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SCHOLARLY PROFILE

My work focuses on how to streamline the transition to a renewable-based future. This topic strains all facets of my background, including high-level communication and data analysis (Harvard), climate modeling and atmospheric science (Max Planck), and remote sensing and GIS (Pacific Northwest National Laboratory). I am very excited to apply my soft and technical skills to the classroom, where I am prepared to teach courses in renewable energy, physical geography, climate science, environmental studies, and field data collection.

RESEARCH EXPERIENCE

- 2015 - **Postdoctoral Fellow**, [John A. Paulson School of Engineering and Applied Sciences](#)
Harvard University, Cambridge, MA (USA)
- 2012-15 **Post-doctoral Researcher**, [Max Planck Institute for Biogeochemistry](#)
Jena, Germany
- 2010 **Research Scientist**, [Max Planck Institute for Meteorology](#)
Al Ain, United Arab Emirates
- 2002-08 **Junior/Senior Research Scientist and Engineer**, [Pacific Northwest National Laboratory](#)
Sequim, WA (USA)

EDUCATION

- 2011 **Ph.D.** Earth Sciences ([Geowissenschaften](#)), University of Hamburg in collaboration with the [International Max Planck Research School for Earth System Modeling](#) (Germany)
Thesis: Limits and Consequences of the Large-Scale Deployment of Renewable Energy Technologies
Advisor: [Hartmut Grassl](#)
- 2002 **M.A.** [Geography](#), University of Maryland
Focus: satellite remote sensing and GIS
Advisor: Ruth DeFries
- 2000 **B.S.** [Geography](#), Mansfield University
Senior Project: Hurricane Energy Increase in the North Atlantic

SELECT PUBLICATIONS

1. **Miller L**, Keith D, (submitted to *Env. Res. Letters* June 22, 2018) Observation-based Solar and Wind Power Capacity Factors and Power Densities
2. **Miller L**, Keith D, (in review as of May 10, 2018) Climatic Impacts of Wind Power. *Joule*.
3. **Miller L**, Kleidon A, (2017) [Correctly estimating wind resources at large scales requires more than simple extrapolation](#). *Proc. Natl. Acad. Sci. USA*.
4. **Miller L**, Kleidon A, (2016) [Wind speed reductions by large-scale wind turbine deployments lower turbine efficiencies and set low generation limits](#). *Proc. Natl. Acad. Sci. USA*.
5. **Miller L.**, Smil V, Wagner G, Keith D, (2016) [Stated estimates for city-integrated wind and solar PV are too high](#). *Science*. (eLetter published June 20, 2016)
6. **Miller L.** et al. (2015) [Two methods for estimating large-scale wind power generation](#). *Proc. Natl. Acad. Sci. USA*.

ADDITIONAL PUBLICATIONS

7. Benali A, Mota B, Carvalhais N, Oom D, **Miller L**, Campagnolo M, Pereira J, (2017) Bimodal fire regimes unveil a global-scale anthropogenic fingerprint. *Global Ecol. Biogeogr.*
8. **Miller L**, Smil V, Wagner G, Keith D, (2016) Establishing practical estimates for city-integrated solar PV and wind. *Science*. (eLetter published July 18, 2016)
9. Kleidon A, **Miller L**, Gans F, (2016) Physical limits of solar energy conversion in the Earth System. *Topics in Current Chemistry*, 371, 1-22
10. Bowring S, **Miller L**, Kleidon A, (2014) Applying the concept of “energy return on investment” to desert greening in the Sahara/Sahel using a global climate model. *Earth Syst. Dynam.* 5, 43-53
11. Gans F, **Miller L**, Kleidon A, (2012) The problem of the second wind turbine - a note on a common but flawed wind power estimation method. *Earth Syst. Dynam.*, 3, 79-86.
12. **Miller L**, Gans F, Kleidon A, (2011) Jet stream wind power as a renewable energy source: little power, big impacts. *Earth Syst. Dynam.*, 2, 201-212.
13. Kleidon A, Gans F, **Miller L**, Pavlick R, (2011) Sun, wind, and waves -- natural boundaries of renewable energy in the Earth System (German) in Bechkammn, Hurtado (eds.), Kraftwerkstechnik, Band 3, TK Verlag, Neuruppin, 463-470.
14. **Miller L**, Gans F, Kleidon A, (2011) Estimating maximum global land surface wind power extractability and associated climate consequences. *Earth Syst. Dynam.*, 2, 1-12.
15. Xu X, Kleidon A, **Miller L**, Wang S, Wang L, Dong G, (2010) Late quaternary glaciation in the Tianshan and implications for paleoclimatic change: a review. *Boreas*, 39, 2, 215-232.
16. Xu X, Yang J, Dong G, Wang L, **Miller L**, (2009) OSL dating of glacier extent during the last glacial and the Kanas Lake Basin formation in Kanas River valley, Altai Mountains China. *Geomorphology*, 112, 306-317.
17. Hibler L, Maxwell A, **Miller L**, Kohn N, Woodruff D, Montes M, Bowles J, Moline M, (2008) Improved fine-scale transport model performance using AUV and HSI feedback in a tidally dominated system. *Journal of Geophysical Research C (Oceans)*, 113, C08036
18. Steinmaus K, Bowles J, Woodruff D, Donato T, Rhea W, Snyder W, Korwan D, **Miller L**, Petrie G, Maxwell A, Hibler L, (2006) Evolution of a man-made plume in coastal waters. *EOS*, 87, 51, 581-592.
19. Borde A, Thom R, Rumrill S, **Miller L**, (2005) Geospatial habitat change analysis in coastal estuaries. *Estuaries*, 26, 4, 1104-1117
20. Goward S, David P, Fleming D, **Miller L**, Townshend J. (2003) Empirical comparison of Landsat 7 and Ikonos multispectral measurements. *Remote Sens. Environ.*, 88, 80-99.

PRESENTATIONS

Selected Invited Talks

- 2018 Harvard University (ABCD talk): *Points to consider regarding future wind and solar power*
- 2017 Harvard University: *Why wind turbines warm night-time temperatures*
- 2017 Harvard University: *What lies ahead for U.S. wind power*
- 2016 Union of Concerned Scientists: *A perspective on wind power in 2050 and beyond*
- 2016 University of Kansas: *Spatial and temporal differences in climate due to a wind farm in Kansas*
- 2014 Laboratoire des Sciences du Climat et de l'Environnement (France): *Limits of Aeolian Energy*
- 2013 University of Reading (UK): *Fundamental extraction limits and associated climate consequences of various renewable energy resources*
- 2012 Energy Talk 2012 (UK) – panelist and delegate
- 2011 Limits of the Anthropocene (Germany): *Solar, wind, and waves: natural limits to renewable energy sources*
- 2010 Potsdam Institute of Climate (Germany): *Thermodynamic limits of renewable sources of free energy*

Selected Conference Presentations and Workshops

- 2016 Estimating wind energy limits and atmospheric impacts at large scales from climate model simulations and first principles. German Physics Society. (Germany)
- 2015 Wind power, what do we know. Workshop at Harvard University
- 2014 A new estimate of Germany's wind energy potential which includes the effects of turbines on the flow. International Conference on Energy & Meteorology (France)
- 2013 Assessing the theoretical potentials of global solar and wind energy from climate reanalysis. European Geosciences Union (Austria)
- 2012 Solar and wind energy extraction within the Earth System: How are they related but different regarding power potentials and climate impacts? American Geophysical Union
- 2011 Influence of dissipation on the spatial structure of the atmospheric boundary layer. European Geosciences Union (Austria)

TEACHING AND MENTORING EXPERIENCE

Teaching

- **Instructor, University of Hamburg (Germany)**
Thermodynamic limits to renewable energy sources (one week block course)
- **Guest Lecturer, University of Jena (Germany)**
Limits and research opportunities of a renewable energy future.
- **Instructor, Heritage University (USA)**
Applications in remote sensing (two week block course).
- **Teaching Assistant, University of Maryland**
Biogeography (teaching assistant, prof. had health disorder, taught last 10 wks.)

Advising

Tanvi Gupta (current Ph.D. student at India Institute of Tech.), Alexander Glaser (2016 M.S. student at U. of Jena), Aljosa Slamersak (2015, M.S. student from Wageningen University) Simon Bowring (2013, MS. student from Wageningen University), Jarrod Jackson (2007, MS student at Oregon State U.), James Cotton (2006, MS student at U. of Washington), Katrina Santos (2005, BS student at Heritage U.)

HONORS AND AWARDS

- 2015 **Scientific Excellence Award** – awarded to the 5 most significant scientific contributions at the Max Planck Institute for Biogeochemistry over the last 5 years
- 2013 **Scientific Achievement Award** – €1500 bonus for outstanding scientific contribution at the Max Planck Institute for Biogeochemistry
- 2006 **Achievement of Excellence** – \$5000 cash award for being one of the top 10 of ~5200 employees pushing the bounds of technology and innovation at the Pacific Northwest National Laboratory
- 2006 **Outstanding Achievement Award** from Pacific Northwest National Laboratory for my efforts in a \$6M field campaign with the US Naval Research Lab
- 2005 **Outstanding Achievement Award** from Pacific Northwest National Laboratory for my efforts at quantifying long-term environmental validation sites using satellite and airborne imagery with GIS data

ADDITIONAL SKILLS

Modeling: advanced modification and use of global and regional weather models for both wind and solar resource assessments; also utilized for quantifying changes to the local climate (surface warming, lengthened growing season, soil erosion, evaporation, etc.)

Remote Sensing and GIS analysis: experience with satellite, airborne, and underwater (multispectral, side scan sonar), data driven approaches of analysis

Data analysis and visualization: spatial and temporal statistics, generating maps and graphs that are both informative and clear

Field work related certifications: Underwater Research Diver, research boat operator to 40 feet, US Army off-road driver's license, HazMat-40, Wilderness First Aid & CPR

Field operation and design: research boat operations, aircraft flight planning, dive operations, scientific instrument planning and retrieval

Additional Skills: Offshore Yachtmaster (sailboats), Search & Rescue (tracker, rapid response, and high-angle rescue for Clallam County Sheriff's Dept. from 2003-2007), Rescue (scuba) Diver, celestial navigation, advanced mechanical skills (race car from 1993-1997; lived on sailboats from 2002-2008)