## Contents

**External Reviewers**

Section 1: Why object-based image analysis

1.1 Object-based image analysis for remote sensing applications: modeling reality – dealing with complexity
*S. Lang*  
3

1.2 Progressing from object-based to object-oriented image analysis
*M. Baatz, C. Hoffmann, G. Willhauck*  
29

1.3 An object-based cellular automata model to mitigate scale dependency
*D. J. Marceau, N. Moreno*  
43

1.4 Geographic Object-Based Image Analysis (GEOBIA): A new name for a new discipline
*G. J. Hay, G. Castilla*  
75

1.5 Image objects and geographic objects
*G. Castilla, G. J. Hay*  
91

Section 2: Multiscale representation and object-based classification

2.1 Using texture to tackle the problem of scale in land-cover classification
*P. Corcoran, A. Winstanley*  
113
2.2 Domain-specific class modelling for one-level representation of single trees
D. Tiede, S. Lang, C. Hoffmann

2.3 Object recognition and image segmentation: the Feature Analyst® approach
D. Opitz, S. Blundell

2.4 A procedure for automatic object-based classification
P.R. Marpu, I. Niemeyer, S. Nussbaum, R. Gloaguen

2.5 Change detection using object features
I. Niemeyer, P.R. Marpu, S. Nussbaum

2.6 Identifying benefits of pre-processing large area QuickBird imagery for object-based image analysis
T. Lübker, G. Schaab

2.7 A hybrid texture-based and region-based multi-scale image segmentation algorithm
A. Tzotsos, C. Iosifidis, D. Argialas

2.8 Semi-automated forest stand delineation using wavelet based segmentation of very high resolution optical imagery
F.M.B. Van Coillie, L.P.C. Verbeke, R.R. De Wulf

2.9 Quality assessment of segmentation results devoted to object-based classification
J. Radoux, P. Defourny

Section 3: Automated classification, mapping and updating: forest

3.1 Object-based classification of QuickBird data using ancillary information for the detection of forest types and NATURA 2000 habitats
M. Förster, B. Kleinschmit
3.2 Estimation of optimal image object size for the segmentation of forest stands with multispectral IKONOS imagery
M. Kim, M. Madden, T. Warner

3.3 An object-based approach for the implementation of forest legislation in Greece using very high resolution satellite data
G. Mallinis, D. Karamanolis, M. Karteris, I. Gitas

3.4 Object-based classification of SAR data for the delineation of forest cover maps and the detection of deforestation – A viable procedure and its application in GSE Forest Monitoring
Ch. Thiel, Ca. Thiel, T. Riedel, C. Schmullius

3.5 Pixels to objects to information: Spatial context to aid in forest characterization with remote sensing
M.A. Wulder, J.C. White, G.J. Hay, G. Castilla

Section 4: Automated classification, mapping and updating: environmental resource management and agriculture

4.1 Object-oriented oil spill contamination mapping in West Siberia with Quickbird data
S. Hese, C. Schmullius

4.2 An object-oriented image analysis approach for the identification of geologic lineaments in a sedimentary geotectonic environment
O. Mavrantza, D. Argialas

4.3 Classification of linear environmental impacts and habitat fragmentation by object-oriented analysis of aerial photographs in Corrubedo National Park (NW Iberian Peninsula)
R.A.D. Varela, P.R. Rego, M.S.C. Iglesias
4.4 Multi-scale functional mapping of tidal marsh vegetation using object-based image analysis

K. Tuxen, M. Kelly

4.5 A Local Fourier Transform approach for vine plot extraction from aerial images

C. Delenne, S. Durrieu, G. Rabatel, M. Deshayes

Section 5: Automated classification, mapping and updating: land use / land cover

5.1 Object-based classification of IKONOS data for vegetation mapping in Central Japan

N. Kamagata, K. Hara, M. Mori, Y. Akamatsu, Y. Li and Y. Hoshino

5.2 Structural biodiversity monitoring in savanna ecosystems: Integrating LiDAR and high resolution imagery through object-based image analysis

S.R. Levick, K.H. Rogers

5.3 Fusion of multispectral optical and SAR images towards operational land cover mapping in Central Europe

T. Riedel, C. Thiel, C. Schmullius

5.4 The development of integrated object-based analysis of EO data within UK national land cover products

G.M. Smith

Section 6: Automated classification, mapping and updating: urban applications

6.1 Detecting informal settlements from QuickBird data in Rio de Janeiro using an object-based approach

P. Hofmann, J. Strobl, T. Blaschke, H. Kux
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2</td>
<td>Opportunities and limitations of object-based image analysis for detecting urban impervious and vegetated surfaces using true-colour aerial photography</td>
<td>M. Kampouraki, G. A. Wood, T. R. Brewer</td>
<td>555</td>
</tr>
<tr>
<td>6.3</td>
<td>Object-based Image Analysis using QuickBird satellite images and GIS data, case study Belo Horizonte (Brazil)</td>
<td>H. J. H. Kux, E. H. G. Araújo</td>
<td>571</td>
</tr>
<tr>
<td>6.4</td>
<td>An object-based approach to detect road features for informal settlements near Sao Paulo, Brazil</td>
<td>R. A. A. Nobrega, C. G. O’Hara, J. A. Quintanilha</td>
<td>589</td>
</tr>
<tr>
<td>7.1</td>
<td>Object-oriented analysis of image and LiDAR data and its potential for a dasymetric mapping application</td>
<td>F. Kressler, K. Steinnocher</td>
<td>611</td>
</tr>
<tr>
<td>7.2</td>
<td>Characterising mountain forest structure using landscape metrics on LiDAR-based canopy surface models</td>
<td>B. Maier, D. Tiede, L. Dorren</td>
<td>625</td>
</tr>
<tr>
<td>7.3</td>
<td>Object detection in airborne laser scanning data - an integrative approach on object-based image and point cloud analysis</td>
<td>M. Rutzinger, B. Höfle, N. Pfeifer</td>
<td>645</td>
</tr>
<tr>
<td>7.4</td>
<td>Support Vector Machine classification for Object-Based Image Analysis</td>
<td>A. Tzotsos, D. Argialas</td>
<td>663</td>
</tr>
<tr>
<td>7.5</td>
<td>Genetic adaptation of segmentation parameters</td>
<td>G. A. O. P. Costa, R. Q. Feitosa, T. B. Cazes, B. Feijó</td>
<td>679</td>
</tr>
</tbody>
</table>
7.6 Principles of full autonomy in image interpretation. The basic architectural design for a sequential process with image objects  
R. de Kok, P. Wezyk

7.7 Strategies for semi-automated habitat delineation and spatial change assessment in an Alpine environment  
E. Weinke, S. Lang, M. Preiner

Section 8: Burning research questions, research needs and outlook

8.1 On segment based image fusion  
M. Ehlers, D. Tomowski

8.2 Modelling uncertainty in high resolution remotely sensed scenes using a fuzzy logic approach  
J. Schiewe, M. Gähler

8.3 Assessing image segmentation quality – concepts, methods and application  
M. Neubert, H. Herold, G. Meinel

8.4 Object-fate analysis: Spatial relationships for the assessment of object transition and correspondence  
E. Schöpfer, S. Lang, F. Albrecht

Index