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Dr. UTA HEIDEN

CURRENT PROJECT WORK

- EnFusionMAP Project: Supervision of the PhD study about the synergistic use of EnMAP and Sentinel-2 data for urban applications
- RS4EBV: Concept development for the definition and derivation of Earth Observation (EO) based Essential Biodiversity Variables (EBV)
- Costa Rica Project: Development of hyperspectral data products for landscape characterisation
- EnMAP Ground Segment project: Application Support Manager of EnMAP Ground Segment (BMWf funded), www.enmap.org

CURRENT TASKS

- Team lead of the “Applied Spectroscopy Team” at DLR-DFD
- Application development for future space-borne hyperspectral missions (EnMAP, DESIS, etc.)
- Developing methods for automated collection of image based spectral reflectance characteristics and optimizing spectral image library for surface material identification
- Hyperspectral image analysis of semi-arid areas, indicator derivation
- Conceptual definition of EnMAP HSI User Interface functions, concept for HSI planning rules, investigation of special issues arising from the EnMAP orbit
- Coordination and harmonization the information for the EnMAP Portal www.enmap.org, Lead of the Web Portal Editorial Board
- Participation on EnMAP Core Science Team (ECST) for the topic “Urban areas”
- Organisation of invited sessions at international conferences (IGARSS, ISRSE, etc.)

EDUCATION

- **2000 – 2003 Ph.D. (Dr. rer. nat.) in Remote Sensing** at Technical University of Berlin and GeoForschungsZentrum Potsdam, Germany; Title: Analysis of airborne hyperspectral data for the ecological characterization of urban biotopes.
- **1999 – Diploma Degree in Geoecology** at University of Potsdam, Germany; Majors: Hyperspectral remote sensing, urban biotope types, GIS; Thesis: Use of hyperspectral DAIS 7915 data for characterizing of urban structure types – a case study in Dresden, Germany.
- **08-09/1996 – Study at Bar-Ilan University in Ramat-Gan (Israel)**, Department of Geography, Laboratory of Geomorphology; Topic: The effect of grazing on landscape patterns and soil properties such as moisture, aggregate stability, biogenic crust and surface stone distribution in semi-arid areas.
- **1992-1999 – Study of Geoecology** at University of Potsdam, Germany

EMPLOYMENT RECORD

- **01/2013 – present** Head of the “Applied Spectroscopy Team” of Land Surface Application Department at DLR-DFD
- **04/2007 – 12/2012** Research Scientist at DLR-DFD within “Applied Spectroscopy Group” of Land Surface Application Department: EnMAP Ground Segment project, imaging spectroscopy for urban areas
- **09/2004 – 03/2007** Junior Scientist at DLR-DFD: Development of semi-automated methods for the determination of land cover using CORINE mode based on multispectral remote sensing data, participation of CORINE Land Cover 2000 project, DECOVER project
- **01/2004 – 08/2004** Postdoctoral Research Scientist at GeoForschungsZentrum Potsdam, Germany, Remote Sensing Section
- **01/2000 – 12/2003** – Research Scientist at GeoForschungsZentrum Potsdam, Germany, Remote Sensing Section: Imaging spectroscopy for urban areas
- **1993 – 1998 Freelancer** for several companies: GUT Potsdam – Gesellschaft für Umweltplanung mbH, UVE Potsdam, Ernst Basler + Partner GmbH

RESEARCH TOPICS

- More than 15 years of experience in the fields of spectroscopy for urban applications
- Investigation of material-based reflectance properties of urban surfaces
- Development of advanced methods for classification and unmixing of urban hyperspectral image data
- Application development for future space-borne hyperspectral missions
- Spectral archiving and spectral library collection
- Participation in multiple ground campaigns for validation / calibration and application of airborne hyperspectral data

MEMBERSHIP

- Co-Chair of the International Space-borne Imaging Spectroscopy (ISIS) Technical Committee of the IEEE GRSS
- Member EnMAP Core Science Team for topic “Urban areas”
- Member of the Group on Remote Sensing for Biodiversity and Conservation of the Committee on Earth Observation Satellites (CEOS Biodiversity)
- Involved in the activities of the Group on Earth Observations Biodiversity Observation Network (GEO BON)

PUBLICATIONS

Peer-Reviewed Journal Papers:

- Zhihui Wang, Andrew K. Skidmore, Roshanak Darvishzadeh, Uta Heiden, Marco Heurich, Tiejun Wang, Leaf nitrogen content indirectly estimated by leaf traits derived from the PROSPECT model, JSTARS, (accepted)
- Wieke Heldens, Uta Heiden, Thomas Esch, Stefan Dech, Integration of remote sensing based surface information into a three-dimensional microclimate model, Remote Sensing of Environment, (in preparation)
- Heldens, Wieke und Taubenböck, Hannes und Esch, Thomas und Heiden, Uta und Wurm, Michael (2013) Analysis of Surface Thermal Patterns in Relation to Urban Structure Types: A Case Study for the City of Munich. In: Thermal Infrared Remote Sensing - Sensors, Methods, Applications Remote Sensing and Digital Image Processing . Springer. Seiten 475-494.

- Heiden, U., Heldens, W., Roessner, S., Segl, K., Esch, T., Mueller, A., 2012. Urban structure type characterization using hyperspectral remote sensing and height information. *Landscape and Urban Planning*, 105, 4, 361-375.
- Heldens, W., Heiden, U., Esch, T., Stein, E., Müller, A., 2011. Can the Future EnMAP Mission Contribute to Urban Applications? A Literature Survey. *Remote Sensing*, 3, 1817-1846, doi:10.3390/rs3091817.
- Heiden, U., Segl, K., Roessner, S. and Kaufmann, H., 2007. Determination of robust spectral features for identification of urban surface materials in hyperspectral remote sensing data. *Remote Sensing of Environment*, 111, 537-552.
- Segl, K., Roessner, S., Heiden, U. and Kaufmann, H., 2003. Fusion of spectral and shape features for identification of urban surface cover types using reflective and thermal data. *ISPRS Journal of Photogrammetry and Remote Sensing*, 58, 99-112.
- Müller, M., Segl, K., Heiden, U. and Kaufmann, H., 2003. Potential of high-resolution satellite data in the context of vulnerability of buildings. *Natural Hazards*, 38, 1-2, 247-258.
- Richter, R., Müller, A., and Heiden, U., 2002, Aspects of operational atmospheric correction of hyperspectral imagery. *International Journal of Remote Sensing*, 23/1, 145-157.
- Roessner, S., Segl, K., Heiden, U. and Kaufmann, H., 2001. Automated differentiation of urban surfaces based on airborne hyperspectral imagery. *IEEE Transaction on Geoscience and Remote Sensing*, 39/7, 1525-1532.

Book chapters:

- H. Kaufmann, S. Förster, H. Wulf, K. Segl, L. Guanter, M. Bochow, U. Heiden, A. Mueller, W. Heldens, T. Schneiderhan, P.J. Leitão, S. van der Linden, J. Hill, H. Buddenbaum, W. Mauser, T. Hank, H. Krasemann, R. Röttgers, N. Oppelt, B. Heim, 2012. Science Plan of the Environmental Mapping and Analysis Program (EnMAP). Potsdam: Deutsches GeoForschungsZentrum GFZ, 63 pp. Scientific Technical Report
- Roessner, S.; Segl, K.; Bochow, M.; Heiden, U.; Heldens, W.; Kaufmann, H. Potential of hyperspectral remote sensing for analyzing the urban environment. In *Urban Remote Sensing: Monitoring, Synthesis and Modeling in the Urban Environment*; Yang, X., Ed.; Wiley-Blackwell: Chichester, UK, 2011.
- Taubenböck, H., Heldens, W., Heiden, U., Wurm, M., 2010. Physikalische Indikatoren für die Stadtplanung. In: *Fernerkundung im urbanen Raum – Erdbeobachtung auf dem Weg zur Planungspraxis WBG*, Darmstadt. Volltext nicht online.
- Heiden, U. and Heldens, W., 2010. Automatische Erkennung von Oberflächenmaterialien städtischer Objekte. In: Taubenböck, H. and Dech, S. (eds.): *Fernerkundung im urbanen Raum – Erdbeobachtung auf dem Weg zur Planungspraxis*. WBG, Darmstadt, 2010.
- Heldens, W. and Heiden, U., 2010. Selektive Identifikation umweltrelevanter Oberflächenmaterialien auf der Basis von Hyperspektraldaten: Beispiel Solarflächen. In: Taubenböck, H. and Dech, S. (eds.): *Fernerkundung im urbanen Raum – Erdbeobachtung auf dem Weg zur Planungspraxis*. WBG, Darmstadt, 2010.
- Taubenböck, H., Heldens, W., Heiden, U., Wurm, M., 2010. Physikalische Indikatoren für die Stadtplanung. In: Taubenböck, H. and Dech, S. (eds.): *Fernerkundung im urbanen Raum – Erdbeobachtung auf dem Weg zur Planungspraxis*. WBG, Darmstadt, 2010.

- Heldens, W. and Heiden, U., 2010. Analyse stadtklimatischer Aspekte auf Basis von Hyperspektraldaten. In: Taubenböck, H. and Dech, S. (eds.): Fernerkundung im urbanen Raum – Erdbeobachtung auf dem Weg zur Planungspraxis. WBG, Darmstadt, 2010.
- Hipple, J. D.; Butchart, T. A.; Davis, C.; Haithcoat, T. L.; Heiden, U.; Jensen, R. R.; Song, W. (2006): Characterizing and Mapping Human Settlements. In: Ridd, M.; Hipple, J.D. [Hrsg.]: ASPRS Manual of Remote Sensing. Remote Sensing of Human Settlements, ISBN 1-57083-077-0.

Conference proceedings:

- Jakub Bieniarz, Esteban Aguilera, Xiaoxiang Zhu, Rupert Müller, Uta Heiden and Peter Reinartz, 2014. SPECTRAL-SPATIAL JOINT SPARSITY UNMIXING OF HYPERSPSPECTRAL DATA USING OVERCOMPLETE DICTIONARIES, Whispers Conference proceedings.
- Kaufmann, Hermann und Segl, Karl und Küster, Theres und Rogass, Christian und Förster, Saskia und Wulf, Hendrik und Hofer, Stefan und Sang, Bernhard und Storch, Tobias und Heiden, Uta und Müller, Andreas und Rossner, Godela und Chlebek, Christian (2013) The environmental mapping and analysis program (EnMAP) – Present status of preparatory phase. IGARSS 2013, 21.-26. Juli 2013, Melbourne, Australien.
- Heldens, Wieke und Esch, Thomas und Heiden, Uta (2012) Supporting urban micro climate modelling with airborne hyperspectral data. IEEE International Geoscience and Remote Sensing Symposium, 23-27 Juli 2012, München, Deutschland.
- Müller, A., Bachmann, M., Heiden, U., Künzer, C., Gessner, U., Günther, K., 2012. REQUIREMENTS FOR AND POTENTIAL OF SENTINEL-2 FOR REGIONAL APPLICATIONS. Sentinel-2 Preparatory Symposium, ESA-ESRIN, Frascati, Italy, 23 - 27 April 2012.
- Heiden, U., Pinnel, N., Mühle, H., Pengler, I., Storch, T., 2011. The EnMAP user interface and user request scenarios. Proceedings of the EARSeL 7th SIG-Imaging Spectroscopy Workshop in Edinburgh, 11-13 April, 2011.
- Mende, A., Heiden, U., Bachmann, M., Hoja, D., Buchroithner, M., 2011. Development of a new spectral library classifier for airborne hyperspectral images on heterogeneous environments. Proceedings of the EARSeL 7th SIG-Imaging Spectroscopy Workshop in Edinburgh, 11-13 April, 2011.
- Müller, A., Bachmann, M., Heiden, U., Künzer, C., Gessner, U., Günther, K., 2011. Requirements and Potential of HypSIIRI for Regional Applications. HypSIIRI Science Workshop - NASA Decadal Survey Mission, 23 -25 August 2011, Washington, DC.
- Habermeyer, M., Storch, T., Eberle, S., Makasy, C., Maslin, S., de Miguel, A., Missling, K.-D., Mühle, H., Müller, R., Engelbrecht, S., Gredel, J., Heiden, U., 2010. Ground Segment Design of the EnMAP Hyperspectral Satellite Mission. ESA Communications. Hyperspectral Workshop 2010, 17.-19. März 2010, Frascati, Italien. ISBN 978-92-9221-247-6. ISSN 1609-042X Volltext nicht online.
- Heiden, U., Gredel, J., Pinnel, N., Mühle, H., Pengler, I., Reissig, K., Dietrich, D., Storch, T., Eberle, S., Kaufmann, H., 2010. USER INTERFACE OF THE ENMAP GROUND SEGMENT, ESA Communications. Hyperspectral Workshop 2010, 17.-19. March 2010, Frascati, Italy. ISBN 978-92-9221-247-6.
- Heiden, U.; Gredel, J.; Pinnel, N.; Mühle, H.; Pengler, I.; Reissig, K.; Dietrich, D.; Heinen, T.; Storch, T.; Eberle, S.; Kaufmann H. (2010): The User Interface of the EnMAP Satellite Mission. Proceedings of the 2010 IEEE International Geoscience

and Remote Sensing Symposium - IGARSS 2010 (Honolulu, HI, USA, 2010-07-25 to 2010-07-30)

- Heldens, W., Heiden, U., Esch, T., Dech, S., 2010. Potential of hyperspectral data for urban micro climate analysis. ESA Communications. Hyperspectral Workshop 2010, 17.-19. March 2010, Frascati, Italy. ISBN 978-92-9221-247-6.
- Heldens, W., Esch, T., Heiden, U., Mueller, A., Dech, S., 2009. Exploring the demands on hyperspectral data products for urban planning: a case study in the Munich region. In: Ben-Dor, E. (ed.), Proceedings of the 6th EARSeL SIG IS Workshop, Tel Aviv, Israel.
- Heldens, W., Heiden, U., Bachmann, M., Esch, T., Mueller, A., Dech, S., 2009. SCALING ISSUES IN VALIDATION OF ABUNDANCE MAPS DERIVED FROM HYMAP DATA OF AN URBAN AREA. In: Ben-Dor, E. (ed.), Proceedings of the 6th EARSeL SIG IS Workshop, Tel Aviv, Israel.
- Heldens, W., Esch, T., Heiden, U., Dech, S. (2008): Potential of hyperspectral remote sensing for characterisation of urban structure in Munich. In: Carsten Jürgens (Ed.), Remote Sensing - New Challenges of High Resolution. Proceedings of the EARSeL Joint Workshop Bochum, March 5-7 2008, CD-ROM, 94-103.
- Segl, K.; Bochow, M.; Roessner, S.; Kaufmann, H.; Heiden, U. (2006): Feature-based identification of urban endmember spectra using hyperspectral HyMap data, First Workshop of the EARSeL Special Interest Group on Urban Remote Sensing 'Challenges and Solutions', 1st EARSeL Workshop of the SIG Urban Remote Sensing (Berlin 2006), CD.
- Heiden, U., Segl, K., Roessner, S. and Kaufmann, H., 2005. Determination and verification of robust spectral features for an automated classification of sealed urban surfaces. 4th EARSeL Workshop on Imaging Spectroscopy in Warsaw.
- Heiden, U., Segl, K., Roessner, S. and Kaufmann, H., 2003. Ecological evaluation of urban biotope types using airborne hyperspectral HyMap data. Proceedings of the 2nd GRSS/ISPRS Joint Workshop on Remote Sensing and Data Fusion over Urban Areas in Berlin, 18-22.
- Segl, K., Heiden, U., Mueller, M. and Kaufmann, H., 2003. Endmember detection in urban environments using hyperspectral HyMap data. Proceedings of the 3rd EARSeL Workshop on Imaging Spectroscopy in Oberpfaffenhofen 2003.
- Heiden, U., Roessner, S., Segl, K. and Kaufmann, H., 2002. Investigation of spectral characteristics of urban surface materials using field measurements and hyperspectral HyMap data. Eos. Trans. AGU, 83(47), Fall Meet. Suppl., Abstract B61C-0738, invited.
- Heiden, U., Roessner, S. and Segl, K., 2001. Potential of hyperspectral HyMap data for material oriented identification of urban surfaces. In: Juergens, C. (ed.) Remote Sensing of Urban Areas, Regensburger Geographische Schriften, 35, Abstracts and Full Papers (on Supplement CD-ROM) of the 2nd International Symposium of Remote Sensing in Urban Areas, June 2001, Regensburg, Germany.
- Heiden, U., Roessner, S., Segl, K. and Kaufmann, H., 2001. Spectral Analysis of Urban Surfaces Using Field Measurements and Hyperspectral HyMap Data. Proceedings of IEEE/ISPRS Joint Workshop on Remote Sensing and Data Fusion over Urban Areas, Rome, 173-177.
- Segl, K., Roessner, S. and Heiden, U., 2000. Differentiation of urban surfaces based on hyperspectral image data and a multi-technique approach. IEEE IGARSS 2000 Proceedings, Honolulu, Hawaii, 2000, 4, 1600-1602.

- Roessner, S., Segl, K. and Heiden, U., 2000. Comparison Of Automated Methods For Identification Of Urban Surfaces Using Airborne Hyperspectral Data Of Reflective And Thermal Wavelength Ranges. Second EARSeL Workshop on Imaging Spectroscopy, Enschede, published on CD.
- Roessner, S., Segl, K., Heiden, U., Munier, K. and Kaufmann, H., 1998. Application of hyperspectral DAIS data for differentiation of urban surface in the city of Dresden, Germany. In: First EARSeL Workshop on Imaging Spectroscopy, Zuerich, 463-472.

PhD Thesis:

- Heiden, U., 2004. Analyse hyperspektraler Flugzeugscannerdaten zur ökologischen Charakterisierung städtischer Biotope. Ph.D. thesis. TU Berlin, <http://d-nb.info/970198744/34>.

Master Thesis:

- Heiden, U., 1999, Nutzung hyperspektraler DAIS 7915 Daten zur Charakterisierung von Strukturtypen unter stadtoökologischen Gesichtspunkten am Beispiel der Stadt Dresden, Diplomarbeit, Universität Potsdam, unpublished

Reviewer for:

Remote Sensing of Environment

IEEE Transaction on Geoscience and Remote Sensing

Remote Sensing

International Journal of Digital Earth

EARSeL eProceedings

Photogrammetric Engineering & Remote Sensing