

# IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING

A PUBLICATION OF THE IEEE GEOSCIENCE AND REMOTE SENSING SOCIETY



SEPTEMBER 2016

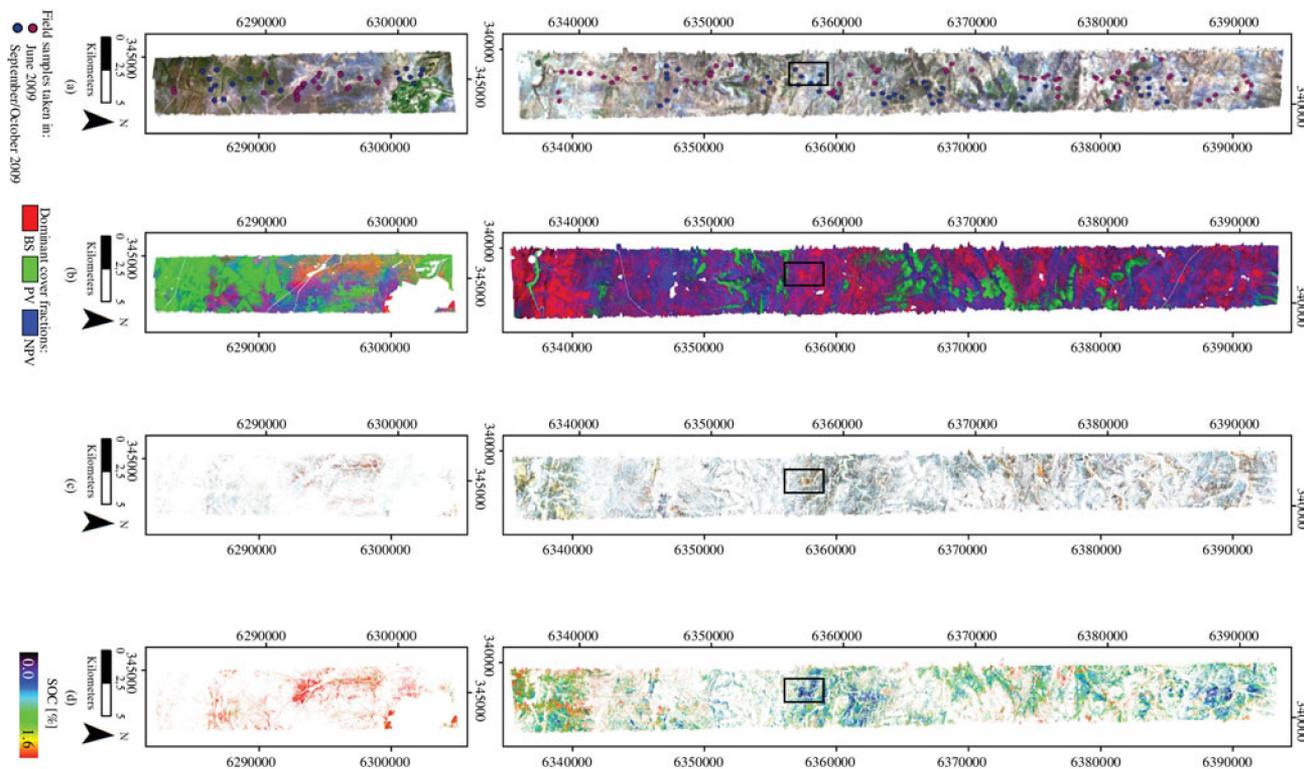
VOLUME 9

NUMBER 9

IJSTHZ

(ISSN 1939-1404)

## SPECIAL ISSUE ON HYPERSPECTRAL REMOTE SENSING AND IMAGING SPECTROSCOPY



Application of the multistage methodology in the 320 km<sup>2</sup> South African study area to derive valuable indicators related to carbon sequestration and land degradation (see [29] for location). True color of HyMap image data (a), results of spectral unmixing as RGB composite (b), true color image of residual soil spectra (c), and predicted SOC contents (d). For more information, please see “Combining Field and Imaging Spectroscopy to Map Soil Organic Carbon in a Semiarid Environment,” by Bayer *et al.*, which begins on p. 3997.

# IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING

A PUBLICATION OF THE IEEE GEOSCIENCE AND REMOTE SENSING SOCIETY



SEPTEMBER 2016

VOLUME 9

NUMBER 9

IJSTHZ

(ISSN 1939-1404)

## SPECIAL ISSUE ON HYPERSPECTRAL REMOTE SENSING AND IMAGING SPECTROSCOPY

### GUEST EDITORIAL

Foreword to the Special Issue on Hyperspectral Remote Sensing and Imaging Spectroscopy . . . . .	
..... U. Heiden, A. Iwasaki, A. Müller, M. Schlerf, T. Udelhoven, K. Uto, N. Yokoya, and J. Chanussot	3904

### *New and Innovative Hyperspectral Sensor Systems*

Development of a Low-Cost Hyperspectral Whiskbroom Imager Using an Optical Fiber Bundle, a Swing Mirror, and Compact Spectrometers . . . . .	K. Uto, H. Seki, G. Saito, Y. Kosugi, and T. Komatsu	3909
Ground-Based Panoramic Stereo Hyperspectral Imaging System With Multiband Stereo Matching . . . . .	A. C. Karaca, A. Ertürk, M. K. Güllü, and S. Ertürk	3926

### *Research and Applications of Imaging Spectroscopy*

Mapping Fractional Land Use and Land Cover in a Monsoon Region: The Effects of Data Processing Options . . . . .	B. Seo, C. Bogner, T. Koellner, and B. Reineking	3941
Discriminating Rangeland Management Practices Using Simulated HypSIRI, Landsat 8 OLI, Sentinel 2 MSI, and VEN $\mu$ S Spectral Data . . . . .	M. Sibanda, O. Mutanga, and M. Rouget	3957
Delta Area at Near Infrared Region (DANIR)—A Novel Approach for Green Vegetation Fraction Estimation using Field Hyperspectral Data . . . . .	D. Dutta, P. K. Das, K. A. Alam, P. Safwan, S. Paul, M. K. Nanda, and V. K. Dadhwal	3970
Utilizing a PLSR-Based Band-Selection Procedure for Spectral Feature Characterization of Floristic Gradients . . . . .	C. Neumann, M. Förster, B. Kleinschmit, and S. Itzerott	3982
Combining Field and Imaging Spectroscopy to Map Soil Organic Carbon in a Semiarid Environment . . . . .	A. D. Bayer, M. Bachmann, D. Rogge, A. Müller, and H. Kaufmann	3997
Quantification of Soil Variables in a Heterogeneous Soil Region With VIS–NIR–SWIR Data Using Different Statistical Sampling and Modeling Strategies . . . . .	M. Vohland, M. Harbich, M. Ludwig, C. Emmerling, and S. Thiele-Bruhn	4011
Evaluation of the Quasi-Analytical Algorithm (QAA) for Estimating Total Absorption Coefficient of Turbid Inland Waters in Northeast China . . . . .	S. Li, K. Song, G. Mu, Y. Zhao, J. Ma, and J. Ren	4022
First Suomi NPP Cal/Val Campaign: Intercomparison of Satellite and Aircraft Sounding Retrievals . . . . .	D. K. Zhou, X. Liu, A. M. Larar, J. Tian, W. L. Smith, S. H. Kizer, W. Wu, Q. Liu, and M. D. Goldberg	4037

(Contents Continued on Page 3902)



---

*Advances in Hyperspectral Image and Signal Processing*

Wavelet-Domain Multiview Active Learning for Spatial-Spectral Hyperspectral Image Classification . . . . .	4047
..... X. Zhou, S. Prasad, and M. M. Crawford	
Combining Rotation Forest and Multiscale Segmentation for the Classification of Hyperspectral Data . . . . .	4060
..... J. Chen, J. Xia, P. Du, and J. Chanussot	
Spectral–Spatial Classification of Hyperspectral Image Based on Deep Auto-Encoder . . . . .	4073
..... X. Ma, H. Wang, and J. Geng	
Adaptive Nonlocal Spatial–Spectral Kernel for Hyperspectral Imagery Classification . . . . .	4086
..... J. Wang, L. Jiao, S. Wang, B. Hou, and F. Liu	
Bilayer Elastic Net Regression Model for Supervised Spectral-Spatial Hyperspectral Image Classification . . . . .	4102
..... B. N. Soomro, L. Xiao, L. Huang, S. H. Soomro, and M. Molaei	
Crop Classification Based on Feature Band Set Construction and Object-Oriented Approach Using Hyperspectral Images . . . . .	4117
..... X. Zhang, Y. Sun, K. Shang, L. Zhang, and S. Wang	
Spatial–Spectral Hyperspectral Image Classification Using Random Multiscale Representation . . . . .	4129
..... J. Liu, Z. Wu, J. Li, L. Xiao, A. Plaza, and J. A. Benediktsson	
Spectral–Spatial Feature Learning Using Cluster-Based Group Sparse Coding for Hyperspectral Image Classification . . . . .	4142
..... X. Zhang, Q. Song, Z. Gao, Y. Zheng, P. Weng, and L. C. Jiao	
Class-Level Joint Sparse Representation for Multifeature-Based Hyperspectral Image Classification . . . . .	4160
..... E. Zhang, L. Jiao, X. Zhang, H. Liu, and S. Wang	
Hyperspectral Image Classification by Fusing Collaborative and Sparse Representations . . . . .	4178
..... W. Li, Q. Du, F. Zhang, and W. Hu	
Low-Rank Subspace Representation for Supervised and Unsupervised Classification of Hyperspectral Imagery . . . . .	4188
..... A. Sumarsono and Q. Du	
Fuzzy Signature-Based Discriminative Subspace Projection for Hyperspectral Data Classification . . . . .	4196
..... S. Yang, H. Zhou, M. Wang, Z. Feng, and L. Jiao	
Spectral-Angle-Based Discriminant Analysis of Hyperspectral Data for Robustness to Varying Illumination . . . . .	4203
..... M. Cui and S. Prasad	
A New Approach for Endmember Extraction and Clustering Addressing Inter- and Intra-Class Variability via Multiscaled-Band Partitioning . . . . .	4215
..... C. Andreou, D. Rogge, and R. Müller	
Automated Construction of Multiple Regional Libraries for Neighborhoodwise Local Multiple Endmember Unmixing . . . . .	4232
..... C. Deng	
Harmonic Mixture Modeling for Efficient Nonlinear Hyperspectral Unmixing . . . . .	4247
..... A. Marinoni, A. Plaza, and P. Gamba	
Hyperspectral Unmixing in the Presence of Mixed Noise Using Joint-Sparsity and Total Variation . . . . .	4257
..... H. K. Aggarwal and A. Majumdar	
Sparsity-Regularized Robust Non-Negative Matrix Factorization for Hyperspectral Unmixing . . . . .	4267
..... W. He, H. Zhang, and L. Zhang	
Comparative Study and Analysis Among ATGP, VCA, and SGA for Finding Endmembers in Hyperspectral Imagery . . . . .	4280
..... C.-I. Chang, S.-Y. Chen, H.-C. Li, H.-M. Chen, and C.-H. Wen	
Evaluation of Temperature and Emissivity Retrieval using Spectral Smoothness Method for Low-Emissivity Materials . . . . .	4307
..... Y. Qian, N. Wang, L. Ma, C. Mengshuo, H. Wu, L. Liu, Q. Han, C. Gao, J. Yuanyuan, L. Tang, and C. Li	
High-Dimensional Data Modeling Techniques for Detection of Chemical Plumes and Anomalies in Hyperspectral Images and Movies . . . . .	4316
..... Y. Wang, G. Chen, and M. Maggioni	
Integrating Hyperspectral Likelihoods in a Multidimensional Assignment Algorithm for Aerial Vehicle Tracking . . . . .	4325
..... B. Uz Kent, M. J. Hoffman, and A. Vodacek	
FPGA Implementation of an Algorithm for Automatically Detecting Targets in Remotely Sensed Hyperspectral Images . . . . .	4334
..... C. González, S. Bernabé, D. Mozos, and A. Plaza	
An Investigation Into Machine Learning Regression Techniques for the Leaf Rust Disease Detection Using Hyperspectral Measurement . . . . .	4344
..... D. Ashourloo, H. Aghighi, A. A. Matkan, M. R. Mobasheri, and A. M. Rad	
Automatic Band Selection Using Spatial-Structure Information and Classifier-Based Clustering . . . . .	4352
..... X. Cao, B. Wu, D. Tao, and L. Jiao	
Spectral–Spatial KerSparseBands Selector . . . . .	4361
..... M. Wang, Z. Feng, and S. Yang	
A Dissimilarity-Weighted Sparse Self-Representation Method for Band Selection in Hyperspectral Imagery Classification . . . . .	4374
..... W. Sun, L. Zhang, L. Zhang, and Y. M. Lai	

---

---

Feature Extraction of Hyperspectral Images With Semisupervised Graph Learning . . . . .	4389
..... <i>R. Luo, W. Liao, X. Huang, Y. Pi, and W. Philips</i>	
GPU-Based Parallel Design of the Hyperspectral Signal Subspace Identification by Minimum Error (HySime) . . . . .	4400
..... <i>X. Wu, B. Huang, L. Wang, and J. Zhang</i>	
Semi-realistic Simulations of Natural Hyperspectral Scenes . . . . .	4407
..... <i>Z. Hao, M. Berman, Y. Guo, G. Stone, and I. Johnstone</i>	
Denoising of Hyperspectral Images Using Group Low-Rank Representation . . . . .	4420
..... <i>M. Wang, J. Yu, J.-H. Xue, and W. Sun</i>	
Multidimensional Striping Noise Compensation in Hyperspectral Imaging: Exploiting Hypercubes' Spatial, Spectral, and Temporal Redundancy . . . . .	4428
..... <i>P. Meza, J. E. Pezoa, and S. N. Torres</i>	
A Spectrally Weighted Structure Tensor for Hyperspectral Imagery . . . . .	4442
..... <i>M. J. Marin-McGee and M. Velez-Reyes</i>	
Correcting Bidirectional Effect for Multiple-Flightline Aerial Images Using a Semiempirical Kernel-Based Model . . . . .	4450
..... <i>Z. Wang and L. Liu</i>	
Poissonian Hyperspectral Image Superresolution Using Alternating Direction Optimization . . . . .	4464
..... <i>C. Zou and Y. Xia</i>	
A New Genetic Method for Subpixel Mapping Using Hyperspectral Images . . . . .	4480
..... <i>X. Tong, X. Xu, A. Plaza, H. Xie, H. Pan, W. Cao, and D. Lv</i>	
Hybrid Norm Pursuit Method for Hyperspectral Image Reconstruction . . . . .	4492
..... <i>J. Yin, W. Yu, and X. Jia</i>	
Adaptive Sampling by Dictionary Learning for Hyperspectral Imaging . . . . .	4501
..... <i>M. Yang, F. de Hoog, Y. Fan, and W. Hu</i>	

---

CALLS FOR PAPERS

Special Issue on Advances in Agro-geoinformatics Research and Application . . . . .	4510
Special Issue on Ground Penetrating Radar for Remote Sensing Applications . . . . .	4511
Special Issue on Contributions to Global Water Cycle Science and Applications from GCOM-W/AMSR2 . . . . .	4512
Special Issue on Remote Sensing Data Simulation . . . . .	4513

---