

PROCEEDINGS OF SPIE

Second International Conference on

Earth Observation for Global Changes

Xianfeng Zhang
Jonathan Li
Guoxiang Liu
Xiaojun Yang
Editors

25–29 May 2009
Chengdu, China

Organized by
Peking University (China) • University of Waterloo (Canada) • Technical University of Munich
(Germany)

Co-organized by
Chengdu University of Technology (China) • Southwest Jiaotong University (China) • Sichuan
University (China) • Sichuan Normal University (China) • Sichuan Agricultural University (China)

Sponsored by
ISPRS—International Society of Photogrammetry and Remote Sensing
ICA—International Cartographic Association
IAG—International Association of Geodesy
ISDE—International Society for Digital Earth

Published by
SPIE

Volume 7471

Proceedings of SPIE, 0277-786X, v. 7471

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

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Second International Conference on Earth Observation for Global Changes*, edited by Xianfeng Zhang, Jonathan Li, Guoxiang Liu, Xiaojun Yang, Proceedings of SPIE Vol. 7471 (SPIE, Bellingham, WA, 2009) Article CID Number.

ISSN 0277-786X
ISBN 9780819477743

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org

Copyright © 2009, Society of Photo-Optical Instrumentation Engineers

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/09/\$18.00.

Printed in the United States of America.

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

SPIE 
Digital Library

SPIDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

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

The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

xiii	<i>Conference Committees</i>
xxi	<i>Introduction</i>

REMOTE SENSING OF LAND COVER/LAND USE

7471 02	Land cover classification with MODIS data in China [7471-01] C. Wang, Institute of Remote Sensing Applications, CAS (China); D. Zhao, Institute of Remote Sensing Applications, CAS (China) and Nanchang Univ. (China); Y. Zhan, Q. Zhang, Institute of Remote Sensing Applications, CAS (China)
7471 03	Analysis of urban thermal characteristics and associated land cover with Landsat TM/ETM+ data in Shenyang, China [7471-02] D. Lv, Jilin Architectural and Civil Engineering Institute (China); K. Song, L. Zeng, C. Jin, D. Liu, Z. Wang, Northeast Institute of Geography and Agricultural Ecology, CAS (China)
7471 04	Applying SLEUTH for simulating urban expansion of Hangzhou [7471-03] Y. Liu, X. Liu, Southwest Univ. (China)
7471 05	Use of remote sensing and GIS to assess the effects of agricultural land quality on spatial extension of construction land in Chengdu [7471-04] H. Pan, Institute of Mountain Hazards and Environment, CAS (China) and Graduate School of Chinese Academy of Sciences (China); J. Zhou, W. He, G. Jiang, Key Lab. of Land Resources Evaluation and Monitoring of Southwest (China); W. Zhou, Institute of Mountain Hazards and Environment, CAS (China)
7471 06	A survey of land use in Lugu Lake using multispectral remote sensing [7471-05] F. Miao, J. Li, C. Ye, L. Li, Q. Wang, B. Wu, H. Luo, Chengdu Univ. of Technology (China)
7471 07	New site selection for the immigrant transit of the post-disaster reconstruction of Wenchuan earthquake region [7471-06] W. Yang, G. Hu, H. Liu, L. Peng, Chengdu Univ. of Technology (China)
7471 08	Use of remote sensing in the second national land investigation in China [7471-07] F. Wang, Institute of Mountain Hazards and Environment, CAS (China) and Hainan Univ. (China); J. Zhou, Institute of Mountain Hazards and Environment, CAS (China) and Key Lab. of Land Resources Evaluation and Monitoring in Southwest (China)
7471 09	Dynamic monitoring of mineral resources region: a case study of Huludao, China [7471-08] G. Wang, J. Chen, China Univ. of Geosciences (China) and Beijing Key Lab. of Research and Exploration Information of Land Resources (China); C. Yan, China Univ. of Geosciences (China)
7471 0A	Hyperspectral remote sensing application in geological mapping in northeast Qinghai-Tibet Plateau [7471-09] C. Ye, F. Miao, X. Bi, J. Li, Chengdu Univ. of Technology (China)

- 7471 0B **Monitoring urbanization and land cover change in the Yangtze River Delta: a case study of Pudong New Area, Shanghai** [7471-10]
J. Xia, P. Du, W. Cao, China Univ. of Mining and Technology (China)
- 7471 0C **Monitoring dynamic changes of cropland in Minqin from 1989 to 2008** [7471-11]
J. Liao, Cold and Arid Regions Environmental and Engineering Research Institute, CAS (China) and Graduate School of the Chinese Academy of Sciences (China); T. Wang, Cold and Arid Regions Environmental and Engineering Research Institute, CAS (China); D. Li, Lanzhou Univ. (China); C. Yan, Cold and Arid Regions Environmental and Engineering Research Institute, CAS (China); N. Li, The Scientific Information Center for Resources and Environment, CAS (China)
- 7471 0D **Analysis of land cover changes using multisource and multitemporal images in loess hilly and gully regions** [7471-12]
D. Wang, Institute of Remote Sensing Applications, CAS (China) and Tianjin Institute of Urban Construction (China); J. Gong, Institute of Remote Sensing Applications, CAS (China); L. Zhang, Institute of Remote Sensing Applications, CAS (China) and Tianjin Institute of Urban Construction (China); Q. Lei, Q. Cao, Soil and Water Conservation Governance and Supervision Bureau of Tianshui (China)
- 7471 0E **Investigations on methods of land cover classification of TM image in mountain area** [7471-13]
Q. Shi, Xinjiang Univ. (China); X. Zhang, Peking Univ. (China); Q. Shi, Xinjiang Univ. (China); W. Gao, Colorado State Univ. (United States)

VEGETATION DYNAMICS AND ECOLOGICAL MONITORING AND ASSESSMENT

- 7471 0F **The composite vegetation indexes and spatial analysis applied to rock-desertification information extraction** [7471-14]
C. Ling, Chinese Academy of Forestry (China) and Central South Univ. of Forestry and Technology (China); H. Zhang, Chinese Academy of Forestry (China); H. Lin, Central South Univ. of Forestry and Technology (China)
- 7471 0G **Estimation of net primary productivity of green coniferous forest in complex terrain** [7471-15]
W. Huang, A-N. Cao, Shanghai Univ. (China); L. Zhang, Wuhan Univ. (China); X. Li, Shanghai Univ. (China); K. Muramatu, Nara Women's Univ. (Japan)
- 7471 0H **Estimation of forest canopy height by integrating multisensor data** [7471-16]
L. Dong, China Meteorological Administration (China) and Institute of Remote Sensing Applications, CAS (China); B. Wu, Institute of Remote Sensing Applications, CAS (China); Z. Guo, Ministry of Land and Resources of China (China)
- 7471 0I **Characterization of vegetation dynamics in Shihezi, Xinjiang using MODIS data** [7471-17]
S. Song, Sichuan Agricultural Univ. (China) and Peking Univ. (China); X. Zhang, Q. Sun, Peking Univ. (China); Q. Lu, State Oceanic Administration of China (China)
- 7471 0J **Estimation of forest canopy height and above-ground biomass using ICESat full waveform data: a case study in Changbai Mountain, China** [7471-18]
Y. Xing, L. Wang, Northeast Forestry Univ. (China)

- 7471 OK **The influence on arid zone oasis landscape eco-environment from human activities**
[7471-19]
H. Zhu, X. Yin, Y. Shang, Shihezi Univ. (China)
- 7471 OL **Retrieving leaf area index of forests in red soil hilly region using remote sensing data**
[7471-20]
X. Li, W. Ju, Y. Zhou, S. Chen, Nanjing Univ. (China)
- 7471 OM **Hyperspectral remote sensing for land degradation mapping in China** [7471-21]
J. Wang, Ministry of Land and Resources (China) and Hong Kong Polytechnic Univ. (Hong Kong, China); T. He, Ministry of Land and Resources (China); Y. Li, ShanDong Agricultural Univ. (China); Y. Chen, Hong Kong Polytechnic Univ. (Hong Kong, China); C. Lv, Ministry of Land and Resources (China)
- 7471 ON **Beijing eco-environment information platform and land use/cover change service construction** [7471-22]
C. Zhao, Y. Wang, J. Wang, National Engineering Research Ctr. for Information Technology in Agriculture (China); Z. Feng, Beijing Forestry Univ. (China); X. Hu, W. Zhou, National Engineering Research Ctr. for Information Technology in Agriculture (China) and Beijing Forestry Univ. (China)
- 7471 OO **A method of integrating ATI with VSWI to retrieve soil moisture in Shiyang River Basin**
[7471-23]
J. Zhao, H. Ren, J. Zheng, Northwest Normal Univ. (China); C. Zhao, Lanzhou Univ. (China)
- 7471 OP **The oasis evolution under human activities of arid Xinjiang in China** [7471-24]
C. Han, Xinjiang Univ. (China)
- 7471 OQ **Monitoring and evaluation of desertification in Shihezi area using Landsat TM imagery**
[7471-25]
M. Jiang, X. Zhang, Q. Tong, Peking Univ. (China)
- 7471 OR **Spatial and temporal characteristics of grassland degradation in the riverhead area of the Yellow River** [7471-26]
X. Xu, J. Liu, Q. Shao, Institute of Geographical Sciences and Nature Resources Research, CAS (China)
- 7471 OS **Use of evapotranspiration model based on energy balance in the Ebinur Lake Wetland Nature Reserve** [7471-27]
Q. Shi, Q. Shi, Z. Wang, Xinjiang Univ. (China); W. Gao, Colorado State Univ. (United States); S. Chang, Xinjiang Univ. (China)
- 7471 OT **Net ecosystem production in the arid land in northwest China from 1982 to 2001** [7471-28]
S. Chang, Institute of Desert Meteorology, CMA (China) and Xinjiang Univ. (China); Q. Shi, Xinjiang Univ. (China)

REMOTE SENSING OF COASTAL AND MARINE ECOSYSTEMS

- 7471 0U **Chlorophyll-a retrieval of coastal waters based on in situ hyperspectral data** [7471-29]
W. Ma, Yantai Institute of Coastal Zone Research for Sustainable Development, CAS (China), Institute of Oceanology, CAS (China), and Graduate School of Chinese Academy of Sciences (China); P. Shi, Yantai Institute of Coastal Zone Research for Sustainable Development, CAS (China); Y. Zhang, The Chinese Univ. of Hong Kong (Hong Kong, China); Q. Xing, J. Tang, D. Liu, Yantai Institute of Coastal Zone Research for Sustainable Development, CAS (China)
- 7471 0V **A method of accurate location for island away from mainland by remote sensing** [7471-30]
S. Liu, Yantai Institute of Coastal Zone Research for Sustainable Development, CAS (China), Southern China Sea Institute of Oceanography, CAS (China), and Graduate School of Chinese Academy of Sciences (China); J. Zhang, Y. Ma, First Institute of Oceanography, State Oceanic Administration (China)
- 7471 0W **Conservative behavior of CDOM optical properties in Changjiang River Estuary, China** [7471-31]
X. Zhang, Zhejiang Univ. (China); L. Wang, Zhejiang Forestry Univ. (China); L. Yu, Zhejiang Univ. (China); H. Lei, State Key Lab. of Satellite Ocean Environment Dynamics (China); X. Chen, Y. Ye, Zhejiang Univ. (China)
- 7471 0X **Spatio-temporal variation of attenuation depths for MODIS in the Bohai Sea** [7471-32]
Y. Liu, Institute of Geographical Sciences and Natural Resources Research, CAS (China) and Graduate School of Chinese Academy of Sciences (China); G. Li, Institute of Geographical Sciences and Natural Resources Research, CAS (China)
- 7471 0Y **Spatial and temporal distributions of suspended sediment in the Nanhui nearshore from TM/ETM images** [7471-33]
R. Kuang, Y. Zhou, X. Li, F. Shen, East China Normal Univ. (China)
- 7471 0Z **Ocean surface monitoring based on GPS kinematic positioning** [7471-34]
C. Hu, Tongji Univ. (China); W. Chen, Hong Kong Polytechnic Univ. (Hong Kong, China); J. Wu, Tongji Univ. (China)
- 7471 10 **Assessment of water quality in Sheyang Estuary (China) using hyperspectral data** [7471-35]
J. Pan, Nanjing Normal Univ. (China) and Nanjing Forestry Univ. (China); Y. Zhang, Y. Xu, Nanjing Normal Univ. (China)
- 7471 11 **Reed wetland extraction in the Yellow River Delta Nature Reserve based on knowledge inference technology** [7471-36]
X. Fu, H. Wang, L. Li, Hohai Univ. (China)
- 7471 12 **Change analysis of Spartina using multitemporal remote sensing data in Jiangsu coast** [7471-37]
H. Zhang, X. Feng, Y. Li, C. Wang, L. Chen, P. Zuo, S. Zhao, Nanjing Univ. (China)

REMOTE SENSING OF SNOW, ICE, AND TIBETAN ENVIRONMENTS

- 7471 13 **Three-dimensional monitoring of ice-snow in Qinghai-Tibet Plateau: a case of Geladandong** [7471-38]
Z. Hong, N. Cong, L. Zhang, B. Ai, Chinese Academy of Surveying and Mapping (China)
- 7471 14 **Comparison study of seasonal snow cover area from space-borne satellite data in the Heilongjiang Basin** [7471-39]
K. Song, Northeast Institute of Geography and Agroecology, CAS (China); G. Zhong, Northeast Normal University (China); Z. Wang, L. Zeng, C. Jin, B. Zhang, D. Liu, J. Du, M. Jia, Northeast Institute of Geography and Agroecology, CAS (China)
- 7471 15 **Snow cover mapping over the Tibetan Plateau with MODIS and ASTER data** [7471-40]
L. Xu, China Univ. of Geosciences (China) and Wuhan Univ. (China); R. Niu, Y. Zhao, J. Li, T. Wu, China Univ. of Geosciences (China)
- 7471 16 **Near-space vehicle in monitoring Qinghai-Tibetan Plateau environmental changes** [7471-41]
W. Wang, China Meteorological Administration (China) and Univ. of Electronic Science and Technology of China (China)
- 7471 17 **Monitoring lake area change in south Qiangtang, Tibet plateau using multitemporal geo-information TUPU** [7471-42]
S. Jia, P. Xiao, Nanjing Univ. (China)
- 7471 18 **Changes of snow and vegetation coverage of Qilian Mountain and water resource in Shiyang River Basin over ten years** [7471-43]
L. Han, China Meteorological Administration (China) and Lanzhou Regional Climate Ctr. (China); C. Zhang, Lanzhou Regional Climate Ctr. (China); Z. Zhang, Key Lab. of Desert and Desertification, CAS (China); T. Han, X. Wan, Y. Liang, M. Li, Lanzhou Regional Climate Ctr. (China)
- 7471 19 **An intensive erosion event in last glaciation in the west of China** [7471-44]
Y. Wang, R. Huang, Y. Luo, O. Su, Chengdu Univ. of Technology (China)

MONITORING AND ASSESSMENT OF GROUND SUBSIDENCE AND EARTHQUAKES

- 7471 1A **ALOS PALSAR differential interferometry for mapping co-seismic deformation of the 2008 Wenchuan earthquake, China** [7471-45]
Y. Hu, Royal Institute of Technology (Sweden) and Institute of Geographical Sciences and Natural Resources Research, CAS (China); Y. Ban, Royal Institute of Technology (Sweden); J. Liu, Institute of Geographic Sciences and Natural Resources Research, CAS (China)
- 7471 1B **Kinematic crustal deformation features of Wenchuan earthquake obtained by GPS** [7471-46]
Y. Xiong, D. Huang, S. Xue, Southwest Jiaotong Univ. (China); H. Liao, Y. Wu, Y. Lu, Sichuan Seismology Bureau (China)
- 7471 1C **Mapping earthquake-induced damage of the Wenchuan earthquake using SAR data** [7471-47]
Y. Liu, X. Shan, C. Qu, X. Song, G. Zhang, China Earthquake Administration (China)

- 7471 1D **Dam-break flood modeling for Tangjiashan Quake Lake** [7471-48]
J. Dai, China Univ. of Geosciences (China); S. Zhang, Wuhan Univ. (China); C. Xue, China Univ. of Geosciences (China)
- 7471 1E **Improved neural network algorithm for classification of UAV imagery related to Wenchuan earthquake** [7471-49]
N. Lin, Chengdu Univ. of Technology (China) and Chongqing Technology and Business Univ. (China); W. Yang, Chengdu Univ. of Technology (China); B. Wang, Chongqing Geomatics Ctr. (China)
- 7471 1F **Application of multimode airborne digital camera system in Wenchuan earthquake disaster monitoring** [7471-50]
X. Liu, Q. Li, J. Fang, Q. Tong, L. Zheng, Institute of Remote Sensing Applications, CAS (China)
- 7471 1G **Application of optical remote sensing in the Wenchuan earthquake assessment** [7471-51]
B. Zhang, L. Lei, L. Zhang, L. Liu, B. Zhu, Z. Zuo, Ctr. for Earth Observation & Digital Earth, CAS (China)
- 7471 1H **HJ-1 CCD image in detecting landscape change in earthquake areas** [7471-52]
Q. Jiao, Y. Wu, L. Liu, Z. Chen, B. Zhang, Ctr. for Earth Observation & Digital Earth, CAS (China)
- 7471 1I **Detection of changes of the earth's volume and geometry by using GPS and VLBI data** [7471-53]
X. Zhu, F. Sun, Zhengzhou Institute of Surveying and Mapping (China); R. Wang, Xi'an Research Institute of Surveying and Mapping (United States)
- 7471 1J **Subsidence monitoring by permanent scatterers in InSAR: a case study of Yancheng city in Jiangsu** [7471-54]
H. Yi, S. Chen, B. Wang, L. Mao, Nanjing Normal Univ. (China)
- 7471 1K **Landslides detection: a case study in Conghua city of Pearl River delta** [7471-55]
J. Dou, Guangzhou Institute of Geography (China), Guangzhou Institute of Geochemistry, CAS (China), and Graduate Univ. of the Chinese Academy of Sciences (China); J. Qian, Guangzhou Institute of Geography (China); H. Zhang, Guangzhou Institute of Geography (China) and Geospatial Information Technology and Application of Public Lab. of Guangdong (China); S. Chen, X. Zheng, J. Zhu, Z. Xie, Guangzhou Institute of Geography (China); Y. Zou, Guangzhou Institute of Geochemistry, CAS (China) and Graduate Univ. of the Chinese Academy of Sciences (China)
- 7471 1L **Risk assessment on the land subsidence in Beijing** [7471-56]
B. Chen, Capital Normal Univ. (China); H. Gong, Northeast Institute of Geography and Agricultural Ecology, CAS (China) and Capital Normal Univ. (China); X. Li, Capital Normal Univ. (China); Y. Zhang, Northeast Institute of Geography and Agricultural Ecology, CAS (China) and Capital Normal Univ. (China); L. Zheng, Capital Normal Univ. (China)
- 7471 1M **Monitoring landslides dynamics using multitemporal terrestrial laser scanning data** [7471-57]
L. Sui, ChangAn Univ. (China); J. Li, Univ. of Waterloo (Canada); X. Wang, D. Zhao, ChangAn Univ. (China)

- 7471 1N **Mapping surface deformation related to the 2008 Wenchuan earthquake with ALOS InSAR and GPS observations** [7471-58]
G. Liu, Southwest Jiaotong Univ. (China); J. Wu, Tongji Univ. (China); J. Li, Univ. of Waterloo (Canada); Q. Chen, J. Qin, H. Zhang, R. Zhang, H. Jia, X. Luo, Southwest Jiaotong Univ. (China)
- 7471 1O **GNSS-based emergency management system** [7471-59]
Y. Wu, X. Chen, Peking Univ. (China); L. Ma, Beijing Foundway S&T Co., Ltd. (China)
- 7471 1P **Real-time geological disaster monitoring with deformation parameters auto-detection technique** [7471-60]
C. Li, X. Shi, L. Tang, H. Qiu, M. Tan, Institute of Surveying and Mapping (China)
- 7471 1Q **GNSS-based network positioning technology for cooperative emergency management** [7471-61]
C. Wu, T. Chu, A. Tang, H. Su, Peking Univ. (China)

ALGORITHMS AND TECHNIQUES FOR SPATIAL CHANGE ANALYSIS

- 7471 1R **Optimal band selection for high dimensional remote sensing data using genetic algorithm** [7471-62]
X. Zhang, Q. Sun, Peking Univ. (China); J. Li, Univ. of Waterloo (Canada)
- 7471 1S **Spatial variability characteristics of soil available N, P, and K and their influencing factors at the county scale** [7471-63]
S. Pang, T. Li, Y. Wang, H. Yu, Sichuan Agricultural Univ. (China)
- 7471 1T **Algorithm and implementation of GPS/VRS network RTK** [7471-64]
C. Gao, B. Yuan, F. Ke, S. Pan, Southeast Univ. (China)
- 7471 1U **Analysis and validation of MODIS and ASTER LAI products inverted by PROSAIL** [7471-65]
S. Li, H. Li, L. Zhou, Beijing Academy of Agricultural and Forestry Sciences (China); D. Sun, China Agricultural Univ. (China)
- 7471 1V **Design and implementation of GEarth spatial data service application system** [7471-66]
J. Chen, F. Miao, W. Wang, H. Wang, Chengdu Univ. of Technology (China)
- 7471 1W **Assessment of travertine evolution in Jiuzhaigou-Huanglong area using grey system model** [7471-67]
J. Gu, Sichuan Normal Univ. (China); X. Fan, Regional Geological Survey Team of Geological BMR (China)
- 7471 1X **Data-oriented composite-kernel-based support vector machine for image classification** [7471-68]
J. Tang, Yantai Institute of Coastal Zone Research for Sustainable Development, CAS (China); X. Zhang, X. Chen, Peking Univ. (China); J. Zhang, State Oceanic Administration (China); X. Wen, Z. Zhang, D. Wang, Yantai Institute of Coastal Zone Research for Sustainable Development, CAS (China)

- 7471 1Y **Application of split window algorithm to retrieve land surface temperature over northwestern China** [7471-69]
S. Zhao, Peking Univ. (China) and Beijing Normal Univ. (China); Q. Qin, Peking Univ. (China); Y. Xiong, Sun Yat-Sen Univ. (China); G. Qiu, Beijing Normal Univ. (China); Y. Yang, Institute of Genetic and Developmental Biology, CAS (China)
- 7471 1Z **Multisource remote sensing supported large scale fully distributed hydrological modeling of the Tarim River Basin in Central Asia** [7471-70]
X. Feng, Xinjiang Institute of Ecology and Geography, CAS (China) and Graduate Univ. of Chinese Academy of Sciences (China); X. Chen, Xinjiang Institute of Ecology and Geography (China); P. Willems, T. Liu, Katholieke Univ. Leuven (Belgium); L. Li, A. Bao, Y. Huang, Xinjiang Institute of Ecology and Geography, CAS (China)
- 7471 20 **Establishment of land use/cover change database and eco-environment decisions in Sichuan province, China** [7471-71]
Z. Zheng, Southwest Jiaotong Univ. (China), Old Dominion Univ. (United States), and Chengdu Univ. of Technology (China); D. Fan, Southwest Jiaotong Univ. (China); W. Yang, Chengdu Univ. of Technology (China); Y. Li, Univ. of Electronic Science and Technology of China (China)
- 7471 21 **Three-dimensional building reconstruction from LiDAR point clouds with minimum circum-rectangle** [7471-72]
R. Wang, Xi'an Research Institute of Surveying & Mapping (China); X. Zhu, Zhengzhou Institute of Surveying & Mapping (China); Y. Fang, Xi'an Research Institute of Surveying & Mapping (China)
- 7471 22 **Remote sensing data sharing platform for emergency management** [7471-73]
Y. Tu, Peking Univ. (China) and Institute of Scientific and Technological Information of China (China); J. Peng, Q. Li, Peking Univ. (China); C. Dong, Institute of Scientific and Technological Information of China (China); H. Zhao, Peking Univ. (China)
- 7471 23 **Integrating mobile GIS, real-time D-GPS, and high-resolution satellite imagery for land use patrolling** [7471-74]
Z. Xu, Southwest Jiaotong Univ. (China); X. Chen, Chengdu Land and Recourses Information Ctr. (China); G. Liu, Southwest Jiaotong Univ. (China); T. Chen, Chengdu Land and Recourses Information Ctr. (China); Y. Meng, Southwest Jiaotong Univ. (China); L. Jiang, Beijing Topcon Business and Trace Co., Ltd. (China); M. Wang, China Petroleum Pipeline Engineering Corp. (China)
- 7471 24 **Multitemporal DEM co-registering for detecting terrain changes using local invariant patches** [7471-75]
T. Zhang, M. Cen, G. Liu, Southwest Jiaotong Univ. (China); Y. Feng, Southwest Jiaotong Univ. (China) and Sichuan Department of Land and Resources (China); Z. Ren, Southwest Jiaotong Univ. (China); R. Yang, Southwest Jiaotong Univ. (China) and Chengdu Univ. of Technology (China)
- 7471 25 **Study of 3D remote sensing system based on optical scanning holography** [7471-76]
S. Zhao, L. Yan, Peking Univ. (China)
- 7471 26 **Grid-based earthquake data sharing** [7471-77]
X. Shi, W. Yang, Chengdu Univ. of Technology (China)

- 7471 27 **Error estimation of 3D reconstruction from image sequences** [7471-78]
M. Sun, Peking Univ. (China); K. Xia, Central South Univ. (China)
- 7471 28 **A novel dual-SAR detector based on the joint metric of interferogram's magnitude and phase for slow ground moving targets** [7471-79]
G. Shi, L. Zhao, N. Wang, G. Gao, Q. Chen, A. Liu, G. Kuang, National Univ. of Defense Technology (China)
- 7471 29 **An algorithm for retrieving rock-desertification from multispectral remote sensing images** [7471-80]
X. Xia, China Univ. of Geosciences (China); Q. Tian, Nanjing Univ. (China); Y. Liao, China Univ. of Geosciences (China)

Author Index

Conference Committees

Conference Chair

Qingxi Tong, Peking University (China)

Conference Co-chairs

Liqiu Meng, Technical University of Munich (Germany)

Huadong Guo, Center for Earth Observation and Digital China, CAS
(China)

Xiuwan Chen, Peking University (China)

Conference Secretariat

Xianfeng Zhang, Peking University (China)

International Advisory Committee

Deren Li, *Chair*, Wuhan University (China)

Orhan Altan, *Co-chair*, Istanbul Technical University (Turkey)

William Cartwright, *Co-chair*, RMIT University (Australia)

Michael Sideris, *Co-chair*, University of Calgary (Canada)

Alberto Setzer, National Institute for Space Research (Brazil)

Ammatzia Peled, University of Haifa (Israel)

Carlos Di Bella, Instituto Nacional de Tecnología Agropecuaria
(Argentina)

Costas Armenakis, York University (Canada)

Guocheng Zhang, National Center for Remote Sensing, Ministry of
Science & Technology (China)

Heinz Ruther, University of Cape Town (South Africa)

Heping Xie, Sichuan University (China)

Hui Lin, Chinese University of Hong Kong (Hong Kong, China)

Huili Gong, Capital Normal University (China)

Jiaduo Liu, Chengdu University of Technology (China)

Jianya Gong, Wuhan University (China)

Jieming Zhou, Sichuan Normal University (China)

Jiliu Zhou, Chengdu University (China)

Jing Li, Beijing Normal University (China)

Jingnan Liu, Wuhan University (China)

Jiren Li, Center of Remote Sensing, Ministry of Water Resources (China)

Jon Mills, Newcastle University (United Kingdom)

Jun Chen, National Geomatics Center of China (China)

M. Saandar, Mongolian Society for Photogrammetry and Remote Sensing (Mongolia)
Marguerite Madden, University of Georgia (United States)
Markus Rothacher, GeoForschungsZentrum (Germany)
Martien Molenaar, ITC—International Institute for Geo-Information Science and Earth Observation (The Netherlands)
Naser El-Sheimy, University of Calgary (Canada)
Peng Gong, University of California, Berkeley (United States)
Ping Wang, Aero-geophysics & Remote Sensing Center, Ministry of Land Resources (China)
Qiao Wang, Environmental Monitoring Center, Ministry of Environmental Protection (China)
Richard Bamler, German Aerospace Center (Germany)
Shailesh Nayak, Indian Space Research Organization (India)
Urs Hugentobler, Technical University of Munich (Germany)
Wolfgang Wagner, Vienna University of Technology (Austria)
Xiaowen Li, Beijing Normal University (China)
Xingfa Gu, Institute of Remote Sensing Applications, CAS (China)
Yunqiu Huang, Chengdu University of Technology (China)
Yunyue Yu, NOAA—National Oceanic and Atmospheric Administration (United States)
Zhilin Li, Hong Kong Polytechnic University (Hong Kong, China)

Scientific Committee

Jonathan Li, *Chair*, University of Waterloo (Canada)
Emilio Chuvieco, *Co-chair*, Universidad de Alcalá (Spain)
Zengyuan Li, *Co-chair*, Chinese Academy of Forestry (China)
Xiaojun Yang, *Co-chair*, Florida State University (United States)
Alexander Brenning, University of Waterloo (Canada)
Antonio M. G. Tommaselli, São Paulo State University (Brazil)
Carsten Juergens, Ruhr-University Bochum (Germany)
Compton Tucker, NASA—National Aeronautics and Space Administration (United States)
Dar Roberts, University of California, Santa Barbara (United States)
Dongmei Chen, Queen's University (Canada)
Else Swinnen, VITO—Flemish Institute for Technological Research (Belgium)
Eric Kwabena Forkuo, Kwame Nkrumah University of Science and Technology (Ghana)
Eyal Ben-Dor, Tel-Aviv University (Israel)
Freek D. van der Meer, ITC—International Institute for Geo-Information Science and Earth Observation (The Netherlands)
Georgia Fotopoulos, University of Toronto (Canada)
Guoxiang Liu, Southwest Jiaotong University (China)
Huajun Tang, Yantai Institute of Coastal Zone Research for Sustainable Development, Chinese Academy of Agricultural Sciences (China)

Huayi Wu, Wuhan University (China)
Ichio Asanuma, Tokyo University of Information Sciences (Japan)
Jay Gao, University of Auckland (New Zealand)
Jeong Woo Kim, University of Calgary (Canada)
Jiakui Tang, Institute of Coastal Research for Sustainable
 Development, CAS (China)
Jianhua Gong, Institute of Remote Sensing Applications, CAS (China)
Jie Zhang, First Institute of Oceanography (China)
Jinfei Wang, University of Western Ontario (Canada)
Julian Smit, University of Cape Town (South Africa)
Jun Yang, National Meteorological Satellite Center (China)
Kaixiang Zeng, Ministry of Industry and Information Technology (China)
Liang Tang, Techedge GmbH Consulting & Software (Germany)
Linlin Ge, University of New South Wales (Australia)
Micha Pazner, University of Western Ontario (Canada)
Norman Kerle, ITC—International Institute for Geo-Information Science
 and Earth Observation (The Netherlands)
Peijun Li, Peking University (China)
Piero Boccardo, Politecnico di Torino (Italy)
Qihao Weng, Indiana State University (United States)
Qiming Zeng, Peking University (China)
Qingquan Li, Wuhan University (China)
Qingshan Jiang, Chengdu University (China)
Richard Kelly, University of Waterloo (Canada)
Samantha Lavender, University of Plymouth (United Kingdom)
Soo Chin Liew, National University of Singapore (Singapore)
Wooil Moon, Seoul National University (Korea, Republic of)
Wunian Yang, Chengdu University of Technology (China)
Xiaoyong Chen, Asian Institute of Technology (Thailand)
Yifang Ban, Royal Institute of Technology (Sweden)
Yimin Jin, National Remote Sensing Center of China (China)
Yitai Ju, Institute of Mineral Resources, China Metallurgical Geology
 Bureau (China)
Yuei-An Liou, National Central University (Taiwan, China)
Yun Zhang, University of New Brunswick (Canada)
Zhaoqiang Huang, Institute of Mineral Resources, China Metallurgical
 Geology Bureau (China)

Local Organizing Committee

Fang Miao, *Chair*, Chengdu University of Technology (China)
Jirong Gu, *Co-chair*, Sichuan Normal University, China (China)
Dingfa Huang, *Co-chair*, Southwest Jiaotong University (China)
Tingxian Li, *Co-chair*, Sichuan Agricultural University (China)
Peng Yuan, *Co-chair*, Sichuan University (China)
Guoxiang Liu, *Publication Coordinator*, Southwest Jiaotong University
 (China)

Jianguo Yan, *Program Coordinator*, Chengdu University of Technology (China)
Wenjiang Zhang, *Sponsorship Coordinator*, Sichuan University (China)
Wu Chen, *Exhibition Coordinator*, Peking University (China)
Charles Yeung, *Director*, LoC Office

Session Chairs

Opening Session
Qingxi Tong, Peking University (China)

Keynote Session I
Liqiu Meng, Technical University of Munich (Germany)

Keynote Session II
Jonathan Li, University of Waterloo (Canada)

Keynote Session III & IV
Xiaojun Yang, Florida State University (United States)

T01 Earth Observation Applications
Emilio Chuvieco, Universidad de Alcalá (Spain)
Qihao Weng, Indiana State University (United States)

T02-1 Land Use and Land Cover Changes I
Bo Huang, Chinese University of Hong Kong (Hong Kong, China)
Liangyun Liu, Center of Earth Observation and Digital Earth Science, CAS (China)

T05 Qinghai-Tibetan Plateau
Zhaoqiang Huang, Institute of Mineral Resources, China Metallurgical Geology Bureau (China)

T06-1 Earthquake Monitoring and Assessment I
Leung Yee, Chinese University of Hong Kong (Hong Kong, China)
Timo Balz, Wuhan University (China)

T03-1 Coastal and Marine Ecosystems I
Xiaojun Yang, Florida State University (United States)
Hongguo Jia, Southwest Jiaotong University (China)

T03-2 Coastal and Marine Ecosystems II
Wenrui Huang, Florida State University (United States)
Jiakui Tang, Yantai Institute of Coastal Zone and Sustainable Development, CAS (China)

T04 Snow, Ice, and the Polar Environment

Hongxu Zhao, Canada Centre for Remote Sensing (Canada)

Yuei-An Liou, National Central University (Taiwan, China)

SS1 Flood and Drought Monitoring and Forecasting

Xiwu Zhan, NOAA-NESDIS Center for Satellite Applications and Research (United States)

Jun Wen, Cold and Arid Regions Environmental and Engineering Research Institute, CAS (China)

T02-2 Land Use and Land Cover Changes II

Qihao Weng, Indiana State University (United States)

Robin Zhang, Murray State University (United States)

T02-3 Urbanization and Environmental Impacts I

Wei Ji, University of Missouri-Kansas City (United States)

Peijun Li, Peking University (China)

T10-1 Methods and Algorithms for Image Processing

Yun Zhang, University of New Brunswick (Canada)

Anthony Gidudu, University of the Witwatersrand (South Africa)

T10-2 Spatial Data Infrastructure & Spatial Analysis

Fuqun Zhou, Canada Centre for Remote Sensing (Canada)

Jirong Gu, Sichuan Normal University (China)

T06-2 Earthquake Monitoring and Assessment II

Bing Zhang, Center for Earth Observation & Digital Earth, CAS (China)

T06-3 Earthquake Monitoring and Assessment III

Yifang Ban, Royal Institute of Technology (Sweden)

SS2 Development and Applications of Satellite Land Surface Products

Yunyue Yu, NOAA/NESDIS (United States)

Qinhua Liu, Institute of Remote Sensing Applications, CAS (China)

SS3 Detection, Monitoring, Modeling, Management, Control and Prevention of Forest Fires Using Geoinformation

Yousif Ali Hussin, ITC—International Institute for Geo-Information Science and Earth Observation (The Netherlands)

Sindh Rathaur, Indian Institute of Remote Sensing (India)

T02-4 Urbanization and Environmental Impacts II

Carsten Juergens, Ruhr-University Bochum (Germany)

Dongmei Chen, Queen's University (Canada)

T02-5 Vegetation Mapping and Analysis I

Qiaofeng Zhang, Murray State University (United States)

Qingxu Huang, University of Waterloo (Canada)

T10-3 LiDAR

Uwe Stilla, Technical University of Munich (Germany)

Zhizhong Kang, China University of Geoscience, Beijing (China)

T10-4 Multi-Scale Representation and Cartographic Generalization

Keping Chen, Macquarie University (Australia)

Zhu Xu, Southwest Jiaotong University (China)

T07-1 Geodetic Techniques for Global Changes I

Qiming Zhou, Hong Kong Baptist University (Hong Kong, China)

Yongliang Xiong, Southwest Jiaotong University (China)

T07-2 Geodetic Techniques for Global Changes II

Wenbin Shen, Wuhan University (China)

Hong Liang, Yunnan University (China)

T08-1 InSAR for Subsidence Monitoring

Guoxiang Liu, Southwest Jiaotong University (China)

Wunian Yang, Chengdu University of Technology (China)

T08-2 Landslide

Lichun Sui, Chang'an University (China)

Butenuth Matthias, Technical University of Munich (Germany)

T02-6 Vegetation Mapping and Analysis II

Abdullah Al-misnid, University of Gassim (Saudi Arabia)

Anand Nandipati, Universidade Nova de Lisboa (Portugal)

T02-7 Environmental Monitoring and Assessment

Julian Smit, University of Cape Town (South Africa)

Xiaohui Yuan, University of North Texas (United States)

T10-5 GIS-Based Resource and Hazard Management

Jiren Li, China Institute of Water Resources and Hydropower Research
(China)

Jiangping Shuai, Public Health Agency of Canada (Canada)

T09 GNSS for Disaster Management

Dingfa Huang, Southwest Jiaotong University (China)

Junping Chen, Helmholtz Zentrum Potsdam (Germany)

T07-3 Geodetic Techniques for Global Changes III

Kefei Zhang, RMIT University (Australia)

Zhigen Yang, Shanghai Astronomical Observatory, CAS (China)

T07-4 Geodetic Techniques for Global Changes IV

Hala Effat, National Authority for Remote Sensing and Space Sciences
(Egypt)

Fuping Sun, Zhengzhou Institute of Surveying and Mapping (China)

T08-3 Flood & Drought

Xianfeng Zhang, Peking University (China)

Özgür Ertac, Technical University of Munich (Germany)

T08-4 Forecast and Monitoring I

Jun Li, University of Wisconsin-Madison (United States)

SS3 University Session: Education of Earth Observation and GIS

Fang Miao, Chengdu University of Technology (China)

Introduction

This volume contains selected papers presented at the 2nd International Conference on Earth Observation for Global Changes (EOGC2009) held on 25–29 May 2009 in Chengdu, China. The First International Symposium on Earth Observation of Global Changes was held in Madrid, Spain in 2006. In the future, the EOGC events will be held biennially and rotate between Asia, Europe, North America, and other continents. It has been planned that EOGC2011 and EOGC 2013 will be held in Munich, Germany and Toronto, Canada, respectively.

The central theme of the EOGC2009 conference is Earth Observation for Global Changes. The main topics included international Earth observation efforts on global change studies, remote sensing of land use and land cover changes, coastal and marine ecosystems, snow, ice and the polar environment, eco-environmental change monitoring in the Tibetan Plateau, applications of remote sensing in the Wenchuan Earthquake, global geodetic observing system for global change studies, GNSS for emergency and disaster management, geospatial data processing and integration, and education and training in Earth observation technology and applications.

The conference provided a forum for original research contributions and practical experiences of the development and use of various Earth observation technologies, data interpretation techniques, and application methods. Validation of the societal impact of operational Earth observation products, as well as the benefits from the enhanced products to be produced by the Global Earth Observing System of System (GEOSS) and Committee of Earth Observing System (CEOS), currently under development, was also discussed. Over 700 abstracts and 456 full papers were received. Approximately 400 participants came from 22 countries and regions, including Austria, Australia, Canada, China, Egypt, Finland, Germany, Hong Kong, India, Iran, Italy, Myanmar, Portugal, Saudi Arabia, South Africa, Spain, Sweden, Taiwan, Thailand, The Netherlands, UNEP, and USA.

A total of 80 papers are finally included in this volume after a peer-review process. We would like to thank many people who contributed to this volume. The authors gave their valuable time to produce a state-of-the-art analysis and evaluation of the Earth observation technologies in global change studies. We are particularly grateful to all the reviewers who helped in evaluating the manuscripts in a short period of time (less than one month), including Costas Armenakis (York University, Canada), Yifang Ban (Royal Institute of Technology,

Sweden), Piero Boccardo (Politecnico di Torino, Italy), Alexander Brenning (University of Waterloo, Canada), Dongmei Chen (Queen's University, Canada), Georgia Fotopoulos (University of Toronto, Canada), Jay Gao (University of Auckland, New Zealand), Jianhua Gong (Institute of Remote Sensing Applications, CAS, China), Richard Kelly (University of Waterloo, Canada), Norman Kerle (ITC, The Netherlands), Zhaoqiang Huang (China Metallurgic Geology Bureau, China), Gangyao Kuang (University of Waterloo, Canada/National University of Defense Technology, China), Peijun Li (Peking University, China), Ting Liu (Florida State University, USA), Guoxiang Liu (Southwest Jiaotong University, China), Micha Pazner (University of Western Ontario, Canada), Dar Roberts (University of California, Santa Barbara, USA), Julian Smit (University of Cape Town, South Africa), Jiakui Tang (Yantai Institute of Coastal Research for Sustainable Development, CAS, China), Antonio M. G. Tommaselli (Sao Paulo State University, Brazil), Freek D. van der Meer (ITC, The Netherlands), Qihao Weng (Indiana State University, USA), Huayi Wu (Wuhan University, China), Min Sun (Peking University, China), Zhu Xu (Southwest Jiaotong University, China), Xianfeng Zhang (Peking University, China), Yun Zhang (University of New Brunswick, Canada), Ping Zhong (The Hong Kong Polytechnic University, Hong Kong, China), and Libin Zhou (Florida State University, USA). The graduate students at Peking University (China), University of Waterloo (Canada), Southwest Jiaotong University (China), and Florida State University (USA) are appreciated in handling the communications with authors during the peer review and revision process as well as some editing work. Our special thanks go to SPIE staff for their efforts in handling the publication issues. Last but not least, we wish to acknowledge the supporting organizations and institutions such as International Society of Photogrammetry and Remote Sensing (ISPRS), International Cartographic Association (ICA), International Association of Geodesy (IAG), International Society for Digital Earth (ISDE) and International Society for Optical Engineering (SPIE).

Xianfeng Zhang

Jonathan Li

Conference Secretariat and Scientific Committee Chair

Editors-In-Chief

2 July 2009