MATTHEW S. VAN DEN BROEKE

Dept. of Earth and Atmospheric Sciences
University of Nebraska-Lincoln
ORCID ID: 0000-0002-1114-0987

306 Bessey Hall
Lincoln, NE 68588
MVanDenBroeke2@UNL.edu

EDUCATION

University of Oklahoma, Norman, OK
Ph.D., Meteorology, May 2011
Dissertation Title: Mesocyclone and Microphysical Evolution in Simulated Supercell Storms with Varying Wind and Moisture Profiles (Jerry Straka, Advisor)

University of Oklahoma, Norman, OK
M.S., Meteorology, May 2007
Thesis Title: Polarimetric Signatures and Microphysical Processes in Tornadic Southern and High Plains Classic Supercells (Jerry Straka, Advisor)

Valparaiso University, Valparaiso, IN
B.S., Meteorology, Summa Cum Laude, May 2005

EXPERIENCE

Department of Earth and Atmospheric Sciences, University of Nebraska-Lincoln, Lincoln, NE
Professor, August 2025 – present
Associate Professor, August 2017 – August 2025
Assistant Professor, August 2011 – August 2017

Central Michigan University, Mount Pleasant, MI
Associate Graduate Faculty, April 2025 – April 2028

School of Meteorology, University of Oklahoma, Norman, OK
Graduate Teaching and Research Assistantships, 2006 – 2011
American Meteorological Society Graduate Fellow, 2005 – 2006

National Severe Storms Laboratory, Norman, OK
Intern, summer 2004 (Oklahoma University Research Experiences for Undergraduates)

Department of Geography and Meteorology, Valparaiso University, Valparaiso, IN
Lab Assistant, 2002 – 2005

Department of Geography and Meteorology, Valparaiso University, Valparaiso, IN
Intern, summer 2003

EXPERTISE

- Expert in interpretation and application of polarimetric radar data
- Expert in supercell thunderstorm structure/evolution and precipitation processes
- Expert in radar aeroecology applications
- Knowledgeable in tropical meteorology, synoptic meteorology, and land-atmosphere interactions
- Knowledgeable in geoscience education research and applications

HONORS/AWARDS/PROGRAMS

- Certificate of Recognition for Contributions to Students, 2012 & 2025
- College Distinguished Teaching Award, College of Arts & Sciences, UNL, 2021
- J. B. Coffman Award for research excellence, Earth & Atmos. Sci., UNL, 2017 & 2022
- Lawson Award for teaching excellence, Earth and Atmos. Sci., UNL, 2019
- Dean's Award for Excellence in Graduate Education, UNL, 2017
- Peer Review of Teaching Program, UNL, 2012–2014
- Weather Challenge national forecasting tournament participant, 2013 & 2014
- Research Development Fellows Program, UNL, 2012–2013
- AMS/SAIC/General Sciences Operation Graduate Fellowship, 2005
- Eugene M. Rasmusson Award in Meteorology, Valparaiso University, 2005
- AMS/Werner A. Baum Endowed Undergraduate Scholarship in Meteorology, 2004
- Udall Scholar, 2004
- Oklahoma University Research Experiences for Undergraduates program, 2004
- Lumina Award from Valparaiso University for excellent scholarship, 2004
- Chi Epsilon Pi Meteorology Honor Society, inducted 2003
- Young Naturalist Award national finalist for ecological research paper, 2001

REFEREED PUBLICATIONS

Healey, D. J., and **M. S. Van Den Broeke**, 2025: Z_{DR} columns in simulated QLCSs: Column-updraft relationships and differences between two microphysics schemes. *Mon. Wea. Rev.*, in press.

Martz, R. A., A. L. Houston, **M. S. Van Den Broeke**, and S. A. Shield, 2025: The impact of urbanized areas on the spatial characteristics of deep convection initiation in the central United States. *J. Appl. Meteor. Climatol.*, **64**, 1045–1061, https://doi.org/10.1175/JAMC-D-23-0153.1.

Wood, M. J., and **M. S. Van Den Broeke**, 2024: Dual-polarization radar characteristics of tropical cyclone tornadic and nontornadic supercells. *Mon. Wea. Rev.*, **153**, 327–345. https://doi.org/10.1175/MWR-D-24-0080.1

Bunkers, M. J., **M. S. Van Den Broeke**, and J. T. Allen, 2024: An update for predicting left-moving supercell motion. *Wea. Forecasting*, **39**, 1777–1794, https://doi.org/10.1175/WAF-D-24-0028.1.

Van Den Broeke, M. S., and E. R. Green, 2024: Temporal associations between polarimetric updraft proxies and signatures of inflow and hail in supercells. *Rem. Sens.*, **16**(22), 4314. https://doi.org/10.3390/rs16224314

Barker, C. A., and **M. S. Van Den Broeke**, 2024: Southerly high-wind events in southern New England: Climatology and synoptic setting. *J. Operational Meteor.*, accepted.

Healey, D. J., and **M. S. Van Den Broeke**, 2023: Comparing polarimetric signatures of proximate tornadic and non-tornadic supercells in similar environments. *Wea. Forecasting*, **38**, 2011–2027. https://doi.org/10.1175/WAF-D-23-0013.1

Van Den Broeke, M. S., M. B. Wilson, C. A. Van Den Broeke, D. J. Healey, M. J. Wood, and R. E. Nelson, 2023: Polarimetric radar observations of a long-lived supercell and associated tornadoes on 10-11 December 2021. *Mon. Wea. Rev.*, **151**, 2501–2520. https://doi.org/10.1175/MWR-D-22-0330.1

Bundy, L. R., V. A. Gensini, and **M. S. Van Den Broeke**, 2023: Tropical cyclone impacts on crop condition ratings and yield in the Coastal Southern United States. *Agric. For. Meteorol.*, **340**, 109599. https://doi.org/10.1016/j.agrformet.2023.109599

Van Den Broeke, M. S., 2023: Radar indications of altered foraging behavior during the February 2021 severe North American cold wave. *Avian Biol. Res.*, **16**, 14–20. https://doi.org/10.1177/17581559221145450

Wilson, M. B., and **M. S. Van Den Broeke**, 2022: Using the Supercell Observation Research Kit (SPORK) to examine a large sample of pretornadic and nontornadic supercells. *Electronic J. Severe Storms Meteor.*, **17** (2), 1–38. https://doi.org/10.55599/ejssm.v17i2.85

Bunkers, M., M. Wilson, **M. Van Den Broeke**, and D. Healey, 2022: Scan-by-scan storm-motion deviations for concurrent tornadic and nontornadic supercells. *Wea. Forecasting*, **37**, 749–770. doi.org/10.1175/WAF-D-21-0153.1

Van Den Broeke, M. S., 2022: Seasonally and diurnally varying cold front effects along the Minnesotan North Shore of Lake Superior. *Atmosphere*, **13**, 441. doi.org/10.3390/atmos13030441

Van Den Broeke, M. S., 2022: Bioscatter transport by tropical cyclones: Insights from ten years in the Atlantic basin. *Rem. Sens. Ecol. Cons.*, **8**, 18–31. doi.org/10.1002/rse2.225

Van Den Broeke, M. S., 2022: Bioscatter characteristics related to inversion variability in Atlantic basin tropical cyclones. *Earth Interact.,* **26**, 28–38. doi.org/10.1175/EI-D-21-0010.1

Van Den Broeke, M., 2021: Polarimetric radar characteristics of tornadogenesis failure in supercell thunderstorms. *Atmosphere*, **12**, 581. doi.org/10.3390/atmos12050581

Wilson, Matthew B., and **M. S. Van Den Broeke**, 2021: An automated Python algorithm to quantify Z_{DR} arc and K_{DP}-Z_{DR} separation signatures in supercells. *J. Atmos. Oceanic Technol.*, **38**, 371–386. doi.org/10.1175/JTECH-D-20-0056.1

Van Den Broeke, M. S., and T. J. Gunkel, 2021: The influence of isolated thunderstorms and the low-level wind field on nocturnally-migrating birds in central North America. *Rem. Sens. Ecol. Cons.*, **7(2)**, 187–197. doi.org/10.1002/rse2.179

Van Den Broeke, M. S., 2020: Disdrometer, polarimetric radar, and condensation nuclei observations of supercell and multicell storms on 11 June 2018 in eastern Nebraska. *Atmosphere*, **2020(11)**, 770–786. doi.org/10.3390/atmos11070770

Hansen, H. H., M. Pegg, **M. Van Den Broeke**, D. Watkinson, and E. C. Enders, 2020: An unseen synchrony or recurrent resource pulse opportunity? Linking fisheries with aeroecology. *Rem. Sens. Ecol. Conserv.*, **6(3)**, 366–380. doi.org/10.1002/rse2.147

Van Den Broeke, M. S., 2020: A preliminary polarimetric radar comparison of pre-tornadic and nontornadic supercell storms. *Mon. Wea. Rev.*, **148**, 1567–1584. doi.org/10.1175/MWR-D-19-0296.1

Alsarraf, H., **M. Van Den Broeke**, and H. Aljassar, 2019: Effects of the sea breeze circulation on soil temperature over Kuwait using in situ observations and the ECMWF model. *Open Atmos. Sci. J.*, **13**, 29–42. doi.org/10.2174/1874282301913010029

Elbing, B. R., C. E. Petrin, and **M. S. Van Den Broeke**, 2019: Measurement and characterization of infrasound from a tornado producing storm. *J. Acous. Soc. Amer.*, **146(3)**, 1528–1540. doi.org/10.1121/1.5124486

Van Den Broeke, M. S., 2019: Radar quantification, temporal analysis, and influence of atmospheric conditions on a roost of American Robins (*Turdus migratorius*) in

Oklahoma. *Remote Sens. Ecol. Conserv.*, **5(2)**, 193–204. doi.org/10.1002/rse2.99

Hu, Q., J. A. Torres-Alavez, and **M. S. Van Den Broeke**, 2018: Land-cover change and the "Dust Bowl" drought in the U.S. Great Plains. *J. Clim.*, **31**, 4657–4667. doi.org/10.1175/JCLI-D-17-0515.1

Van Den Broeke, M. S., A. Kalin, J. A. Torres, R. Oglesby, and Q. Hu, 2017: A warm-season comparison of WRF coupled to the CLM4.0, Noah-MP, and bucket hydrology land surface schemes over the central USA. *Theor. Appl. Climatol.*, **134(3)**, 801–816. doi.org/10.1007/s00704-017-2301-8

Van Den Broeke, M. S., 2017: Polarimetric radar metrics related to tornado life cycles and intensity in supercell storms. *Mon. Wea. Rev.*, **145**, 3671–3686. doi.org/10.1175/MWR-D-16-0453.1

Van Den Broeke, M. S., 2017: Potential for tornado warning improvement through utilization of the TDS in the warning decision process. *J. Operational Meteor.*, **5**, 121–133. doi.org/10.15191/nwajom.2017.0510

Jauernic, S. T., and **M. S. Van Den Broeke**, 2017: Tornado warning response and perceptions among undergraduates in Nebraska. *Wea. Clim. Soc.*, **9**, 125–139. doi.org/10.1175/WCAS-D-16-0031.1

Van Den Broeke, M. S., 2016: Polarimetric variability of classic supercell storms as a function of environment. *J. Appl. Meteor. Climatol.*, **55**, 1907–1925. doi.org/10.1175/JAMC-D-15-0346.1

Van Den Broeke, M. S., and H. Alsarraf, 2016: Polarimetric radar observations of dust storms at C- and S-band. *J. Operational Meteor.*, **4**, 123–131. dx.doi.org/10.15191/nwajom.2016.0409

Arthurs, L. A., and **M. S. Van Den Broeke**, 2016: Novice explanations of hurricane formation offer insights into scientific literacy and the development of expert-like conceptions. *J. Astron. Earth Sci. Educ.*, **3**, 1–26. dx.doi.org/10.19030/jaese.v3i1.9686

Van Den Broeke, M. S., D. M. Tobin, and M. R. Kumjian, 2016: Polarimetric radar observations of precipitation type and rate from the 2-3 March 2014 winter storm in Oklahoma and Arkansas. *Wea. Forecasting*, **31**, 1179–1196. dx.doi.org/10.1175/WAF-D-16-0011.1

Duell, R. S., and **M. S. Van Den Broeke**, 2016: Climatology, synoptic conditions, and misanalyses of Mississippi River Valley drylines. *Mon. Wea. Rev.*, **144**, 927–943. dx.doi.org/10.1175/MWR-D-15-0108.1

Jauernic, S. T., and **M. S. Van Den Broeke**, 2016: Perceptions of tornadoes, tornado risk, and tornado safety actions and their effects on warning response among Nebraska undergraduates. *Natural Hazards*, **80**, 329–350. dx.doi.org/10.1007/s11069-015-1970-9

Van Den Broeke, M. S., 2015: Polarimetric tornadic debris signature variability and debris fallout signatures. *J. Appl. Meteor. Climatol.*, **54**, 2389–2405. dx.doi.org/10.1175/JAMC-D-15-0077.1

Van Den Broeke, M. S., and L. Arthurs, 2015: Conceptions of tornado wind speed and land surface interactions among undergraduate students in Nebraska. *J. Geosci. Educ.*, **63**, 323–331. dx.doi.org/10.5408/14-029.1

Alsarraf, H., and **M. S. Van Den Broeke**, 2015: Using the WRF regional climate model to simulate future summertime wind speed changes over the Arabian Peninsula. *J. Climatol. Wea. Forecasting*, **3(3)**: 144. dx.doi.org/10.4172/2332-2594.1000144

Alsarraf, H., and **M. Van Den Broeke**, 2015: Using high-resolution WRF model simulations to investigate the relationship between mesoscale circulations and aerosol transport over Kuwait. *J. Climatol. Wea. Forecasting*, **3(1)**:126. dx.doi.org/10.4172/2332-2594.1000126

Van Den Broeke, M. S., and C. A. Van Den Broeke, 2015: Polarimetric radar observations from a waterspout-producing thunderstorm. *Wea. Forecasting*, **30**, 329–348. dx.doi.org/10.1175/WAF-D-14-00114.1

Van Den Broeke, M. S., and S. T. Jauernic, 2014: Spatial and temporal characteristics of polarimetric tornadic debris signatures. *J. Appl. Meteor. Climatol.*, **53**, 2217–2231. dx.doi.org/10.1175/JAMC-D-14-0094.1

Van Den Broeke, M. S., 2014: Effects of mid- and upper-level drying on microphysics of simulated supercell storms. *Electronic J. Severe Storms Meteor.*, **9(3)**, 1–29. https://doi.org/10.55599/ejssm.v9i3.55

Van Den Broeke, M. S., 2013: Polarimetric radar observations of biological scatterers in Hurricanes Irene (2011) and Sandy (2012). *J. Atmos. Oceanic Technol.*, **30**, 2754–2767. dx.doi.org/10.1175/JTECH-D-13-00056.1

Van Den Broeke, M. S., W.H. Beasley, and M.B. Richman, 2010: The role of atmospheric conditions in determining intensity of crepuscular and anticrepuscular rays. *Mon. Wea. Rev.*, **138**, 2883–2894. dx.doi.org/10.1175/2010MWR3162.1

Van Den Broeke, M. S., J. M. Straka, and E. N. Rasmussen, 2008: Polarimetric radar observations at low levels during tornado life cycles in a small sample of classic

Southern Plains supercells. *J. Appl. Meteor. Climatol.*, **47**, 1232–1247. dx.doi.org/10.1175/2007JAMC1714.1

Van Den Broeke, M. S., D. M. Schultz, R. H. Johns, J. S. Evans, and J. E. Hales, 2005: Cloud-to-ground lightning production in strongly-forced, low-instability convective lines associated with damaging wind. *Wea. Forecasting*, **20**, 517–530. dx.doi.org/10.1175/WAF876.1

PUBLISHED DATASET

Van Den Broeke, M., C. Van Den Broeke, S. Kirby, B. Schweigert, and R. Nelson, 2024: Left-moving supercells with polarimetric data available, 2011–2022 [Data set]. Zenodo. https://doi.org/10.5281/zenodo.10551964

CONFERENCE PRESENTATIONS AND PROCEEDINGS

Haberlie, A. M., W. S. Ashely, **M. S. Van Den Broeke**, N. Sonntag, B. Weart, and W. Phipps, 2026: Quasi-linear convective systems in the United States: 1996–2025. *106th Annual Meeting of the American Meteorological Society*. Houston, TX, Amer. Meteor. Soc.

Healey, D. J., and **M. Van Den Broeke**, 2025: Z_{DR} columns and mesovortices in quasi-linear convective systems with varying degrees of low-level hodograph curvature and shear. *21st Conference on Mesoscale Processes*. Boise, ID, Amer. Meteor. Soc.

Carothers, E. A., and **M. Van Den Broeke**, 2025: Radar indicated precursors to severe weather development in left-moving supercells. *105th Annual Meeting of the American Meteorological Society*. New Orleans, LA, Amer. Meteor. Soc.

Lammes, A. F., **M. Van Den Broeke**, and T. White, 2025: The impact of weather on protests in the Washington, D.C., area. *105th Annual Meeting of the American Meteorological Society*. New Orleans, LA, Amer. Meteor. Soc.

Scott, C. A., C. M. Kuster, B. Herzog, and **M. Van Den Broeke**, 2025: Evaluating quasi-linear convective system mesovortices using dual-polarization radar data. *105th Annual Meeting of the American Meteorological Society*. New Orleans, LA, Amer. Meteor. Soc.

Scott, C. A., C. M. Kuster, B. Herzog, and **M. Van Den Broeke**, 2025: Specific differential phase signatures within quasi-linear convective system mesovortices.

105th Annual Meeting of the American Meteorological Society. New Orleans, LA, Amer. Meteor. Soc.

Zeeb, A. W., J. T. Allen, **M. Van Den Broeke**, and M. Bunkers, 2025: Understanding left-moving supercells: Environmental factors and forecasting challenges. *31st Conference on Severe Local Storms*. Virginia Beach, VA, Amer. Meteor. Soc.

Barker, C. A., and **M. S. Van Den Broeke**, 2024: Southerly high wind events in southern New England: Climatology and synoptic setting. *Southern New England Weather Conference*. Canton, MA, Blue Hill Observatory.

Nelson, R. E., and **M. S. Van Den Broeke**, 2024: Polarimetric radar signatures in significantly severe left-moving supercells. *104th Annual Meeting of the American Meteorological Society*. Baltimore, MD, Amer. Meteor. Soc.

Nelson, R. E., and **M. Van Den Broeke**, 2023: Polarimetric radar signatures in a large sample of left-moving supercells. *103rd Annual Meeting of the American Meteorological Society*. Denver, CO, Amer. Meteor. Soc.

Martz, R., A. L. Houston, and **M. Van Den Broeke**, 2023: The impact of urban heat islands on convection initiation. *103rd Annual Meeting of the American Meteorological Society*. Denver, CO, Amer. Meteor. Soc.

Drager, A. J., R. D. Dixon, A. L. Houston, D. Kopacz, C. M. Rowe, and **M. Van Den Broeke**, 2023: Open educational resource (OER) activities developed at the University of Nebraska-Lincoln for introductory weather and climate labs. *103rd Annual Meeting of the American Meteorological Society*. Denver, CO, Amer. Meteor. Soc.

Bundy, L., V. A. Gensini, and **M. Van Den Broeke**, 2023: Tropical cyclone impacts on crop conditions in the coastal southeast United States. *103rd Annual Meeting of the American Meteorological Society*. Denver, CO, Amer. Meteor. Soc.

Healey, D. J., and **M. Van Den Broeke**, 2022: Comparing polarimetric signatures of proximate tornadic and nontornadic supercells in similar environments. *102nd Annual Meeting of the American Meteorological Society (Virtual)*. Virtual, Amer. Meteor. Soc.

Wilson, T. C., R. J. KC, B. R. Elbing, and **M. S. Van Den Broeke**, 2020: Modeling infrasound propagation from tornado producing thunderstorms. *179th Meeting of the Acoustical Society of America (Virtual)*. Virtual, Acous. Soc. Amer.

Wilson, T. C., R. J. KC, B. R. Elbing, and **M. S. Van Den Broeke**, 2020: Infrasound propagation in the atmospheric conditions of tornado producing storms. *73rd Annual Meeting of the American Physical Society Division of Fluid Dynamics (Virtual)*. Virtual, Amer. Phys. Soc.

Wilson, M. B., N. R. Humrich, and **M. S. Van Den Broeke**, 2020: The supercell polarimetric observation research kit (SPORK): An automated, python-based algorithm for examining supercell dual-pol signatures. *100th Annual Meeting of the American Meteorological Society*. Boston, MA, Amer. Meteor. Soc.

Wilson, M. B., and **M. S. Van Den Broeke**, 2020: An analysis of Z_{DR} column characteristics in a large sample of supercell storms. *100th Annual Meeting of the American Meteorological Society*. Boston, MA, Amer. Meteor. Soc.

Elbing, B. R., C. E. Petrin, **M. S. Van Den Broeke**, and E. Green, 2019: Infrasound observations from the 2019 tornado season. *178th Meeting of the Acoustical Society of America*. San Diego, CA, Acous. Soc. Amer.

Van Den Broeke, M. S., 2019: Disdrometer measurements and comparison to polarimetric radar observations in Nebraska precipitation. *CLOUD-MAP Workshop*. Norman, OK, July 2019.

Elbing, B. R., C. E. Petrin, and **M. S. Van Den Broeke**, 2019: Infrasound measurements from a tornado in Oklahoma. *Proc. Mtgs. Acoust.*, **33**, 045003. https://doi.org/10.1121/2.0001015

Wilson, M. B., and **M. S. Van Den Broeke**, 2019: Developing a Python-based algorithm to identify and track Z_{DR} arcs in supercells. *99th Annual Meeting of the American Meteorological Society*. Phoenix, AZ, Amer. Meteor. Soc.

Lee, K.-Y., and **M. S. Van Den Broeke**, 2019: Polarimetric radar observations of aerosol effects on the microphysical structure of Great Plains thunderstorms. *99th Annual Meeting of the American Meteorological Society*. Phoenix, AZ, Amer. Meteor. Soc.

Petrin, C. E., **M. S. Van Den Broeke**, and B. R. Elbing, 2018: Severe storm infrasound observations during spring 2018. *71st Annual Meeting of the APS Division of Fluid Dynamics*. Atlanta, GA, Amer. Physical Soc.

Wilson, M. B., and **M. S. Van Den Broeke**, 2018: How well do Z_{DR} arc metrics indicate potential for strong low-level rotation in supercells? *29th Conference on Severe Local Storms*. Stowe, VT, Amer. Meteor. Soc.

Petrin, C. E., **M. S. Van Den Broeke**, and B. R. Elbing, 2018: Tornado and hail infrasound observations during severe storms. *29th Conference on Severe Local Storms*. Stowe, VT, Amer. Meteor. Soc.

Elbing, B. R., C. E. Petrin, and **M. S. Van Den Broeke**, 2018: Monitoring infrasound from a tornado in Oklahoma. *175th Meeting of the Acoustical Society of America*. Minneapolis, MN, Acous. Soc. Of Amer.

Hartzler, J. C., C. E. Petrin, B. R. Elbing, and **M. S. Van Den Broeke**, 2018: Infrasonic recordings during a tornado. *38th Oklahoma AIAA/ASME Symposium*. Edmond, OK, Amer. Inst. of Aeronautics and Astronautics/Amer. Soc. of Mech. Engineers.

Petrin, C. E., J. C. Hartzler, **M. S. Van Den Broeke**, and B. R. Elbing, 2018: Infrasound from May 11, 2017 tornado in Perkins Oklahoma. *Oklahoma NSF EPSCoR 2018 Annual State Conference*. Oklahoma City, OK, Oklahoma EPSCoR.

Paltz, E., M. Hayes, and **M. S. Van Den Broeke**, 2018: Impact of past experiences with tornadoes on future decisions in Nebraska. *98th American Meteorological Society Annual Meeting*. Austin, TX, Amer. Meteor. Soc.

Engel, A. J., and **M. S. Van Den Broeke**, 2017: Spatiotemporal variability of Z_{DR} column areal and altitudinal extent in tornadic and nontornadic supercells. *38th Conference on Radar Meteorology*. Chicago, IL, Amer. Meteor. Soc.

Engel, A. J., and **M. S. Van Den Broeke**, 2017: Z_{DR} column maximum altitudinal extent in tornadic and nontornadic supercells. *21st Annual Severe Storms and Doppler Radar Conference*. Ankeny, IA, Central Iowa National Weather Association.

Whitby, M. D., **M. Van Den Broeke**, C. Allen, and Z. Warren, 2017: Discerning migratory patterns of bats in Nebraska using RADAR. *North American Society for Bat Research 2017 Symposium*. Knoxville, TN, North American Society for Bat Research.

Caruthers, A. L., and **M. S. Van Den Broeke**, 2017: Land use land cover change effects on Southern Great Plains precipitation patterns. *97th American Meteorological Society Annual Meeting*. Seattle, WA, Amer. Meteor. Soc.

Heuscher, L., and **M. Van Den Broeke**, 2016: Hail variability in supercell storms and response to environmental variables. *28th Conference on Severe Local Storms.* Portland, OR, Amer. Meteor. Soc.

Engel, A. J., and **M. S. Van Den Broeke**, 2016: Z_{DR} column altitudinal extent in isolated tornado-producing supercells. *28th Conference on Severe Local Storms.* Portland, OR, Amer. Meteor. Soc.

Caruthers, A. L., and **M. Van Den Broeke**, 2016: Sensitivity of Tropical Storm Erin to land use land cover changes in the Southern Great Plains. *National Weather Association 41st Annual Meeting*. Norfolk, VA, National Weather Association.

Paltz, E., and **M. Van Den Broeke**, 2016: Polarimetric radar signatures of supercell thunderstorms in tropical cyclones. *UNL Spring 2016 Research Fair*. Lincoln, NE, University of Nebraska-Lincoln.

Van Den Broeke, M. S., 2015: Polarimetric variability of supercell storms in similar environments. *37th Conference on Radar Meteorology*. Norman, OK, Amer. Meteor. Soc. [personally presented]

Van Den Broeke, C. A., and **M. S. Van Den Broeke**, 2015: Polarimetric radar characteristics of warm front-crossing storms on 9 April 2015. *37th Conference on Radar Meteorology*. Norman, OK, Amer. Meteor. Soc. [personally presented]

Heuscher, L., and **M. S. Van Den Broeke**, 2015: Hail and small-drop DSD variability by environment in supercell storms. *37th Conference on Radar Meteorology*. Norman, OK, Amer. Meteor. Soc.

Humrich, N. R., and **M. S. Van Den Broeke**, 2015: Association between rear flank gust front mesocyclone-relative position and supercell microphysical variability. *37th Conference on Radar Meteorology*. Norman, OK, Amer. Meteor. Soc.

Van Den Broeke, M. S., 2015: Polarimetric radar observations of spring migration in Nebraska and Oklahoma. *2015 Joint Meeting of The American Ornithologists' Union and The Cooper Ornithological Society*. Norman, OK, AOU/COS. [personally presented]

Van Den Broeke, M. S., 2015: Polarimetric radar observations of bioscatter transport by tropical cyclones. *2015 Joint Meeting of The American Ornithologists' Union and The Cooper Ornithological Society*. Norman, OK, AOU/COS. [personally presented]

Petr, J., and **M. Van Den Broeke**, 2015: Synoptic and polarimetric radar analysis of the 2 March 2014 winter storm in the south-central United States. *95th Annual Meeting of the American Meteorological Society*. Phoenix, AZ, Amer. Meteor. Soc.

Jauernic, S. T., and **M. S. Van Den Broeke**, 2014: Tornado knowledge, perceptions, and safety actions taken among undergraduates. *16th Annual High Plains Conference*. Hastings, NE. High Plains Chapter of the American Meteorological Society and National Weather Association.

Van Den Broeke, M. S., 2014: Identifying optimal instructional methods in synoptic meteorology. *2014 Peer Review of Teaching Final Workshop*. Lincoln, NE. University of Nebraska-Lincoln. [personally presented]

Boggs, L., and **M. S. Van Den Broeke**, 2014: Peak current and polarity of cloud-to-ground lightning strikes in multicell and supercell convection related to polarimetric radar data. *2014 National Conference on Undergraduate Research*. Lexington, KY. Council on Undergraduate Research.

Lee, K.-Y., and **M. S. Van Den Broeke**, 2014: Polarimetric radar analysis of the microphysics of charge separation in an MCC event on June 15, 2013. *2014 National Conference on Undergraduate Research*. Lexington, KY. Council on Undergraduate Research.

Humrich, N. R., and **M. S. Van Den Broeke**, 2014: Tropical cyclone lightning related to polarimetric radar variables. *5th International Lightning Meteorology Conference*. Tucson, AZ, Vaisala.

Boggs, L., and **M. S. Van Den Broeke**, 2014: Electrification of multicell and supercell convection related to polarimetric radar data. *5th International Lightning Meteorology Conference*. Tucson, AZ, Vaisala.

Lee, K.-Y., and **M. S. Van Den Broeke**, 2014: Polarimetric radar analysis of lightning in an MCC event on June 15, 2013. *5th International Lightning Meteorology Conference*. Tucson, AZ, Vaisala.

Van Den Broeke, M. S., 2014: Polarimetric debris signature spatial and temporal characteristics. *94th Annual Meeting of the American Meteorological Society*. Atlanta, GA, Amer. Meteor. Soc. [personally presented]

Duell, R., and **M. Van Den Broeke**, 2014: Eastern dryline climatology and synoptic-scale environment. *94th Annual Meeting of the American Meteorological Society*. Atlanta, GA, Amer. Meteor. Soc.

Jauernic, S., and **M. Van Den Broeke**, 2014: The influence of tornado knowledge and perceptions on safety actions taken among undergraduates. *94th Annual Meeting of the American Meteorological Society*. Atlanta, GA, Amer. Meteor. Soc.

Lojero, G. A., and **M. Van Den Broeke**, 2014: Aerosol association with severe weather in Oklahoma. *94th Annual Meeting of the American Meteorological Society*. Atlanta, GA, Amer. Meteor. Soc.

Arthurs, L., and **M. Van Den Broeke**, 2013: Revealing and characterizing novice conceptions of hurricane formation using textual and diagrammatic analyses. *LearnLab Summer Workshop*. Pittsburgh, PA. Carnegie Mellon University.

Arthurs, L., and **M. Van Den Broeke**, 2012: Textual and diagrammatic analyses reveal novice ideas about hurricane formation. *2012 Conference on Transforming Research in STEM Education*, St. Paul, MN.

Van Den Broeke, M. S., J.M. Straka, and E. Rasmussen, 2010: Mesocyclone and RFD evolution in simulated supercell storms with varying wind profiles. Preprints, *25th Conf. on Severe Local Storms*, Denver, CO, Amer. Meteor. Soc., 8A.6. http://ams.confex.com/ams/25SLS/techprogram/paper_175853.htm

Van Den Broeke, M. S., 2010: Mesocyclone and RFD evolution in simulated supercell storms with varying wind profiles. *25th Conf. on Severe Local Storms*, Denver, CO, Amer. Meteor. Soc. [personally presented]

Van Den Broeke, M. S., D. M. Schultz, R. H. Johns, J. S. Evans, and J. E. Hales, 2005: Cloud-to-ground lightning production in strongly forced, low-instability convective lines associated with damaging wind. Preprints, *Fourth AMS Student Conference*, San Diego, CA, Amer. Meteor. Soc., CD-ROM, P1.34.

Van Den Broeke, M. S., 2005: Cloud-to-ground lightning production in strongly forced, low-instability convective lines. *Second Annual Great Lakes Meteorology Conference*, La Porte, IN, Valparaiso University. [personally presented]

PUBLICATIONS IN PEER REVIEW

Healey, D. J., and **M. S. Van Den Broeke**: Z_{DR} columns and mesovortices in quasi-linear convective systems with varying degrees of low-level hodograph curvature and shear. Submitted May 2025 (*Mon. Wea. Rev.*, in revision).

Van Den Broeke, M., C. Van Den Broeke, and B. Schweigert: Spatiotemporal characteristics of left-moving supercells in the contiguous United States. Submitted May 2025 (*J. Appl. Meteor. Climatol.*, in revision).

Zeeb, A., J. T. Allen, and **M. Van Den Broeke**: Understanding left-moving supercells: Environmental factors and forecasting challenges. Submitted July 2025 (*Mon. Wea. Rev.*, in revision).

Scott, C., **M. S. Van Den Broeke**, and C. M. Kuster: Specific differential phase signatures associated with quasi-linear convective system mesovortices. Submitted Aug. 2025 (*J. Operational Meteor.*, submitted).

Schweigert, B. J., and **M. S. Van Den Broeke**: A dual-polarimetric benchmark for left-moving supercells. Submitted Aug. 2025 (*Mon. Wea. Rev.*, submitted).

PUBLICATIONS IN PREPARATION

Barker, C. A., and **M. S. Van Den Broeke**: Environmental controls of hail in quasi-linear convective systems. (*Mon. Wea. Rev.*).

Van Den Broeke, M. S.: The influence of meteorological factors and moon phase on radar-detected migration density in central North America. (*Rem. Sens. Ecol. Conserv.*).

Carothers, E. A., and **M. S. Van Den Broeke**: Radar precursors to severe weather reports in left-moving supercells. (*Wea. Forecasting*).

Van Den Broeke, M. S., and R. E. Nelson: Polarimetric radar signatures in significant severe left-moving supercells. (*J. Appl. Meteor. Climatol.*).

NON-PEER-REVIEWED PUBLICATIONS

Van Den Broeke, M. S., 2014: Peer Review of Teaching Inquiry Portfolio (2014): METR 341 (Synoptic Meteorology). UNL: Peer Review of Teaching program. Available at http://www.courseportfolio.org/peer/potfolioFiles/anonF/1401479699932__2014%20Van%20Den%20Broeke.pdf

Van Den Broeke, M. S., 2013: Peer Review of Teaching benchmark portfolio (2013): METR 200 (Weather and Climate). UNL: Peer Review of Teaching program. Available at http://www.courseportfolio.org/peer/potfolioFiles/anonF/1369362176390__Van%20Den%20Broeke_Matthew-2013.pdf

Grinter, C. C., and **M. S. Van Den Broeke**, 2013: Probable rediscovery of *Ethmia monachella* Busck (Gelechioidea) from a photograph on BugGuide.net. *News of the Lepidopterists' Society*, **55**, 124–125, https://images.peabody.yale.edu/lepsoc/nls/2010s/2013/2013_v55_n3.pdf&ved=2ahUKEwiU2cC_y7GKAxVgEkQIHVCdLBkQFnoECBwQAQ&usg=AOvVaw1GctTaAxTmTmGz6_6VHKnt

Van Den Broeke, M. S., 2011: *Mesocyclone and Microphysical Evolution in Simulated Supercell Storms with Varying Wind and Moisture Profiles*. Doctoral Dissertation, 134 pp., https://shareok.org/items/79ae0077-e154-4aed-9f7c-d08cd6c57695

Van Den Broeke, M. S., 2007: *Polarimetric Signatures and Microphysical Processes in Tornadic Southern and High Plains Classic Supercells*. Master's Thesis, 166 pp., https://digitalcommons.unl.edu/geosciencefacpub/305/

GRANTS AWARDED

NSF: “Collaborative Research: Polarimetric Radar and Modeling Perspectives of Updraft, Cold Pool, and Mesovortex Evolution in Quasi-Linear Convective Systems.” Role: PI, $677,338 (UNL: $368,983). August 2025 – July 2028.

NSF: “Developing a Structural, Morphological, and Microphysical Understanding of Left-moving Supercells.” Role: PI, $473,485 (UNL: $272,344). August 2022 – July 2026.

UNL College of Arts and Sciences: “Publishing Research in Radar Applications Linking Meteorology and Radar Aeroecology.” Role: PI, $5,000. October 2024 – October 2026.

UNL College of Arts and Sciences: “Publishing Research in Radar Applications to Severe Storms and Synoptic Meteorology.” Role: PI, $4,970. April 2022 – September 2023.

NOAA: “Infrasound Observations and Demonstration of Real-Time Tools.” Role: Co-PI, $499,907 (UNL: $135,539). September 2019 – August 2022.

NOAA: “Identification of the Physical Mechanism Responsible for Tornado Infrasound.” Role: Co-PI, $271,478 (UNL: $128,869). September 2018 – August 2021.

NSF: “EAGER: Cloud Microphysics Measurements using Unmanned Aircraft Systems.” Role: PI, $51,466 (UNL: $51,466). August 2017 – July 2018.

NSF: “Aeroecology as a Test-bed for Interdisciplinary STEM Training.” Role: PI-UNL, $3,057,337 (UNL: $391,463). September 2015 – August 2022.

NSF: “Unmanned Aircraft System for Atmospheric Physics.” Role: Co-PI, $5,995,869 (UNL: $1,454,757; Van Den Broeke research group: $260,242). August 2015 – July 2019.

UNL Research Council: “Publishing Research in Polarimetric Radar Applications to Severe Storms.” Role: PI, $6,500 (UNL: $6,500). January 2015 – August 2016.

NSF: “Quantifying the Relative Roles of Progressive Land Use Change, Irrigation, and Remote Forcing in Southern Great Plains Precipitation Variability.” Role: PI, $446,697 (UNL: $446,697). July 2014 – June 2017.

UNL Layman Award: “Climatology and Large-scale Weather Patterns Associated with Eastern Dryline Severe Weather Outcomes.” Role: PI, $17,320 (UNL: $17,320). June 2013 – December 2015.

UNL College of Arts and Sciences: “Developing Discipline-specific Mathematics Example Problems for the UNL Meteorology-Climatology Major.” Role: PI, $1,975. August 2012 – May 2013.

TEACHING (U = undergraduate; G = graduate)

Synoptic Meteorology (U/G)	2014, 2016, 2018, 2021, 2023-2025
Advanced Synoptic Meteorology (U/G)	2014, 2016, 2018, 2021–25
Radar Signal Processing and Applications (G)	2013, 2015, 2018, 2022, 2023
Cloud Physics (U/G)	2013, 2015-16, 2018, 2020, 2022
Tropical Meteorology (U/G)	2012, 2013, 2016, 2017, 2019, 2021, 2025
Pathways to Success in Meteorology-Climatology (U)	2025
Teaching and Outreach in Meteorology (U/G)	2024
Weather and Climate (U)	2011–2013, 2015, 2017, 2020
Radar Meteorology (U/G), guest lecturer	Spring 2021
Avian Biology (U/G), guest lecturer	Spring 2021
Meteorology Internship Coordinator (U/G)	Fall 2019 – present
Interdisciplinary Research Practicum (G)	2019
Thermodynamics, Microphysics, and Radiation (indep. study) (G)	2014
High Plains Severe Storms (indep. study) (U)	2014
Radar-Lightning Research (U)	2013, 2014
Mid-latitude Precipitation Predictability (G)	2013
Advanced Synoptic Theory and Application (G)	2013
Weather Data Interpretation and Applications (U)	2012
Radar Meteorology and Polarimetry (U)	2012
Severe Storm Theory and Forecasting (U)	2012
Tropical Cyclone Assoc. with ENSO Phase (U)	2012
Severe and Unusual Weather (U. of Oklahoma) (U)	2010–2011

CURRENT GRADUATE STUDENTS (PRIMARY ADVISOR)

Engel, Adrianne, M.S. Aug. 2014 – Oct. 2021; Dec. 2024 – present
"Updraft Polarimetric Characteristics and Variability by Environment in a Large Sample of Supercell Storms"

Scott, Caitlyn, M.S. April 2025 – present
"Polarimetric Radar Precursors of Severe Weather Reports in QLCSs"

Stapleton, Kate, M.S. April 2025 – present
"Polarimetric Radar Observations of QLCS Updrafts"

FORMER GRADUATE STUDENTS (PRIMARY ADVISOR)

22 at the M.S. level

- 12 currently working in the government sector
- 2 currently working in in the private sector
- 5 continued to work toward a Ph.D.
- 3 took other employment

2 at the Ph.D. level

- 1 currently working in the government sector
- 1 currently working in the private sector

SERVED OR SERVING AS GRADUATE COMMITTEE MEMBER

24 students at the M.S. level

- 23 at the University of Nebraska-Lincoln
- 1 at the University of Nebraska-Omaha

12 students at the Ph.D. level

- 10 at the University of Nebraska-Lincoln
- 1 at Central Michigan University
- 1 at Charles Darwin University, Australia

UNDERGRADUATE STUDENTS SUPERVISED

9 UNL UCARE participants
8 Research Assistants (hired on grants)
1 Volunteer

UNDERGRADUATE THESIS ADVISING

5 Undergraduate theses, Meteorology-Climatology
1 Undergraduate thesis, Meteorology-Climatology and National Security Studies

UNDERGRADUATE ADVISING

Undergraduate Advisor, Meteorology-Climatology at the Univ. of Nebraska-Lincoln, June 2016 – August 2017

SERVICE TO PROFESSION: JOURNAL RESPONSIBILITIES

Journal of Applied Meteorology and Climatology
Editor, January 2024 – present
Associate Editor, October 2023 – January 2024

Remote Sensing in Ecology and Conservation: Associate Editor, May 2018 – present

Atmosphere: Editorial Board member, May 2020 – January 2024
Special Issue Editor: "Radar Applications for Severe Weather Understanding and Nowcasting", Aug. 2020 – May 2021

SERVICE TO PROFESSION: CONFERENCES

40th Conference on Radar Meteorology (American Meteorological Society, Minneapolis, MN, 28 August – 1 September 2023): Subcommittee on Radar Observations of Severe Storms and Mesoscale Phenomena

SERVICE TO PROFESSION: NATIONAL ASSOCIATION DUTIES

National Weather Association: Remote Sensing Committee, Nov. 2015 – present
National Weather Association: Annual Meeting abstract reviewer, 2020

SERVICE TO PROFESSION: PEER REVIEWER

National Science Foundation (Multiple panels and ad-hoc reviews)
National Science Centre of Poland (Ad-hoc review)
Proceedings of the National Conference of Undergraduate Research
14 separate journals in the atmospheric sciences
4 separate journals in biology, ecology, and/or conservation
3 separate journals in geography
1 journal in hydrometeorology

1 journal in optics

SERVICE TO PROFESSION: PEER REVIEWER AWARD

Remote Sensing (Exceptional Reviewer recognition, 2024 Quarter 4)

SERVICE TO PROFESSION: REVIEWS FOR PUBLISHERS/COMPETITIONS

2023	IET Press: chapter reviewer, content on weather radar advances
2019–25	National Science Bowl question reviewer
2017, 2021–25	National Science Bowl question writer
2016	Pearson: textbook reviewer
2012	Brooks/Cole Cengage Learning: textbook reviewer
2011	Oxford University Press: textbook proposal review
2011	Red Line Editorial: book series content consultant

SERVICE TO DEPARTMENT & UNIVERSITY

EAS Graduate Committee 2015 – 2016, 2021 – present
Committee Chair (EAS Graduate Chair) July 2021 – present

CAS Committee for Advancing Undergraduate Success and Equity 2019 – present
(originally the CAS Undergraduate Education Working Group, 2019 – Aug. 2023)
Meteorology-Climatology major representative Fall 2022 – present

CAS Cares Application Reviewer Fall 2022 – present

Graduate Committee for the Minor in College STEM Education 2013 – present
Committee Chair Fall 2017 – present

EAS Mentoring and Peer-Review Committee Fall 2025 – present
Committee Chair Fall 2025 - present

EAS Curriculum Committee July 2021 – present

EAS Grade Appeal Committee 2018, 2023 – present

EAS Information Committee 2016 – 2021, 2022 – 2025
Committee Chair 2017 – 2021

Local Manager, Weather Challenge (UNL) 2011 – present

EAS Salary Advisory Committee 2013, 2019, 2024–25

Coordinator/Presenter, Friday weather discussions 2011 – 2021, 2023

Hydrometeorologist/hydroclimatologist Faculty Search Committee
Committee Chair Fall 2021 – Spring 2022

EAS Ombudsperson 2017 – 2023

Graduate Committee for Earth Observation Science for Society and Sustainability
Committee Chair 2016 – 2020

Hydrogeology/Groundwater Modeling Search Committee 2018 – 2019

EAS Space Committee 2018 – 2019

EAS Mentorship and Peer Review Committee 2017 – 2018

Application Reviewer, Education Abroad Scholarship (UNL) 2017, 2019

Graduate Education Specialization Committee 2012 – 2017

Professor of Practice Search Committee (Met.-Clim.) 2016 – 2017

EAS Beautification Committee 2014 – 2016

Advisor, Student AMS Chapter at UNL 2014 (spring)

Reviewer, 5 posters for UNL Graduate Research Conference 2014

Reviewer, twelve student proposals for GEOS 900 2011 – 2013

Guest Presenter, land use/landcover and climate, METR 470 2012

Ad-hoc Committee on ACE-4 Requirements 2011 – 2012

Guest Presenter, lecture on interview/CV skills for GEOS 900 2011

Community Consultant, Westside High School, Omaha, NE 2011

Participant, UCAR Alliance Workshop, Boulder, CO 2011

Presenter, UNL AMS student chapter 2011, 2018

OUTREACH ACTIVITIES

Volunteer, Dinosaurs and Disasters	2011–13, 2016–17, 2020–22, 2025
Kindergarten weather outreach, Lincoln, NE	2022, 2024
Homeschool group weather outreach, Lincoln, NE	2024
Nebraska State Museum, Science Chats volunteer	2017
Nebraska Game & Parks BioBlitz presenter	2017

SELECTED PROFESSIONAL DEVELOPMENT ACTIVITIES

CLOUD-MAP field campaign and workshop	2016, 2017, 2019
Radar Aeroecology Workshop instructor	2017
Weather Radar Ornithology Workshop	2015
Scientific Teaching Workshop (Just-in-Time Teaching)	2014
Peer Review of Teaching Program, UNL	2012 – 2014
Research Development Fellows Program, UNL	2012 – 2013
Write Winning Grant Proposals Workshop, UNL	2012
Obtaining Research Funding from the DoD Workshop, UNL	2012
National Science Foundation Day, UNL	2012