CURRICULUM VITAE

Stan Trier

PERSONAL

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EDUCATION

1997	Ph.D., Atmospheric Science, Colorado State University
1987	M.S., Meteorology, Pennsylvania State University
1984	B.S., Meteorology, Florida State University

PROFESSIONAL RECORD

1/17-present	Project Scientist III, Dynamical and Physical Meteorology Section
12/10-1/17	Project Scientist III, Mesoscale Dynamics Group, NCAR/MMM
6/02-12/10	Project Scientist II, Prediction Diagnostics Group, NCAR/MMM
1/99-6/02	Project Scientist I, Mesoscale Dynamics Group, NCAR/MMM
6/95-1/99	Associate Scientist III, Mesoscale Analysis Group, NCAR/MMM
6/91-5/95	Associate Scientist II, Mesoscale Prediction Section, NCAR/MMM/ATD
1/88-5/91	Associate Scientist I, Mesoscale Prediction Section, NCAR/MMM

PROFESSIONAL ACTIVITIES

2019-present	Editor, Monthly Weather Review
2015	Field Operations Weather Forecaster, Plains Elevated Convection at Night (PECAN) Experiment
2012-2018	American Meteorological Society Mesoscale Processes Committee (17^{th} AMS Conference on Mesoscale Processes, co-chair, 2017)
2005-2008	American Meteorological Society Severe Local Storms Committee

2001-2003	Bow-Echo and MCV Experiment (BAMEX) Steering Committee
1998-2001, 2005-2007, 2015-2018	Associate Editor, Monthly Weather Review

Honors and Awards

2000	MMM outstanding publication and nominee for NCAR outstanding publication award
2002	NCAR outstanding publication award
2019	AMS Editor's Award (*Monthly Weather Review)*

REFEREED PUBLICATIONS

Reviewed Articles

1. **Trier, S. B.**, D. B. Parsons, and T. J. Matejka, 1990: Observations of a subtropical cold front in a region of complex terrain. *Mon. Wea. Rev*., 118, 2449-2470.

2. **Trier, S. B.**, D. B. Parsons, and J. H. E. Clark, 1991: Environment and evolution of a cold-frontal mesoscale convective system. *Mon. Wea. Rev*., 119, 2429-2455.

3. **Trier, S. B.** and D. B. Parsons, 1993: Evolution of environmental conditions preceding the development of a nocturnal mesoscale convective complex. *Mon. Wea. Rev*., 121, 1078-1098.

4. **Trier, S. B.** and D. B. Parsons, 1995: Updraft dynamics within a numerically simulated subtropical rainband. *Mon. Wea. Rev.*, 123, 39-58.

5. **Trier, S. B.**, W. C. Skamarock, M. A. LeMone, D. B. Parsons, and D. P. Jorgensen, 1996: Structure and evolution of the 22 February 1993 TOGA-COARE squall line: Numerical simulations. *J. Atmos. Sci.,* 53, 2861-2886.

6. **Trier, S. B.**, W. C. Skamarock, and M. A. LeMone, 1997: Structure and evolution of the 22 February 1993 TOGA-COARE squall line: Organization mechanisms inferred from numerical simulation. *J. Atmos. Sci.,* 54, 386-407.

7. Jorgensen, D. P., M. A. LeMone, and **S. B. Trier**, 1997: Structure and evolution of the 22 February 1993 TOGA-COARE squall line: Aircraft observations of precipitation, circulation, and surface energy fluxes. *J. Atmos. Sci.,* 54, 1961-1985.

8. **Trier, S. B.**, M. A. LeMone, and W. C. Skamarock, 1998: Effect of three-dimensional structure on the stormwide horizontal accelerations and momentum budget of a simulated squall line. *Mon. Wea. Rev*., 126, 2580-2598.

9. LeMone, M. A., E. J. Zipser, and **S. B. Trier**, 1998: The role of environmental shear and thermodynamic conditions in determining the structure and evolution of mesoscale convective systems during TOGA COARE. *J. Atmos. Sci.,* 55, 3493-3518.

10. **Trier, S. B.**, C. A. Davis, and J. Tuttle, 2000: Long-lived mesoconvective vortices and their environment. Part I: Observations from the Central United States during the 1998 warm season. *Mon. Wea. Rev*., 128, 3376-3395.

11. **Trier, S. B.**, C. A. Davis, and W. C. Skamarock, 2000: Long-lived mesoconvective vortices and their environment. Part II: Induced thermodynamic destabilization in idealized simulations. *Mon. Wea. Rev*., 128, 3396-3412.

12. Davis, C.A., D. A. Ahijevych, and **S. B. Trier**, 2002: Detection and prediction of warm season midtropospheric vortices by the rapid update cycle. *Mon. Wea. Rev*., 130, 24-42.

13. **Trier, S. B.**, and C. A. Davis, 2002: Influence of balanced motions on heavy precipitation within a long lived convectively generated vortex. *Mon. Wea. Rev.,* 130, 877-899.

14. Carbone, R. E., J. D. Tuttle, D. A. Ahijevych, and **S. B. Trier**, 2002: Inferences of predictability associated with warm season precipitation episodes. *J. Atmos. Sci.,* 59, 2033-2056.

15. Davis, C. A., and **S. B. Trier**, 2002: Cloud resolving simulations of mesoscale vortex intensification and its effect on a serial mesoscale convective system. *Mon. Wea. Rev.,* 130, 2839-2858.

16. Snyder, C., T. M. Hamill, and **S. B. Trier**, 2003: Linear evolution of error covariances in a quasigeostrophic model. *Mon. Wea. Rev.*, 131, 189-205.

17. Davis, C. A., K. W. Manning, R. E. Carbone, **S. B. Trier**, and J. D. Tuttle, 2003: Coherence of warm-season continental rainfall in numerical prediction models. *Mon. Wea. Rev*., 131, 2667-2679.

18. **Trier, S. B.**, F. Chen, and K. W. Manning, 2004: A study of convection initiation in a mesoscale model using high-resolution land surface initial conditions. *Mon. Wea. Rev*., 132, 2954-2976.

19. Davis, C. A., N. Atkins, D. Bartels, L. Bosart, M. Coniglio, G. Bryan, W. Cotton, D. Dowell, B. Jewett, R. Johns, D. Jorgensen, J. Knievel, K. Knupp, W.-C. Lee, G. McFarquhar, J. Moore, R. Przybylinski, R. Rauber, B. Smull, R. Trapp, **S. Trier**, R. Wakimoto, M. Weisman, and C. Ziegler, 2004: The Bow Echo and MCV experiment: Observations and opportunities. *Bull. Amer. Meteor. Soc.,* 85, 1075-1093.

20. **Trier, S. B.**, C. A. Davis, D. A. Ahijevych, M. L. Weisman, and G. H. Bryan, 2006: Mechanisms supporting long-lived episodes of propagating nocturnal convection within a 7-day WRF model simulation. *J. Atmos. Sci.*, **63**, 2437-2461.

21. Chen, F., K. W. Manning, M. A. LeMone, **S. B. Trier**, J. G. Alfieri, R. Roberts, J. Wilson, M. Tewari, D. Niyogi, T. W. Horst, S. P. Oncley, J. Basara, and P. Blanken, 2007: Evaluation of the characteristics of the NCAR high-resolution land data assimilation system. *J. Appl. Meteor.Climatol.,* **46**, 694-713.

22. Davis, C. A., and **S. B. Trier**, 2007: Mesoscale convective vortices observed during BAMEX. Part I: Kinematic and thermodynamic structure. *Mon. Wea. Rev.*, **135**, 2029-2049.

23. **Trier, S. B.**, and C. A. Davis, 2007: Mesoscale convective vortices observed during BAMEX. Part II: Influences on secondary deep convection. *Mon. Wea. Rev.*, **135**, 2051-2075.

24. **Trier, S. B.**, F. Chen, K. W. Manning, M. A. LeMone, and C. A. Davis, 2008: Sensitivity of the PBL and precipitation in 12-day simulations of warm-season convection using different land surface models and soil wetness conditions. *Mon. Wea. Rev.*, **136**, 2321-2343.

25. **Trier, S. B.** and R. D. Sharman, 2009: Convection-permitting simulations of the environment supporting widespread turbulence within the upper-level outflow of a mesoscale convective system. *Mon. Wea. Rev.*, **137**, 1972-1990.

26. **Trier, S. B.**, C. A. Davis, and D. A. Ahijevych, 2010: Environmental controls on the diurnal cycle of warm-season precipitation in the continental United States. *J. Atmos. Sci.*, **67**, 1066-1090.

27. **Trier, S. B.**, R. D. Sharman, R. G. Fovell, and R. G. Frehlich, 2010: Numerical simulation of radial cloud bands within the upper-level outflow of an observed mesoscale convective system. *J. Atmos. Sci.*, **67**, 2990-2999.

28. Marsham, J. H., **S. B. Trier**, T. M. Weckwerth, and J. W. Wilson, 2011: Observations of elevated convection initiation leading to a surface-based squall line during 13 June IHOP_2002. *Mon. Wea. Rev.*, **139**, 247-271.

29. **Trier, S. B.**, M. A. LeMone, F. Chen, and K. W. Manning, 2011: Effects of surface heat and moisture exchange on ARW-WRF model warm-season precipitation forecasts over the central United States. *Wea. Forecasting*, **26**, 3-25.

30. **Trier, S. B.**, J. H. Marsham, C. A. Davis, and D. A. Ahijevych, 2011: Numerical simulations of the post-sunrise reorganization of a nocturnal mesoscale convective system during 13 June IHOP_2002. *J. Atmos. Sci.*, **68**, 2988-3011.

31. Lane, T. P., R. D. Sharman, **S. B. Trier**, R. G. Fovell, and J. K. Williams, 2012: Recent advances in the understanding of near-cloud turbulence. *Bull. Amer. Meteor. Soc.*, **93**, 499-515.

32. Sharman, R. D., **S. B. Trier**, T. P. Lane, and J. D. Doyle, 2012: Sources and dynamics of turbulence in the upper troposphere and lower stratosphere: A review. *Geophys. Res. Lett.*, **39**, L12803, doi:10.1029/2012GL051996.

33. **Trier, S. B.**, R. D. Sharman, and T. P. Lane, 2012: Impacts of moist convection on a cold-season outbreak of the clear-air turbulence (CAT). *Mon. Wea. Rev.*, **140**, 2477-2496.

34. Sun. J., Q. Xiao, **S. B. Trier**, M. L. Weisman, H. Wang, Z. Ying, M. Xu, and Y. Zhang, 2012: Sensitivity of 0-12 hour warm-season precipitation forecasts over the central United States to model initialization and parameterizations. *Wea*. *Forecasting*, **27**, 832-855.

35. Laing, A. G., **S. B. Trier**, and C. A. Davis, 2012: Numerical simulation of episodes of organized convection in tropical northern Africa. *Mon. Wea. Rev.*, **140**, 2874-2886.

36. **Trier, S. B.**, C. A. Davis, D. A. Ahijevych, and K. W. Manning, 2014: Use of the parcel buoyancy minimum (B_{min}) to diagnose simulated thermodynamic destabilization. Part I: Methodology and case studies of MCS initiation environments. *Mon. Wea. Rev.*, **142**, 945-966.

37. **Trier, S. B.**, C. A. Davis, D. A. Ahijevych, and K. W. Manning, 2014: Use of the parcel buoyancy minimum (B_{min}) to diagnose simulated thermodynamic destabilization. Part II: Composite analysis of mature MCS environments. *Mon. Wea. Rev.*, **142**, 967-990.

38. Kim, J.-H., H.-Y. Chun, R. D. Sharman, and **S. B. Trier**, 2014: The role of vertical shear on aviation turbulence within cirrus bands of a simulated western Pacific cyclone. *Mon. Wea. Rev.*, **142**, 2794-2813.

39. **Trier, S. B.**, C. A. Davis, and R. E. Carbone, 2014: Mechanisms governing the persistence and diurnal cycle of a heavy rainfall corridor. *J. Atmos. Sci.*, **71**, 4102-4126, doi: 10.1175/JAS-D014-0134.1.

40. Keller, T. L., **S. B. Trier**, W. D. Hall, R. D. Sharman, M. Xu, and Y. Liu, 2015: Lee waves associated with a commercial jetliner accident at Denver International Airport. *J. Appl. Meteor. Climatol.*, **54**, 1373-1392.

41. **Trier, S. B.**, G. S. Romine, D. A. Ahijevych, R. J. Trapp, R. S. Schumacher, M. C. Coniglio, and D. J. Stensrud, 2015: Mesoscale thermodynamic influences on convection initiation

near a surface dryline in a convection-permitting ensemble. *Mon. Wea. Rev.*, **143**, 3276-3753.

42. Schwartz, C. S., G. S. Romine, M. L. Weisman, R. A. Sobash, K. R. Fossell, K. W. Manning, and **S. B. Trier**, 2015: A real-time convection-allowing ensemble prediction system initialized by mesoscale ensemble Kalman filter analyses. *Wea. Forecasting*, **30**, 1158-1181.

43. Weisman, M. L., R. J. Trapp, G. S. Romine, C. Davis, R. Torn, M. Baldwin, L. Bosart, J. Brown, M. Coniglio, D. Dowell, A. C. Evans, T. J. Galarneau, Jr., J. Haggerty, T. Hock, K. Manning, P. Roebber, P. Romashkin, R. Schumacher, C. S. Schwartz, R. Sobash, D. Stensrud, and **S. B. Trier**, 2015: The Mesoscale Predictability Experiment (MPEX), *Bull. Amer. Meteor. Soc.*, **96**, 2127-2149.

44. **Trier, S. B.**, and R. D. Sharman, 2016: Mechanisms influencing cirrus banding and aviation turbulence near a convectively enhanced upper-level jet stream. *Mon. Wea. Rev.*, **144**, 3003-3027.

45. **Trier, S. B.**, J. W. Wilson, D. A. Ahijevych, and R. A. Sobash, 2017: Mesoscale vertical motions near nocturnal convection initiation in PECAN. *Mon. Wea. Rev.*, **145**, 2919-2941.

46. Prein, A. F., C. Liu, K. Ikeda, **S. B. Trier**, R. M. Rasmussen, G. J. Holland, and M. P. Clark, 2017: Increased rainfall volume from future convective storms in the US. *Nat. Clim. Change*, **7**, 880-884.

47. Wilson, J. W., **S. B. Trier**, D. W. Reif, R. D. Roberts, and T. M. Weckwerth, 2018: Nocturnal convection initiation of the PECAN 4 July hailstorm. *Mon. Wea. Rev.*, **146**, 243-262.

48. **Trier, S. B.**, and R. D. Sharman, 2018: Trapped gravity waves and their association with turbulence in a large thunderstorm anvil during PECAN. *Mon. Wea. Rev.*, **146**, 3031-3052.

49. Sharman, R. D., and **S. B. Trier**, 2019: Influences of gravity waves on convectively-induced turbulence (CIT): A review. *Pure Appl. Geophys.*, **176**, 1923-1958.

50. Gultepe, I., R. Sharman, P. D. Williams, B. B. Zhou, G. Ellrod, P. Minnis, **S. B. Trier**, S. Griffin, S. S. Yum, B. Gharabaghi,, W. Feltz, M. Temimi, Z. X. Pu, L. N. Storer, P. Kneringer, M. J. Weston, H. Y. Chuang, L. Thoboi, A. P. Dimri, S. J. Dietz, G. B. Franca, M. V. Almeida, and F. L. A. Albuquerque, 2019: A review of high impact weather for aviation meteorology, *Pure Appl. Geophys.*, **176**, 1869-1921.

51. Kim, S.-Y., H.-Y. Chun, R. D. Sharman, and **S. B. Trier**, 2019: Development of near-cloud turbulence diagnostics based on a convective gravity wave drag parameterization. *J. Appl. Meteor. Climatol.*, **58**, 1725-1750.

52. Weckwerth, T. M., J. Hanesiak, J. W. Wilson, **S. B. Trier**, S. K. Degelia, W. A. Gallus, Jr., R. D. Roberts, and X. Wang, 2019: Nocturnal convection initiation during PECAN. *Bull. Amer. Meteor. Soc.*, **100**, 2353-2372.

53. **Trier**, **S. B.**, G. S. Romine, D. A. Ahijevych, and R. A. Sobash, 2019: Lower-tropospheric influences on the timing and intensity of afternoon severe convection over modest terrain in a convection-allowing ensemble. *Wea. Forecasting*, **34**, 1633-1656.

54. Zovko-Rajak, D., T. P. Lane, R. D. Sharman, and **S. B. Trier**, 2019: The role of gravity wave breaking in a case of upper-level near-cloud turbulence. *Mon. Wea. Rev.*, **147**, 4567-4588.

55. **Trier, S. B.**, S. D. Kehler, and J. Hanesiak, 2020: Observations and simulation of elevated nocturnal convection initiation on 24 June 2015 during PECAN. *Mon. Wea. Rev.*, **148**, 613-635.

56. Phoenix, D., C. Homeyer, M. Barth, and **S. B. Trier**, 2020: Mechanisms responsible for stratosphere-to-troposphere transport around a mesoscale convective system anvil. *J. Geophys. Res.*, e2019JD032016.

57. Muñoz-Esparza, D., R. D. Sharman, and **S. B. Trier**, 2020: On the consequences of PBL scheme diffusion on UTLS wave and turbulence representation in high-resolution NWP models. *Mon. Wea. Rev.*, **148**, 4247-4265.

58. **Trier, S. B.**, R. D. Sharman, D. Muñoz-Esparza, and T. P. Lane, 2020: Environment and mechanisms of severe turbulence in a midlatitude cyclone. *J. Atmos. Sci*., **77**, 3869-3889.

59. **Trier, S. B.**, G. S. Romine, D. A. Ahijevych, R. A. Sobash, and M. B. Chasteen, 2021: Relationship of convection initiation and subsequent storm strength to ensemble simulated initial conditions during IOP3b of VORTEX Southeast 2017. *Mon. Wea. Rev.*, **149**, 3265-3287.

60. **Trier, S. B.**, R. D. Sharman, D. Muñoz-Esparza, T. L. Keller, 2022: Effects of distant organized convection on forecasts of widespread clear-air turbulence. *Mon. Wea. Rev.*, in press. DOI: https://doi.org/10.1175/MWR-D-22-0077.1

Book Chapters

Trier, S. B., 2003: Convective Storms: Convection Initiation. *Encyclopedia of Atmospheric Sciences*, Academic Press, 560-570.

Trier, S. B., 2016: Modeling Studies of Turbulence Mechanisms Associated with Mesoscale Convective Systems. Chapter 17, *Aviation Turbulence: Processes, Detection, and Prediction*, R. D. Sharman and T. P. Lane, eds., Springer.

RECENT INVITED TALKS, SEMINARS AND LECTURES

April 2012 *Influences of Organized Convection on Clear-Air Turbulence.* Invited lecture for Prof. Richard Johnson's graduate course in mesoscale dynamics (AT 735) at Colorado State University. Fort Collins, CO.

Dec 2015 *Observations and Simulations of Multi-day Midlatitude Corridors of Heavy Warm-Season Precipitation.* Invited talk, AGU Fall Meeting, San Francisco, CA

May 2016 *Some Influences of Gravity Waves on Aviation Turbulence*. Invited Talk, 2016 SPARC Gravity Wave Symposium, Pennsylvania State University, State College, PA

Oct 2017 *Influences of Remote Deep Convection on Aviation Turbulence.* Invited Seminar, Department of Atmospheric Sciences, University of North Dakota, Grand Forks, ND

Jan 2020 *Using Numerical Models to Understand Linkages between Deep Convection and Aviation Turbulence*. Invited Talk, 20th Conference on Aviation, Range, and Aerospace Meteorology, 100th AMS Annual Meeting, Boston, MA

Jan 2021 *Gravity Waves as a Linkage between Deep Convection and Clear-Air Turbulence*. Invited Talk, Robert Sharman Symposium, 21st Conference on Aviation, Range, and Aerospace Meteorology, 101st AMS Annual Meeting, New Orleans, LA

Aug 2022 *Effects of Distant Convection on Widespread Clear-Air Turbulence.* Invited Talk, Aviation Meteorology Session of 19th Annual Meeting of the Asia Oceania Geosciences Society (AOGS 2022), Singapore.

GRANTS AND PROPOSALS

Davis, C. A. (PI), W. C. Skamarock (Co-I), S. B. Trier (Co-I), and R. H. Johnson (Collaborator), NASA Grant "Mesoscale convective vortices as precursors of organized, heavy precipitation," 2/1/98 – 4/30/01.

Carbone, R. (PI), C. Davis (Co-PI), M. Moncrieff (Co-PI), S. Trier (Co-PI), D. Ahijevych (Co-I), C. Liu (Co-I), L. J. Miller (Co-I), and J. Tuttle (Co-I), "Predictability and Prediction of Heavy Warm-Season Rainfall," 7/1/01 – 9/30/03. USWRP.

Chen, F. (PI), E. Brandes (Co-PI), J. Coen (Co-PI), M. LeMone (Co-PI), L. Mearns (Co-PI), D. Parsons (Co-PI), S. Trier (Co-PI), T. Warner (Co-PI), M. Xu (Co-PI), and D. Yates (Co-PI), "Land Surface/Atmosphere Interactions and its Relationship to Improving Quantitative Precipitation Fo recasting of Deep Convection in the Southern Great Plains," 7/1/01 – 9/30/03. USWRP.

Moncrieff, M. (PI), R. Carbone (Co-PI), C. Davis (Co-PI), C. Liu (Co-I), and S. Trier (Co-I), "Organized Convective Precipitation over the US Continent and Applications to Stochastic Hydrology," 3/15/03 – 3/15/06. NSF Global Energy and Water Cycle Experiment.

Chen, F. (PI), D. Gochis (Co-PI), M. LeMone (Co-PI), K. Manning (Co-PI), S. Trier (Co-PI), D. Yates (Co-PI), R. Wakimoto (Collaborator), and D. Niyogi (Collaborator), "Land-Surface/Atmosphere Interactions and their Impacts on the Quantitative Precipitation Forecasting in the Southern Great Plains, "10/1/03 – 10/1/06. USWRP

Chen, F. (PI), M. A. LeMone (Co-I), and S. B. Trier (Co-I), "Atmospheric Responses to Land-Surface Forcing and their Impact on Precipitation Processes in the Southern Great Plains. NASA, 3/1/07 - 2/28/10.

Trier, S. B. (PI), and C. A. Davis (Co-PI), D. A. Ahijevych, and J. D. Tuttle, "Contribution of Mesoscale Processes Above the PBL on Lifecycles of Deep Convection", NCAR STEP/USWRP Science Program. 10/1/07 – 9/30/09.

Chen, F (PI), M. LeMone, S. Trier, M. Barlage, and K. Manning, "Impacts of Land/PBL Interactions on Short-term Prediction of Precipitation: A Focused Study over the IHOP_2002 Region. NCAR STEP/USWRP Science Program. 10/1/07 – 9/30/09.

Trier, S. B. (PI), and D. A. Ahijevych, "A Process Study of Transitions between Surface-Based and Elevated Convection during IHOP and BAMEX", NCAR STEP/USWRP Science Program. 10/1/09-9/30/12.

Chen, F., M. A. LeMone, S. B., Trier, K. W. Manning, and S.-L. Kang, "Impacts of Land-Surface Exchange Processes on Surface and Elevated Convection: A Contrasting Study of IHOP_2002 and BAMEX_2003". NCAR STEP/USWRP Science Program. 10/1/09-9/30/12.

Trier, S. (PI), C. Davis (Co-I), and D. Ahijevych (Co-I), "Thermodynamic Mechanisms Responsible for Initiating Deep Convection in Convection-Permitting Simulations with ARW-WRF". NCAR STEP/USWRP Science Program. 10/1/12-10/1/15.

Trier, S. (PI), and D. Ahijevych (Co-I), "Examination of the Mesoscale Forcing of Nocturnal Convection in the WRF Ensemble Modeling System". NCAR STEP/USWRP Science Program. 10/1/16-10/1/19.

Trier, S. (PI), D. Carroll-Smith (Co-I), G. Bryan (Co-I), and R. Edwards (collaborator), "Environmental and Storm-Scale Characteristics of Tornado-Producing Rainbands within Landfalling Tropical Cyclones", NOAA, Award # NA19OAR4590215, 9/1/19 – 8/31/22.

Trier, S. (PI), and D. Ahijevych (Co-I), Physical Processes Influencing Convection Initiation and Mesoscale Prediction in the WRF Modeling System". NCAR STEP/USWRP Science Program. 10/1/19-present.