

Stefanie M. Herrmann, PhD
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PROFILE

I am a multilingual, multi-skilled geographer and remote sensing scientist with 15 years of research experience across disciplinary boundaries. I possess excellent writing, communication, and organizational skills, and I am detail-oriented, creative, and self-motivated. I am always seeking to learn and grow into new directions. [Google Scholar Profile](#)

EDUCATION

PhD Arid Lands Resource Sciences, University of Arizona, Tucson (2006)

- Minor: Remote Sensing

MSc Geography, Universität Würzburg, Germany (2001)

- Minors: Sociology, Political Science

BSc Geography, Université de Caen, France (1998)

APPOINTMENTS

The University of Arizona, Tucson (Jan. 2011 – Present)

- **Affiliate Faculty**, School of Geography and Development
- **Associate/Assistant Research Scientist**, Office of Arid Land Studies, School of Natural Resources and the Environment, Electrical and Computer Engineering & Department of Biosystems Engineering

NASA Goddard Space Flight Center, Greenbelt, MD (Jan. 2009 – Dec. 2010)

- **Research Scientist**, Biospheric Sciences Branch (through Science Systems & Applications, Inc.)

National Center for Atmospheric Research, Boulder, CO (Sep. 2006 – Sep. 2008)

- **Post-doctoral Research Fellow**, Institute for the Study of Society and Environment

The University of Arizona, Tucson (Jan. 2002 – Aug. 2006)

- **Graduate Research Assistant**, The Office of Arid Land Studies & Arizona Remote Sensing Center
- **Graduate Teaching Assistant**, Graduate Interdisciplinary Programs

Jacob Blaustein Institute for Desert Research, Sede Boqer, Israel (Nov. 1999 – Oct. 2000)

- **Research Assistant**, Remote Sensing Laboratory

REFEREED PUBLICATIONS

Journal Articles:

- Tong, X., Brandt, M., Hiernaux, P. **Herrmann, S.**, Rasmussen, L.V., Rasmussen, K., Tian, F., Tagesson, T., Zhang, W. and Fensholt, R. (2019): The forgotten land use class: mapping fallow fields across the Sahel using Sentinel-2. *Remote Sensing of Environment*. Under revision.
- Smith, W.K., Dannenberg, M.P.; Yan, D., **Herrmann, S.**, Barnes, M.L., Barron-Gafford, G.A., Biederman, J.A., Ferrenberg, S., Fox, A.M., Hudson, A.R., Knowles, J.F., MacBean, N., Moore, D.J., Nagler, P.L., Reed, S.C., Rutherford, W.A., Scott,

R.L., Wang, Z. and Yang, J. (2019): Remote sensing of dryland ecosystem structure and function: Progress, challenges and opportunities. *Remote Sensing of Environment*. Under revision.

- **Herrmann, S.**, Diouf, A.A. and Sall, I. (2019): Beyond Bioproductivity: Engaging Local Perspectives in Land Degradation Monitoring and Assessment. *Journal of Arid Environments*. In press. <https://doi.org/10.1016/j.jaridenv.2019.104002>
- Brandt, M., Hiernaux, P., Rasmussen, K., Tucker, C.J., Wigneron, J.-P., Diouf, A.A., **Herrmann, S.**, Zhang, W., Kergoat, L., Mbow, C., Abel, C., Auda, Y. and Fensholt, R. (2019): Changes in rainfall distribution promote woody foliage production in the Sahel. *Communications Biology*. doi:10.1038/s42003-019-0383-9
- Brandt, M., Rasmussen, K., Hiernaux, P., **Herrmann, S.**, Tucker, C.J., Tong, X., Tian, F., Mertz, O., Kergoat, L., Mbow, C., David, J., Melocik, K., Dendoncker, M., Vincke, C. and Fensholt, R. (2018): Reduction of tree cover in West African woodlands and promotion in semi-arid farmlands. *Nature Geoscience*. doi:10.1038/s41561-018-0092-x
- Tong, X., Brandt, M., Hiernaux, P., **Herrmann, S.M.**, Tian, F., Prishchepov, A. and Fensholt, R. (2017): Revisiting the coupling between NDVI trends and cropland changes in the Sahel drylands: A case study in western Niger. *Remote Sensing of Environment* 191, pp. 286-296. doi.org/10.1016/j.rse.2017.01.030
- **Herrmann, S.M.**, Didan, K., Barreto Munoz, A., Crimmins, M. (2016): Divergent responses of vegetation productivity in Southwestern US ecosystems to dry and wet years at different elevations. *Environmental Research Letters* 11, doi: 10.1088/1748-9326/11/12/124005
- **Herrmann, S.M.**, Sall, I., Sy, O. (2014): People and Pixels in the Sahel – a Study Linking Coarse-Resolution Remote Sensing Observations to Land Users' Perceptions of their Changing Environment in Senegal. *Ecology and Society* 19, doi: 10.5751/ES-06710-190329. [Awarded Best Paper of Ecology and Society of 2014]
- **Herrmann, S.M.**, Wickhorst, A.J. and Marsh, S.E. (2013): Estimation of Tree Cover in an Agricultural Parkland of Senegal Using Rule-Based Regression Tree Modeling. *Remote Sensing* 5, pp. 4900-4918. doi:10.3390/rs5104900
- **Herrmann, S.M.** and Tappan, G.G. (2013): Vegetation Impoverishment Despite Greening: A Case Study from Central Senegal. *Journal of Arid Environments* 90, pp. 55-66. doi.org/10.1016/j.jaridenv.2012.10.020
- **Herrmann, S.M.** and Mohr, K.I. (2011): A Continental-Scale Classification of Rainfall Seasonality Regimes in Africa Based on Gridded Precipitation and Land Surface Temperature Products. *Journal of Applied Meteorology and Climatology* 50, pp. 2504-2513. doi.org/10.1175/JAMC-D-11-024.1
- Propastin, P., Kappas, M.W., **Herrmann, S.M.** and Tucker, C.J. (2011): Modified light use efficiency model for assessment of carbon sequestration in grasslands of

Kazakhstan: combining ground biomass data and remote-sensing. *International Journal of Remote Sensing* 33, pp. 1465-1487.

- Buenemann, M., Martius, C., Jones, J.W., **Herrmann, S.M.**, Klein, D., Mulligan, M., Reed, M.S., Winslow, M., Washington-Allen, R.A., Lal, R. and Ojima, D. (2011): Integrative geospatial approaches for monitoring and assessing the sustainability of land management: rationale, potentials, and characteristics. *Land Degradation and Development* 22, pp. 226-239. doi.org/10.1002/ldr.1074
- Van Leeuwen, W.J.D., Orr, B.J., Marsh, S.E. and **Herrmann, S.M.** (2006): Multi-Sensor NDVI Data Continuity: Uncertainties and Implications for Vegetation Monitoring. *Remote Sensing of Environment* 100, pp. 67-81. doi.org/10.1016/j.rse.2005.10.002
- **Herrmann, S.M.**, Anyamba, A. and Tucker, C.J. (2005): Recent Trends in Vegetation Dynamics in the African Sahel and their Relationship to Climate. *Global Environmental Change* 15, pp. 394-404. doi.org/10.1016/j.gloenvcha.2005.08.004
- **Herrmann, S.M.** and Hutchinson, C.F. (2005): The Changing Contexts of the Desertification Debate. *Journal of Arid Environments* 63, pp. 538-555. doi.org/10.1016/j.jaridenv.2005.03.003
- Hutchinson, C.F., **Herrmann, S.M.**, Maukonen, T. and Weber, J. (2005): Introduction: The “Greening” of the Sahel [Editorial]. *Journal of Arid Environments* 63, pp. 535-537. doi.org/10.1016/j.jaridenv.2005.03.002

Books:

- CILSS (Comité permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel) (2016): Landscapes of West Africa—A window on a changing world: Ouagadougou, Burkina Faso, CILSS, 219 p., <http://dx.doi.org/10.5066/F7N014QZ> [**S. Herrmann** in the production and editorial team]
- Hutchinson, C.F. and **Herrmann, S.M.** (2007): The Future of Arid Lands – Revisited. A Review of 50 Years of Drylands Research. UNESCO Publishing/Springer, 238 pages.

Book Chapters:

- **Herrmann, S.M.** and Sop, T. (2016): “The Map is not the Territory. How Satellite Remote Sensing and Ground Evidence have (Re-)Shaped the Image of Sahelian Desertification” – in: Behnke, R. and Mortimore, M. (eds.) The End of Desertification? Disputing Environmental Change in the Drylands. Berlin, Heidelberg: Springer (Earth System Science Series), pp. 117-145.
- **Herrmann, S.M.** (2008): “Drought” – in: Darity, W.A. (ed.) (2008) International Encyclopedia of the Social Sciences, 2nd edition. 9vols. Detroit: Macmillan Reference
- **Herrmann, S.M.** and Glantz, M.H. (2007): “Desertification: Modern” – in: Middleton, J. and Miller, J.C. (eds.): New Encyclopedia of Africa, Second Edition. Farmington Hills, MI: Charles Scribner's Sons, Volume 2, pp. 59-63.

- **Herrmann, S.M.** (lead author) et al. (2006): “Chapter 6: Desert Outlook and Options for Action” – in: E. Ezcurra (ed.): Global Environmental Outlook for World Deserts. UNEP: Earthprint, pp.111-139.
- **Herrmann, S.M.** and Hutchinson, C.F. (2006): “The Scientific Basis: Linkages between Land Degradation, Drought and Desertification.” – in: Johnson, P.M., Mayrand, K. and Paquin, M. (eds.): Governing Global Desertification; Linking Environmental Degradation, Poverty and Participation. Aldershot: Ashgate, pp. 11-25.

Reports:

- Serrat Capdevila, A. and **Herrmann, S.M.** (2019): New Avenues for Remote Sensing Applications for Water Management. Washington DC: The World Bank, 47 pages.
- Serrat Capdevila, A. and **Herrmann, S.M.** (2018): Mainstreaming the Use of Remote Sensing Data and Applications in Operational Contexts. Washington DC: The World Bank, 72 pages.

ORAL PRESENTATIONS AND CONFERENCE PROCEEDINGS (selected)

- **Herrmann, S.** [invited]: “People and Pixels in the Sahel – Satellite and Ground Perspectives on the Desertification Debate”, School of Geography and Development Colloquium Series, University of Arizona, October 16, 2015
- **Herrmann, S.**, Baro, M. and Park, T. [invited]: “People and pixels in the Sahel – findings, challenges and lessons learned”, Annual Meeting of the Association of American Geographers, Los Angeles, April 11, 2013
- **Herrmann, S.** and Tappan, G.: “Vegetation Impoverishment Despite Greening? A Case Study from Senegal”, Global Land Project 2010 Open Science Meeting, Arizona State University, Phoenix, AZ, October 18, 2010
- **Herrmann, S.** [invited]: “Potential and challenges of using the NDVI for detecting land degradation and rehabilitation”, AGU Fall Meeting, San Francisco, December 15, 2009
- **Herrmann, S.** and Hopson, T.: “Integrating remotely-sensed vegetation phenology and rainfall metrics to characterize changes in dryland vegetation cover: example from Burkina Faso”, Drylands, Deserts & Desertification Conference, Sede Boqer Campus, Israel, December 14-17, 2008
- **Herrmann, S.M.** [invited]: “Variability of Sahelian rainfall and its impact on vegetation dynamics”, UCAR Management Committee Meeting, Boulder, CO, July 2007
- **Herrmann, S.M.**: “Land use decision making: the case of savannas”, Young Scientists Network Workshop on Incorporating Land Use Decision Making into the Earth System Model, Bristol, UK, June 2007
- Hutchinson, C.F., **Herrmann, S.M.** and Foerch, W.: “The Future of Drylands - Revisited”, International Scientific Conference on The Future of Drylands, Tunis, June 2006

RESEARCH EXPERIENCE

- **Collaborating Scientist**, “Vegetation Assessment of Phenology and Evapotranspiration Using Satellite Imagery in Western USA Riparian Zones” (USGS Southwest Biological Science Center, Oct. 2018 – May 2019)
 - Analyzed riparian vegetation phenology along the Lower Colorado River pre- and post-water release using multi-sensor Earth Observation time series data
- **Principal Investigator**, “Potential of Local Knowledge to Fill Data Gap for Scientific Understanding of Land Degradation” (Faculty Seed Grant, June 2016 – Dec. 2016)
 - Designed and implemented pilot project to develop evidence of Sahelian pastoralists’ traditional knowledge
 - Built collaborative relationship and worked with partner agency in Senegal
- **Collaborating Scientist**, “Land Cover Dynamics and Adapting to Climate Change in West Africa” (USGS Earth Observation and Science (EROS) Center, Jan. 2011 – Dec. 2014)
 - Analysed and interpreted regional-scale land cover dynamics and trends, and identified local-scale hotspots of change
 - Designed and conducted capacity building workshops for local environmental professionals
 - Conceived, compiled material, and wrote and edited sections of atlas of region’s changing environment as member of the production and editorial team
- **Collaborating Scientist**, “Mapping and Monitoring Land Resources, Land Uses, and Development Impacts in Ghana” (USGS Earth Observation and Science (EROS) Center, Sep. 2015 – Aug. 2016)
 - Supported USAID/Ghana’s Economic Growth Program with baseline geographic data and analyses for project planning, geographic targeting, measuring program impacts
- **Collaborating Scientist**, “Vegetation Indices from EOS Terra and Aqua MODIS” (Vegetation Index and Phenology Lab, Mar. – Nov. 2015)
 - Conducted data set comparison, error and sensitivity analysis of MODIS VI product collections 5 and 6
 - Led spatio-temporal characterization of vegetation cover and phenology in US Southwest
- **Principal Investigator**, “‘Desertification’ or ‘Greening’? Human-Environment Relationships in the Face of Climate Variability: Case Studies in Mauritania and Senegal” (NSF Research Grant, June 2008 – May 2013)
 - Led project to investigate contrasting claims of desertification and greening in the Sahel
 - Designed and implemented (1) land cover change analyses using remote sensing, (2) field surveys on vegetation cover and species diversity, (3) interviews, focus group discussions and participatory activities
 - Devised novel methods to integrate and jointly analyze data from diverse data sources

- **Research Fellow**, Advanced Study Program (UCAR, Sep. 2006 – Sep. 2008)
 - Conducted independent research examining relationships between regional-scale vegetation phenological metrics and rainfall metrics
 - Conceived, wrote and submitted research proposals
 - Contributed to the UCAR Africa Initiative
- **Research Assistant**, “The Future of Arid Lands – Revisited” (Office of Arid Land Studies, Jan. 2004 – Aug. 2006)
 - Collected and analysed background material for UNESCO-commissioned book reviewing 50 years of dryland research
 - Co-authored book with Dr. Chuck Hutchinson
- **Research Assistant**, “Changes in the Sahel” (Office of Arid Land Studies, Jan. 2003 – Dec. 2003)
 - Supported preparation of a joint UNEP/FAO/UNCCD Workshop on Changes in the African Sahel held in Nairobi
 - Wrote background paper on the desertification debate
- **Research Assistant**, “RangeView” (Arizona Remote Sensing Center, Jan. – Dec. 2002)
 - Processed vegetation index data for implementing web-based geospatial tools for natural resource management
- **Student Research Assistant**, “Assessment of the Agricultural Potential of an Indigenous Water Harvesting System in Central Asian Deserts” (Jacob Blaustein Institute for Desert Research, Nov. 1999 – Oct. 2000)
 - Developed a methodology to identify and classify takyr soils according to their surface properties using Landsat TM and ETM+ images
 - Planned and carried out field work in Turkmenistan

TEACHING AND MENTORING EXPERIENCE

- **RNR696A: Remote Sensing of Coupled Human-Environment Systems (2018)**
 - Developed and co-taught graduate seminar
- **GEOG330 Introduction to Remote Sensing (2017)**
 - Redeveloped and taught introductory undergraduate class with 100+ students
- **Inter-university collaboration with University of Freiburg, Germany (2012, 2015, 2018)**
 - Co-organized and accompanied the Tucson portion of a study tour of the U.S. Southwest by German geography graduate students
- **Capacity building for USAID West Africa project (2011 – 2014)**
 - Developed curriculum and teaching materials
 - Co-delivered onsite workshops on remote sensing-based land cover mapping and change detection for professionals from 15 West African countries
- **Mentorships (2011 – 2012)**
 - Mentored undergraduate student from the Department of Geography and Development participating in NASA Space Grant Internship Program
 - Supervised a Graduate Research Assistant in Arid Lands Resource Sciences

- **Guest lecturer (2007 – Present)**
 - University of Arizona: Physical Aspects of Arid Lands; Natural and Human Impacts on Arid Lands
 - University of Maryland: Geography graduate seminar; Introduction to Remote Sensing
 - University of Colorado: Critical Thinking in Development; Meteorology and Climate
- **Teaching Assistantships (2004 – 2005)**
 - Introduction to Oceanography, Geosciences Department, University of Arizona
 - Sonora: A Description of Place in Arid America, School of Agriculture and Southwest Studies Center, University of Arizona

OTHER PROFESSIONAL ACTIVITIES

- **Guest Editor**, *Remote Sensing*, Special Issue on “Earth Observations for Ecosystem Resilience”, Aug. 2019 – May 2020
- **External Consultant**, Assessment of Farmer-Led Irrigation to Maximize Finance for Development, The World Bank, Jan. – June 2019
 - Conducted study to assess the potential of multi-spectral and synthetic aperture radar remote sensing for mapping farmer-led irrigation in Rwanda
- **Associate Editor**, *Land Degradation and Development*, Remote Sensing and Emerging Technologies Section, 2018
- **Co-chair**, Session on “Success Stories of How Remote Sensing is Serving Water Resources Management“. Fall Meeting of the American Geophysical Union. New Orleans, Dec.11-15, 2017
- **External/Internal Consultant**, Global Initiative Remote Sensing for Water Resources Management, The World Bank, Jan. 2017 – June 2019
 - Delivered technical and logistical support to the World Bank’s Water Expert Team
 - Facilitated mainstreaming the use of earth observation data and applications in water resource management
 - Tracked and reported on all project processes (progress reports, knowledge briefs, slide decks)
- **Member of Science Advisory Committee** for Global Environment Facility (GEF)-funded Land Degradation Monitoring project, Oct 2016 – Dec 2017
- **Co-chair**, Session on “Including Land Use and Land Cover Change in Earth System Models“. Fall Meeting of the American Geophysical Union. San Francisco, Dec.12-15, 2007
- **Co-guest Editor**, *Journal of Arid Environments*, Special Issue on “The ‘Greening’ of the Sahel” (Volume 63, Issue 3, Nov. 2005)
- **Pro Bono Reviewer**: *Agriculture, Ecosystems and Environment; Ambio; Arid Lands Research and Management; British Journal for Applied Science and Technology;*

Ecological Applications; Environmental Monitoring and Assessment; Geoinformatics and Geostatistics; Global and Planetary Change; Global Change Biology; Global Environmental Change; Journal of Applied Meteorology and Climatology; Journal of Arid Environments; Land Degradation and Development; Remote Sensing; Remote Sensing of the Environment; Research in Economic Anthropology; Science of the Total Environment; Singapore Journal of Tropical Geography; CRDF Global; The National Science Foundation; Natural Environment Research Council (UK)

FUNDING RECEIVED

- **Office of the Vice President for Research, The University of Arizona**, Faculty Seed Grant (PI), June 2016 – Dec. 2016, \$10,000
- **USGS Earth Observation and Science (EROS) Center**, CESU Cooperative Agreement (PI), Sep. 2015 – Aug. 2016, \$80,716
- **USGS Earth Observation and Science (EROS) Center**, Intergovernmental Personnel Act (IPA) assignment (PI), Dec. 2011 – Dec. 2014, \$350,000
- **National Science Foundation, Geography and Regional Science Program**, Research Grant (PI, with co-Is Tad Park, Mamadou Baro, Randy Gimblett), June 2008 – Dec. 2010, \$400,000
- **University Corporation for Atmospheric Research**, Advanced Study Program fellowship at the National Center for Atmospheric Research, Sep. 2006 – Sep. 2008

PROFESSIONAL SOCIETIES

- American Geophysical Union (AGU)
- Association of American Geographers (AAG)

LANGUAGES AND SKILLS

- Languages: German (native), English (fluent), French (fluent)
- Operating systems: Windows (advanced), Linux (novice – intermediate)
- Software packages: ArcMap (advanced), QGIS (novice), ENVI (advanced), MS Office Suite (advanced)
- Scientific programming languages: IDL (advanced), R (novice), C# (novice)
- Cloud computing platforms: Google Earth Engine (intermediate)