Ronald David Leeper rdleepe2@ncsu.edu

Educational Experience

North Carolina State University	Raleigh, NC	Atmospheric Science	PhD Present
Western Kentucky University	Bowling Green, KY	Geography	M.S. 2009
Western Kentucky University	Bowling Green, KY	Geography	B.S. 2006
Western Kentucky University	Bowling Green, KY	Geography	GIS Certificate 2006

Professional Experience

Research Scholar	North Carolina Institute for Climate Studies	2010 - Present
Research Associate	Western Kentucky University	2009 - 2010
GIS Analyst	Connected Nation	2008 – 2009

Skill Sets

- ArcGIS, ArcGIS-Online, Geoserver, R, Python, Bash-Shell scripting, numerical modeling, and Linux environment, AWS Cloud, Docker, Codder, & GitHub

Geospatial Projects

- Upper Missouri River Basin Data Value Study Mapping Project https://www.drought.gov/indicators/umrb-soil-moisture-snowpack-demo
- 2024 Solar Eclipse Viewability Map
- 2017 Great American Solar Eclipse Viewability Map
- 20th Century Reanalysis Extra Tropical Cyclone tracks
- U.S. Drought Monitor Climatology https://experience.arcgis.com/experience/05f40e44c86b4fc2a871267a6bb382b8

Awards and Achievements

2021 **NOAA's NESDIS** Outstanding Science and Research Team
2020 **NOAA's NESDIS** Outstanding Information Technology and Engineering Employee(s) of the Year
2018 **NOAA's NCEI** Outstanding Information Technology and Engineering Employee Award
2014 **NOAA's NCEI** Special Service Award
2014 **Award for Excellence** Office of Research, Innovation, and Economic Development North Carolina State University
2009 **Outstanding Graduate Student** Department of Geography and Geology Western Kentucky University
2002 **President's Scholar** at Western Kentucky University

Funded Projects

2021 **NOAA MAPP** - Century-scale variations and trends in heat stress metrics: $446,948
2020 **NOAA NVDIA GPU Hackathon** – Development of a hybrid Variational Auto Encoder (VAR) LSTM to quality control soil moisture data.
2020 **NOAA MAPP** - Coping with Drought: $582,568
2020 **NCEI Innovates** - Machine Learning as a Quality Control Strategy: $87,166

Reports

Woloszyn, M., S. Reeves, M. Skumanich, E. Hasenbeck, A. Lang, J. Lisonbee, R. D. Leeper, M. Muth, E. Ossowski, J. Otkin, H. Wang 2024: 2nd National Flash Drought Workshop Report: Building on Progress and Looking Forward.

Peer Reviewed Publications

Wyatt, B. M., N. Gaur, P. Knox, M. R. Levi, M. Cosh, E. Osenga, M. Skumanich, S. M. Quiring, B. G. Illston, E. Ayers, Z. Libohva, V. Sehgal, R. C. Sullivan, K. R. Brinson, O. Crompton, **R. D. Leeper**, P. B. Duncan, X. Zhang, R. F. Brown, C. Quintero, L. Rivera, C. Baffaut, and T. Caldwell, 2025: Data Quality and Metadata Guidelines for the Soil Moisture Monitoring Community, *Submitted to Vadose Zone.*

Walker, V., M. Cosh, T. Caldwell, **R. D. Leeper**, and K. Sutcliffe, 2026: Modeling Soil Moisture From Rainfall: An Evaluation of the Diagnostic Soil Moisture Equation, *Vadose Zone Journal,* 25, e70085, https://doi.org/10.1002/vzj2.70085

Abadi, A. M., Y. Gwon, M. J. Smith, J. D. Berman, A. Rau, **R. D. Leeper**, J. Rennie, S. Munde, B. J. Fard, and J. E. Bell, 2026: The Lethal Connection: Investigating the Relationship of Drought Conditions on Firearm and Nonfirearm Suicides among U.S. Adults. *GeoHeatlh, Accepted.*

Leeper, R. D., T. Harrington, M. A. Palecki, K. DePolt, E. Scott, J. Runkle, and H. Diamond, 2025. The Influence of Drought on Heatwave Intensity, Duration, and Exposure. *Journal of Applied Meteorology and Climatology*, **64**, 425 – 438, https://doi.org/10.1175/JAMC-D-24-0072.1.

Gown, Y., Y. Ji, J. D. Berman, A. M. Abadi, **R. D. Leeper**, J. Rennie, and J. E. Bell, 2025: Impacts of Drought on Respiratory Mortality in the Upper Midwest United States: A Population Subgroup Assessment. *Environmental Research Health,* **3**, https://doi.org/10.1088/2752-5309/adafd6.

Leeper R. D., R. Bilotta, J. Rennie, J. E. Bell, J. D. Berman, A. M. Abadi, S. Munde, Y. Gwon, and B. J. Fard 2024: On the Variability of Drought Frequency, Duration, and Intensity from Commonly Used Drought Indicators, *Submitted to Journal of Applied Meteorology and Climatology*

Anand K. Inamdar and **Leeper, R. D.**, 2024: A novel approach combining satellite and in situ observations to estimate the daytime variation of land surface temperatures for all sky conditions. *Science of Remote Sensing*, **9**, https://doi.org/10.1016/j.srs.2024.100127.

Wilson, T., J. Kochendorfer, H. Diamond, T. Meyers, M. E. Hall, T. Lee, R. Saylor, P. Krishnan, **R. D. Leeper**, M. A. Palecki, 2024: Evaluation of soil water content and bulk electrical conductivity across the U.S. Climate Reference Network using two electromagnetic sensors. *Vadose Zone Journal,* 23, e20336. https://doi.org/10.1002/vzj2.20336

Leeper, R. D., M. A. Palecki, M. Watts, and H. Diamond, 2023: On the Detection of Remotely Sensed Soil Moisture Extremes. *J. Appl. Meteor. Climatol*., **62**, 1611 – 1626, https://doi.org/10.1175/JAMC-D-23-0059.1.

Sewell, K., S. Paul, K. De Polt, M. M. Sugg, **R. D. Leeper**, D. Rao, J. D. Runkel, 2023: Impacts of

compounding drought and heatwave events on child mental health: insights from a spatial clustering analysis. *Discovery Mental Health*, **4,** https://doi.org/10.1007/s44192-023-00055-0.

Lee, R. T., S. Pal, **R. D. Leeper**, T. Wilson, H. J. Diamond, T. P. Meyers, and D. D. Turner, 2024. On the Importance of Regime-Specific Evaluations for Numerical Weather Prediction Models as Demonstrated using the High Resolution Rapid Refresh (HRRR) Model. Weather and Forecasting, 39, 781-791, https://doi.org/10.1175/WAF-D-23-0177.1

Gown Y., N. Y. Richard, Y. Ji, A. M. Abadi, A. Rau, J. Berman, **R. D. Leeper**, J. Rennie, J. Bell, 2023. The effect of heterogeneous severe drought pattern on all-cause and cardiovascular mortality in the Northern Rockies and Plains of the United States. *Science of the Total Environment.* http://dx.doi.org/10.2139/ssrn.4510896

Gown, Y., Y. Ji, J. Bell, A. Abadi, J. Berman, A. Rau, **R. D. Leeper**, and J. Rennie, 2023. The association between drought exposure and respiratory-related mortality in the United States from 2000 to 2018. *International Journal of Environmental Research and Public Health*, https://doi.org/10.3390/ijerph20126076.

Lee, T., **Leeper R. D.**, T. Wilson, H. Diamond, T. P. Meyers, and D. D. Turner, 2023: Using the US Climate Reference Network to Identify Biases in Near- and Sub-Surface Meteorological Fields in the High-Resolution Rapid Refresh (HRRR) Weather Prediction Model, *Journal of Weather and Forecasting*, https://doi.org/10.1175/WAF-D-22-0213.1.

Leeper, R. D., R. Bilotta, B. Petersen, C. J. Stiles, R. Heim, B. Fuchs, O. P. Prat, M. Palecki, and S. Ansari, 2022: Characterizing U.S. Drought over the Past Twenty Years using the U.S. Drought Monitor. *International Journal of Climatology*, https://doi.org/10.1002/joc.7653.

Moreno, C., J. Sugg, J. Runkel, **R. D. Leeper**, B. L. Perry, and M. Sugg, 2022: Examining spatiotemporal trends of drought in the conterminous United States using self-organizing maps, *Physical Geography*, https://doi.org/10.1080/02723646.2022.2035891

Nelson, B. R., O. Prat, and **R. D. Leeper**, 2021: An investigation of NEXRAD based Quantitative Precipitation Estimates. Remote Sensing, 13, 3202. https://doi.org/10.3390/rs13163202.

Leeper, R. D., B. Petersen, M. A. Palecki, and H. Diamond, 2021: Exploring the use of Standardized Soil Moisture as a Drought Indicator. **Journal of Applied Meteorology and Climatology**, 60, https://doi.org/10.1175/JAMC-D-20-0275.1

Leeper, R. D., J. L. Matthews, M. S. Cessarini, J. E. Bell, 2021: Evaluation of air and soil temperatures for determining the onset of growing season. Journal of Geophysical Research: Biogeosciences, 126, e2020JG006171. https://doi.org/10.1029/2020JG006171

Sugg, M., H. Bagil, A. Golden, L. H. Handwerger, M. Tatiana, C. Moreno, R. Reed-Kelly, M. Taylor, S. Woolard, **R. Leeper**, J. Runkle, 2020. A Scoping Review of Drought Impacts on Health and Society in North America, **Climatic Change**, https://doi.org/10.1007/s10584-020-02848-6

Runkle, J. D., M. M. Suggs, **R. D. Leeper**, Y. Rao, J. L. Matthews, J. J. Rennie, 2020.

Short-term effects of weather parameters on COVID-19 morbidity in select US cities. **Science of the Total Environment**, 740, https://doi.org/10.1016/j.scitotenv.2020.140093.

Prat, O. P., B. R. Nelson, E. Nickl, and **R. D. Leeper**, 2020. Global evaluation of gridded satellite precipitation products from the NOAA Climate Data Record program. **Journal of Hydrometeorology**, 22, https:// doi.org/10.1175/JHM-D-20-0246.1.

Nelson, B., O. P. Prat, and **R. D. Leeper**, 2020. Using Ancillary information from Radar-based observations and Rain Gauges to Identify Error and Bias. **Journal of Hydrometeorology,** 22, 1249 – 1258, https://doi.org/10.1175/JHM-D-20-0193.1

Lawrimore, J., D. Wuertz, S. Stevens, B. Koreniewski, M. A. Palecki, **R. D. Leeper**, T. Trunk, 2020. Quality Control and Processing of Cooperative Observer Program Hourly Precipitation Data. **Journal of Hydrometeorology,** 21, https://doi.org/10.1175/JHM-D-19-0300.1.

Wilson, T. B., H. J. Howard, J. Kochendorfer, T. P. Meyers, M. Hall, N. W. Casey, C. B. Baker, **R. D. Leeper**, M. A. Palecki, 2020. Evaluating Time Domain Reflectometry and Coaxial Impedance Sensors for Soil Observations by the U.S. Climate Reference Network. **Vadose Zone Journal**,19, https://doi.org/10.1002/vzj2.20013

Leeper, R. D., J. Kochendorfer, T. Henderson, M. A. Palecki, 2019. Impacts of small-scale urban encroachment on air temperature observations. **Journal Applied Meteorology and Climatology**, 58, 1369 – 1380. http://dx.dio.org/ 10.1175/JAMC-D-19-0002.1

Leeper, R. D., J. E. Bell, and M. A. Palecki, 2019. A description and evaluation of U.S. Climate Reference Network Standardized Soil Moisture Dataset. **Journal Applied Meteorology and Climatology,** 58, 1417 - 1428. https://doi.org/10.1175/JAMC-D-18-0269.1

Rodgers, W., R. Mahmood, **R. Leeper**, J. Yan, 2018. Land cover change, surface mining, and their impacts on a heavy rain event in the Appalachia. Annals of American Association of Geographers. http://dx.doi.org/10.1080/24694452.2018.1460249

Lee, R. T., M. Buban, M. A. Palecki, **R. D. Leeper**, H. J. Diamond, E. Dumas, T. P. Meyers and C. B. Baker, 2018. Great American Eclipse data may fine-tune weather forecasts. Earth Observing System, 99, 18 - 22. https://doi.org/10.1029/2018EO103931

Leeper, R. D., J. E., Bell, C. Vines, M. Palecki, 2017. An Evaluation of the North American Regional Reanalysis Simulated Soil Moisture Conditions during the 2011 to 2013 Drought Period. **Journal of Hydrometeorology**, 18, 515-527. **http://dx.doi.org/10.1175/JHM-D-16-0132.1**

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Klotzbach, P. J., E. C. J. Oliver, **R. D. Leeper**, and C. J. Schreck, III, 2016. The

relationship between the Madden–Julian Oscillation (MJO) and southeastern New England snowfall. **Monthly Weather Review**, 144**,** 1355-1362. **http://dx.doi.org/doi:10.1175/MWR-D-15-0434.1**

Leeper, R. D., M. A. Palecki, and E. Davis, 2015. Methods to Calculate Precipitation from Weighing-Bucket Gauges with Redundant Depth Measurements. **Journal of Atmospheric and Oceanic Technology**, **32**, 1179 – 1190, **http://dx.doi.org/10.1175/JTECH-D-14-00185.1**

Leeper, R. D., J. Rennie, and M. A. Palecki, 2015. Observational perspectives from U.S. Climate Reference Network (USCRN) and Cooperative Observer Program (COOP) Network: Temperature and precipitation comparison. **Journal of Atmospheric and Oceanic Technology**, 32, 703-721. **http://dx.doi.org/10.1175/JTECH-D-14-00172.1**

Leeper, R. D., and J. Kochendorfer, 2015. Evaporation from weighing precipitation gauges: Impacts on automated gauge measurements and quality assurance methods. **Atmospheric Measurement Techniques**, 8**,** 2291-2300. **http://dx.doi.org/10.5194/amt-8-2291-2015**

Quintanar, A. I., R. Mahmood, A Suarez, **R Leeper,** 2015. Atmospheric sensitivity to roughness length in a regional atmospheric model over the Ohio–Tennessee River Valley. **Meteorology and Atmospheric Physics**, 128, 315 – 330. **http://dx.doi.org/ 10.1007/s00703-015-0415-z**

Bell, J. E., **R. D. Leeper**, M. A. Palecki, E. Coopersmith, T. Wilson, R. Bilotta, and S. Embler, 2015. Evaluation of the 2012. Drought with a Newly Established National Soil Monitoring Network. **Vadose Zone Journal,** 14 **http://dx.doi.org/10.2136/vzj2015.02.0023**

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Bell, B. E., M. A. Palecki, B. C. Baker, W. G. Collins, J. H. Lawrimore, **R. D. Leeper**, M. E. Hall, J. Kochendorfer, T. P. Meyers, T. Wilson, and H. J. Diamond. 2013. U.S. Climate Reference Network soil moisture and temperature observations. **Journal of Hydrometeorology**, 14**,** 977-988. **http://dx.doi.org/10.1175/JHM-D-12-0146.1**

Diamond, H., T. R. Karl, M. A. Palecki, C. B. Baker, J. E. Bell, **R. D. Leeper**, D. R. Easterling, J. H. Lawrimore, T. P. Meyers, M. R. Helfert, G. Goodge, P. W. Thorne. 2013. U.S. Climate Reference Network after a decade of operations. **Bulletin of The American Meteorological Society**, 94, 485-498. https://doi.org/10.1175/BAMS-D-12-00170.1

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Mahmood, R., **R. Leeper**, A.I. Quintanar. 2011. Sensitivity of planetary boundary layer atmosphere to historical and future changes of land use/land cover, vegetation fraction, and soil moisture in Western Kentucky, USA. **Global and Planetary Change**, 78: 36-53

Mahmood, R., R.A. Pielke Sr., K.G. Hubbard, D. Niyogi, G. Bonan, P. Lawrence, B. Baker, R. McNider, C. McAlpine, A. Etter, S. Gameda, B. Qian, A. Carleton, A. Beltran-Przekurat, T. Chase, A.I. Quintanar, J.O. Adegoke, S. Vezhapparambu, G. Conner, S. Asefi, E. Sertel, D.R. Legates, Y. Wu, R. Hale, O.N. Frauenfeld, A. Watts, M. Shepherd, C. Mitra, V.G. Anantharaj, S. Fall, R. Lund, A. Nordfelt, P. Blanken, J. Du, H-I. Chang, **Leeper. R**, U.S. Nair, S. Dobler, R. Deo, J. Syktus. 2010. Impacts of land use land cover change on climate and future research priorities. **Bulletin of American Meteorological Society**,91:37-46.

Leeper, R. D., Walker, J. M., and Goodrich, G. B. 2010. Teleconnective relationships to the Kentucky Snowfall Impact Scale. **Journal of Kentucky Academy of Science**, 71(1):36-46.

Leeper, R., R. Mahmood, A.I. Quintanar. 2009. Near surface atmospheric response to simulated changes in land-cover, vegetation fraction, and soil moisture over Western Kentucky. **Monograph, in Climatology**, 62(2). 41 pp.

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