Brice E. Coffer, Ph.D.

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Professional Experience

Senior Research Associate – European Severe Storms Laboratory, Wiener Neustadt, Austria (June 2025 – Present)
Senior Research Scholar – North Carolina State University, Raleigh, NC (October 2019 – March 2025)
Postdoctoral Research Scholar – North Carolina State University, Raleigh, NC (January 2018 – September 2019)
Graduate Research Assistant – North Carolina State University, Raleigh, NC (August 2012 – December 2017)
Undergraduate Research Intern – Storm Prediction Center, Norman, OK (January 2012 – June 2012)
Undergraduate Research Assistant – National Severe Storms Laboratory, Norman, OK (March 2009 – May 2012)

Education

Ph.D. in Atmospheric Sciences, North Carolina State University, 2017
Dissertation: *Tornadogenesis in simulated supercells from VORTEX2 environments*, Advisor: Dr. Matthew Parker

Graduate Certificate in Geospatial Information Science, North Carolina State University, 2016

M.S. in Atmospheric Science, North Carolina State University, 2014
Thesis**:** *Impacts of increasing low-level shear on supercells during the early evening transition*, Advisor: Dr. Matthew Parker

B.S. in Meteorology, Minor in Mathematics and Statistics, Graduated with Distinction, University of Oklahoma, 2012
Capstone Thesis**:** *Dryline position errors in convection-allowing NSSL-WRF model*, Advisor: Dr. Adam Clark

Relevant Skills

Atmospheric data science, skilled in numerical modeling of severe convective storms, computer programming experience in various languages. Proficient in Python, MATLAB, FORTRAN. Experience with GIS software (incl. ArcGIS), statistical methods for data analysis, machine learning techniques (incl. tensorflow, scikit-learn), GitHub, Slack.

Experience in managing, analyzing, and interpreting large volumes of model output, re-analyses, and observations in a variety of data formats (incl. NetCDF, GRIB, DAT, HDF5, CSV), experience with Amazon Web Services

Successful in contributing timely deliverables for large and small projects. Projects include working individually and as part of large collaboration groups, resulting in various scientific publications and funded research proposals.

Particularly interested in the dynamics of thunderstorms, the prediction and verification of high impact weather events including quantifying probabilistic risks to society and other sectors (incl. financial and commodity markets)

Funded Grants

NSF 2021 – 2025: Storm-environment interactions controlling the probability of supercell tornadogenesis, National Science Foundation, AGS-2130936 ($686,966.00), **Principal Investigator**

NOAA 2019 – 2021: Understanding the infrasound characteristics of nontornadic and tornadic supercells in VORTEX2 and VORTEX-SE environments using high-resolution ensemble simulations, National Oceanic and Atmospheric Administration, NA19OAR4590341 ($172,804.00), **Principal Investigator**

NSF 2018 – 2021: Mechanisms controlling the probability of tornadogenesis in supercell thunderstorms, National Science Foundation, AGS-1748715 ($587,109.00), Collaborator

Peer-Reviewed Publications

Coffer, B. E., M. D. Parker, M. C. Coniglio, C. R. Homeyer, 2025: Supercell environments using Grid-Rad Severe and the HRRR: Addressing discrepancies between prior tornado datasets, *Wea. Forecasting.,* **40**, 1405-1428**.** https://doi.org/10.1175/WAF-D-24-0251.1

Werkema, A. D., M. D. Parker, **B. E. Coffer**, 2025: Interactions between supercells in multi-storm simulations, *Mon. Wea. Rev.,* **Published as Early Online Release**. https://doi.org/10.1175/MWR-D-24-0175.1

LaFleur, A. T., R. L. Tanamachi, D. T. Dawson, **B. E. Coffer**, 2025: The Relationship between ZDR Arcs and Storm-Relative

Helicity in Simulated Tornadic and Nontornadic Thunderstorms, *Mon. Wea. Rev.,* **In Prep.**

Fischer, J., J. M. L. Dahl, **B. E. Coffer**, J. L. Houser, P. M. Markowski, M. D. Parker, C. C. Weiss, A. Scheuth, 2024: Supercell tornadogenesis: Recent progress in our state of understanding., *Bull. Amer. Met. Soc.*, **105**, E1084-E1097. https://doi.org/10.1175/BAMS-D-23-0031.1

Kosiba, K. A., and **Co-Authors**, 2024: The Propagation, Evolution, and Rotation in Linear Storms (PERiLS) Project., *Bull. Amer. Met. Soc.*, **105**. E1768-1799. https://doi.org/10.1175/BAMS-D-22-0064.1

Coffer, B. E., M. D. Parker, J. M. Peters, A. R. Wade, 2023: Supercell low-level mesocyclones: Origins of inflow and vorticity. *Mon. Wea. Rev.,* **151**, 2205-2232. https://doi.org/10.1175/MWR-D-22-0269.1

Peters, J. M., D. R. Chavis, C. Su, H. Morrison, **B. E. Coffer**, 2023: An analytic formula for entraining CAPE in mid-latitude storm environments. *J. the Atmos. Sci.*, **80**, 2165-2186. https://doi.org/10.1175/JAS-D-23-0003.1

Loeffler, S.D., M. R. Kumjian, P. M. Markowski, **B. E. Coffer**, M. D. Parker, 2023: Investigating the relationship between polarimetric radar signatures of hydrometeor size sorting and tornadic potential in simulated supercells. *Mon. Wea. Rev.*, **151**, 1863-1884, https://doi.org/10.1175/MWR-D-22-0228.1

Peters, J. M., **B. E. Coffer**, M. D. Parker, C. J. Nowotarski, J. P. Mulholland, C. J. Nixon, J. T. Allen, 2023: Disentangling the influences of storm-relative flow and horizontal streamwise vorticity on low-level mesocyclones in supercells. *J. the Atmos. Sci.*, **80**, 129-149, https://doi.org/10.1175/JAS-D-22-0114.1

Coffer, B.E. and M.D. Parker, 2022: Infrasound signals in simulated nontornadic and pre-tornadic supercells. *J. Acoustical Soc. of America*, **151**, 939-954, https://doi.org/10.1121/10.0009400

Coffer, B. E., M. Kubacki, Y. wen, T. Zhang, CA Barajas, MK Gobbert, 2021: Machine learning with feature importance analysis for tornado prediction from environmental sounding data. *Proc. Appl. Math. Mech*., **20**. https://doi.org/10.1002/pamm.202000112

Coffer, B.E., M. Taszarek, M.D. Parker, 2020: Near-ground wind profiles of tornadic and nontornadic environments in the United States and Europe from ERA5 reanalyses. *Wea. Forecasting*, **35**, 2621-2638, https://doi.org/WAF-D-20-0153.1

Flournoy, M.D., M.C. Coniglio, E.N. Rasmussen, J.C. Furtado, **B.E. Coffer**, 2020: Modes of storm-scale variability and tornado potential in VORTEX2 near- and far-field tornadic environments. *Mon. Wea. Rev*., **148**, 4185-4207, https://doi.org/MWR-D-20-0147.1

Coffer, B.E., M.D. Parker, R. L. Thompson, B. T. Smith, R. Jewell, 2019: Using near-ground storm relative helicity in supercell tornado forecasting. *Wea. Forecasting*, **34**, 1417-1435, https://doi.org/WAF-D-19-0115.1

Coffer, B.E. and P.M. Markowski, 2018: Comments on "The regulation of tornado intensity by updraft width". *J. Atmos. Sci*. **75**, 4049–4056, https://doi.org/JAS-D-18-0170.1

Coffer, B.E. and M.D. Parker, 2018: Is there a "tipping point" between simulated nontornadic and tornadic supercells in VORTEX2 environments?. *Mon. Wea. Rev.,* **146**, 2667–2693, https://doi.org/MWR-D-18-0050.1

Coffer, B.E., M.D. Parker, J. M. L. Dahl, L. J. Wicker, A. J. Clark, 2017: Volatility of tornadogenesis: An ensemble of simulated nontornadic and tornadic supercells in VORTEX2 environments. *Mon. Wea. Rev.,* **145**, 4605-4625, https://doi.org/MWR-D-17-0152.1

Coffer, B.E. and M.D. Parker, 2017: Simulated supercells in nontornadic and tornadic VORTEX2 environments. *Mon. Wea. Rev.,* **145**, 149–180, https://doi.org/MWR-D-16-0226.1

Coffer, B.E. and M.D. Parker, 2015: Impacts of increasing low-level shear on supercells during the early evening transition. *Mon. Wea. Rev.,* **143**, 1945–1969, https://doi.org/MWR-D-14-00328.1

Clark, A.J., M.C. Coniglio, **B.E. Coffer**, G. Thompson, M. Xue, and F. Kong, 2015: Sensitivity of 24-h forecast dryline position and structure to boundary layer parameterizations in convection-allowing WRF model simulations. *Wea. Forecasting,* **30**, 613–638, https://doi.org/WAF-D-14-00078.1

Coffer, B. E., 2014: Would "tornado-preventing" walls work? *Electronic J. Severe Storms Meteor*., **9** (4), 1–13, https://doi.org/10.55599/ejssm.v9i4.56

Coffer, B.E., L.C. Maudlin, P.G. Veals, and A.J. Clark, 2013: Dryline position errors in experimental convection-allowing NSSL-WRF model forecasts and the operational NAM. *Wea. Forecasting,* **28**, 746–761, https://doi.org/WAF-D-12-00092.1

Field Experience

Propagation, Evolution, and Rotation in Linear Storms (**PERiLS**) – 2022-23
Verification of the Origins of Rotation in Tornadoes Experiment – Southeast (**VORTEX-SE**) – 2016-18
Plains Elevated Convection at Night (**PECAN**) – 2015
Integrated Precipitation and Hydrology Experiment (**IPHEx**) – 2014
Deep Convective Clouds and Chemistry (**DC3**) – 2012
Second Verification of the Origins of Rotation in Tornadoes Experiment (**VORTEX2**) – 2009-10

Teaching Experience

Main/Co-Instructor:
- MEA 599 Regional Geology of North America: Fall 2021, Fall 2023, Fall 2024
- MEA 444 Mesoscale Analysis and Forecasting: Spring 2021
- MEA 135 Introduction to Weather and Climate: Spring 2014

Teaching Assistant:
- MEA 443 Synoptic Weather Analysis and Forecasting: Fall 2020
- MEA 444 Mesoscale Analysis and Forecasting: Spring 2013, Spring 2016
- MEA 213/214/215 Introduction to Atmospheric Sciences: Fall 2012, Fall 2013, Fall 2016

Guest Lecture:
- MEA 215 Introduction to Atmospheric Sciences: Fall 2018, Spring 2020
- MEA 444 Mesoscale Analysis and Forecasting: Spring 2017
- MEA 714 Atmospheric Convection: Fall 2014, Fall 2016

Professional Development

Associate Editor for AMS Journal of Atmospheric Science: 2021-Present
Associate Editor for AMS Monthly Weather Review: 2020-Present
AMS Course in 'Starting a "Storm Chasing" Course at Your College or University': 2022
NC State Preparing the Professoriate program: 2020/21
NSF Multidisciplinary Research and Education on Big Data + High-Performance Computing + Atmospheric Sciences: 2020
NC State Professional Grant Development Workshop: 2019
North Carolina Museum of Natural Sciences: Engaging the Public in Science Course: 2015/16

Research Accolades

Atmosphere Young Scholar Award: 2019
Student presentations awards: 2013 AMS Student Conf., 2015 AMS Mesoscale Conf., 2017 AMS Mesoscale Conf.
Univ. of Oklahoma School of Meteorology Mark & Kandi McCasland Award: Outstanding Undergraduate Research
Univ. of Oklahoma School of Meteorology Thomas-Julian-Lockhart Award: Exceptional Research in Measurements

Educational Outreach

Geopaths Open House Event for NC State's Marine, Earth, and Atmospheric Science department (2018)
Educational talks on tornado research at local schools in the Raleigh area (2015-2020)
North Carolina Museum of Natural Sciences: Daily Planet Talks (2014-2018)
North Carolina Museum of Natural Science: Engaging the Public in Science (2014-2015)
North Carolina Museum of Natural Sciences' Open Minds: Teen Science Café (2014, 2017, 2018)
North Carolina Museum of Natural Sciences' StormFest (2013)
Filming the IMAX movie *Tornado Alley* (2012)
National Weather Center's Weather Festival (2010-2012)

Conference Presentations

"Supercell environments using Grid-Rad Severe and the HRRR: Addressing discrepancies between prior tornado climatologies." *31st Conf. on Severe Local Storms*, Virginia Beach, VA; 10/2024

"Exploring the Operational Utility of Entraining CAPE in Supercell Tornado Forecasting." *104th Meeting of the American Meteorological Society*, Baltimore, MD; 1/2024

"Supercell low-level mesocyclones: Origins of inflow and vorticity". *11th European Conf. on Severe Storms*, Bucharest, Romania; 5/2023

"Supercell low-level mesocyclones: Origins of inflow and vorticity". *30th Conf. on Severe Local Storms*, Santa Fe, NM; 10/2022

"How quickly do supercell low-level mesocyclones respond to changes in their environment?". *30th Conf. on Severe Local Storms*, Santa Fe, NM; 10/2022

"Forecasting supercell tornadogenesis using the near-ground wind profile". *Student and Early Career Scientist Conference on Severe Local Storms, Zoom; 10/2021.* ***Invited Keynote Presentation.***

"In search of novel environmental differences between nontornadic and tornadic supercells using deep learning techniques". *101st Meeting of the American Meteorological Society*, Zoom; 1/2021

"Infrasound characteristics of nontornadic and tornadic thunderstorms using high-resolution simulations". *101st Meeting of the American Meteorological Society*, Zoom; 1/2021

"Infrasound characteristics of nontornadic and tornadic thunderstorms using high-resolution simulations". *Acoustics Virtually Everywhere*, Zoom; 12/2020

"Using near-ground storm relative helicity in supercell tornado forecasting". *10th European Conf. on Severe Storms*, Kraków, Poland; 11/2019

"Using near-ground storm relative helicity in supercell tornado forecasting". *18th Conf. on Mesoscale Processes*, Savannah, GA; 7/2019

"Testing new environmental proxies for supercell tornadogenesis using HRRR analyses". *29th Conf. on Severe Local Storms*, Stowe, VT; 10/2018

"Is there a 'tipping point' between simulated nontornadic and tornadic supercells in VORTEX2 environments?". *29th Conf. on Severe Local Storms*, Stowe, VT; 10/2018

"Volatility of tornadogenesis: An ensemble of nontornadic and tornadic supercells in VORTEX2 environments". *17th Conf. on Mesoscale Processes*, San Diego, CA; 7/2017

"Characteristics of low-reflectivity ribbons in simulated supercells". *17th Conf. on Mesoscale Processes*, San Diego, CA; 7/2017

"Simulated supercells in nontornadic and tornadic VORTEX2 environments". *28th Conf. on Severe Local Storms*, Portland, OR; 11/2016

"Verification of RUC analyses using VORTEX2 soundings for nontornadic and tornadic supercell environments". *28th Conf. on Severe Local Storms*, Portland, OR; 11/2016

"Verification of RUC analyses using VORTEX2 soundings for nontornadic and tornadic supercell environments". *15th AMS Student Conf.*, New Orleans, LA; 1/2016

"Nontornadic and tornadic VORTEX2 supercell simulations". *16th Conf. on Mesoscale Processes*, Boston, MA; 8/2015

"Impacts of increasing low-level shear on supercells during the evening transition". *27th Conf. on Severe Local Storms*, Madison, WI; 11/2014

"Simulating a convective event with "tornado-preventing" walls". *27th Conf. on Severe Local Storms*, Madison, WI; 11/2014

"Impacts of increasing low-level shear on supercells during the evening transition". *Special Symposium on Severe Local Storms*, Atlanta, GA; 2/2014

"Impacts of low-level environmental shear upon surface vorticity in supercells". *15th Conf. on Mesoscale Processes*, Portland, OR; 8/2013

"Sensitivity of 24 h forecast dryline position and structure to boundary layer parameterizations in convection-allowing WRF model simulations". *15th Conf. on Mesoscale Processes*, Portland, OR; 8/2013

"Composite VORTEX2 supercell environments from mobile soundings. *VORTEX2 Science Workshop*, Austin, TX; 4/2013

"Dryline position errors in experimental convection-allowing NSSL- WRF model forecasts and the operational NAM". *12th AMS Student Conf.*, Austin, TX; 1/2013

"Dryline position errors in experimental convection-allowing NSSL- WRF model forecasts and the operational NAM". *26th Conf. on Severe Local Storms*, Nashville, TN; 11/2012