Taylor Smith

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EDUCATION

Dr. rer. nat. (summa cum laude), Remote Sensing. *Universität Potsdam* — February 2018
Master of Arts, Geography. *UC Santa Barbara* — September 2014
Bachelor of Arts, Geology. *Middlebury College* — May 2011

RESEARCH INTERESTS

My research focuses on extracting signals from large, complex, and diverse environmental datasets. My dissertation work used passive microwave sensors to understand recent climate-driven changes in snow across High Mountain Asia. My current projects both expand upon that work and explore new areas focused on soil moisture estimation, long-term landscape evolution, and the interplay between ecology and geomorphology. My methods are data-driven, and rely on te combination of high-performance computing and novel statistical methods to extract insights from massive environmental datasets.

PROFESSIONAL EXPERIENCE

2018 -	Postdoctoral Researcher and Instructor, Universität Potsdam
2014 - 2018	PhD Candidate and Teaching Assistant, Universität Potsdam
2013 - 2018	Independent Consultant, Climate Hazard Analysis for International Development
Summer 2013	Natural Hazards Research Fellow, Earth Research Institute
2012 - 2014	MA Candidate and Teaching Assistant, UC Santa Barbara
2011 - 2012	GIS Intern and GIS Analyst, Tetra Tech ARD
Summer 2010	Field Researcher, UMass Amherst
2009 - 2011	Research and Teaching Assistant, Middlebury College

TEACHING EXPERIENCE

Instructor, Universität Potsdam
Remote Sensing of the Environment (RCM01, Winter 2019, 2020, 2021)
Big Data Analytics (GEW-DAP03, Summer 2019, 2020, 2021)

Graduate Teaching Assistant, Universität Potsdam
Remote Sensing of the Environment (RCM01, Winter 2017, 2018)
Terrestrial and Airborne Lidar and Photogrammetry (RSM02, Summer 2018)
GIS Methods and Techniques (Block Course, Winter 2016)

Graduate Teaching Assistant, UC Santa Barbara
Quantitative Geomorphology II (GEOG 288, Spring 2014)
Quantitative Geomorphology (GEOG 237, Winter 2013)
Groundwater (GEOG 116, Spring 2013)
Water Quality (GEOG 162, Winter 2012)
Oceans and Atmospheres (GEOG 3A, Fall 2012, 2013)

Undergraduate Teaching Assistant, Middlebury College
The Dynamic Earth (GEOL 170)
The Ocean Floor (GEOL 142)
Remote Sensing in Geoscience (GEOL 222)

AWARDS AND HONORS

- **Michelson Prize** (Universität Potsdam, 2018) - Awarded for the best doctoral thesis of the year in the Math and Science Faculty at Universität Potsdam
- **Prize for Excellent Teaching** (Universität Potsdam, 2018) - Awarded for excellent teaching at the graduate level. Assessed based on course design, innovation, and student reviews
- **GSA Excellence in Teaching Award** (UCSB, Spring 2014) - Awarded for outstanding graduate student teaching

THESIS ADVISING

4. **Toni Schmidt** (MSc Thesis): Theoretical Potential of Former, Present, and Hypothetical Optical Spaceborne Sensors for the Differentiation of Plastics Using Hyperspectral Analysis
3. **Kittipon Wutthimetheekul** (Msc Thesis): Detection and analysis of flooding areas by using Sentinal-1 data in a part of the lower Chao-phraya river basin (Thailand)
2. **Ariane Müting** (MSc Thesis): Generating high-resolution DEMs from tri-stereo satellite imagery: A geomorphologic case study in the Quebrada del Toro, NW Argentina
1. **Ariane Müting** (BSc Thesis): Classification and spectral unmixing of remote sensing data for the Batura Glacier, Karakoram

PEER-REVIEWED PUBLICATIONS

Journal Articles

11. I van der Veen, H Hassenruck-Gudipati, **T Smith**, E Deal, H Wichura, M Strecker, B Bookhagen, D Sachse. "Stable isotopes of modern surface waters show seasonal snowmelt amounts and identify moisture sources in the western Himalaya", *in review.*
10. **T Smith**, A Rheinwalt, and B Bookhagen. "Topography and Climate in the Upper Indus Basin: Mapping Elevation-Snow Cover Relationships." Science of The Total Environment, 2021, 147363, ISSN 0048-9697, https://doi.org/10.1016/j.scitotenv.2021.147363
9. **T Smith** and B. Bookhagen. "Climatic and Biotic Controls on Topographic Asymmetry at the Global Scale." Journal of Geophysical Research: Earth Surface, 125, e2020JF005692 (2020). https://doi.org/10.1029/2020JF005692
8. **T Smith** and B. Bookhagen. "Assessing Multi-Temporal Snow-Volume Trends in High Mountain Asia From 1987 to 2016 Using High-Resolution Passive Microwave Data." Front. Earth Sci. (2020) 8:559175. https://doi.org/10.3389/feart.2020.559175
7. **T Smith**, A Rheinwalt, and B Bookhagen. "Determining the Optimal Grid Resolution for Topographic Analysis on an Airborne Lidar Dataset", Earth Surface Dynamics 7 (2019): 475-489 https://doi.org/10.5194/esurf-7-475-2019
6. **T Smith** and B Bookhagen. "Using passive microwave data to understand spatio-temporal trends and dynamics in snow-water storage in High Mountain Asia", Proc. SPIE 10788, Active and Passive Microwave Remote Sensing for Environmental Monitoring II, 1078806 (9 October 2018) https://doi.org/10.1117/12.2323827
5. **T Smith** and B Bookhagen. "Changes in seasonal snow water equivalent distribution in High Mountain Asia (1987 to 2009)", Science Advances 4 (2018): 1, https://doi.org/10.1126/sciadv.1701550
4. **T Smith**, B Bookhagen, and A Rheinwalt. "Spatio-temporal Patterns of High Mountain Asia's Snowmelt Season Identified with an Automated Snowmelt Detection Algorithm, 1987-2016", The Cryosphere 11 (2017): 2329-2343, https://doi.org/10.5194/tc-11-2329-2017
3. **T Smith** and B Bookhagen. "Assessing uncertainty and sensor biases in passive microwave data across High Mountain Asia", Remote Sensing of Environment 181 (2016): 174-185. https://doi.org/10.1016/j.rse.2016.03.037
2. **T Smith**, B Bookhagen, and F Cannon. "Improving semi-automated glacier mapping with a multi-method approach: applications in central Asia", The Cryosphere 9.5 (2015): 1747-1759. https://doi.org/10.5194/tc-9-1747-2015
1. W Amidon, B Bookhagen, J-P Avouac, **T Smith**, D Rood. "Late Pleistocene Glacial Advances in the Western Tibet Interior", *Earth and Planetary Science Letters 381* (2013): 210-221.

Book Chapters

1. **T. Smith** and B Bookhagen. "Chapter 7: Remotely sensed rain and snowfall in the Himalaya", in: Dimri, A.P., Bookhagen, B., Stoffel, M., Yasunari, T. (Eds.): *Himalayan Weather and Climate and their Impact on the Environment*, Springer International Publishing, 2020. https://www.springer.com/gp/book/9783030296834

Technical Reports

2. **T Smith**. *Climate Vulnerability in Asia's High Mountains: How climate change affects communities and ecosystems in Asia's water towers.* WWF: 2014. Web Link

1. M Gale, J Kim, H Earle, A Clark, **T Smith**, K Peterson. Open File Report VG09-5: *Bedrock Geologic Map of Charlotte, Vermont* (Vermont Geologic Survey, 2009)

PUBLISHED DATASETS AND SOFTWARE

6. **T Smith** and B Bookhagen. (2021). Elevation-Snow Clusters for Glaciers and Watersheds in the Upper Indus Basin Region (Version v1.0). Zenodo. https://doi.org/10.5281/zenodo.4469473

5. **T Smith** and Bodo Bookhagen. (2020). Global Climatic, Biotic, and Topographic Asymmetries (Version v1.0). Zenodo. https://doi.org/10.5281/zenodo.4019109

4. **TSmith**. (2020). Hillslope Asymmetry: Initial Release. Zenodo. https://doi.org/10.5281/zenodo.3839251

3. **T Smith** and Bodo Bookhagen. (2020). Snow Variables for High Mountain Asia (Version v1.0). Zenodo. http://doi.org/10.5281/zenodo.3898517

2. **T Smith**, A Rheinwalt, and B Bookhagen (2019): TopoMetricUncertainty - Calculating Topographic Metric Uncertainty and Optimal Grid Resolution. V. 1.0. GFZ Data Services. https://doi.org/10.5880/fidgeo.2019.017

1. **T Smith** and B Bookhagen (2017): Snowmelt Parameters, 1987-2016, High Mountain Asia. V. 1.0. GFZ Data Services. https://doi.org/10.5880/fidgeo.2017.006

THESES

Smith, T (2018) - Decadal changes in the snow regime of High Mountain Asia, 1987-2016, *Doctoral Thesis, Universität Potsdam, 142. pp.* (Advisor: Bodo Bookhagen) Link

Smith, T (2014) - Glacial Response to Climate Change in the Tien Shan Mountain Range of Central Asia, *Masters Thesis, UC Santa Barbara, 116. pp.* (Advisor: Bodo Bookhagen) Link

Smith, T (2011) - Petrogenesis of Highly Evolved Rocks in the Springerville Volcanic Field, Eastern Arizona, *Bachelor Thesis, Middlebury College, 98. pp.* (Advisors: Ray Coish and Chris Condit)

JOURNAL REFEREE

Earth and Planetary Science Letters, Science Advances, Remote Sensing of Environment, Remote Sensing, Science of the Total Environment, Journal of Mountain Science, Sensors, Resources, Journal of Hydrometeorology

TECHNICAL PROFICIENCIES

- Languages - Native English, Professional German, Conversational French, Basic Spanish
- Programming - Skilled user of Python and other open-source tools for data processing and analysis
- GIS, Remote Sensing - ArcGIS, QGIS. Google Earth Engine. Adobe Illustrator, Photoshop.
- International Experience - Internationally schooled. Field implementation on multiple development projects in sub-Saharan Africa. Remote support for projects throughout Africa, Asia and Latin America.

CONFERENCE PARTICIPATION

16. **European Geophysical Union 2021, Online**

    - **T Smith** and B Bookhagen. *Climatic and Biotic Controls on Topographic Asymmetry at the Global Scale*

15. **AI for Climate Hackathon**

    - Session Organizer: Changing Cryosphere

14. **European Geophysical Union 2020, Online**

    - **T Smith** and B Bookhagen. *Shaping Planetary Surfaces: The Impact of Water Mobility on Topography*

13. **YES Conference 2019, Potsdam**
    - Session Co-organizer - Data-driven Remote Sensing of Earth Surface Processes
12. **European Geophysical Union 2019, Vienna**
    - **T Smith**, A Rheinwalt, and B Bookhagen. *Determining the Optimal Grid Resolution for Topographic Analysis on an Airborne Lidar Dataset*
11. **European Geophysical Union 2018, Vienna**
    - **T Smith** and B Bookhagen. *The impacts of physical weathering regimes on large-scale slope distributions in High Mountain Asia and the Central Andes*
    - **T Smith**, B Bookhagen, and A Rheinwalt. *Spatiotemporal Trends in Snow-Water Storage and the Timing of Snowmelt in High Mountain Asia*
10. **Natural Hazards and Risks 2018, Potsdam**
    - **T Smith** and B Bookhagen. *Decadal trends in the timing of the snowmelt season in High Mountain Asia*
9. **European Geophysical Union 2017, Vienna**
    - **T Smith** and B Bookhagen. *Spatiotemporal Trends in the Timing and Volume of Snowfall in High Mountain Asia*
8. **FOSDEM Open Source Conference 2017, Brussels**
7. **European Geophysical Union 2016, Vienna**
    - I Crisologo, B Bookagen, **T Smith** and M Heistermann. *Using TRMM and GPM precipitation radar for calibration of weather radars in the Philippines*
6. **PyData 2016, Berlin**
5. **American Geophysical Union 2015, San Francisco**
    - **T Smith** and B Bookhagen. *Tracking Snowmelt Events in Remote High Asia Using Passive Microwave Data.*
4. **American Geophysical Union 2013, San Francisco**
    - **T Smith** and B Bookhagen. *Glacial Retreat and Associated Glacial Lake Hazards in the High Tien Shan.*
3. **Geological Society of America 2010, Denver**
    - **T Smith**, M Mnich, and C Condit. *Progress Towards Completed Mapping of the Springerville Volcanic Field, East-Central Arizona.*
2. **New England Geological Society of America 2010, Baltimore**
    - A Clark, **T Smith**, P Ryan, J Kim, H Mango. *Elevated Arsenic in Domestic Wells from the Taconic Allochthons in Southern Vermont* (Paper 79-35) (NEGSA, Baltimore, 2010)
    - G Springston, M Gale, J Kim, S Wright, L Becker, A Clark, **T Smith**. *Geologic Framework for Evaluating Groundwater Resources, Charlotte, VT* (Paper 39-6) (NEGSA, Baltimore, 2010)
1. **Geological Society of America 2009, Portland**
    - P Ryan, J Kim, A Clark, **T Smith**, D Chow, C Sullivan, K Bright. *Ultramafic Source of Arsenic in a Fractured Bedrock Aquifer*