

# Matthew David Parker

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Curriculum Vitae  
June 2024

## PROFESSIONAL EXPERIENCE

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**Dept. of Marine, Earth, & Atmospheric Sciences, North Carolina State University**  
*University Faculty Scholar; Academy of Outstanding Teachers*

2015-            Professor  
2008-2015    Associate professor  
2005-2008    Assistant professor

**Dept. of Geosciences, University of Nebraska-Lincoln**

2002-2005    Assistant professor

## EDUCATION

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**Colorado State University**, Fort Collins, Colorado

2002            **Ph.D.**, Atmospheric science (Mesoscale meteorology)  
1999            **M.S.**, Atmospheric science (Mesoscale meteorology)

**Valparaiso University**, Valparaiso, Indiana

1996            **B.S.**, Meteorology, Summa Cum Laude, with honors

## REFEREED PUBLICATIONS

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Most publications available in PDF format from: <https://sites.google.com/ncsu.edu/mdparker/publications>  
ResearcherID profile: <https://www.webofscience.com/wos/author/rid/A-5156-2008>  
Google scholar profile: <http://scholar.google.com/citations?user=zHIR6e8AAAAJ>  
Annotations: \*Student supervised by Parker, #Other student author, †Postdoc/research scholar supervised by Parker

70.        Kosiba, K. A., and co-authors (**M. Parker** is 5<sup>th</sup> author of 36), in press: The Propagation, Evolution, and Rotation in Linear Storms (PERiLS) Project. *Bull, Amer. Meteor. Soc.*, accepted in final form, June 2024.
69.        Fischer, J., J. M. L. Dahl, B. E. Coffert<sup>†</sup>, J. L. Houser, P. M. Markowski, **M. D. Parker**, C. C. Weiss, and A. Schueth<sup>#</sup>, in press: Supercell tornadogenesis: Recent progress in our state of understanding. *Bull, Amer. Meteor. Soc.*, accepted in final form, April 2024.
68.        Campbell, T. A. <sup>#</sup>, G. M. Lackmann, M. J. Molina, and **M. D. Parker**, 2024: Severe convective storms in limited instability organized by pattern and distribution. *Wea. Forecasting*, **39**, 217-240.

67. Goldacker, N. A.\*, and **M. D. Parker**, 2023: Assessing the comparative effects of storm-relative helicity components within right-moving supercell environments. *J. Atmos. Sci.*, **80**, 2805-2822.
66. Coffey, B.E. †, **M. D. Parker**, J. M. Peters, and A. R. Wade\*, 2023: Supercell low-level mesocyclones: Origins of inflow and vorticity. *Mon. Wea. Rev.*, **151**, 2205-2232.
65. Loeffler, S. D., M. R. Kumjian, P. M. Markowski, B. E. Coffey†, and **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.
64. **Parker, M. D.**, 2023: How well must surface vorticity be organized for tornadogenesis? *J. Atmos. Sci.*, **80**, 1433-1448.
63. Peters, J. M., B. E. Coffey†, **M. D. Parker**, C. J. Nowotarski, J. P. Mulholland, C. J. Nixon#, and J. T. Allen, 2023: Disentangling the influences of storm-relative flow and horizontal streamwise vorticity on low-level mesocyclones in supercells. *J. Atmos. Sci.*, **80**, 129-149.
62. Lovell, L. T.\*, and **M. D. Parker**, 2022: Simulated QLCS vortices in a high-shear low-CAPE environment. *Wea. Forecasting*, **37**, 989-1012.
61. Coffey, B. E.†, and **M. D. Parker**, 2022: Infrasound signals in simulated nontornadic and pre-tornadic supercells. *J. Acoust. Soc. Am.*, **151**, 939-954.
60. Goldacker, N. A.\*, and **M. D. Parker**, 2021: Low-level updraft intensification in response to environmental wind profiles. *J. Atmos. Sci.*, **78**, 2763-2781.
59. Wade, A. R.\*, and **M. D. Parker**, 2021: Dynamics of simulated high-shear low-CAPE supercells. *J. Atmos. Sci.*, **78**, 1389-1410.
58. **Parker, M. D.**, 2021: Self-organization and maintenance of simulated nocturnal convective systems from PECAN. *Mon. Wea. Rev.*, **149**, 999-1022.
57. Coffey, B. E.†, **M. D. Parker**, and M. Taszarek, 2020: Near-ground wind profiles of tornadic and nontornadic environments in the United States and Europe from ERA5 reanalyses. *Wea. Forecasting*, **35**, 2621-2638.
56. Coniglio, M. C., and **M. D. Parker**, 2020: Insights into supercells and their environments from three decades of targeted radiosonde observations. *Mon. Wea. Rev.*, **148**, 4893-4915.
55. **Parker, M. D.**, B. S. Borchardt\*, R. L. Miller#, and C. L. Ziegler, 2020: Simulated evolution and severe wind production by the 25-26 June 2015 nocturnal MCS from PECAN. *Mon. Wea. Rev.*, **148**, 183-209.
54. Coffey, B. E.†, **M. D. Parker**, R. L. Thompson, B. T. Smith, and R. E. Jewell, 2019: Using near-ground storm relative helicity in supercell tornado forecasting. *Wea. Forecasting*, **34**, 1417-1435.
53. Hitchcock, S. M.#, R. S. Schumacher, G. R. Herman#, M. C. Coniglio, **M. D. Parker**, and C. L. Ziegler, 2019: Evolution of pre- and post-convective environmental profiles from mesoscale convective systems during PECAN. *Mon. Wea. Rev.*, **147**, 2329-2354.

52. Sherburn, K. D.\*, and **M. D. Parker**, 2019: The development of severe vortices within simulated high-shear low-CAPE convection. *Mon. Wea. Rev.*, **147**, 2189-2216.
51. Sherburn, K. D.\*, **M. D. Parker**, C. E. Davenport, R. A. Sirico<sup>#</sup>, J. L. Blaes, B. Black<sup>#</sup>, S. E. McLamb<sup>#</sup>, M. C. Mugrage<sup>#</sup>, and R. M. Rackliffe<sup>#</sup>, 2019: Partnering research, education, and operations via a cool season severe weather soundings program. *Bull. Amer. Meteor. Soc.*, **100**, 307-320.
50. Coffey, 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.
49. Coffey, B.E.\*, **M. D. Parker**, J. M. L. Dahl, L. J. Wicker, and A. J. Clark, 2017: Volatility of tornadogenesis: An ensemble of simulated nontornadic and tornadic supercells in VORTEX2 environments. *Mon. Wea. Rev.*, **145**, 4605-4625.
48. **Parker, M. D.**, 2017: How much does “backing aloft” actually impact a supercell? *Wea. Forecasting*, **32**, 1937-1957.
47. Peters, J., E. R. Nielsen<sup>#</sup>, **M. D. Parker**, S. H. Hitchcock<sup>#</sup>, and R. S. Schumacher, 2017: The impact of low-level moisture errors on model forecasts of an MCS observed during PECAN. *Mon. Wea. Rev.*, **145**, 3599-3624.
46. MacIntosh, C. W.\*, and **M. D. Parker**, 2017: The 6 May 2010 elevated supercell during VORTEX2. *Mon. Wea. Rev.*, **145**, 2635-2657.
45. Geerts, B., and co-authors (**M. Parker** is 19<sup>th</sup> author of 27), 2017: The 2015 Plains Elevated Convection at Night (PECAN) field project. *Bull. Amer. Meteor. Soc.*, **98**, 767-786.
44. King, J. R.\*, **M. D. Parker**, K. D. Sherburn\*, and G. M. Lackmann, 2017: Rapid evolution of cool season, low CAPE severe thunderstorm environments. *Wea. Forecasting*, **32**, 763-779.
43. Coffey, B. E.\*, and **M. D. Parker**, 2017: Simulated supercells in nontornadic and tornadic VORTEX2 environments. *Mon. Wea. Rev.*, **145**, 149-180.
42. Sherburn, K. D.\*, **M. D. Parker**, J. R. King\*, and G. M. Lackmann, 2016: Composite environments of severe and non-severe high-shear, low-CAPE convective events. *Wea. Forecasting*, **31**, 1899-1927.
41. Davenport, C. E.\*, and **M. D. Parker**, 2015: Impact of environmental heterogeneity on the dynamics of a dissipating supercell thunderstorm. *Mon. Wea. Rev.*, **143**, 4244-4277.
40. **Parker, M. D.**, and J. M. L. Dahl<sup>†</sup>, 2015: Production of near-surface vertical vorticity by idealized downdrafts. *Mon. Wea. Rev.*, **143**, 2795-2816.
39. Coffey, B. E.\*, and **M. D. Parker**, 2015: Impacts of increasing lower tropospheric vertical wind shear on supercells during the early evening transition. *Mon. Wea. Rev.*, **143**, 1945-1969.
38. Davenport, C. E.\*, and **M. D. Parker**, 2015: Observations of the 9 June 2009 dissipating supercell from VORTEX2. *Wea. Forecasting*, **30**, 368-388.
37. French, A. J.\*, and **M. D. Parker**, 2014: Numerical simulations of bow echo formation following a squall line – supercell merger. *Mon Wea. Rev.*, **142**, 4791-4822.

36. Dahl, J. M. L.<sup>†</sup>, **M. D. Parker**, and L. J. Wicker, 2014: Imported and storm-generated near-ground vertical vorticity in a simulated supercell. *J. Atmos. Sci.*, **71**, 3027-3051.
35. Sherburn, K. D.\* and **M. D. Parker**, 2014: Climatology and ingredients of significant severe convection in high shear, low CAPE environments. *Wea. Forecasting*, **29**, 854-877.
34. Davis, J. M.\* and **M. D. Parker**, 2014: Radar climatology of tornadic and non-tornadic vortices in high shear, low CAPE environments in the mid-Atlantic and southeastern U.S. *Wea. Forecasting*, **29**, 828-853.
33. **Parker, M. D.**, 2014: Composite VORTEX2 supercell environments from near-storm soundings. *Mon. Wea. Rev.*, **142**, 508-529.
32. Letkewicz, C. E.\* , A. J. French\*, and **M. D. Parker**, 2013: Base-state substitution: An idealized modeling technique for approximating environmental variability. *Mon. Wea. Rev.*, **141**, 3062-3086.
31. Yuter, S. E., M. A. Miller, **M. D. Parker**, P. M. Markowski, Y. Richardson, H. Brooks, and J. M. Straka, 2013: Comment on “Why do tornadoes rest on weekends?” by D. Rosenfeld and T. Bell. *J. Geophys. Res.*, **118**, 1-7, doi:10.1002/jgrd.50526.
30. Dahl, J. M. L.<sup>†</sup>, **M. D. Parker**, and L. J. Wicker, 2012: Uncertainties in trajectory calculations within near-surface mesocyclones of simulated supercells. *Mon. Wea. Rev.*, **140**, 2959-2966.
29. French, A. J.\* , and **M. D. Parker**, 2012: Observations of mergers between squall lines and isolated supercell thunderstorms. *Wea. Forecasting*, **27**, 255-278.
28. Billings, J. M.\* , and **M. D. Parker**, 2012: Evolution and maintenance of the 22-23 June 2003 nocturnal convection during BAMEX. *Wea. Forecasting*, **27**, 279-300.
27. **Parker, M. D.**, 2012: Impacts of lapse rates upon low-level rotation in idealized storms. *J. Atmos. Sci.*, **69**, 538-559.
26. Letkewicz, C. E.\* , and **M. D. Parker**, 2011: Impact of environmental variations on simulated squall lines interacting with terrain. *Mon. Wea. Rev.*, **139**, 3163-3183.
25. Morin, M. J.\* , and **M. D. Parker**, 2011: A numerical investigation of supercells in landfalling tropical cyclones. *Geophys. Res. Lett.*, **38**, L10801, doi:10.1029/2011GL047448.
24. Bryan, G. H., and **M. D. Parker**, 2010: Observations of a squall line and its near environment using high-frequency rawinsonde launches during VORTEX2. *Mon. Wea. Rev.*, **138**, 4076-4097.
23. French, A. J.\* , and **M. D. Parker**, 2010: The response of simulated nocturnal convective systems to a developing low-level jet. *J. Atmos. Sci.*, **67**, 3384-3408.
22. **Parker, M. D.**, 2010: Relationship between system slope and updraft intensity in squall lines. *Mon Wea. Rev.*, **138**, 3572-3578.
21. Letkewicz, C. E.\* , and **M. D. Parker**, 2010: Forecasting the maintenance of mesoscale convective systems crossing the Appalachian Mountains. *Wea. Forecasting*, **25**, 1179-1195.

20. **Parker, M. D.**, 2010: Comments on “A comparison of tropical and midlatitude thunderstorm evolution in response to wind shear”. *J. Atmos. Sci.*, **67**, 1700-1707.
19. Kiefer, M. T.\*, **M. D. Parker**, and J. J. Charney, 2010: Regimes of dry convection above wildfires: Sensitivity to fireline details. *J. Atmos. Sci.*, **67**, 611-632.
18. Mahoney, K. M.<sup>#</sup>, G. M. Lackmann, and **M.D. Parker**, 2009: The role of momentum transport in the motion of a quasi-idealized mesoscale convective system. *Mon. Wea. Rev.*, **137**, 3316–3338.
17. Kiefer, M. T.\*, **M. D. Parker**, and J. J. Charney, 2009: Regimes of dry convection above wildfires: Idealized numerical simulations and dimensional analysis. *J. Atmos. Sci.*, **66**, 806-836.
16. Baker, A.K.\*, **M. D. Parker**, and M. D. Eastin, 2009: Environmental ingredients for supercells and tornadoes within Hurricane Ivan. *Wea. Forecasting*, **24**, 223-244.
15. French, A.J.\*, and **M. D. Parker**, 2008: The initiation and evolution of multiple modes of convection within a meso-alpha scale region. *Wea. Forecasting*, **23**, 1221-1252.
14. **Parker, M. D.**, 2008: Response of simulated squall lines to low-level cooling. *J. Atmos. Sci.*, **65**, 1323-1341.
13. **Parker, M. D.**, and D. A. Ahijevych, 2007: Convective episodes in the east-central United States. *Mon. Wea. Rev.*, **135**, 3707-3727.
12. Storm, B. A. \*, **M. D. Parker**, and D. P. Jorgensen, 2007: A linear MCS with leading stratiform precipitation from BAMEX. *Mon. Wea. Rev.*, **135**, 1769-1785.
11. **Parker, M. D.**, 2007: Simulated convective lines with parallel stratiform precipitation, I: An archetype for convection in along-line shear. *J. Atmos. Sci.*, **64**, 267-288.
10. **Parker, M. D.**, 2007: Simulated convective lines with parallel stratiform precipitation, II: Governing dynamics and associated sensitivities. *J. Atmos. Sci.*, **64**, 289-313.
9. Bryan, G. H., J. C. Knievel, and **M. D. Parker**, 2006: A multi-model assessment of RKW Theory’s relevance to squall line characteristics. *Mon. Wea. Rev.*, **134**, 2772-2792.
8. Kuchera, E. L.\*, and **M. D. Parker**, 2006: Severe convective wind environments. *Wea. Forecasting*, **21**, 595-612.
7. **Parker, M. D.**, I. C. Ratcliffe<sup>#</sup>, and G. M. Henebry, 2005: The July 2003 Dakota hailswaths: Creation, characteristics, and possible impacts. *Mon. Wea. Rev.*, **133**, 1241-1260.
6. **Parker, M. D.**, and J. C. Knievel, 2005: Do meteorologists suppress thunderstorms? Radar-derived statistics and the behavior of moist convection. *Bull. Amer. Meteor. Soc.*, **86**, 341-358.
5. **Parker, M. D.**, and R. H. Johnson, 2004: Simulated convective lines with leading precipitation. Part I: Governing dynamics. *J. Atmos. Sci.*, **61**, 1637-1655.
4. **Parker, M. D.**, and R. H. Johnson, 2004: Simulated convective lines with leading precipitation. Part II: Evolution and maintenance. *J. Atmos. Sci.*, **61**, 1656-1673.

3. **Parker, M. D.**, and R. H. Johnson, 2004: Structures and dynamics of quasi-2D mesoscale convective systems. *J. Atmos. Sci.*, **61**, 545-567.
2. **Parker, M. D.**, S. A. Rutledge, and R. H. Johnson, 2001: Cloud-to-ground lightning in linear mesoscale convective systems. *Mon. Wea. Rev.*, **129**, 1232-1242.
1. **Parker, M. D.** and R. H. Johnson, 2000: Organizational modes of midlatitude mesoscale convective systems. *Mon. Wea. Rev.*, **128**, 3413-3436.

## MANUSCRIPTS IN PROGRESS

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Wolff, E. C. #, R. J. Trapp, S. W. Nesbitt, **M. D. Parker**, K. A. Kosiba, and J. Wurman, 2024: On discrete convective updrafts and tornadoes in quasi-linear convective systems. *Wea. Forecasting*, submitted April 2024.

## BOOK CHAPTERS

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**Parker, M.D.**, in press: Mesoscale convective systems. *Encyclopedia of Atmospheric Sciences*, 3<sup>rd</sup> edition, Elsevier, in final form June 2024. *Invited contribution*.

**Parker, M.D.**, in press: Convective storm modeling. *Encyclopedia of Atmospheric Sciences*, 3<sup>rd</sup> edition, Elsevier, in final form May 2024. *Invited contribution*.

**Parker, M.D.**, 2015: Convective storm modeling. *Encyclopedia of Atmospheric Sciences*, 2<sup>nd</sup> edition, G. R. North, J. Pyle, and F. Zhang, Eds., Vol. 4, Academic Press Elsevier, 246-254. *Invited contribution*.

## OTHER FORMAL PUBLICATIONS

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**Parker, M. D.**, 2004: Chasing and observing storms in the High Plains. *Colorado Climate*, Summer 2002 edition (Vol. 3, No. 3, publ. in 2004), 11-13.

**Parker, M. D.**, 2003: Why is the Park Range Colorado's snowfall capital? *Colorado Climate*, Winter 2001-2002 edition (Vol. 3, No. 1, publ. in 2003), 1-3.

**Parker, M. D.**, 2002: Quasi-two-dimensional convective lines with leading precipitation: Dynamics inferred from idealized numerical simulations. Atmospheric Science Paper No. 726, Colorado State University, 168 pp (Ph.D. dissertation).

**Parker, M. D.**, 1999: May 1996 and May 1997 linear mesoscale convective systems of the Central Plains: synoptic meteorology and a reflectivity-based taxonomy. Atmospheric Science Paper No. 675, Colorado State University, 185 pp (M.S. thesis).

## CONFERENCE PRESENTATIONS (LAST 5 YEARS)

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- Blind-Doskocil L. <sup>#</sup>, R. J. Trapp, S. W. Nesbitt, K. A. Kosiba, J. Wurman, and **M. D. Parker**, 2023: Radar-based characteristics of tornadic and non-tornadic QLCS mesovortices during PERiLS. *40<sup>th</sup> Conference on Radar Meteorology*, AMS, 28 August-1 September 2023, Minneapolis, MN.
- Kosiba, K. A., J. Wurman, R. J. Trapp, **M. D. Parker**, and S. W. Nesbitt, 2023: The PERiLS Project: Tornado chasing in the Southeast. *40<sup>th</sup> Conference on Radar Meteorology*, AMS, 28 August-1 September 2023, Minneapolis, MN.
- Syed, H. A. <sup>#</sup>, D. T. Dawson II, F. Vendl, R. Tanamachi, and **M. D. Parker**, 2023: DSD characteristics and evolution of the leading stratiform region of a tornadic QLCS during PERiLS-2022 IOP #2 (30 March 2022). *40<sup>th</sup> Conference on Radar Meteorology*, AMS, 28 August-1 September 2023, Minneapolis, MN.
- Chalmers, Z. A. <sup>\*</sup>, **M. D. Parker**, K. A. Kosiba, S. W. Nesbitt, R. J. Trapp, and J. Wurman, 2023: Evaluating the CAPE-shear parameter space of Southeastern US QLCS environments. *20<sup>th</sup> Conference on Mesoscale Processes*, AMS, 17-21 July 2023, Madison, WI.
- Melanson, S. D. <sup>\*</sup>, **M. D. Parker**, K. A. Kosiba, S. W. Nesbitt, R. J. Trapp, and J. Wurman, 2023: Identification of mesovortexgenesis mechanisms in QLCSs using PERiLS radar data. *20<sup>th</sup> Conference on Mesoscale Processes*, AMS, 17-21 July 2023, Madison, WI.
- Silcott, M. K. <sup>\*</sup>, **M. D. Parker**, K. A. Kosiba, S. W. Nesbitt, R. J. Trapp, and J. Wurman, 2023: Structures of cold pools from PERiLS 2022 & 2023. *20<sup>th</sup> Conference on Mesoscale Processes*, AMS, 17-21 July 2023, Madison, WI.
- Coffer, B. E. <sup>†</sup>, **M. D. Parker**, J. M. Peters, and A. R. Wade <sup>\*</sup>, 2023: Supercell low-level mesocyclones: Origins of inflow and vorticity. *11<sup>th</sup> European Conference on Severe Storms*, 8-12 May 2023, Bucharest, Romania.
- Kosiba, K. A., J. Wurman, R. J. Trapp, **M. D. Parker**, and S. W. Nesbitt, 2023: Overview of the PERiLS (Propagation, Evolution and Rotation in Linear Storms) project. *11<sup>th</sup> European Conference on Severe Storms*, 8-12 May 2023, Bucharest, Romania.
- Parker, M. D.**, 2022: Cold pools, nocturnal MCSs, and self organization. *Cold Pool Workshop*, Max Planck Society, 7-9 December 2020, Kreuth, Germany.
- Coffer, B. E. <sup>†</sup>, **M. D. Parker**, and C. Davenport, 2022: How quickly do supercell low-level mesocyclones respond to changes in their environment? *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.
- Coffer, B. E. <sup>†</sup>, **M. D. Parker**, and J. M. Peters, 2022: Environmental versus storm-generated SRH contributions to low-level mesocyclones. *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.
- Coniglio, M. C., **M. D. Parker**, and R. E. Jewell, 2022: Insights into supercells and their environments through field-project soundings and comparison to SPC mesoanalysis. *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.
- Goldacker, N. <sup>\*</sup>, and **M. D. Parker**, 2022: Assessing the comparative effects of storm-relative helicity components within right-moving supercell environments. *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.
- Kosiba, K. A., J. Wurman, R. J. Trapp, **M. D. Parker**, and S. W. Nesbitt, 2022: The PERiLS (Propagation, Evolution and Rotation in Linear Storms) Southeastern tornado study. *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.

- Loeffler, S., M. Kumjian, P. Markowski, B. E. Coffert<sup>†</sup>, and **M. D. Parker**, 2022: Role of precipitation distribution and KDP foot location in the forward flank on low-level circulation. *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.
- Parker, M. D.**, 2022: Is a coherent vorticity source required for tornadogenesis? *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.
- Parker, M. D.**, K. A. Kosiba, S. W. Nesbitt, R. J. Trapp, and J. Wurman, 2022: The influence of pre-QLCS precipitation on environmental stability in HSLC environments: a first look from PERiLS. *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.
- Peters, J. M., B. E. Coffert<sup>†</sup>, **M. D. Parker**, C. J. Nowotarski, J. P. Mulholland, C. J. Nixon<sup>#</sup>, and J. T. Allen, 2022: Disentangling the influences of storm-relative flow, updraft width, and horizontal streamwise vorticity on low-level supercell mesocyclones. *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.
- Silcott, M. K.\* , **M. D. Parker**, K. A. Kosiba, S. W. Nesbitt, R. J. Trapp, and J. Wurman, 2022: Structures of cold pools from PERiLS 2022. *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.
- Werkema, A. D.\* , and **M. D. Parker**, 2022: Mutual influences of adjacent supercells in multistorm simulations. *30<sup>th</sup> Conference on Severe Local Storms*, AMS, 24-28 October 2022, Santa Fe, NM.
- Kosiba, K., J. Wurman, J. Trapp, S. Nesbitt, and **M. Parker**, 2022: Radar deployments in the PERiLS (Propagation, Evolution and Rotation in Linear Storms) Southeastern tornado study. *11<sup>th</sup> European Conference on Radar in Meteorology and Hydrology*, 29 August-2 September 2022, Locarno, Switzerland.
- Coffert, B. E.<sup>†</sup>, and **M. D. Parker**, 2022: Infrasound signals in simulated nontornadic and pre-tornadic supercells. *19<sup>th</sup> Conference on Mesoscale Processes, 102nd Annual Meeting of the AMS*, 23-27 January 2022, held virtually.
- Parker, M. D.**, 2022: Nocturnal MCSs from PRE-STORM to PECAN. *Richard H. Johnson Symposium, 102nd Annual Meeting of the AMS*, 23-27 January 2022, held virtually.
- Peters, J. M., B. E. Coffert<sup>†</sup>, **M. D. Parker**, C. J. Nowotarski, C. J. Nixon, and J. T. Allen, 2022: Controls on the width and rotation of low-level mesocyclones on simulated supercells. *19<sup>th</sup> Conference on Mesoscale Processes, 102nd Annual Meeting of the AMS*, 23-27 January 2022, held virtually.
- Coffert, B. E.<sup>†</sup>, and **M. D. Parker**, 2021: Infrasound characteristics of nontornadic and tornadic supercell thunderstorms using high resolution simulations. *Symposium on Mesoscale Processes Across Scales, 101<sup>st</sup> Annual Meeting of the AMS*, 10-15 January 2021, held virtually.
- Coffert, B. E.<sup>†</sup>, and **M. D. Parker**, 2020: Infrasound characteristics of nontornadic and tornadic thunderstorms using high resolution simulations. *Acoustics Virtually Everywhere, Acoustical Society of America*, 7-11 December 2020, held virtually.
- Parker, M. D.**, 2020: Mesoscale convective systems in nature and in models. *Severe Local Storms Symposium, 100th Annual Meeting of the AMS*, 14 January 2020, Boston, MA.
- Coffert, B. E.<sup>†</sup>, **M. D. Parker**, R. L. Thompson, and B. T. Smith, 2019: Using near-ground storm-relative helicity in tornado forecasting. *10<sup>th</sup> European Conference on Severe Storms*, 4-8 November 2019, Krakow, Poland.
- Parker, M. D.**, 2019: Dynamics of nocturnal convective systems. *10<sup>th</sup> European Conference on Severe Storms*, 4-8 November 2019, Krakow, Poland.



Coffer, B. E. †, and **M. D. Parker**, 2019: Using near-ground storm-relative helicity in tornado forecasting. *18th Conference on Mesoscale Processes*, AMS, 29 July-1 August 2019, Savannah, GA.

**Parker, M. D.**, 2019: Are nocturnal MCSs self-organizing? *18th Conference on Mesoscale Processes*, AMS, 29 July-1 August 2019, Savannah, GA.

Wade, A.\*, and **M. D. Parker**, 2019: Dynamics of simulated high-shear low-CAPE tornadic supercells. *18th Conference on Mesoscale Processes*, AMS, 29 July-1 August 2019, Savannah, GA.

**Parker, M. D.**, 2019: How well can we explain why some supercells make tornadoes and others do not?" *23<sup>rd</sup> Severe Storms & Doppler Radar Conference*, C. Iowa NWA, 28-30 March, Ankeny, IA.  
Invited keynote talk

**Prior to 2019:** 106 conference presentations (34 by Parker, 55 by students, 3 invited, 1 keynote)

## ADDITIONAL PRESENTATIONS (LAST 5 YEARS)

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### Invited presentations

Apr. 2024 Central North Carolina chapter of the AMS, Raleigh, NC  
 Nov. 2023 *Mid-Atlantic Severe Weather Conference*, Science Museum of Virginia  
 Oct. 2023 Department of Atmospheric Sciences, Texas A&M University  
 Sep. 2022 Upstate South Carolina chapter of the AMS, Greenville, SC  
 Nov. 2021 *Student and Early Career Scientist Virtual Severe Storms Conference*, invited panelist  
 Dec. 2020 Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign  
 Mar. 2019 *23<sup>rd</sup> Severe Storms & Doppler Radar Conference*, C. Iowa NWA, invited keynote talk

### Other research presentations

Apr. 2024 3<sup>rd</sup> Annual MEAS Symposium, NCSU  
 Jan. 2024 Student Chapter of the AMS, NCSU  
 Nov. 2023 PERiLS Science Workshop, NSF/NOAA  
 Jul. 2022 Eastern Regional science sharing webinar, NOAA-NWS

**Prior to 2019:** 27 invited presentations, 8 short courses taught, 23 other research presentations

## SELECTED AWARDS AND HONORS

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2015 Fujita Research Achievement Award<sup>1</sup>, *National Weather Association*  
 2013- University Faculty Scholar (Chancellor's recognition), *NCSU*  
 2011- Member, Academy of Outstanding Teachers, *NCSU*  
 2011 Outstanding Teacher Award, *NCSU*  
 2008 Elva and Leroy Martin Teaching Effectiveness Award, *College of Physical and Mathematical Sciences, NCSU*  
 2005 Inducted into Sigma Xi, The Scientific Research Society  
 2004 Faculty Early Career Development (CAREER) Award, *National Science Foundation*  
 2002 Herbert Riehl Memorial Award (best published manuscript by a graduate student), *Department of Atmospheric Science, Colorado State University*  
 1999 Best student presentation, *Eighth Conf. on Mesoscale Processes*, AMS, Boulder, CO  
 1996-97 AMS Graduate Fellowship

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<sup>1</sup> This was a group award to NCSU and NOAA CSTAR partners for "15 years of collaborative operations-to-research and research-to-operations contributions". Parker was a lead- or co-PI for 9 of the 15 years.

## FUNDED PROPOSALS

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*Total awarded: \$6.25 M*

- 2024 **Parker, M.D.:** *Enhancing student engagement by exploiting Perusall for meteorology lab assignments.* Instructional Tools Express Grant, DELTA, NCSU. \$2,000.
- 2021-24 **Parker, M. D.:** *Collaborative research: Propagation, Evolution, and Rotation in Linear Storms (PERiLS).* NSF, Mesoscale Dynamic Meteorology program. Collaborating institutions: University of Illinois at Urbana-Champaign. \$582,139 (NCSU part, including supplement).
- 2021-24 **Parker, M. D.,** and B. E. Coffert<sup>†</sup>: *Storm-environment interactions controlling the probability of supercell tornadogenesis.* NSF, Mesoscale Dynamic Meteorology program. \$686,966.
- 2019-21 **Parker, M. D.,** and B. E. Coffert<sup>†</sup>: *Understanding the infrasound characteristics of nontornadic and tornadic supercells in VORTEX2 and VORTEX-SE environments using high-resolution ensemble simulations.* NOAA/OAR, Office of Weather and Air Quality program. \$347,198.
- 2018-21 **Parker, M.D.:** *Mechanisms controlling the probability of tornadogenesis in supercell thunderstorms.* NSF, Physical and Dynamic Meteorology Program. \$587,109.
- 2017-20 **Parker, M.D.,** and G.M. Lackmann: *Understanding fundamental processes and evaluating high-resolution model forecasts in high-shear low-CAPE severe storm environments.* NWS/NOAA, CSTAR program. \$436,719.
- 2016-18 **Parker, M.D.:** *Four-dimensional variability of Southeastern storm environments, with and without terrain.* NOAA, VORTEX-Southeast program. \$142,945.
- 2015-17 Brown, M., **M. D. Parker,** and T. A. Murphy: *Understanding the variability and predictability of Southeastern severe storm environments using mobile soundings during VORTEX-SE.* NOAA, VORTEX-Southeast program. Collaborating institutions: Mississippi State University (lead) and University of Louisiana at Monroe. \$84,629 (NCSU part).
- 2015-16 **Parker, M.D.:** *Opportunistic soundings to advance the understanding of high-shear low-CAPE convective environments.* NSF, EAGER Program. \$23,413.
- 2015-18 **Parker, M.D.:** *Collaborative research: Measurement and analysis of nocturnal mesoscale convective systems and their stable boundary layer environment during PECAN.* NSF, Physical and Dynamical Meteorology Program. Collaborating institutions: University of Oklahoma (lead) and Colorado State University. \$293,124 (NCSU part).
- 2014-17 **Parker, M.D.,** G.M. Lackmann, and L. Xie: *Improving understanding and prediction of high impact weather associated with low-topped severe convection in the Southeastern U.S.* NWS/NOAA, CSTAR program. \$375,000.
- 2012-15 **Parker, M.D.:** *Fundamental lower tropospheric processes in observed and simulated supercells.* NSF, Physical and Dynamic Meteorology Program. \$484,935.
- 2010-13 Lackmann, G. M., A. R. Aiyyer, and **M. D. Parker:** *Improving understanding and prediction of hazardous weather in the Southeastern United States: Landfalling tropical cyclones and convective storms.* NWS/NOAA, CSTAR program. \$375,000.
- 2008-11 **Parker, M. D.:** *VORTEX2: Mobile upsonde measurements and studies of lower tropospheric processes.* NSF, Physical and Dynamic Meteorology Program. \$523,755 (including related subcontracts from NCAR).

- 2007-10 Lackmann, G. M., L. Xie, and **M. D. Parker**: *Improving understanding and prediction of warm season precipitation systems in the Southeastern and Mid-Atlantic regions*. NWS/NOAA, CSTAR program. \$375,000.
- 2006-09 Lackmann, G. M., and **M. D. Parker**: *Improving the representation of organized convection in numerical weather prediction (NWP) models*. NSF, Physical and Dynamic Meteorology Program. \$323,000.
- 2006-07 **Parker, M. D.**: *Tornadoes in landfalling hurricanes: A pilot study*. Faculty Research and Professional Development Fund, NCSU. \$4,000.
- 2004-09 **Parker, M. D.**: *CAREER: Integrated studies of recurring, non-traditional mesoscale convective systems*. Faculty Early Career Development (CAREER) award, NSF, Mesoscale Dynamic Meteorology Program. \$598,444.

## PROFESSIONAL COMMITTEES AND EDITORIAL BOARDS

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- 2020-22 Organizing Committee for the *Richard H. Johnson Symposium*, AMS
- 2015-18 Editor, *Journal of the Atmospheric Sciences*, AMS
- 2015-17 Scientific Steering Committee, VORTEX-Southeast project
- 2011-15 Scientific Steering Committee, Plains Elevated Convection at Night (PECAN) project
- 2010-15 Observing Facilities Assessment Panel, NSF/NCAR
- 2009 Working Group on Quantitative Precipitation and Hydrologic Predictions, *Workshop on Progress and Priorities of US Weather Research*, NAS/NRC
- 2008-13 AMS *Committee on Mesoscale Processes*
- 2008-09 Program Committee for the *13<sup>th</sup> Conference on Mesoscale Processes*, AMS
- 2007-08, 12-14 Associate editor, *Weather and Forecasting*, AMS
- 2006-08 Co-chair, Program Committee for the *24th Conference on Severe Local Storms*, AMS
- 2004-06, 09-10 Associate editor, *Monthly Weather Review*, AMS
- 2004-08 AMS *Committee on Severe Local Storms*
- 2004-06 Joint Program Committee for *Symposium on the Challenges of Severe Convective Storms* and *23rd Conference on Severe Local Storms*, AMS

## FIELD PROJECTS

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- 2022-23 PERiLS: NSF lead PI team; radiosondes coordinator
- 2016 VORTEX-Southeast: scientific steering committee; radiosondes coordinator; NOAA PI
- 2015 PECAN: scientific steering committee; radiosondes coordinator; NSF PI
- 2009-10 VORTEX2: radiosondes coordinator; NSF PI
- 2000 STEPS: mobile mesonet team leader (student)
- 1999 CLEX: forecaster (student)
- 1998 SCSMEX: soundings quality control (student)

## POST-GRADUATE SCHOLARS SUPERVISED

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- 2018-2010-13 Brice Coffey (NCSU), Postdoctoral Scholar 2018-19, Senior Research Scholar thereafter  
Johannes Dahl (NCSU), Postdoctoral Scholar

## GRADUATE THESES SUPERVISED

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- 2024 Zachary Chalmers (M.S., North Carolina State University)  
*Variability in High-Shear Low-CAPE QLCS Environments in the Southeastern U.S.*
- 2023 Miranda Silcott (M.S., North Carolina State University)  
*Structures of Cold Pools from PERiLS 2022-2023*
- 2022 Adam Werkema (M.S., North Carolina State University)  
*Mutual Influences of Adjacent Supercells during Multistorm Simulations*
- 2020 Nicholas Goldacker (M.S., North Carolina State University)  
*Investigating the Sensitivity of Supercell Maturation to Variations in the Low-Level Vertical Wind Profile*
- 2020 Levi Lovell (M.S., North Carolina State University)  
*Examining the Structure and Dynamics of QLCS Vortices in High-Shear, Low-CAPE Environments*
- 2020 Andrew Wade (Ph.D., North Carolina State University)  
*Dynamics and Vorticity Evolution in Simulated Low-CAPE Supercells*
- 2018 Keith Sherburn (Ph.D., North Carolina State University)  
*Environments and origins of low-level vortices within high-shear, low-CAPE convection*
- 2017 Brice Coffey (Ph.D., North Carolina State University)  
*Tornadogenesis in Simulated Supercells from VORTEX2 Environments*
- 2016 Jessica King (M.S., North Carolina State University)  
*Environmental Conditioning of Cool Season, Low Instability Thunderstorm Environments in the Tennessee and Ohio Valleys and Southeastern U.S.*
- 2014 Christopher MacIntosh (M.S., North Carolina State University)  
*The 6 May 2010 Elevated Supercell During VORTEX2*
- 2014 Brice Coffey (M.S., North Carolina State University)  
*Impacts of Increasing Low-Level Shear on Supercells during the Early Evening Transition*
- 2013 Jason Davis (M.S., North Carolina State University)  
*Radar Climatology of Tornadic and Non-tornadic Vortices in High Shear, Low CAPE Environments in the Mid-Atlantic and Southeast*
- 2013 Keith Sherburn (M.S., North Carolina State University)  
*Improving the Understanding and Detection of Severe High Shear, Low CAPE Environments*
- 2013 Casey Letkewicz (Ph.D., North Carolina State University)  
*Observed and Simulated Supercell Demise Depicted by VORTEX2 Observations*

- 2011 Adam French (Ph.D., North Carolina State University)  
*Squall Line Evolution in Response to a Developing Nocturnal Low-Level Jet and Mergers with Isolated Supercell Thunderstorms*
- 2011 Matthew Morin (M.S., North Carolina State University)  
*A Numerical Investigation of Supercells in Landfalling Tropical Cyclones*
- 2009 Casey Letkewicz (M.S., North Carolina State University)  
*Mesoscale Convective Systems Crossing the Appalachian Mountains*
- 2009 Michael Kiefer (Ph.D., North Carolina State University)  
*The Dynamics of Wildfire-Generated Dry Convection: Fundamental Processes and Complicating Factors*
- 2008 William Booth (M.S., North Carolina State University)  
*Climatology of Summertime Convective Storms along the Carolina Coastline*
- 2007 Adam French (M.S., North Carolina State University)  
*The Initiation and Evolution of Multiple Modes of Convection Within a Meso-Alpha Scale Region*
- 2007 Jerilyn Billings (M.S., North Carolina State University)  
*Evolution and Maintenance of the 22-23 June 2003 Nocturnal Convection during BAMEX*
- 2005 Brandon Storm (M.S., University of Nebraska-Lincoln)  
*Investigation of 31 May 2003 MCS with Leading Stratiform Precipitation from BAMEX*
- 2004 Evan Kuchera (M.S., University of Nebraska-Lincoln)  
*Identifying Severe Convective Wind Environments*

## EXTERNAL GRADUATE COMMITTEES/ADJUNCT APPOINTMENTS

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*School of Marine and Atmospheric Sciences, Stony Brook University  
Department of Civil and Environmental Engineering, Duke University  
Department of Geosciences, Texas Tech University*

## TEACHING EXPERIENCE

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- Dept. of Marine, Earth, & Atmospheric Sciences, North Carolina State University**
- 2018 MEAS third-year seminar (MEA495), co-instructor
- 2016 Atmospheric dynamics I (MEA421), instructor
- 2009 Special topics: VORTEX2 field course (MEA 593A), instructor
- 2007-22 Dynamics of mesoscale precipitation systems (MEA 715), co-instructor (8 times)
- 2006-23 Atmospheric convection (MEA 714), co-instructor (8 times)
- 2006-23 Mesoscale numerical modeling (MEA 712), instructor (11 times)
- 2006-24 Mesoscale weather analysis and forecasting (MEA 444), instructor (18 times)

**Dept. of Geosciences, University of Nebraska-Lincoln**

- 2005 Special topics: Mesoscale meteorology (METR 498/898), instructor  
 2004 Graduate seminar: Dynamics of clouds (METR 953), instructor  
 2003-05 Dynamic meteorology II (METR 458/858), instructor (3 times)  
 2002-04 Dynamic meteorology I (METR 456/856), instructor (3 times)  
 2002-04 Special problems in geosciences (GEOS 898), independent study supervisor (4 times)

**NORTH CAROLINA STATE UNIVERSITY SERVICE**

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- 2023- Peer Review and Teaching Effectiveness Committee, MEAS  
 2023-24 Department Head Search Committee, MEAS/COS  
 2022- Post-Tenure Review committee, MEAS  
 2020 Atmospheric Boundary Layer Search Committee chair, MEAS  
 2018- Academic Assessment Committee, MEAS  
 2018- Teaching Assistant Assignment Committee, MEAS, chair 2023-  
 2018-19 Pack Promise student mentor, MEAS  
 2017 Goodnight Professor of Distinction Review Committee, COS  
 2016- Roscoe Braham Seminar Committee chair, MEAS  
 2016-18 Atmospheric Prediction and Data Assimilation Search Committee chair, MEAS  
 2016-19 Post-Tenure Review committee, MEAS  
 2016-18 Peer Review and Teaching Effectiveness Committee, MEAS  
 2015-16 Teaching Awards Committee, COS  
 2014- Faculty Co-advisor, Student soundings club, MEAS  
 2012-14 Computing and Network Facilities Committee chair, MEAS  
 2011-14 Department Executive Committee, MEAS  
 2010 Peer teaching reviewer, MEAS  
 2009-11 Meteorology Curriculum Review Committee chair, MEAS  
 2008-09 Atmospheric Measurements Faculty Search Committee, MEAS  
 2008 Panelist, "New Faculty Workshop" Research Panel, PAMS  
 2007-09 Mesoscale Dynamics Faculty Search Committee, MEAS  
 2006- Atmospheric Sciences Undergraduate Program Coordinator  
 2006- Undergraduate Curriculum and Programs Committee, MEAS  
 2006- Undergraduate student academic advising (6-12 students each semester)  
 2006-09 Social Committee chair, MEAS  
 2005-07, 10 Faculty Co-advisor, Student Chapter of the AMS  
 2005 Tropical Meteorology Faculty Search Committee, MEAS

**List of Acronyms in this Document**

AMS	American Meteorological Society
CLEX	Complex Layered Cloud Experiment, 1999
COMET	Cooperative Program for Operational Meteorology, Education and Training
COS	College of Sciences
C-RITE	Community workshop on observing priorities in convective and turbulent environments
CSTAR	Collaborative Science, Technology, and Applied Research
DELTA	Digital Education and Learning Technology Applications
ESSL	European Severe Storms Laboratory
MEAS	Department of Marine, Earth, and Atmospheric Sciences
NAS	National Academy of Sciences
NCAR	National Center for Atmospheric Research
NCSU	North Carolina State University
NOAA	National Oceanographic and Atmospheric Administration
NRC	National Research Council
NSF	National Science Foundation
NWA	National Weather Association
NWS	National Weather Service
PAMS	College of Physical and Mathematical Sciences (became College of Sciences)
PECAN	Plains Elevated Convection at Night experiment, 2015
PERiLS	Propagation, Evolution, and Rotation in Linear Systems experiment, 2022-2023
PI	principal investigator
SCSMEX	South China Sea Monsoon Experiment, 1998
STEPS	Severe Thunderstorm Electrification and Precipitation Study, 2000
VORTEX2	Verification of the Origins of Rotation in Tornadoes Experiment, 2009-2010