

Zachary T. Leasor

Department of Geography
The Ohio State University
154 North Oval Mall
Columbus, Ohio 43210

Email: leasor.4@osu.edu
Office: 1048 Derby Hall
Phone: (502)-541-3795
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Education:

The Ohio State University **Columbus, Ohio**
Doctor of Philosophy (Geography): August 2021
Advisor: Dr. Steven Quiring
Dissertation: Utilizing Antecedent Soil Moisture to Improve Monthly Temperature Forecasts

The Ohio State University **Columbus, Ohio**
Master of Arts (Geography): August 2017
Advisor: Dr. Steven Quiring
Thesis: Spatiotemporal Variations of Drought Persistence in the South-Central U.S.

Western Kentucky University **Bowling Green, KY**
Bachelor of Science: May 2015
Major: Meteorology
Minor: Water Resources

Research Areas

Hydroclimatology	Drought Monitoring
Land-Atmosphere Interactions	Seasonal Forecasting
Applied Climatology	Water Resources

Professional Experience

Postdoctoral Scholar **August 2021 – Present**
NSF funded project: Quantifying Uncertainties in Drought Severity to Improve Drought Monitoring (PI: Dr. Steven Quiring)

- Perform climate data analysis to develop and validate drought monitoring and prediction tools for improving resilience
- Responsible for preparing project reports and research papers for publication, presenting research at national conferences, and leading efforts to develop proposals to secure external funding

Research Assistant **May 2020 – August 2021**
NIDIS funded project: National Coordinated Soil Moisture Monitoring Network (PI: Dr. Steven Quiring)

- Responsible for expanding and maintaining a national soil moisture database
- Developed and disseminated experimental soil moisture products through a web portal at nationalsoilmoisture.com

Teaching Assistant **August 2019 – May 2020**
Department of Geography, The Ohio State University

Research Assistant **August 2017 - August 2019**
NOAA MAPP funded project: Developing National Soil Moisture Products to Improve Drought Monitoring (PI: Dr. Trent Ford)

- Utilized cloud computing to automate the daily retrieval of soil moisture data from numerous federal and state climate monitoring networks
- Produced and distributed daily blended soil moisture products on nationalsoilmoisture.com using in situ, model-derived, and remote sensing data

Research Assistant **August 2015 - December 2016**
NOAA/RISA funded project: Improved Seasonal Climate/Drought Forecasting in the SCIPP Region (PI: Dr. Steven Quiring)

- Analyzed a high resolution temperature dataset to quantify the utility of persistence-based seasonal temperature forecasts across the south-central US
- Developed experimental seasonal forecast models using antecedent soil moisture to predict temperatures

Intern **January 2014 - May 2015**
Wx Or Not forecasting enterprise, Bowling Green, KY

- Produced regular 3-day forecasts for Warren and Butler counties on wxornotbg.com

Director **January 2014 - January 2015**
Stormtopper Network, Western Kentucky University, Bowling Green, KY

- Served as director for a student-led storm spotting organization affiliated with Western Kentucky University and Warren County Emergency Management

Tour Guide **May 2013 - May 2014**
Lost River Cave, Bowling Green, KY

- Provided boat tours educating guests on the local history, biology, and geology of Lost River Cave

Volunteer **Summer 2012 - 2014**
National Weather Service, Louisville, KY

- Assisted the NWS Louisville office with many tasks including research for ASOS site assessments and historical weather events

Peer-Reviewed Publications

In press:

- Yuan, S., Quiring, S.M., and **Z.T. Leasor** (2020): Historical changes in soil moisture over the contiguous United States: an assessment of CMIP6. *Geophysical Research Letters*, **48**(1), 1-9, <https://doi.org/10.1029/2020GL089991>.
- Ford, T.W., Quiring, S.M., Zhao, C., **Leasor, Z.T.**, and C. Landry (2020): Triple Collocation Evaluation of In Situ Soil Moisture Observations from 1,200+ Stations as part of the U.S. National Soil Moisture Network. *Journal of Hydrometeorology*, **21**(11), 2537-2549, <https://doi.org/10.1175/JHM-D-20-0108.1>.
- Tian, L., **Leasor, Z.T.**, and S.M. Quiring (2020): Developing a new drought index: Precipitation Evapotranspiration Difference Condition Index. *Climate Risk Management*, **29**, 1-17, <https://doi.org/10.1016/j.crm.2020.100238>.
- Zhao, C., Quiring, S.M., Yuan, S., McRoberts, D.B., Zhang, N., and **Z.T. Leasor** (2020): Developing and Evaluating National Soil Moisture Maps. *Soil Science Society of America Journal*, **84**, 443-460, <https://doi.org/10.1002/saj2.20045>.
- Leasor, Z.T.**, Quiring, S.M., and M.D. Svoboda (2020): Utilizing Objective Drought Severity Thresholds to Improve Drought Monitoring. *Journal of Applied Meteorology and Climatology*, **59**, 455-475, <https://doi.org/10.1175/JAMC-D-19-0217.1>.
- Leasor, Z.T.**, Quiring, S.M., Ford, T.W., and D.B. McRoberts (2019): Spatiotemporal variations in temperature persistence in the south-central United States. *Climate Research*, **77**, 181-192, <https://doi.org/10.3354/cr01550>.
- Tian, L., **Leasor, Z.T.**, and S.M. Quiring (2017): Potential to improve precipitation forecasts in Texas through the incorporation of multiple teleconnections. *International Journal of Climatology*, **37**, 3863-3872, <https://doi.org/10.1002/joc.4960>.

Under review:

- Leasor, Z.T.**, Quiring, S. M., and C. Zhao (2021): Examining the Sensitivity of Monthly Temperature Forecast Models to Multiple Sources of Soil Moisture Data, *Journal of Hydrometeorology*.

In preparation:

- Leasor, Z.T.**, and S.M. Quiring (2021): Constant Thresholds Contribute to Bias in Global Drought Severity.

Theses & Dissertation

Leasor, Z.T. (2021): Utilizing Antecedent Soil Moisture to Improve Monthly Temperature Forecasts. Ph.D. Dissertation, *The Ohio State University*.

Leasor, Z.T. (2017): Spatiotemporal Variations of Drought Persistence in the South-Central United States. M.A. Thesis, *The Ohio State University*.

Grants and Contracts

Funded:

Quantifying Uncertainties in Drought Severity to Improve Drought Monitoring. *NSF 20-547: Human-Environment and Geographical Sciences Program (HEGS)*, \$399,959. PI: S. M. Quiring, Co-PI: **Z.T. Leasor**, 2021.

Exploring the Benefits of Displaying High Resolution Drought Maps in Near Real-Time. *Sharpe Innovation Commons Seed Grant*, \$5,000. **Z.T. Leasor** (Team Leader); Team Members: C. Zhao, L. Liu, 2020.

Conference Paper Presentations

Leasor, Z.T., Quiring, S.M. (2022) “Bias in Drought Severity Resulting from Fixed Thresholds” American Association of Geographers Annual Meeting 2022, February 25 - March 1, *Virtual Presentation*.

Leasor, Z.T., Quiring, S.M. (2021) “Utilizing Antecedent Soil Moisture to Improve Monthly Temperature Forecasts” American Geophysical Union Fall Meeting 2021, December 13-17, *Virtual Presentation*.

Leasor, Z.T., Quiring, S.M. (2021) “Exploring the Benefits of Downscaled Remote Sensing Soil Moisture for Drought Monitoring” American Association of Geographers Annual Meeting 2021, April 7-11, *Virtual Presentation*.

Leasor, Z.T., Quiring, S.M. (2021) “Quantifying the Added Value of Multisource Soil Moisture Data in Subseasonal-to-Seasonal Forecast Models” 2021 American Meteorological Society 101st Annual Meeting, January 10-15, *Virtual Presentation*.

Leasor, Z.T., Quiring, S.M. (2020) “Uncertainty in Global Drought Severity” 2020 American Geophysical Union Fall Meeting, December 1-17, *Virtual Presentation*.

Leasor, Z.T., Quiring, S.M. (2019) “Utilizing Objective Drought Severity Thresholds to Improve Drought Monitoring.” Eleventh Biennial U.S. Drought Monitor Forum, September 17-19, 2019, Western Kentucky University, Bowling Green, KY.

Leasor, Z.T., Quiring, S.M. (2017) “Utilizing Objective Drought Thresholds to Improve Drought Monitoring with the SPI.” 2017 American Geophysical Union Fall Meeting, December 11-15, Ernest N. Morial Convention Center, New Orleans, LA.

Leasor, Z.T., Quiring, S.M. (2016) “Improved Seasonal Forecasting in the SCIPP Region.” Southern Climate Impacts Planning Program Annual Stakeholder Services Committee Meeting, May 25-26, 2016, Tulsa, OK.

Leasor, Z.T., Quiring, S.M. (2016) “Temperature persistence in the south-central United States.” The 19th Annual Student Research Week Symposium April 1, 2016, Texas A&M University, College Station TX.

Leasor, Z.T., Durkee, J. (2015) “The potential influence of cyclogenesis on precipitation banding in winter storms: A local-scale analysis of a heavy snow event across the Ohio Valley during 22-23 December 2004.” 45th Annual WKU Student Research Conference, March 28, 2015, Western Kentucky University, Bowling Green, KY.

Poster Presentations

Leasor, Z.T., Quiring, S.M. (2020) “Examining the Sensitivity of Monthly Forecast Models to Multiple Sources of Soil Moisture Data.” Byrd Center Symposium on Climate Change, October 9, The Ohio State University, *Virtual Presentation*.

Leasor, Z.T., Quiring, S.M. (2020) “Examining the Sensitivity of Monthly Forecast Models to Multiple Sources of Soil Moisture Data.” Midwest Student Conference on Atmospheric Research, September 26-27, University of Illinois at Urbana-Champaign, *Virtual Presentation*.

Leasor, Z.T., Quiring, S.M. (2020) “Examining the Sensitivity of Monthly Forecast Models to Multiple Sources of Soil Moisture Data.” National Soil Moisture Workshop, August 12-13, USDA-Agricultural Research Service, *Virtual Presentation*.

Leasor, Z.T., Quiring, S.M., and C. Zhao (2019) “Developing Daily Blended Soil Moisture Products in Near Real-Time.” 2019 National Soil Moisture Workshop, May 22-24, Kansas State University, Manhattan, KS.

Leasor, Z.T., Quiring, S.M. (2019) “Improvements in Monthly Temperature Forecasts Utilizing Antecedent Soil Moisture: A Comparison of Observational and Modeled Soil Moisture Products.” Byrd Center Symposium: Climate Change Research at Ohio State, March 22, Byrd Polar & Climate Research Center, Columbus, OH.

Leasor, Z.T., Quiring, S.M. (2018) “Improvements in Monthly Temperature Forecasts Utilizing Antecedent Soil Moisture: A Comparison of Observational and Modeled Soil Moisture Products.” 2018 American Geophysical Union Fall Meeting, December 10-14, Walter E. Washington Convention Center, Washington, DC.

- Leasor, Z.T.,** Quiring, S.M. (2018) “Improved Seasonal Forecasts Utilizing Antecedent Soil Moisture: A Comparison of Observational and Modeled Monthly Soil Moisture Products.” 2018 GeoWeek Graduate Student Forum, November 15, The Ohio State University, Columbus, OH.
- Leasor, Z.T.,** Quiring, S.M. (2018) “Improved Seasonal Forecasts Utilizing Antecedent Soil Moisture: A Comparison of Observational and Modeled Monthly Soil Moisture Products.” The 2018 MOISST Workshop: From Soil Moisture Observations to Actionable Decisions, June 4-7, University of Nebraska-Lincoln, Lincoln, NE.
- Leasor, Z.T.,** Quiring, S.M. (2017) “Improvements in Monthly Temperature Forecasts Utilizing Antecedent Soil Moisture in the South-Central U.S.” The 2017 Workshop at MOISST: Integrating Diverse Sources of Soil Moisture Information, May 23-25, Oklahoma State University, Stillwater, OK.
- Leasor, Z.T.,** Quiring, S.M. (2016) “Spatial Variations of Drought Persistence in the South-Central United States.” 2016 American Geophysical Union Fall Meeting, December 12-18, Moscone Convention Center, San Francisco, CA.
- Leasor, Z.T.,** Quiring, S.M. (2016) “A Monthly-to-Seasonal Temperature Forecast Utilizing Antecedent Soil Moisture Conditions in the SCIPP region.” The 2016 Workshop at MOISST: The Growing Science of Soil Moisture Sensing, May 17-18, Oklahoma State University, Stillwater, OK.
- Leasor, Z.T.,** Quiring, S.M. (2016) “Temperature Persistence in the South-Central United States.” Third Annual Symposium of the Association of Geography Graduate Students, March 4, 2016, Texas A&M University, College Station, TX.

Invited Talks and Seminars

- Leasor, Z.T.,** S.M. Quiring (2021) “Utilizing Hydroclimatic Data to Improve Drought Monitoring and Seasonal Forecasting,” Ohio State Department of Geography Graduate Colloquium. March 5, 2021. *Virtual Presentation.*
- Quiring, S.M., **Z.T. Leasor**, and C. Zhao (2018) “Introduction to Cloud Computing,” Ohio State Department of Geography Sharpe Innovation Commons Workshop Series. October 23, 2018. Columbus, OH.
- Quiring, S.M., **Z.T. Leasor** (2018) “Developing a National Soil Moisture Network (NSMN),” Aurora Fall Board Meeting Research Lightning Talks. October 16, 2018. Columbus, OH.

Awards and Honors

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| 2020-2021 | E. Willard and Ruby S. Miller Fellowship, Department of Geography, The Ohio State University |
| 2015-2016 | Lechner Scholarship, Office of Graduate Studies, Texas A&M University |

Memberships

American Meteorological Society (AMS)	Sep 2020 - Present
American Association of Geographers (AAG)	Oct 2019 - Present
American Geophysical Union (AGU)	Jun 2016 - Present
Geography Graduate Organization (OSU)	Sep 2016 – Aug 2021

Service

University Service:

Judge	April 2022
Chi Epsilon Pi Atmospheric Sciences Honor Society Awards, The Ohio State University	
Spring Panel Planning Committee Member	October 2019 – March 2020
Geography Graduate Organization (GGO), The Ohio State University	
Committee Member	October 2018 - April 2019
Graduate Studies Committee Plus (Curriculum Development), The Ohio State University	
Graduate Studies Committee Representative	June 2018 - June 2019
Geography Graduate Organization (GGO), The Ohio State University	
Judge	September 2016
2016 Fall Student Poster Forum, The Ohio State University	

External Service:

Judge	February 2022
American Association of Geographers Annual Meeting 2022 Climate Specialty Group Student Paper Competition	
Judge	December 2021
American Geophysical Union Fall Meeting 2021 Outstanding Student Presentation Awards (OSPA)	
Peer Reviewer	
Climate Research	
International Journal of Climatology	
Nature Scientific Reports	
Physical Geography	

Professional Development

US Forest Service Workshop **May 15-17, 2018**
Monitoring Forest Soil Moisture for a Changing World, Michigan Tech Research
Institute, Ann Arbor, MI

Midwest DEWS Workshop **December 7-8, 2016**
NIDIS Midwest Drought Early Warning System Regional Workshop, Cincinnati, OH

Teaching Orientation **August 2016**
University Center for the Advancement of Teaching (UCAT), The Ohio State University

Teaching Experience

Lab Instructor **Fall 2019 – May 2020**
Geography 1900: Extreme Weather and Climate
Department of Geography, The Ohio State University, Columbus, OH

Guest Lecture **Spring 2020**
Geography 5921: Boundary Layer Climatology
Department of Geography, The Ohio State University, Columbus, OH

Guest Lecture **Fall 2019 - Present**
Geography 5900: Weather, Climate, and Global Warming
Department of Geography, The Ohio State University, Columbus, OH

Technical Skills

Programming: Matlab, R, Python, Unix

GIS & Geospatial software: ArcGIS, Panoply GISS, SaTScan

Other software: SPSS, IDV, PuTTY, GR2Analyst, AWS, MS Office Suite