834</b>
<i>Jon Atherton, University of Helsinki, Finland; Alasdair MacArthur, University of Edinburgh, United Kingdom; Teemu Hakala, Finnish Geodetic Institute, Finland; Kadmiel Maseyk, Open University, United Kingdom; Iain Robinson, Rutherford Appleton Laboratory, United Kingdom; Weiwei Liu, Institute of Geographic Sciences and Natural Resources Research, China; Eija Honkavaara, Finnish Geodetic Institute, Finland; Albert Porcar-Castell, University of Helsinki, Finland</i>	

**FR4-R12.5: DERIVING HYPER SPECTRAL REFLECTANCE SPECTRA FROM UAV DATA ..... 8837**  
**COLLECTED IN CHANGEABLE ILLUMINATION CONDITIONS TO ASSESS VEGETATION**  
**CONDITION**

*France Gerard, Charles George, Centre for Ecology and Hydrology, United Kingdom; Jakob Iglhaut, University of Swansea, United Kingdom; Richard Broughton, Centre for Ecology and Hydrology, United Kingdom; Cecilia Chavana-Bryant, Lawrence Berkeley National Laboratory, United States; Kevin White, University of Reading, United Kingdom; Karsten Schonrogge, Centre for Ecology and Hydrology, United Kingdom*

**FR1-R13: LANDSAT 9**

**FR1-R13.1: LANDSAT 9 THERMAL INFRARED SENSOR 2 ARCHITECTURE AND DESIGN ..... 8841**

*Jason H. Hair, Dennis Reuter, Synthia L. Tonn, Joel McCorkel, Amy A. Simon, NASA Goddard Space Flight Center, United States; Melody Djam, Bay Engineering Innovations, Inc., United States; David Alexander, ASRC Federal Space and Defense, United States; Kevin Ballou, Richard Barclay, Phillip Coulter, NASA Goddard Space Flight Center, United States; Michael Edick, Florez Engineering, LLC, United States; Boryana Efremova, GeoThinkTank, LLC, United States; Paul Finneran, Jackson and Tull, Inc., United States; Jose Florez, Florez Engineering, LLC, United States; Steven Graham, NASA Goddard Space Flight Center, United States; Kenneth Harbert, Florez Engineering, LLC, United States; Dennis Hewitt, Bay Engineering Innovations, Inc., United States; Michael Hickey, Samantha Hicks, NASA Goddard Space Flight Center, United States; William Hoge, Florez Engineering, LLC, United States; Murzy Jhabvala, NASA Goddard Space Flight Center, United States; Carol Lilly, Alcyon Technical Services, LLC, United States; Allen Lunsford, Catholic University of America, United States; Laurie Mann, NASA Goddard Space Flight Center, United States; Candace Masters, General Dynamics C4 Systems, Inc., United States; Matthew Montanaro, Rochester Institute of Technology, United States; Theodore Muench, Veronica Otero, Fil Parong, NASA Goddard Space Flight Center, United States; Aaron Pearlman, GeoThinkTank, LLC, United States; Jonathan Penn, Stinger Ghaffarian Technologies, Inc., United States; Danielle Vigneau, NASA Goddard Space Flight Center, United States; Brian Wenny, Science Systems and Applications, Inc., United States*

**FR1-R13.2: LANDSAT 9 THERMAL INFRARED SENSOR 2 CHARACTERIZATION PLAN ..... 8845**  
**OVERVIEW**

*Joel McCorkel, NASA Goddard Space Flight Center, United States; Matthew Montanaro, Rochester Institute of Technology, United States; Boryana Efremova, Aaron Pearlman, GeoThinkTank LLC, United States; Brian Wenny, SSAI, Inc., United States; Allen Lunsford, Catholic University of America, United States; Amy A. Simon, Jason Hair, Dennis Reuter, NASA Goddard Space Flight Center, United States*

**FR1-R13.3: LANDSAT 9 THERMAL INFRARED SENSOR 2 SUBSYSTEM-LEVEL SPECTRAL ..... 8849**  
**TEST RESULTS**

*Boryana Efremova, Aaron Pearlman, GeoThinkTank LCC / NASA GSFC, United States; Joel McCorkel, NASA Goddard Space Flight Center, United States; Matthew Montanaro, Rochester Institute of Technology / NASA GSFC, United States; Michael Hickey, NASA Goddard Space Flight Center, United States; Allen Lunsford, Catholic University of America / NASA GSFC, United States; Dennis Reuter, NASA Goddard Space Flight Center, United States*

**FR1-R13.4: LANDSAT 9 THERMAL INFRARED SENSOR 2 PRELIMINARY STRAY LIGHT ..... 8853**  
**ASSESSMENT**

*Matthew Montanaro, Rochester Institute of Technology, United States; Joel McCorkel, June Tveekrem, NASA Goddard Space Flight Center, United States; John Stauder, Utah State University, United States; Allen Lunsford, Catholic University of America, United States; Eric Mentzell, Jason Hair, Dennis Reuter, NASA Goddard Space Flight Center, United States*

**FR3-R13: DATA FUSION TECHNIQUES II**

**FR3-R13.1: A LOW-RANK METHOD FOR SENTINEL-2 SHARPENING USING CYCLIC ..... 8857**  
**DESCENT**

*Magnus Orn Ulfarsson, University of Iceland, Iceland; Mauro Dalla Mura, Grenoble Institute of Technology, France*

**FR3-R13.2: URBAN IMPERVIOUS SURFACE EXTRACTION BASED ON THE INTEGRATION ..... 8861**  
**OF REMOTE SENSING IMAGES AND SOCIAL MEDIA DATA**

*Yan Yu, Sun Yat-sen University, China; Wei Wei, Northwestern Polytechnical University, China; Jun Li, Sun Yat-sen University, China; Yanning Zhang, Northwestern Polytechnical University, China*

<b>FR3-R13.3: PHYSICALLY BASED DATA FUSION BETWEEN AIRBORNE LIDAR AND HYPERSPETRAL DATA: GEOMETRIC AND RADIOMETRIC SYNERGIES</b>	<b>8865</b>
<i>Maximilian Brell, Luis Guanter, Karl Segl, GFZ Potsdam, Germany</i>	
<b>FR3-R13.4: URBAN LAND USE/LAND COVER CLASSIFICATION BASED ON FEATURE FUSION FUSING HYPERSPETRAL IMAGE AND LIDAR DATA</b>	<b>8869</b>
<i>Qiong Cao, Yanfei Zhong, Ailong Ma, Liangpei Zhang, Wuhan University, China</i>	
<b>FR3-R13.5: FUSION OF HYPERSPETRAL AND LIDAR IMAGES USING NON-SUBSAMPLED SHEARLET TRANSFORM</b>	<b>8873</b>
<i>Mohammad Reza Soleimanzadeh, Azam Karami, Shahid Bahonar University of Kerman, Iran; Paul Scheunders, University of Antwerp, Belgium</i>	
 <b>FR4-R13: DATA FUSION: COREGISTRATION AND SUPER-RESOLUTION</b>	
<b>FR4-R13.1: AUTOMATIC COREGISTRATION OF SAR AND OPTICAL IMAGES EXPLOITING COMPLEMENTARY GEOMETRY AND MUTUAL INFORMATION</b>	<b>8877</b>
<i>Mario Costantini, Massimo Zavagli, e-GEOS - an Italian Space Agency and Telespazio company, Italy; Javier Martin, Anabella Medina, INTA, Spain; Aureliana Barghini, B-Open Solutions, Italy; Jorge Naya, Indra, Spain; Carlos Hernando, Telespazio Iberica, Spain; Flavia Macina, e-GEOS - an Italian Space Agency and Telespazio company, Italy; Inés Ruiz, Telespazio Iberica, Spain; Enrique Nicolas, Severino Fernández, INTA, Spain</i>	
<b>FR4-R13.2: COMBINED USE OF MULTIMODAL SIMILARITY MEASURES FOR VISUAL TO RADAR IMAGE REGISTRATION</b>	<b>8881</b>
<i>Mykhail L. Uss, National Aerospace University, Ukraine; Benoit Vozel, University of Rennes, France; Vladimir V. Lukin, National Aerospace University, Ukraine; Kacem Chehdi, University of Rennes, France</i>	
<b>FR4-R13.3: REGISTRATION OF SAR AND OPTICAL IMAGES BY WEIGHTED SIFT BASED ON PHASE CONGRUENCY</b>	<b>8885</b>
<i>Shuai Jiang, Bingnan Wang, Institute of Electronics, Chinese Academy of Sciences, China; Xiangyu Zhu, China Samsung Research, China; Maosheng Xiang, Xikai Fu, Xiaofan Sun, Institute of Electronics, Chinese Academy of Sciences, China</i>	
<b>FR4-R13.4: HIGH QUALITY REMOTE SENSING IMAGE SUPER-RESOLUTION USING DEEP MEMORY CONNECTED NETWORK</b>	<b>8889</b>
<i>Wenjia Xu, Institute of Electronics, Chinese Academy of Sciences; University of Chinese Academic of Sciences, China; Guangluan Xu, Yang Wang, Xian Sun, Institute of Electronics, Chinese Academy of Sciences, China; Daoyu Lin, Yirong Wu, Institute of Electronics, Chinese Academy of Sciences; University of Chinese Academic of Sciences, China</i>	
<b>FR4-R13.5: RADAR FORWARD-LOOKING SUPERRESOLUTION IMAGING FOR SEA-SURFACE TARGETS USING BAYESIAN METHOD</b>	<b>8893</b>
<i>Haiguang Yang, Changlin Li, Yin Zhang, Yulin Huang, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
 <b>FRP1-PA: SAR IMAGE PROCESSING II</b>	
<b>FRP1-PA.1: SAR IMAGES COMPRESSED SENSING BASED ON RECOVERY ALGORITHMS.....</b>	<b>8897</b>
<i>Slim Rouabah, Mounira Ouarzeddine, Boularbah Souissi, USTHB, Algeria</i>	
<b>FRP1-PA.2: CURVED-PATH SAR GEOLOCATION ERROR ANALYSIS BASED ON BP ALGORITHM</b>	<b>8901</b>
<i>Junbin Liu, University of Chinese Academy of Sciences, China; Xiaolan Qiu, Lijia Huang, Chibiao Ding, Institute of Electronics, Chinese Academy of Sciences, China; Ming Liu, National Disaster Reduction Center of the Ministry of Civil Affairs, NDRCC, China</i>	
<b>FRP1-PA.3: POTENTIAL OF THE REVERSE SYNTHESIS METHOD FOR THE HIGH-QUALITY SAR IMAGE SYNTHESIS</b>	<b>8905</b>
<i>Evgeny Shiro, Independent researcher, Canada</i>	

<b>FRP1-PA.4: AN ITERATIVE ADAPTIVE REWEIGHTED NORM MINIMIZATION SPARSITY</b> .....	<b>8909</b>
<b>AUTOFOCUS ALGORITHM VIA BAYESIAN RECOVERY FOR ARRAY SAR IMAGING</b>	
<i>Bokun Tian, Xiaoling Zhang, Shunjun Wei, Jun Shi, Liwei Dang, University of Electronic Science and Technology of China, China</i>	
<b>FRP1-PA.5: OPTRONIC HIGH-RESOLUTION SAR PROCESSING WITH THE CAPABILITY OF</b> .....	<b>8913</b>
<b>FULL-RESOLUTION IMAGING</b>	
<i>Lei Liu, Yesheng Gao, Xingzhao Liu, Shanghai Jiao Tong University, China</i>	
<b>FRP1-PA.6: HIGHLY SQUINTED IMAGING FOR DIVING SAR WITH 3-D ACCELERATION</b> .....	<b>8917</b>
<i>Huang Bang, University of Electronic Science and Technology of China, China; Zhao Xin, Du Dunwei, Beijing Electro-Mechanical Engineering Institute, China; Zhang Shunsheng, Wang Wen-Qin, University of Electronic Science and Technology of China, China</i>	
<b>FRP1-PA.7: FPGA-BASED MULTI-CORE RECONFIGURABLE SYSTEM FOR SAR IMAGING</b> .....	<b>8921</b>
<i>Wei Di, Changlin Chen, Yongxiang Liu, National University of Defense Technology, China</i>	
<b>FRP1-PA.8: DOPPLER CENTROID ESTIMATION FOR DOPPLER BEAM SHARPENING</b> .....	<b>8925</b>
<b>IMAGING BASED ON THE MORPHOLOGICAL EDGE DETECTION METHOD</b>	
<i>Deqing Mao, Yongchao Zhang, Yin Zhang, Changlin Li, Yulin Huang, Jianyu Yang, University of Electronic Science and Technology of China, China</i>	
<b>FRP1-PA.9: DESNET: DEEP RESIDUAL NETWORKS FOR DESCALLOPING OF SCANSAR</b> .....	<b>8929</b>
<b>IMAGES</b>	
<i>Shangliang Xu, East China Normal University, China; Xiaolan Qiu, Insititute of Electricis, Chinese Academy of Sciences, Suzhou, China; Changbo Wang, East China Normal University, China; Lihua Zhong, Insititute of Electricis, Chinese Academy of Sciences, Suzhou, China; Xinzhe Yuan, National Satellite Ocean Application Service, China</i>	
<b>FRP1-PA.10: PROCESSING OF ULTRA-HIGH RESOLUTION SPACEBORNE SPOTLIGHT SAR</b> .....	<b>8933</b>
<b>DATA BASED ON ONE-STEP MOTION COMPENSATION</b>	
<i>Tianshun Xiang, Daiyin Zhu, Fan Xu, Nanjing University of Aeronautics and Astronautics, China</i>	
 <b>FRP1-PB: LAND USE APPLICATIONS I</b>	
<b>FRP1-PB.1: ASSESSMENT OF LANDSCAPE MULTIFUNCTIONALITY IN INNER MONGOLIA,</b> .....	<b>8937</b>
<b>CHINA</b>	
<i>Yi'na Hu, Peking University, China; Tao Hu, Huazhong Agricultural University, China; Kun Qi, Peking University, China</i>	
<b>FRP1-PB.2: ENVIRONMENTAL MONITORING USING DRONE IMAGES AND</b> .....	<b>8941</b>
<b>CONVOLUTIONAL NEURAL NETWORKS</b>	
<i>Rogério Thomazella, Jose Castanho, Fabio Dotto, Sao Paulo State University, Brazil; Oswaldo Rodrigues Junior, Corumba Concessoes S.A, Brazil; Gustavo Rosa, Aparecido Marana, Joao Papa, Sao Paulo State University, Brazil</i>	
<b>FRP1-PB.3: LAND SURFACE TEMPERATURE RETRIEVAL FROM LANDSAT-8 DATA: A</b> .....	<b>8945</b>
<b>COMPARISON USING A QUARTZ SPECTRAL LIBRARY BASED ON TEMPERATURES</b>	
<i>Pâmela Suélen Käfer, Silvia Beatriz Alves Rolim, María Luján Iglesias, Luíza Vargas de Oliveira Heinz, Nájila Souza da Rocha, Adriana Coromoto Becerra-Rondón, Bibiana Salvador Cabral da Costa, Suzianny Cristia Salazar da Silva, Federal University of Rio Grande do Sul (UFRGS), Brazil</i>	
<b>FRP1-PB.4: RETRIEVAL OF SURFACE ALBEDO BASED ON BRDF MODEL</b> .....	<b>8949</b>
<i>Zihao Wang, Qiming Qin, Yuanheng Sun, Guhuai Han, Huazhong Ren, Peking University, China</i>	
<b>FRP1-PB.5: CIRCULAR RELEVANCE FEEDBACK FOR REMOTE SENSING IMAGE</b> .....	<b>8953</b>
<b>RETRIEVAL</b>	
<i>Xu Tang, Xiangrong Zhang, Fang Liu, Licheng Jiao, Key Laboratory of Intelligent Perception and Image Understanding of Ministry of Education, Xidian University, China</i>	

<b>FRP1-PB.6: SPATIAL ASSESSMENT OF MINING DATA IN THE SOUTHWEST REGION OF THE STATE OF PARÁ, BRAZIL.</b>	<b>8957</b>
<i>Jefferson Jesus de Souza, Jeremias Vitorio Pinto Feitosa, Arlesson Antônio de Almeida Souza, Nelton Cavalcante da Luz, Foundation for Science, Technology and Space Applications, Brazil; Laís Freitas Moreira Santos, University of Brasilia, Brazil; Igor da Silva Narvaes, National Institute of Space Research, Brazil; Roberto Wilson Oliveira Dias, Douglas Rafael Vidal de Moraes, Mirian Corrêa Dias, Camila Barata Quadros, Magda Valéria Corrêa Miranda, Ronise Rafaele Mendonça Arraes, Foundation for Science, Technology and Space Applications, Brazil; Marcos Adami, Alessandra Rodrigues Gomes, National Institute of Space Research, Brazil</i>	
<b>FRP1-PB.7: INVESTIGATION OF SEASONAL SEPARATION IN MINE AND NON MINE WATER BODIES USING LOCAL FEATURE ANALYSIS OF LANDSAT 8 OLI/TIRS IMAGES</b>	<b>8961</b>
<i>Jit Mukherjee, Jayanta Mukhopadhyay, Debashish Chakravarty, Indian Institute of Technology Kharagpur, India</i>	
<b>FRP1-PB.10: SAR PATCH CATEGORIZATION USING STACKED SPARSE CODING</b>	<b>8973</b>
<i>Dušan Gleich, Danijel Šipoš, University of Maribor, Slovenia</i>	
 <b>FRP1-PC: BIODIVERSITY AND REMOTE SENSING II</b>	
<b>FRP1-PC.1: MEASURING LEAF ANGLE DISTRIBUTION USING TERRESTRIAL LASER SCANNING IN A EUROPEAN BEECH FOREST</b>	<b>8977</b>
<i>Jing Liu, Andrew K Skidmore, Tiejun Wang, Xi Zhu, University of Twente, Netherlands; Joe Premier, Marco Heurich, Burkhard Beudert, Bavarian Forest National Park, Germany</i>	
<b>FRP1-PC.2: CHANGE DETECTION IN (SEMI-) NATURAL GRASSLAND ECOSYSTEMS FOR BIODIVERSITY MONITORING USING OPEN DATA</b>	<b>8981</b>
<i>Cristina Tarantino, Maria Adamo, National Research Council of Italy (CNR), Italy; Richard Lucas, The University of New South Wales, Australia; Palma Blonda, National Research Council of Italy (CNR), Italy</i>	
<b>FRP1-PC.3: THE EARTH OBSERVATION DATA ECOSYSTEM MONITORING (EODESM) SYSTEM</b>	<b>8985</b>
<i>Richard Lucas, Aberystwyth University, United Kingdom; Anthea Mitchell, University of New South Wales, Australia; Ioannis Manakos, Information Technologies Institute, Greece; Palma Blonda, CNR, Greece</i>	
 <b>FRP1-PD: FOREST MONITORING BY OPTICAL REMOTE SENSING</b>	
<b>FRP1-PD.1: MONITORING THE SPATIO-TEMPORAL VARIATIONS OF C3/C4 GRASS SPECIES USING MULTISPECTRAL SATELLITE DATA</b>	<b>8988</b>
<i>Onesimo Mutanga, Cletah Shoko, University of KwaZulu Natal, South Africa</i>	
<b>FRP1-PD.2: ESTIMATING LEAF AND CANOPY BIOCHEMISTRY VARIABLES IN MEDITERRANEAN HOLM OAK (QUERCUS ILEX) FROM PROXIMAL AND AIRBORNE HYPERSPECTRAL DATA</b>	<b>8992</b>
<i>Rosario González-Cascón, INIA, Spain; Javier Pacheco-Labrador, Max Planck Institute for Biogeochemistry, Germany; Gerardo Moreno, University of Extremadura, Spain; Mirco Migliavacca, Max Planck Institute for Biogeochemistry, Germany; Maria Pilar Martín, Spanish National Research Council, Spain</i>	
<b>FRP1-PD.4: TROPICAL FOREST TREE SPECIES CLASSIFICATION USING METER-SCALE IMAGE DATA</b>	<b>8999</b>
<i>Matthew Cross, University of Colorado Denver, United States; Ted Scambos, University of Colorado Boulder, United States</i>	
<b>FRP1-PD.6: DRONE-BASED FOREST VARIABLES MAPPING OF ICOS TOWER SURROUNDINGS</b>	<b>9003</b>
<i>Jörgen Wallerman, Jonas Bohlin, Mats B. Nilsson, Johan E.S. Fransson, Swedish University of Agricultural Sciences, Sweden</i>	

<b>FRP1-PD.8: IMPLICATIONS OF DIURNAL CHANGES IN LEAF PRI ON REMOTE MEASUREMENTS OF LIGHT USE EFFICIENCY</b>	<b>9007</b>
<i>Matti Mõttus, VTT Technical Research Centre of Finland Ltd, Finland; Juho Aalto, University of Helsinki, Finland; Luiz Aragão, National Institute for Space Research - INPE, Brazil; Jaana Bäck, University of Helsinki, Finland; Rocío Hernández-Clemente, University of Swansea, Finland; Eduardo Eiji Maeda, University of Helsinki, Finland; Vincent Markiet, VTT Technical Research Centre of Finland Ltd, Finland; Caroline J. Nichol, University of Edinburgh, United Kingdom; Raimundo Cosme Oliveira Jr., Brazilian Agricultural Research Corporation - Embrapa, Brazil; Natalia Restrepo-Coupe, Scott R. Saleska, University of Arizona, United States</i>	
<b>FRP1-PD.9: DETECTION OF FOREST CHANGES WITH MULTI-TEMPORAL LIDAR DATA</b>	<b>9011</b>
<i>Michele Dalponte, Fondazione Edmund Mach, Italy; Sicong Liu, Tongji University, China; Damiano Gianelle, Fondazione Edmund Mach, Italy</i>	
<b>FRP1-PD.10: ESTIMATION OF THE PLOT-LEVEL FOREST PARAMETERS FROM TERRESTRIAL LASER SCANNING DATA</b>	<b>9014</b>
<i>Junjie Zhou, Guiyun Zhou, Hongqiang Wei, Xiaodong Zhang, University of Electronic Science and Technology of China, China</i>	
<b>FRP1-PE: ESTIMATION OF ABOVE GROUND VEGETATION PARAMETERS</b>	
<b>FRP1-PE.1: THE SYNERGETIC ESTIMATION APPROACH OF FOREST ABOVE GROUND BIOMASS BASED ON X-BAND INSAR AND P-BAND POLSAR DATA</b>	<b>9018</b>
<i>Lei Zhao, Erxue Chen, Zengyuan Li, Institute of Forest Resource Information Techniques, Chinese Academy of Forestry, China; Wangfei Zhang, College of Forestry, Southwest Forestry University, China; Yaxiong Fan, Xiangxing Wan, Institute of Forest Resource Information Techniques, Chinese Academy of Forestry, China</i>	
<b>FRP1-PE.2: ANALYSIS OF P-BAND REPEAT-PASS SAR TOMOGRAPHY UNDER CHANGING WEATHER CONDITIONS</b>	<b>9022</b>
<i>Yu Bai, Stefano Tebaldini, Politecnico di Milano, Italy; Dinh Ho Tong Minh, Institut national de Recherche en Sciences et Technologies pour l'Environnement et l'Agriculture, France; Wen Yang, Wuhan University, China</i>	
<b>FRP1-PE.3: FOREST ABOVEGROUND BIOMASS ESTIMATION USING A COMBINATION OF SENTINEL-1 AND SENTINEL-2 DATA</b>	<b>9026</b>
<i>Agata Hoscilo, Aneta Lewandowska, Dariusz Ziolkowski, Institute of Geodesy and Cartography, Poland; Krzysztof Sterenczak, Marek Lisanczuk, Forest Research Institute, Poland; Christiane Schmullius, Carsten Pathe, Friedrich-Schiller University Jena, Germany</i>	
<b>FRP1-PE.4: THE POTENTIAL OF SENTINEL SATELLITES FOR LARGE AREA ABOVEGROUND FOREST BIOMASS MAPPING</b>	<b>9030</b>
<i>Andrew Haywood, Royal Melbourne Institute of Technology, Australia; Christine Stone, New South Wales Department of Industry, Australia; Simon Jones, Royal Melbourne Institute of Technology, Australia</i>	
<b>FRP1-PE.5: RELATING SAR TOMOGRAPHY TO TROPICAL FOREST BIOMASS VIA LIDAR DATA</b>	<b>9034</b>
<i>Xinwei Yang, Wuhan University, China; Mauro Mariotti D'Alessandro, Stefano Tebaldini, Politecnico di Milano, Italy; Mingsheng Liao, Wuhan University, China</i>	
<b>FRP1-PE.6: SMOS L-BAND VEGETATION OPTICAL DEPTH IS HIGHLY SENSITIVE TO ABOVEGROUND BIOMASS</b>	<b>9038</b>
<i>Nemesio Rodríguez-Fernández, CNRS, France; Arnaud Mialon, Stephane Mermoz, Alexandre Bouvet, Philippe Richaume, Ahmad Al Bitar, CESBIO, France; Amen Al Yaari, INRA, France; Martin Brandt, Thomas Kaminski, Inversion Lab, Denmark; Thuy Le Toan, CNRS, France; Yann Kerr, CNES, France; Jean-Pierre Wigneron, INRA, France</i>	
<b>FRP1-PE.7: USE OF L-BAND GROUND-BASED RADIOMETERS FOR FREEZE/THAW RETRIEVAL IN A BOREAL FOREST SITE</b>	<b>9042</b>
<i>Alexandre Roy, Université de Montréal, Canada; Peter Toose, Environment and Climate Change Canada, Canada; Alex Mavrovic, Université de Sherbrooke, Canada; Christoforos Pappas, Université de Montréal, Canada; Aaron Berg, Tracy Rowlandson, University of Guelph, Canada; Chris Derksen, Environment and Climate Change Canada, Canada; Alain Royer, Mariam El-Amine, Université de Sherbrooke, Canada; Warren Helgason, University of Saskatchewan, Canada; Alan Barr, Environment and Climate Change Canada, Canada; Oliver Sonnentag, Université de Montréal, Canada</i>	

<b>FRP1-PE.8: FREQUENCY-DEPENDENCE OF VEGETATION OPTICAL DEPTH-DERIVED ISOHYDRICITY ESTIMATES</b>	<b>9045</b>
<i>Alexandra Konings, Mostafa Momen, Stanford University, United States</i>	
<b>FRP1-PE.9: INTEGRATING EDDY COVARIANCE INFORMATION WITH BEPS MODEL USING A VARIATIONAL ASSIMILATION SCHEME FOR IMPROVING TEMPORALLY CONTINUOUS GPP ESTIMATION</b>	<b>9048</b>
<i>Xinyao Xie, University of Chinese Academy of Sciences, Research Center for Digital Mountain and Remote Sensing Application, Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, China; Ainong Li, Gaofer Yin, Jinhua Bian, Research Center for Digital Mountain and Remote Sensing Application, Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, China</i>	
<b>FRP1-PE.10: GPP ESTIMATION IN THE HEIHE RIVER BASIN BASED ON A LIGHT USE EFFICIENCY MODEL</b>	<b>9052</b>
<i>Li Li, Xiaozhou Xin, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, China; Yanhua Gao, Satellite Environment Center (SEC), China; Hailong Zhang, Yongming Du, Yong Tang, Bo Zhong, Jianguang Wen, Baocheng Dou, Qinhuo Liu, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, China</i>	
<b>FRP1-PF: REMOTE SENSING FOR CROP AND SOIL PARAMETERS II</b>	
<b>FRP1-PF.1: MODELING WATER STRESS AS AN INDICATOR OF RED PALM WEEVIL INFESTATION USING FIELD SAMPLING, WORLDVIEW-3 REFLECTANCE, AND LABORATORY ANALYSIS</b>	<b>9056</b>
<i>Abderrazak Bannari, Arabian Gulf University, Bahrain; Thuraya Almansoori, University of Bahrain, Bahrain; Abdulaziz Mohamed, Ali El-Battay, Nadir Hameid, Arabian Gulf University, Bahrain</i>	
<b>FRP1-PF.2: USING SENTINEL-2 IMAGERY TO TRACK CHANGES PRODUCED BY XYLELLA FASTIDIOSA IN OLIVE TREES</b>	<b>9060</b>
<i>Alberto Hornero, Rocío Hernández-Clemente, Swansea University, United Kingdom; Pieter S.A. Beck, European Commission, Joint Research Centre (JRC), Italy; Juan A. Navas-Cortés, Instituto de Agricultura Sostenible (IAS), Consejo Superior de Investigaciones Científicas (CSIC), Spain; Pablo Jesús Zarco-Tejada, European Commission, Joint Research Centre (JRC), Italy</i>	
<b>FRP1-PF.3: DEEP LEARNING-BASED METHODOLOGICAL APPROACH FOR VINEYARD EARLY DISEASE DETECTION USING HYPERSPECTRAL DATA</b>	<b>9063</b>
<i>Jonás Hruška, University of Trás-os-Montes e Alto Douro, Portugal; Telmo Adão, University of Trás-os-Montes e Alto Douro, INESC Technology and Science (INESC-TEC), Portugal; Luís Pádua, Pedro Marques, University of Trás-os-Montes e Alto Douro, Portugal; Emanuel Peres, António Sousa, Raul Morais, Joaquim João Sousa, University of Trás-os-Montes e Alto Douro, INESC Technology and Science (INESC-TEC), Portugal</i>	
<b>FRP1-PF.4: DVDI: A NEW REMOTELY SENSED INDEX FOR MEASURING VEGETATION DAMAGE CAUSED BY NATURAL DISASTERS</b>	<b>9067</b>
<i>Liping Di, Eugene Yu, Ranjay Shrestha, Li Lin, George Mason University, United States</i>	
<b>FRP1-PF.5: MONITORING RICE CROPS IN PIEMONTE (ITALY): TOWARDS AN OPERATIONAL SERVICE BASED ON FREE SATELLITE DATA</b>	<b>9070</b>
<i>Gianmarco Corvino, Andrea Lessio, Enrico Borgogno Mondino, University of Torino, Italy</i>	
<b>FRP1-PF.7: EVALUATION OF COVARIATES TO UNDERSTAND THE INTERACTIVE FEEDBACK BETWEEN SOIL-LANDSCAPE PARAMETER AND CHANGES OF SOIL-CLIMATIC CONDITIONS</b>	<b>9074</b>
<i>Gaurav Shukla, Rahul Dev Garg, Indian Institute of Technology Roorkee, India; Hari Shanker Srivastava, IIRS, Indian Space Research Organization (ISRO), India; Pradeep Kumar Garg, Indian Institute of Technology Roorkee, India</i>	
<b>FRP1-PF.8: A FFT-BASED APPROACH TO EXPLORE PERIODICITY OF VINES/SOIL PROPERTIES IN VINEYARD FROM TIME SERIES OF SATELLITE-DERIVED SPECTRAL INDICES</b>	<b>9078</b>
<i>Enrico Borgogno-Mondino, Andrea Lessio, University of Torino, Italy</i>	

<b>FRP1-PF.9: ASSESSING THE PERFORMANCE OF DIFFERENT IRRIGATION METHODS BY SATELLITE INDICATORS IN SOUTHERN ITALY</b>	<b>9082</b>
<i>Juan Miguel Ramírez-Cuesta, Centro de Edafología y Biología Aplicada del Segura (CEBAS-CSIC), Spain; Daniela Vanella, Università degli Studi di Catania Italy, Italy; Diego Sebastiano Intrigliolo Molina, Centro de Edafología y Biología Aplicada del Segura (CEBAS-CSIC), Spain; Giancarlo Rocuzzo, Fiorella Stagno, Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria (CREA), Italy; Simona Consoli, Università degli Studi di Catania Italy, Italy</i>	
<b>FRP1-PF.10: USING COPERNICUS DATA AND GROWTH MODELLING TO GLOBALLY ASSESS VIRTUAL WATER FLOWS IN AGRICULTURAL PRODUCTION – THE VIWA CONCEPT</b>	<b>9086</b>
<i>Tobias Hank, Ludwig-Maximilian University of Munich, Germany; Heike Bach, VISTA Remote Sensing in Geosciences GmbH, Germany; Tom Jaksztat, Ludwig-Maximilian University of Munich, Germany; Philipp Klug, VISTA Remote Sensing in Geosciences GmbH, Germany; Florian Zabel, Ludwig-Maximilian University of Munich, Germany; Lena Brueggemann, VISTA Remote Sensing in Geosciences GmbH, Germany; Elisabeth Probst, Francesca Perosa, Ludwig-Maximilian University of Munich, Germany; Tobias Ruf, VISTA Remote Sensing in Geosciences GmbH, Germany; Christoph Heinzeller, Wolfram Mauser, Ludwig-Maximilian University of Munich, Germany</i>	
<b>FRP1-PG: MICROWAVE ALGORITHMS FOR SOIL MOISTURE III</b>	
<b>FRP1-PG.1: SOIL MOISTURE RETRIEVAL WITH BACKSCATTER MODELING AND SATELLITE DATASETS IN ZOIGE WETLAND, CHINA</b>	<b>9090</b>
<i>Yuanyuan Yang, Yong Wang, Xinyi Miao, University of Electronic Science and Technology of China, China; Hong Li, East Carolina University, United States</i>	
<b>FRP1-PG.3: THREE-DIMENSIONAL FINITE DIFFERENCE TIME DOMAIN SIMULATION FOR SCATTERING COMPUTATION FROM SOIL SURFACE</b>	<b>9094</b>
<i>Ming Li, Ling Tong, Yu Li, Xun Yang, University of Electronic Science and Technology of China, China</i>	
<b>FRP1-PG.4: MOISTURE RETRIEVAL USING MONOSTATIC RADAR DOUBLE BOUNCE.</b>	<b>9098</b>
<i>Orian Couderc, Laetitia Thirion-Lefevre, Régis Guinvarc'h, CentraleSupélec, France</i>	
<b>FRP1-PG.5: SOIL MOISTURE RETRIEVAL USING MODIFIED VEGETATION BACKSCATTERING MODEL BASED ON RADARSAT-2 DATA</b>	<b>9102</b>
<i>Liangliang Tao, Guojie Wang, Nanjing University of Information Science and Technology, China; Shi He, Henan Polytechnic University, China; Xi Chen, Peking University, China</i>	
<b>FRP1-PG.6: ESTIMATING HI-RESOLUTION SOIL MOISTURE DATA USING THE HP MODEL COUPLED WITH LANDSAT-8 AND SMAP DATASETS</b>	<b>9106</b>
<i>Xinyi Miao, Yong Wang, Yuanyuan Yang, University of Electronic Science and Technology of China, China; Hong Li, East Carolina University, United States</i>	
<b>FRP1-PG.7: INVERSION OF SURFACE SOIL MOISTURE FROM RADAR ALTIMETRY BACKSCATTERING IN SEMI-ARID ENVIRONMENTS</b>	<b>9114</b>
<i>Fabien Blarel, Frédéric Frappart, Eric Mougin, Observatoire Midi-Pyrénées, France; Catherine Ottlé, IPSL, France; Manuela Grippa, Guillaume Ramillien, Observatoire Midi-Pyrénées, France; Nina Raoult, IPSL, France</i>	
<b>FRP1-PG.8: SENSITIVITY OF MULTI-TEMPORAL L-BAND RADAR BACKSCATTERING POWER TO SOIL MOISTURE FOR TWO CROPS WITH CONTRASTING FEATURES</b>	<b>9114</b>
<i>Matias Barber, CONICET-Universidad de Buenos Aires, Instituto de Astronomía y Física del Espacio, Argentina; Carlos López-Martínez, Luxembourg Institute of Science and Technology, Luxembourg; Francsico Grings, CONICET-Universidad de Buenos Aires, Instituto de Astronomía y Física del Espacio, Argentina</i>	
<b>FRP1-PG.9: DOWNSCALING OF QP MODEL WITH DUAL-CHANNEL SOIL MOISTURE RETRIEVALS OVER GENHE AREA IN CHINA</b>	<b>9118</b>
<i>Huizhen Cui, Lingmei Jiang, Beijing Normal University, China; Zhuang Zhou, Chinese Academy of Sciences, China; Shirui Hao, Jian Wang, Gongxue Wang, Beijing Normal University, China</i>	
<b>FRP1-PG.10: UPSCALING GROUND SOIL MOISTURE TO VALIDATE REMOTE SENSING ESTIMATIONS: IS THE SIMPLE SPATIAL AVERAGE A SUITABLE APPROACH?</b>	<b>9122</b>
<i>Nilda Sánchez, Ángel González-Zamora, José Martínez-Fernández, Miriam Pablos, University of Salamanca, Spain</i>	



## FRP1-PH: AEROSOLS AND ATMOSPHERIC CHEMISTRY II

### FRP1-PH.1: EVALUATION OF MODIS C6 COMBINED AEROSOL PRODUCT AT GLOBAL SCALE ..... 9126

Muhammad Bilal, Zhongfeng Qiu, Nanjing University of Information Science and Technology, China

### FRP1-PH.2: VALIDATION OF MODIS AEROSOL OPTICAL DEPTH OVER SOUTH CHINA SEA ..... 9130

Xiaojing Shen, Zhongfeng Qiu, Muhammad Bilal, NUIST, China

### FRP1-PH.3: LONG TERM VARIATION ANALYSIS OF SATELLITE-DERIVED AIR POLLUTION COMPONENTS OVER EAST CHINA ..... 9134

Yingjie Li, Qingmiao Ma, Jing Chen, Ruyi Li, Boyan Liu, Meihan Qian, Zhaoxian Wang, Jiangsu Normal University, China

### FRP1-PH.4: AEROSOL OPTICAL DEPTH CHARACTERIZATION IN MIDDLE AND POLAR LATITUDES ..... 9138

Abel Calle, David Mateos, Victoria Cachorro, Carlos Toledano, Cistian Velasco, Andrés Benito, Ramiro González, Ángel Maximo de Frutos, Juan Carlos Antuña-Sánchez, Roberto Román, University of Valladolid, Spain

### FRP1-PH.5: ASSESSMENT OF SATELLITE AEROSOL OPTICAL DEPTH TO ESTIMATE PARTICULATE MATTER DISTRIBUTION IN VALENCIA CITY ..... 9141

Represa Natacha Soledad, Universidad Nacional de La Plata, Spain; Alfonso Fernández-Sarría, Universitat Politècnica de València, Spain; Andrés Porta, Universidad Nacional de La Plata, Argentina; Jesús Palomar Vázquez, Universitat Politècnica de València, Spain

### FRP1-PH.6: ATMOSPHERIC CORRECTION AND CIRRUS CLOUDS REMOVAL FROM MSI SENTINEL 2A IMAGES ..... 9145

Mauro Antonio Homem Antunes, Isadora Ferreira Bolpato, Federal Rural University of Rio de Janeiro, Brazil

## FRP1-PI: PASSIVE MICROWAVE SENSORS AND MISSIONS

### FRP1-PI.3: SUPERCONDUCTING SUBMILLIMETER-WAVE LIMB-EMISSION SOUNDER, SMILES-2, FOR MIDDLE AND UPPER ATMOSPHERIC STUDY ..... 9153

Satoshi Ochiai, Philippe Baron, Yoshihisa Irimajiri, National Institute of Information and Communications Technology, Japan; Yoshinori Uzawa, National Astronomical Observatory of Japan, Japan; Toshiyuki Nishibori, Makoto Suzuki, Japan Aerospace Exploration Agency, Japan; Akinori Saito, Masato Shiotani, Kyoto University, Japan

### FRP1-PI.5: VALIDATION RESULTS OF NMF2 DERIVED FROM BEIDOU NAVIGATION SATELLITE SYSTEM RADIO OCCULTATION OBSERVED BY GNOS ON FY3C SATELLITE ..... 9157

Weihua Bai, National Space Science Center, Chinese Academy of Sciences, China; Guanglin Yang, National Satellite Meteorological Center, China Meteorological Administration, China; Yueqiang Sun, Junming Xia, Guangyuan Tan, National Space Science Center, Chinese Academy of Sciences, China; Cheng Cheng, State Intellectual Property Office of the P.R.C, China; Yingqiang Wang, College of Meteorology and Oceanology, National University of Defense Technology, China; Xianyi Wang, Dongwei Wang, National Space Science Center, Chinese Academy of Sciences, China

### FRP1-PI.6: PRELIMINARY IN-ORBIT EVALUATION OF GNOS ON FY3D SATELLITE ..... 9161

Wang Dongwei, Tian Yusen, Sun Yueqiang, Du Qifei, Wang Xianyi, Bai Weihua, Meng Xiangguang, Cai Yuerong, Wu Chunjun, Liu Cheng, Xia Junming, Zhao Danyang, Li Wei, Li Fu, Qiao Hao, National Space Science Center, China

## FRP1-PJ: CURRENT DEVELOPMENTS IN ACTIVE MICROWAVE AND OPTICAL MISSIONS

### FRP1-PJ.1: DEVELOPMENT AND PRE-LAUNCH TEST OF A RETURN SIGNAL SIMULATOR FOR HY-2B ALTIMETER ..... 9164

Wei Guo, Caiyun Wang, Peng Liu, National Space Science Center, Chinese Academy of Sciences, China

### FRP1-PJ.2: DEVELOPMENT AND PERFORMANCE ANALYSIS OF A FULLY FUNCTIONAL RETURN SIGNAL SIMULATOR FOR HY-2B SCATTEROMETER ..... 9168

Caiyun Wang, Wei Guo, Shuang-Bao Yang, Peng Liu, Chinese Academy of Sciences, China

**FRP1-PJ.3: PRELIMINARY QUALITY ANALYSIS OF THE TRIPLE LINEAR-ARRAY AND ..... 9172  
MULTISPECTRAL IMAGES OF ZY-3 02 SATELLITE**

*Tao Zhang, Bing Lei, Jingjing Wang, Satellite Surveying and Mapping Application Center, National Administration of Surveying, Mapping and Geoinformation, China; Yunqing Li, School of Urban Construction, Beijing City University, China; Ke Liu, Tao Li, Satellite Surveying and Mapping Application Center, National Administration of Surveying, Mapping and Geoinformation, China*

**FRP1-PJ.4: FIRST-PRINCIPLE DYNAMIC ELECTRO-THERMAL NUMERICAL MODEL OF A ..... 9176  
SCANNING RADIOMETER FOR EARTH RADIATION BUDGET APPLICATIONS**

*Anum Ashraf, Kory Priestley, NASA Langley Research Center, United States; James Mahan, Virginia Polytechnic Institute and State University, United States*

**FRP1-PK: SENSORS AND CALIBRATION**

**FRP1-PK.1: A DESIGN OF THE COMPLETE POLARIZATION CONVERTER USING ..... 9188  
DIELECTRIC PERIODIC STRUCTURES**

*Yueting Zhang, Chibiao Ding, Bin Lei, Institute of Electronics, Chinese Academy of Sciences, China; Weihai Fang, Beijing General Institute of Electronic Engineering, China*

**FRP1-PK.2: REDUCTION OF THE GROUND REFLECTION EFFECT ON AN L-BAND ..... 9191  
POLARIMETRIC ACTIVE RADAR CALIBRATOR FOR AIRBORNE AND SPACEBORNE  
CALIBRATION**

*Mostafa Zaky, Mani Kashanianfard, Kamal Sarabandi, University of Michigan, United States*

**FRP1-PK.3: UNCERTAINTY QUANTIFICATION IN SYNTHETIC APERTURE RADAR REMOTE ..... 9193  
SENSING DATA PROCESSING**

*Salvatore Savastano, Raffaella Guida, University of Surrey, United Kingdom*

**FRP1-PK.4: DOPPLER SENSITIVITY ANALYSIS AND OTHOGONAL WAVEFORM DESIGN ..... 9197  
BY USING MULTIPLE FREQUENCY SLOPES**

*Zhulin Zong, Shunsheng Zhang, University of Electronic Science and Technology of China, China*

**FRP1-PK.5: AN INTERNAL INSTRUMENT CALIBRATION SIMULATOR FOR ..... 9201  
MULTI-CHANNEL SAR**

*Marwan Younis, Felipe Queiroz de Almeida, Sigurd Huber, Christopher Laux, Michele Martone, Michelangelo Villano, Gerhard Krieger, German Aerospace Center (DLR), Germany*

**FRP1-PK.6: REMOTE PROGRAMMABLE TEMPERATURE STABILIZED POLARIMETRIC ..... 9204  
ACTIVE RADAR CALIBRATOR WITH RCS AGILITY FOR AIRBORNE AND SPACEBORNE SAR  
CALIBRATION**

*Mani Kashanianfard, Kamal Sarabandi, Adib Nashashibi, Arya Sarabandi, University of Michigan, United States; Xueyang Duan, Bruce Chapman, Jet Propulsion Laboratory, United States*

**FRP1-PK.7: DETERMINISTIC CRAMÉR-RAO BOUND FOR SCANNING RADAR SENSING ..... 9208**

*Yongchao Zhang, Yin Zhang, Yulin Huang, Jianyu Yang, Xiaobo Yang, University of Electronic Science and Technology of China, China*

**FRP1-PL: GROUND BASED SYSTEMS III**

**FRP1-PL.1: 3D DATA ACQUISITION USING STEREO CAMERA..... 9214**

*Evandro Kirsten, Leonardo Campos Inocencio, Maurício Roberto Veronez, Luiz Gonzaga da Silveira Jr., Fabiane Bordin, Fernando Pinho Marson, UNISINOS University, Brazil*

**FRP1-PL.2: ACCELERATED CODE GENERATOR FOR PROCESSING OCEAN COLOR ..... 9218  
REMOTE SENSING DATA ON GPU**

*Jae-Moo Heo, Korea Institute of Ocean Science and Technology, Republic of Korea; Gangwon Jo, Seoul National University and ManyCoreSoft Co., Ltd., Republic of Korea; Hee-Jeong Han, Hyun Yang, Korea Institute of Ocean Science and Technology, Republic of Korea*

<b>FRP1-PL.3: EVALUATION THE SPATIAL-TEMPORAL AVERAGE METHOD IN THE MULTI-ANGLE INFORMATION EXTRACTION BASED ON NEAR SURFACE OBSERVATION SENSORS</b>	<b>9222</b>
<i>Biao Cao, Zunjian Bian, Qing Xiao, Junyong Fang, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Huaguo Huang, Beijing Forestry University, China; Junhua Bai, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China; Wenjie Fan, Institute of RS and GIS, Peking University, China; Yongming Du, Hua Li, Qinhua Liu, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China</i>	
<b>FRP1-PL.4: EFFECT OF NON-UNIFORM AZIMUTH SAMPLING ON SAR IMAGE FORMATION EVALUATED AT 79GHZ</b>	<b>9226</b>
<i>Man Chung Chim, Daniele Perissin, Purdue University, United States; Lei Zhang, Hongyu Liang, The Hong Kong Polytechnic University, Hong Kong SAR of China</i>	
 <b>FRP1-PM: REMOTE SENSING OF WETLANDS I</b>	
<b>FRP1-PM.1: DYNAMIC CHANGES OF THE ALPINE WETLANDS IN TIBET, CHINA</b>	<b>9229</b>
<i>Dong Liu, Mengjia Xu, Nanjing Institute of Environmental Sciences, Ministry of Environmental Protection, China</i>	
<b>FRP1-PM.2: A NEW HIERARCHICAL OBJECT-BASED CLASSIFICATION ALGORITHM FOR WETLAND MAPPING IN NEWFOUNDLAND, CANADA</b>	<b>9233</b>
<i>Fariba Mohammadimanesh, C-CORE and Department of Electrical Engineering, Memorial University of Newfoundland, St. John's, Newfoundland, Canada, A1B 3X5., Canada; Bahram Salehi, C-CORE, Canada; Masoud Mahdianpari, PhD Candidate, C-CORE and Department of Electrical Engineering, Memorial University of Newfoundland, St. John's, Newfoundland, Canada, A1B 3X5., Canada; Mahdi Motagh, Institute of Photogrammetry and GeoInformation, Leibniz Universität Hannover, Germany</i>	
<b>FRP1-PM.4: ESTIMATING THE ABOVEGROUND BIOMASS OF PHRAGMITES AUSTRALIS (COMMON REED) BASED ON MULTI-SOURCE DATA</b>	<b>9241</b>
<i>Yingkun Du, Jing Wang, Wuhan University, China; Yifan Lin, Peking University, China; Zhengjun Liu, Chinese Academy of Surveying and Mapping, China; Haiying Yu, the Fourth Institute of Anhui Surveying and Mapping, China; Haiyan Yi, Chinese Academy of Sciences, China</i>	
<b>FRP1-PM.5: A MULTISCALE BASED APPROACH FOR RIVER EXTRACTION FROM SAR IMAGES USING ATTRIBUTE FILTERS</b>	<b>9245</b>
<i>Moslem Ouled Sghaier, Samuel Foucher, Computer Research Institute of Montreal, Canada; Richard Lepage, École de technologie supérieure (ÉTS), Canada; Tom Landry, Computer Research Institute of Montreal, Canada</i>	
<b>FRP1-PM.6: WETLAND CLASSIFICATION USING DEEP CONVOLUTIONAL NEURAL NETWORK</b>	<b>9249</b>
<i>Masoud Mahdianpari, C-CORE and Department of Electrical Engineering, Memorial University of Newfoundland, St. John's, Newfoundland, Canada; Mohammad Rezaee, Yun Zhang, CRC-Laboratory in Advanced Geomatics Image Processing, Canada; Bahram Salehi, C-CORE, Canada</i>	
<b>FRP1-PM.7: CARBON DIOXIDE AND WATER VAPOUR FLUXES OF A ALKALINE FEN AND THEIR DEPENDENCE ON REFLECTANCE</b>	<b>9253</b>
<i>Wojciech Ciężkowski, Warsaw University of Life Sciences, Poland; Tomasz Berezowski, Gdansk University of Technology, Poland; Małgorzata Kleniewska, Jarosław Chormański, Warsaw University of Life Sciences, Poland</i>	
<b>FRP1-PM.8: WATER STRESS INDEX FOR BOGS AND MIRES BASED ON UAV LAND SURFACE MEASUREMENTS AND ITS DEPENDENCY ON AIRBORNE HYPERESPECTRAL DATA</b>	<b>9257</b>
<i>Wojciech Ciężkowski, Jacek Józwiak, Sylwia Szporak-Wasilewska, Piotr Dąbrowski, Małgorzata Kleniewska, Maciej Góraj, Jarosław Chormański, Warsaw University of Life Sciences, Poland</i>	
<b>FRP1-PM.10: INVESTIGATING WATERFOWL HABITAT-USE PATTERNS WITH MULTI-SOURCE REMOTE SENSING DATA</b>	<b>9264</b>
<i>Ruobing Zheng, University of Chinese Academy of Sciences, China; Ze Luo, Baoping Yan, Computer Network Information Center, Chinese Academy of Sciences, China</i>	

## FRP1-PN: REMOTE SENSING OF INLAND WATERS I ADDITIONAL PAPERS

### FRP1-PN.1: REMOTE SENSING INVERSION OF WATER QUALITY PARAMETERS IN ..... 9268 LONGQUAN LAKE BASED ON PSO-SVR ALGORITHM

*Yuxia Li, University of Electronic Science and Technology of China, China; Lei He, Chengdu University of Information Technology, China; Bo Peng, Kunlong Fan, Ling Tong, University of Electronic Science and Technology of China, China*

### FRP1-PN.2: A MULTI-CLOUD CYBER INFRASTRUCTURE FOR MONITORING GLOBAL ..... 9272 PROLIFERATION OF CYANOBACTERIAL HARMFUL ALGAL BLOOMS

*Deepak Mishra, Lakshmish Ramaswamy, Abhishek Kumar, Suchendra Bhandarkar, Vinay Kumar, University of Georgia, United States; Sunil Narumalani, University of Nebraska, United States*

### FRP1-PN.3: CALIBRATION AND VALIDATION OF ALGORITHMS FOR THE ESTIMATION OF ..... 9276 CHLOROPHYLL-A IN INLAND WATERS WITH SENTINEL-2

*Marcela Pereira-Sandoval, Antonio Ruiz-Verdú, Carolina Tenjo, Jesús Delegido, Patricia Urrego, Ramón Peña, University of Valencia, Spain; Eduardo Vicente, Institut Cavanilles de Biodiversitat i Biología Evolutiva, Spain; Juan Soria, Departament de Microbiologia i Ecologia, Spain; Javier Soria, Institut Cavanilles de Biodiversitat i Biología Evolutiva, Spain; José Moreno, University of Valencia, Spain*

### FRP1-PN.5: AN ENSEMBLE APPROACH TO RETRIEVING WATER QUALITY PARAMETERS ..... 9284 FROM MULTISPECTRAL SATELLITE IMAGERY

*Hongxing Liu, Min Xu, Richard Beck, University of Cincinnati, United States*

### FRP1-PN.6: HUMAN ACTIVITIES IMPACT ON LAKE CHANGE IN TIBETAN PLATEAU DURING ..... 9288 THE PERIOD 1990-2015

*Bo Ma, Dingfang Tian, Huazhong Ren, Wenjie Fan, Peking University, China; Yanjuan Yao, Ministry of Environmental Protection, China*

### FRP1-PN.7: SPATIAL ALGAL BLOOM CHARACTERIZATION BY LANDSAT 8-OLI AND FIELD ..... 9292 DATA ANALYSIS

*Andrea Guachalla Alarcón, Instituto de Investigaciones Farmaceuticas y Bioquimicas, Universidad Mayor de San Andres, Bolivia; Alba Germán, Secretaría de Recursos Hídricos de la provincia de Cordoba, Argentina; Alejandro Aleksinkó, Secretaria de Recursos Hidricos, Argentina; María Fernanda García Ferreyra, Carlos Marcelo Scavuzzo, Anabella Ferral, Instituto Gulich, Argentina*

### FRP1-PN.8: COMPARISON OF RETRACKERS' PERFORMANCES OVER INLAND WATER ..... 9296 BODIES

*Qi Gao, Eduard Makhoul Varona, Maria Jose Escorihuela, isardSAT, Spain; Mehrez Zribi, CESBIO, France; Pere Quintana-Seguí, Observatori de l'Ebre, Spain*

### FRP1-PN.9: PERFORMANCE ANALYSIS OF THE C2RCC PROCESSOR IN ESTIMATE THE ..... 9300 WATER QUALITY PARAMETERS IN INLAND WATERS USING OLCI/SENTINEL-3A IMAGES

*Enner Alcântara, Caroline Andrade, Ana Carolina Gomes, Nariane Bernardo, Alisson Carmo, Thanan Rodrigues, Fernanda Watanabe, Sao Paulo State University - Unesp, Brazil*

### FRP1-PN.10: ESTIMATING RIVER DISCHARGES IN THE OGOOUÉ RIVER BASIN USING ..... 9304 SATELLITE ALTIMETRY DATA

*Sakaros Bogning, Frédéric Frappart, Fabien Blarel, Fernando Niño, Observatoire Midi-Pyrénées, Cameroon; Gil Mahé, Frédérique Seyler, Jean-Jacques Braun, IRD, France; Raphaël Onguéné, Jacques Etamé, Université de Douala, Cameroon*

## FRP1-PO: GLOBAL PRECIPITATION MEASUREMENT INSTRUMENTS AND ALGORITHMS I

### FRP1-PO.1: EVALUATION OF SPACEBORNE PRECIPITATION RADAR BY USING HIGH ..... 9308 DENSITY OBSERVATION DURING THE TRMM END-OF-MISSION EXPERIMENT

*Nobuhiro Takahashi, Nagoya University, Japan*

### FRP1-PO.4: VALIDATION OF THE GLOBAL PRECIPITATION MEASUREMENT MISSION ..... 9317 CORE OBSERVATORY OVER GREAT BRITAIN AND IRELAND

*Daniel Watters, Alessandro Battaglia, Kamil Mroz, Frederic Tridon, University of Leicester, United Kingdom*

**FRP1-PO.6: EXPLOITATION OF GPM/CLOUDSAT COINCIDENCE DATASET FOR GLOBAL SNOWFALL RETRIEVAL ..... 9323**  
*Giulia Panegrossi, Jean-François Rysman, Institute of Atmospheric Sciences and Climate, Italy; Daniele Casella, SERCO S.p.A., Italy; Paolo Sanò, Anna Cinzia Marra, Stefano Dietrich, Institute of Atmospheric Sciences and Climate, Italy; Mark Kulie, Michigan Technological University, United States*

**FRP1-PO.7: DPR MEASUREMENTS OF HAIL BEARING COLUMNS..... 9327**  
*Kamil Mroz, Alessandro Battaglia, NCEO, United Kingdom; Timothy Lang, NASA Marshall Space Flight Center, United States; Simone Tanelli, Gian Franco Sacco, NASA Jet Propulsion Laboratory, United States*

**ADDITIONAL PAPERS**

**PROPOSAL OF MILLIMETER-WAVE ADAPTIVE GLUCOSE-CONCENTRATION ESTIMATION SYSTEM USING COMPLEX-VALUED NEURAL NETWORKS.....4074**  
*Shizhen Hu, Akira Hirose*