

CURRICULUM VITAE of Sander VERAVERBEKE

PhD in Geography

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Profile

I am an environmental scientist with specific interest in studying wildfire effects from a regional to global perspective. I have a broad interest in terrestrial ecosystems, biosphere-atmosphere interactions and global environmental change. I received my PhD in Geography in 2010 from Ghent University (Belgium). The focus of my PhD was to assess ecological impacts of wildfires with spaceborne data. Now I am a post-doctoral scholar at NASA's Jet Propulsion Laboratory where I am involved in a project studying the interactions between fires, climate, ecosystems and humans in Southern California.

Education

2007-2010 PhD in Geography (Ghent University)

Dissertation: *Assessing fire/burn severity using spaceborne spectral indices*

2007-2010 Doctoral training program in Geography (Ghent University)

with courses on *Landscape ecology, Land cover and land use monitoring, Land process monitoring, Spatial uncertainty propagation, Sampling for survey and monitoring of natural resources, MATLAB recipes for earth science, Remote sensing of vegetative systems, Non-parametric statistics, Advanced academic English: writings skills, Advanced Academic English: conference skills, Getting started with high performance computing*

2005-2007 Master in Geography (Ghent University) with highest honors

Thesis: *Study of landscape changes and land degradation by means of remote sensing and GIS at Chios island, Greece* (in Dutch) (best master thesis award winner)

2003-2005 Bachelor in Geography (Ghent University) with high honors

Research experience

- 2011-now* post-doctoral scholar (NASA Jet Propulsion Laboratory, California Institute of Technology)
Focus on the interactions between fires, climate, ecosystems and humans in southern California
- 2010-2011* post-doctoral scholar (Ghent University)
Focus on post-fire vegetation recovery trajectories in Mediterranean-type ecosystems
- 2007-2010* PhD student (Ghent University)
Focus on the ecological impact of wildfires using spaceborne data

Field work experience

- 2012* Assessment of fire severity (CBI) and carbon losses in Alaska, USA (in collaboration with the University of California Irvine)
- 2011* Assessment of fire severity (CBI), post-fire vegetation recovery (line transect method) and field spectroscopy in several burns in Arizona and California, USA.
- 2010* Assessment of post-fire vegetation regeneration (line transect method) and field spectroscopy measurements in the Peloponnese (Greece)
- 2008* Assessment of fire severity (CBI) in the Peloponnese (Greece)
- 2006* Inventory of ground truth for land cover mapping and digital elevation modeling at Chios island (Greece)

Conference, project and review support

Conference support

- 2011* - 8th International Workshop of the EARSeL Special Interest Group (SIG) on Forest Fires, 20-21.10.2011, Stresa (Italy)

Scientific committee member

- American Geophysical Union (AGU) Fall Meeting 2011, 5-9.12.2011, San Francisco (CA)

Outstanding Student Paper Awards (OSPA) judge (2 oral and 1 poster presentation)

- 2010* - Joint SIG Workshop: Urban - 3D - Radar - Thermal Remote Sensing and Developing Countries, 22-24.09.2010, Ghent (Belgium)

Assistance in program scheduling

2007 - 5th EARSeL SIG workshop: Imaging spectroscopy: innovation in environmental research, 23-25.04.2007, Bruges (Belgium)

Practical assistance

Project collaboration

- NASA Interdisciplinary Research in Earth Science, *Fires in Southern California: Interactions between climate change, ecosystems, and humans*, in cooperation with UCI and UCLA, funded by NASA (2011-2013)
- HeathReCover, *Remote sensing support to assist ecological restoration management after heathland fires at the Kalmthoutse Heide, Belgium*, in cooperation with INBO, ANB, VITO and KNMI, funded by Belgian Science Policy (2011-2013)
- PROBA-V Preparatory programme, *Burned area mapping and post-fire monitoring of Mediterranean ecosystems using Proba-V imagery*, in cooperation with the laboratory of forest management and remote sensing of the Aristotle University of Thessaloniki, funded by Belgian Science Policy (2010-2011)

Proposal writing experience

- Participated in a Grant Proposal Writing Workshop at the California Institute of Technology in January 2013
- Co-I on HeathReCover, *Remote sensing support to assist ecological restoration management after heathland fires at the Kalmthoutse Heide, Belgium*, in cooperation with INBO, ANB, VITO and KNMI, funded by Belgian Science Policy (2011-2013)
- Co-I on the PROBA-V Preparatory programme, *Burned area mapping and post-fire monitoring of Mediterranean ecosystems using Proba-V imagery*, in cooperation with the laboratory of forest management and remote sensing of the Aristotle University of Thessaloniki, funded by Belgian Science Policy (2010-2011)
- wrote proposal as Science-PI for the NASA Carbon Monitoring System 2012, *Carbon emissions from biomass burning*, which was not awarded but received very good reviews

Performed reviews for

Remote Sensing of Environment, International Journal of Wildland Fire, ISPRS Journal of Photogrammetry and Remote Sensing, International Journal of Applied Earth Observation and Remote Sensing, Applied Vegetation Science, Natural Hazards, International Journal of Remote Sensing, Journal

of Applied Remote Sensing, Photogrammetric Engineering and Remote Sensing, International Journal of Digital Earth, Remote Sensing, Geosciences, International Journal of Safety and Security Engineering, The Open Remote Sensing Journal

Awards

2009 Best poster at the PhD symposium of Ghent University
2007-2011 Special Research Funds PhD scholarship (Ghent University)
2007 Best master thesis in Geography at Ghent University

Skills

Software

Scientific applications: Matlab, R, IDL

Remote sensing and GIS: Envi, ArcGIS, Idrisi, Ilwis, Erdas

Office applications: Office (Word, Excel, Powerpoint, Access), Adobe Creative Suite (Photoshop, Illustrator)

Languages

Dutch: mother tongue

English: very good understanding, speaking and writing

French: good understanding, speaking and writing

German, Italian and Greek: basic understanding, speaking and writing.

Education support

Master thesis support

2011-2012 Lennert Schepers, *Burn severity assessment of the natural fire at the Kalmthoutse Heide by using hyperspectral airborne imagery* (Ghent University, in Dutch)

2010-2011 Carolien Willen, *Remote sensing for mapping lava stream chronology (Nyamulagira, Africa)* (Ghent University, in Dutch)

2009-2010 Niels Gagelmans, *Multitemporal analysis of the 'heide' heathland area (Belgium) with high resolution satellite imagery* (Ghent University, in Dutch)

2008-2009 Stephanie de Muelenaere, *Land use and cover changes in the Ethiopian highlands; Landsat data analysis using contemporaneous ground photographs for calibration* (Ghent University, in Dutch)

Master thesis jury membership

2009-2010 Niels Gagelmans, *Multitemporal analysis of the 'heide' heathland area (Belgium) with high resolution satellite imagery* (Ghent University, in Dutch)

Teaching experience

2007-2010 Lab sessions in *Remote sensing: image registration and processing* (Bachelor in Geography, Ghent University), *Remote sensing: image interpretation* (Bachelor in Geography, Ghent University), *Remote Sensing* (Master in Physical Land Resources, Ghent University)

Publications

Published peer-reviewed publications

17. de Muelenaere, S., Frankl, A., Haile, M., Poesen, J., Deckers, J., Munro, R., Veraverbeke, S. & Nyssen, J. (2013). *Historical landscape photographs for calibration of Landsat land use/cover (1972) in the Ethiopian highlands*. Land Degradation and Development, in press.
16. Veraverbeke, S. & Hook, S. (2013). *Evaluating spectral indices and spectral mixture analysis for assessing fire severity, combustion completeness and carbon emissions*. International Journal of Wildland Fire, 22, 707-720.
15. Van De Kerchove, R., Lhermitte, S., Veraverbeke, S., & Goossens, R. (2013). *Assessment of the spatio-temporal variability in remotely sensed Land Surface Temperature, and its relationship with physiographic variables in the Russian Altay Mountains*. International Journal of Applied Earth Observation and Geoinformation, 20, 4-19.
14. Veraverbeke, S., Hook, S. & Harris, S. (2012). *Synergy of VSWIR (0.4-2.5 μm) and MTIR (3.5-12.5 μm) data for post-fire assessments*. Remote Sensing of Environment, 124, 771-779.
13. Veraverbeke, S., Verstraeten, W.W., Lhermitte, S., Van De Kerchove, R. & Goossens, R. (2012). *Assessment of post-fire changes in land surface temperature and surface albedo, and their relation with fire-burn severity using multitemporal MODIS imagery*. International Journal of Wildland Fire, 21, 243-256.
12. Veraverbeke, S., Hook, S. & Hulley, G. (2012). *An alternative spectral index for rapid fire severity assessments*. Remote Sensing of Environment, 123, 72-80.

11. Veraverbeke, S., Gitas, I., Katagis, T., Polychronaki, A., Somers, B. & Goossens, R. (2012). *Assessing post-fire vegetation recovery using red-near infrared vegetation indices: accounting for background and vegetation variability*. ISPRS Journal of Photogrammetry and Remote Sensing, 68, 28-39.
- and Veraverbeke, S., Gitas, I., Katagis, T., Polychronaki, A. , Somers, B. & Goossens, R. (2012). *Erratum to "Assessing post-fire vegetation recovery using red-near infrared vegetation indices : accounting for background and vegetation variability" [ISPRS Journal of Photogrammetry and Remote Sensing 68 (2012) 28-39]*. ISPRS Journal of Photogrammetry and Remote Sensing, 68C, 191.
10. Veraverbeke, S., Somers, B., Gitas, I., Katagis, T., Polychronaki, A. & Goossens, R. (2012). *Spectral mixture analysis to assess post-fire vegetation regeneration using Landsat Thematic mapper imagery: accounting for soil brightness variation*. International Journal of Applied Earth Observation and Geoinformation, 14, 1-11.
9. Harris, S., Veraverbeke, S., & Hook, S. (2011). *Evaluating spectral indices for assessing fire severity in chaparral ecosystems (southern California) using MODIS/ASTER (MASTER) airborne simulator data*. Remote Sensing, 3, 2403-2419.
8. Veraverbeke, S., Harris, S. & Hook, S. (2011). *Evaluating spectral indices for burned area discrimination using MODIS/ASTER (MASTER) airborne simulator data*. Remote Sensing of Environment, 115, 2702-2709.
7. Veraverbeke, S., Lhermitte, S., Verstraeten, W.W., & Goossens, R. (2011). *Evaluation of pre/post-fire differenced spectral indices for assessing burn severity in a Mediterranean environment with Landsat Thematic Mapper*. International Journal of Remote Sensing 32, 3521-3537.
6. Veraverbeke, S., Lhermitte, S., Verstraeten, W.W., & Goossens, R., (2011). *A time-integrated MODIS burn severity assessment using the multi-temporal differenced Normalized Burn Ratio (dNBR_{MT})*. International Journal of Applied Earth Observation and Geoinformation 13, 52-58.
5. Lhermitte, S., Verbesselt, J., Verstraeten, W.W., Veraverbeke, S. & Coppin, P. (2011). *Assessment of the intra-annual variation in vegetation regrowth after fire based on the pixel based regeneration index*. ISPRS Journal of Photogrammetry and Remote Sensing 66, 17-27.
4. Veraverbeke, S., Lhermitte, S., Verstraeten, W.W., & Goossens, R., (2010). *The temporal dimension of differenced Normalized Burn Ratio (dNBR) fire/burn severity studies: the case of the large 2007 Peloponnese wildfires in Greece*. Remote Sensing of Environment 114, 2548-2563

3. Veraverbeke, S., Verstraeten, W.W., Lhermitte, S., & Goossens, R. (2010). *Evaluating Landsat Thematic Mapper spectral indices for estimating burn severity of the 2007 Peloponnese wildfires in Greece*. International Journal of Wildland Fire 19, 558-569
2. Veraverbeke, S., Verstraeten, W.W., Lhermitte, S. & Goossens, R. (2010). *Illumination effects on the differenced Normalized Burn Ratio's optimality for assessing fire severity*. International Journal of Applied Earth Observation and Geoinformation, 12, 60-70
1. Veraverbeke, S., Vanderstraete, T. & Goossens, R. (2008). *Study of landscape changes and land degradation by means of remote sensing and GIS at the Chios island, Greece* (in Dutch). De Aardrijkskunde, 3-4, 91–101 (not in Web of Knowledge)

Book chapters

Gitas, I., Mitri, G., Veraverbeke, S. & Polychronaki, A. (2012). *Advances in remote sensing of post-fire vegetation recovery monitoring – a review*. Remote Sensing of Biomass: Principles and Applications, Lola Fatoyinbo (Ed.), ISBN: 978-953-51-0313-4, InTech, Available from: <http://www.intechopen.com/books/remote-sensing-of-biomass-principles-and-applications/advances-in-remote-sensing-of-post-fire-monitoring-a-review->

Proceedings

Haest, B., Vanden Borre, J., Spanhove, T. , Veraverbeke, S., Lhermitte, S., Waterinckx, M., Dufrene, M. & Paelinckx, D. (2012). *The HeathReCover project: remote sensing support to assist ecological restoration management after heathland fires*. EARSeL Newsletter, 89, 14-15.

Veraverbeke, S., Van De Kerchove, R., Verstraeten, W.W. , Lhermitte, S. & Goossens, R. (2010). *Fire-induced changes in vegetation, albedo and land surface temperature assessed with MODIS*. In Reuter, R. (Ed.) Remote sensing for science, education and natural and cultural heritage, 431-438

Veraverbeke, S., Lhermitte, S., Verstraeten, W.W. & Goossens, R. (2010). *Assessing burn severity using satellite time series*. In Perona, G. & Brebbia, C. (Eds.) Modelling, monitoring and management of forest fires II , 107-118

Veraverbeke, S., Lhermitte, S., Verstraeten, W.W., & Goossens, R., (2010). *Assessing burn severity using satellite time series*. Geophysical research abstracts, Vol. 12, EGU2010-253

Veraverbeke, S., Lhermitte, S., Verstraeten, W.W., & Goossens, R., (2010). *Assessing the temporal sensitivity of the differenced Normalized Burn Ratio (dNBR) to estimate burn severity using MODIS time series*. Geophysical research abstracts, Vol. 12, EGU2010-254

Veraverbeke, S., Verstraeten, W.W., Lhermitte, S. & Goossens, R. (2009). *Correction of topographic effects influencing the differenced Normalized Burn Ratio's optimality for estimating fire severity*. In Chuvieco, E. & Lasaponara, R. (Eds.) Proceedings 7th EARSeL workshop on advances in RS and GIS applications in forest fire management , 271-276

Veraverbeke, S., Verstraeten, W.W., Lhermitte, S. & Goossens, R. (2009). *Burn severity mapping using Landsat Thematic Mapper data, case of the 2007 Peloponnese fires (Greece)*. In Neutens, T. & De Maeyer, P. (Eds.) Proceedings of the 15th international conference InterCarto-InterGIS part II-Ghent, 259-271

Veraverbeke, S., Lhermitte, S., Verstraeten, W.W., & Goossens, R., (2009). *Assessing post-fire effects of the 2007 Peloponnese (Greece) wildfires using spaceborne data*. Doctoraatssymposium faculteit Wetenschappen, 113

Veraverbeke, S., Vanderstraete, T., & Goossens, R., (2009). *Use of ASTER-data for a soil erosion risk model application, Chios island (Greece)*. In Maktav D. (Ed.) Proceedings of the 28th Symposium of the European Association of Remote Sensing Laboratories, 117-124

Conference communications

2013 - Postdoc seminar, 1.2.2013, Pasadena, CA

Fire in the earth system (oral)

2012 - HyspIRI Science Workshop, 16-18.10.2012, Washington, DC

Fire severity and impact on carbon emission estimates from wildfires (oral)

Synergy of VSWIR (0.4-2.5 μm) and MTIR (3.5-12.5 μm) data for post-fire assessments (poster)

- Belgian Earth Observation Day 2012, 5.9.2012, Bruges (Belgium)

Remote sensing support to assist ecological restoration management after heathland fires (oral, presented by B. Haest)

- Bryhyp 2012, 4.9.2012, Bruges (Belgium)

APEX for vegetation monitoring applications: living up to long-awaited high expectations? (oral, presented by B. Haest)

-Postdoc Research Day, 25.7.2011, Pasadena, CA

Carbon emissions from wildfires using remote sensing and modeling (poster)

- AOS274, 'Atmospheric Chemistry, Radiation and Climate', 4.6.2012, UCLA, CA

Remote sensing methods to assess wildfire emissions (invited talk)

- Innovation for Sustainable Production, 6-9.5.2012, Bruges (Belgium)

- Remote sensing methods to assess post-fire effects* (invited talk)
- MODIS Science Team Meeting, 7-9.5.2012, Silver Spring, MD
- Refining combustion completeness and carbon emissions from wildfires by combining remote sensing and modeling* (poster, presented by C. Hughes)
- European Geosciences Union General Assembly 2012, 22-27.4.2012, Vienna (Austria)
- Refining combustion completeness and carbon emissions from wildfires by combining remote sensing and modeling* (poster)
- A single date SWIR-MIR index (SMI) for rapid fire severity assessments* (poster)
- 2011 - American Geophysical Union (AGU) Fall Meeting 2011, 5-9.12.2011, San Francisco, CA
- An alternative spectral index for rapid fire severity assessments* (oral)
- 8th International Workshop of the EARSeL Special Interest Group (SIG) on Forest Fires, 20-21.10.2010, Stresa (Italy)
- Fire severity assessment of the natural fire at the Kalmthoutse Heide in May, 2011* (poster, presented by L. Schepers)
- NASA CC&E Joint Science Workshop, 03-07.10.2011, Alexandria, VA
- Remote sensing of post-fire effects* (poster)
- Postdoc Research Day, 07.09.2011, Pasadena, CA
- Remote sensing of post-fire effects* (poster)
- HyspIRI Science Workshop, 23-25.08.2011, Washington, DC
- Potential of HyspIRI for post-fire assessments* (oral)
- 2010 - Joint SIG Workshop Urban, 3D, Thermal Remote Sensing and Developing Countries, 22-24.09.2010, Ghent (Belgium)
- Post-fire changes in land surface temperature and surface albedo with MODIS* (oral, presented by R. Van De Kerchove)
- Forest fires 2010, Second international conference on modelling, monitoring and management of forest fires, 23-25.06.2010, Kos (Greece)
- Assessing post-fire effects using satellite time series* (oral)
- 30th EARSeL symposium: Remote sensing for science, education and culture, 03.05-03.06.2010, Paris (France)
- Fire-induced changes in vegetation, albedo and land surface temperature assessed with MODIS* (oral)
- Remote sensing symposium, 19.05.2010, Delft (The Netherlands)

- Assessing post-fire effects using spaceborne spectral indices* (oral)
 - European Geosciences Union General Assembly 2010, 02-07.05.2010, Vienna (Austria)
- The temporal dimension of dNBR fire/burn severity studies* (oral)
Assessing burn severity using satellite time series (oral)
- 2009 - Advances in RS and GIS applications in forest fire management, 02-05.09.2009, Matera (Italy)
Correction of topographic effects influencing the differenced Normalized Burn Ratio's optimality for assessing fire severity (poster)
 - 15th international conference InterCarto-InterGIS, 03- 06.07.2010, Ghent (Belgium)
Burn severity mapping using Landsat Thematic Mapper data, case of the 2007 Peloponnese fires (Greece) (oral)
 - 29th EARSeL annual symposium "Imagin(e/g) Europe", 15-18.06.2009, Chania (Greece)
Evaluating spectral indices for burn severity mapping using Landsat TM data (oral)
 - Doctoraatssymposium faculteit Wetenschappen, 17.04.2009, Ghent (Belgium)
Assessing post-fire effects using spaceborne data (best poster award winner)

Referrals

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