## PROCEEDINGS OF SPIE

## Earth Resources and Environmental Remote Sensing/GIS Applications XIII

Karsten Schulz Ulrich Michel Konstantinos G. Nikolakopoulos Editors

5–7 September 2022 Berlin, Germany

Sponsored by SPIE

Cooperating Organisations
Cranfield University (United Kingdom)
OpTecBB (Germany)
International Society for Photogrammetry and Remote Sensing
European Association of Remote Sensing Companies

Published by SPIE

**Volume 12268** 

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings: Author(s), "Title of Paper," in *Earth Resources and Environmental Remote Sensing/GIS Applications XIII*, edited by Karsten Schulz, Ulrich Michel, Konstantinos G. Nikolakopoulos, Proc. of SPIE 12268, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510655393

ISBN: 9781510655409 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

Copyright © 2022 Society of Photo-Optical Instrumentation Engineers (SPIE).

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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



**Paper Numbering:** A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

## **Contents**

vii Conference Committee

SESSION 1	SENSORS AND PLATFORMS
3E33ION 1	SENSORS AND FLATFORMS
12268 03	On the field geometrical characterization of illegal micro-dumps by means of RPAS survey with depth camera $[12268\text{-}2]$
SESSION 2	ENVIRONMENTAL MONITORING CONCEPTS
12268 07	Evaluation of the NEON dataset for the automatic detection of treetops and delineation of tree crowns in American and German mixed forests [12268-7]
12268 08	An approach for determination of sea surface plastic waste transport routes using Copernicus Marine Service products [12268-9]
SESSION 3	REMOTE SENSING FOR ARCHAEOLOGY, PRESERVATION OF CULTURAL AND NATURAL HERITAGE
12268 0A	Synergistic use of UAV and TLS data for precise rockfall monitoring over a hanging monastery [12268-11]
12268 OB	HBIM for cultural heritage: the case study of Panayia Karmiotissa church [12268-12]
12268 0C	The use of digital twin models to document cultural heritage monuments [12268-13]
SESSION 4	SATELLITE RS AND GROUND-BASED NONDESTRUCTIVE TECHNOLOGIES IN CIVIL AND ENVIRONMENTAL ENGINEERING I
12268 0D	Assessing the root system of urban trees by geostatistical analysis of GPR data [12268-14]
12268 OE	Integrated health monitoring of masonry arch bridges by remote sensing and ground penetrating radar technologies [12268-15]
12268 OF	Training data generation for machine learning using GPR images [12268-17]

SESSION 5	SATELLITE RS AND GROUND-BASED NONDESTRUCTIVE TECHNOLOGIES IN CIVIL AND ENVIRONMENTAL ENGINEERING II
12268 0G	Automatic damage detection of bridge joints and road pavements by artificial neural networks ANNs [12268-18]
12268 OH	A novel bridge monitoring system implementing ground-based, structural and remote sensing information into a GIS-based catalogue [12268-20]
12268 01	Implementation of an interoperable BIM platform integrating ground-based and remote sensing information for network-level infrastructures monitoring [12268-21]
12268 OJ	Satellite remote sensing and integrated technologies for infrastructures monitoring: advances and perspectives of ASI's satellite-data exploitation [12268-22]
SESSION 6	INFRASTRUCTURES AND URBAN AREAS
12268 OK	Multiparametric microsensor monitoring platform of the Enceladus Hellenic supersite: the PROION project [12268-23]
12268 OM	The study of urban heat island effect in Cyprus using Sentinel-3 data [12268-26]
12268 00	Comparison of the IRS and SPOT satellite data for shoreline mapping: the case of Katakolo bay, Ilia Prefecture, Greece [12268-6]
SESSION 7	HAZARD MITIGATION GEOLOGIC APPLICATIONS I
12268 OP	National scale classification of landslide types by a data–driven approach and artificial neural networks [12268-28]
12268 0Q	Assessment of landslide susceptibility in Garhwal Himalayas using random forest model [12268-29]
SESSION 8	PROCESSING METHODOLOGIES
12268 OS	Vegetation phenology from Sentinel 2 data: a GIS open source application [12268-32]
12268 OT	Exploring fusion techniques in U-Net and DeepLab V3 architectures for multi-modal land cover classification [12268-33]
12268 OV	Assessment of decadal land use land cover change using random forest classifier in Google Earth engine for Himachal Pradesh, India [12268-36]

SESSION 9	HAZARD MITIGATION GEOLOGIC APPLICATIONS II
12268 0W	Ten-year wildfire mapping using satellite imagery: the case study of Western Greece [12268-37]
12268 0X	Sentinel-1 and ALOS data for lineament extraction: a comparative study [12268-38]
12268 OY	Applying self-organizing maps to characterize hyperspectral drill core data from three ore prospects in Northern Finland [12268-39]
	POSTER SESSION
12268 10	Synergy of UAV data and in situ measurements for the shoreline mapping in Arkoudi beach, Western Greece [12268-42]
12268 11	The potential of spectral unmixing method applied to PRISMA hyperspectral images in the identification of Li minerals: an evaluation for prospecting purposes [12268-43]
12268 12	The influence of DSM on rock-fall simulation: a case study from Western Greece [12268-44]
12268 13	Spatiotemporal changes of land use in Henan section of the Yellow River Basin from 2008 to 2017 [12268-45]
12268 15	Application of chaotic sequences to expand the spectrum [12268-49]
12268 16	Application of ranking correlation in synthesis of resistance-resistant signals [12268-50]
12268 19	Impacts of urbanization on groundwater resources in Jebel Ali, Dubai [12268-54]