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Education

2003	Ph.D., Atmospheric Sciences	University of Washington
1993	B.S., summa cum laude, Meteorology with minor in Mathematics	University of Oklahoma

Professional Experience

08/2020–present	Chair, Department of Geography and Atmospheric Science
08/2018–present	Professor, Department of Geography and Atmospheric Science, University of Kansas, Lawrence, Kansas
07/2018–06/2019	Professor/Associate Professor and Acting Chair, Department of Geography and Atmospheric Science, University of Kansas, Lawrence, Kansas
08/2013–07/2018	Associate Professor, Department of Geography and Atmospheric Science, University of Kansas, Lawrence, Kansas
01/2011–present	Adjunct Assistant Professor, Department of Marine, Earth, and Atmospheric Sciences, North Carolina State University, Raleigh, NC
03/2009–present	Courtesy Faculty Appointment, Environmental Studies Program, University of Kansas, Lawrence, Kansas
08/2007–07/2013	Assistant Professor, Department of Geography, University of Kansas
07/2003–08/2007	Research Scientist, Cooperative Institute for Mesoscale Meteorological Studies, Norman, OK
01/2004–05/2004	Adjunct Instructor, School of Meteorology (Physical Meteorology II), University of Oklahoma, Norman, OK
01/2001–07/2003	Research Associate, Cooperative Institute for Mesoscale Meteorological Studies, Norman, OK

01/1999–12/2000 Research Associate, Coastal Meteorology Research Program,
Norman, OK

09/1993–12/1998 Research Assistant, Department of Atmospheric Sciences,
University of Washington, Seattle, WA

09/1989–08/1993 Meteorological Technician, National Severe Storms Laboratory,
Norman, OK

Formal publications

In review

- [–] Ekpeterere, K., X. Li, J. Kastens, J. Coll, and **D. B. Mechem**, 2024: Estimating Probable Maximum Precipitation Using IMERG Satellite Data. *Water Resource Research*, in review.
- [–] Z. Zhang, **D. B. Mechem**, J. Covert[†], and C. Chiu, 2024: An analysis of uncertainties in warm rain parameterizations in climate models based on in situ measurements. *J. Atmos. Sci.*, in review.

Published

- Ghate, V. P., and **D. B. Mechem**, 2023: Planetary boundary layer and processes. *Fast Physics in Large Scale Atmospheric Models: Parameterization, Evaluation, and Observations*, Y. Liu and P. Kollias, Eds., Wiley/AGU, ISBN: 978-1-119-52899-9.
- Covert[†], J. A., **D. B. Mechem**, and Z. Zhang, 2022: Subgrid-scale Horizontal and Vertical Variations of Cloud Water in Stratocumulus Clouds: A case study based on LES and comparisons with in-situ observations. *Atmos. Chem. Phys.*, **22**, 1159–1174, <https://doi.org/10.5194/acp-22-1159-2022>.
- Krause, C., W. Huang, **D. B. Mechem**, E. S. Van Vleck, and M. Zhang, 2022: A metric tensor approach to data assimilation with adaptive moving meshes. *J. Computational Physics*, **466**, 111407.
- McMichael[†], L. A., **D. B. Mechem**, and T. Heus, 2022: Shallow cumulus entrainment dynamics in a sheared environment. *J. Atmos. Sci.*, **79**, 3275–3295.
- Wang, J., and co-authors (including **D. B. Mechem**), 2022: Aerosol and cloud experiments in the Eastern North Atlantic (ACE–ENA). *Bull Amer. Meteor. Soc.*, 103(2), E619–E641. <https://doi.org/10.1175/BAMS-D-19-0220.1>
- Zhang, Z., L. Oreopoulos, M. D. Lebsock, **D. B. Mechem**, and J. Covert, 2022: Understanding the microphysical control and spatial-temporal variability of warm rain probability using CloudSat and MODIS Observations. *Geophys. Res. Lett.*, e2022GL098863.
- Brunsell, N. A., D. A. Rahn, and **D. B. Mechem**, 2021: Impact of a nocturnal low-level jet on surface-layer turbulent characteristics. *J. Geophys. Res. Atmos.*, **126**,

- e2020JD034083. <https://doi.org/10.1029/2020JD034083>.
- Eissner[†], J. M., **D. B. Mechem**, M. P. Jensen, and S. E. Giangrande, 2021: Factors governing cloud growth and entrainment rates in shallow cumulus and congestus during GoAmazon2014/5. *J. Geophys. Res. Atmos.*, 126, e2021JD034722. <https://doi.org/10.1029/2021JD034722>.
- Tomkins[†], L. M., **D. B. Mechem**, S. E. Yuter, and S. R. Rhodes, 2021: Regional flow conditions associated with stratocumulus cloud-eroding boundaries over the southeast Pacific. *Mon. Wea. Rev.*, 149, 1903–1917.
- Wang, Y., and co-authors (including **D. B. Mechem**), 2021: Vertical profiles of trace gas and aerosol properties over the eastern North Atlantic: variations with season and synoptic condition. *Atmos. Chem. Phys.*, 21, 11079–11098. <https://doi.org/10.5194/acp-21-11079-2021>.
- Zhang, Z., Q. Song, **D. B. Mechem**, V. E. Larson, J. Wang, Y. Liu, M. K. Witte, X. Dong, and P. Wu, 2021: Vertical Dependence of Horizontal Variation of Cloud Microphysics: Observations from the ACE-ENA field campaign and implications for warm rain simulation in climate models. *Atmos. Chem. Phys.*, in press, <https://doi.org/10.5194/acp-2020-788>.
- Giangrande, S. E., D. Wang, and **D. B. Mechem**, 2020: Cloud regimes over the Amazon basin: Perspectives from the GoAmazon2014/5 campaign. *Atmos. Chem. Phys.*, 20, 7489–7507, <https://doi.org/10.5194/acp-20-7489-2020>.
- McMichael[†], L. A., F. Yang, T. Marke, U. Löhnert, **D. B. Mechem**, A. M. Vogelmann, et al., 2020: Characterizing subsiding shells in shallow cumulus using Doppler lidar and large-eddy simulation. *Geophysical Research Letters*, 47, e2020GL089699. <https://doi.org/10.1029/2020GL089699>
- Ghate, V. P., **D. B. Mechem**, M. P. Cadetdu, E. W. Eloranta, M. P. Jensen, M. L. Nordeen, and W. L. Smith, Jr., 2019: Entrainment in closed cellular marine stratocumulus clouds from the MAGIC field campaign. *Quart. J. Roy. Meteor. Soc.*, 145, 1589–1602, <https://doi.org/10.1002/qj.3514>.
- Giangrande, S. E., D. Wang, M. J. Bartholomew, M. Jensen, **D. B. Mechem**, J. Hardin, and R. Wood, 2019: Midlatitude oceanic cloud precipitation properties as sampled by the ARM eastern North Atlantic observatory. *J. Geophys. Res. Atmos.*, 124, 4741–4760.
- McMichael[†], L. A., **D. B. Mechem**, S. Wang, Q. Wang, Y. L. Kogan, and J. Teixeira, 2019: Assessing the mechanisms governing the daytime evolution of marine stratocumulus using large-eddy simulation. *Quart. J. Roy. Meteor. Soc.*, 145, 845–866.
- Mechem, D. B.**, and S. E. Giangrande, 2018: Controls on cloud properties and precipitation onset for a case of cumulus congestus sampled during MC3E. *J. Geophys. Res. Atmos.*, 123, <https://doi.org/10.1002/2017JD027457>.
- Mechem, D. B.**, C. S. Wittman[†], M. A. Miller, S. E. Yuter, and S. P. de Szoeke, 2018:

- Joint synoptic and cloud variability over the Northeast Atlantic near the Azores. *J. Appl Meteor. Climatol.*, **57**, 1273–1290.
- Yuter, S. E., J. D. Hader, M. A. Miller, and **D. B. Mechem**, 2018: Abrupt cloud clearing of marine stratocumulus in the subtropical southeast Atlantic. *Science*, **361**, 697–701.
- Ziyadeh, A., A. Karimi, D. R. Hirmas, M. Kehl, A. Lakzian, H. Khademi, and **D. B. Mechem**, 2018: Spatial and temporal variations of airborne dust fallout in Khorasan Razavi Province, northeast Iran. *Geoderma*, **326**, 42–55.
- Rémillard, J., A. M. Fridlind, A. S. Ackerman, G. Tselioudis, P. Kollias, **D. B. Mechem**, H. E. Chandler[†], E. Luke, R. Wood, M. K. Witte, P. Y. Chuang, and J. K. Ayers, 2017: Use of cloud radar Doppler spectra to evaluate stratocumulus drizzle size distributions in large-eddy simulations with size-resolved microphysics. *J. Appl. Meteor. Climatol.*, **56**, 3263–3283.
- de Szoeke, S. P., K. L. Verlinden, S. E. Yuter, and **D. B. Mechem**, 2016: The time scales of variability of marine low clouds. *J. Climate*, **29**, 6463–6481.
- Nelson[†], K. J., **D. B. Mechem**, and Y. K. Kogan, 2016: Evaluation of warm-rain microphysical parameterizations in mesoscale simulations of the cloudy marine boundary layer. *Mon. Wea. Rev.*, **144**, 2134–2154.
- Kogan, Y. L., and **D. B. Mechem**, 2016: A PDF-based formulation of microphysical variability in cumulus congestus clouds. *J. Atmos. Sci.*, **73**, 167–184.
- Mechem, D. B.**, S. E. Giangrande, C. S. Wittman[†], P. Borque, T. Toto, and P. Kollias, 2015: Insights from modeling and observational evaluation of a precipitating continental cumulus event observed during the MC3E field campaign. *J. Geophys. Res. Atmos.*, **120**, 1980–1995, doi:10.1002/2014JD022255.
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- Wood, R., M. Wyant, C. S. Bretherton, J. Remillard, P. Kollias, J. Fletcher, J. Stemmler, S. de Szoeke, S. E. Yuter, M. Miller, **D. Mechem**, G. Tselioudis, C. Chiu, J. Mann, E. O'Connor, R. Hogan, X. Dong, M. Miller, V. Ghate, A. Jefferson, Q. Min, P. Minnis, R. Palinkonda, B. Albrecht, E. Luke, C. Hannay, and Y. Lin, 2015: Clouds, aerosol, and precipitation in the marine boundary layer: An ARM Mobile Facility deployment. *Bull. Amer. Meteor. Soc.*, **96**, 419–440.
- Huber[†], D. B., **D. B. Mechem**, and N. A. Brunzell, 2014: Effects of Great Plains irrigation on regional climate. *Climate*, **2**, 103–128.
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- Cochran, F. V., N. A. Brunzell, and **D. B. Mechem**, 2013: Comparing surface and

- mid-troposphere CO₂ concentrations from central U.S. grasslands. *Entropy*, **15**, 606–623, doi:10.3390/e15020606.
- Mechem, D. B.**, and A. J. Oberthaler[†], 2013: Numerical simulation of tropical cumulus congestus during TOGA COARE. *J. Adv. Model. Earth Syst.*, **5**, 1-15, doi:10.1002/jame.20043.
- de Szoeke, S. P., S. Yuter, **D. B. Mechem**, C. Fairall, C. Burleyson, and P. Zuidema, 2012: Observations of stratocumulus clouds and their effects on the eastern Pacific surface heat budget along 20°S. *J. Climate*, **25**, 8542–8567.
- Kogan, Y. L., **D. B. Mechem**, and K. Choi, 2012: Effects of sea-salt aerosols on precipitation in simulations of shallow cumulus. *J. Atmos. Sci.*, **69**, 463–483.
- Mechem, D. B.**, S. E. Yuter, and S. P. de Szoeke, 2012: Thermodynamic and aerosol controls in southeast Pacific stratocumulus. *J. Atmos. Sci.*, **69**, 1250–1266.
- Brunsell, N. A., **D. B. Mechem**, and M. C. Anderson, 2011: Surface heterogeneity impacts on boundary layer dynamics via energy balance partitioning. *Atmos. Chem. Phys.*, **11**, 3403–3416.
- Melnikov, V. M., D. S. Zrnica, R. J. Doviak, P. B. Chilson, **D. B. Mechem**, and Y. L. Kogan, 2011: Prospects of the WSR-88D radar for cloud studies. *J. Appl. Meteor. Climatol.*, **50**, 859–872.
- vanZanten, M. C., B. Stevens, L. Nuijens, A. P. Siebesma, A. Ackerman, F. Burnet, A. Cheng, F. Couvreaux, H. Jiang, M. Khairoutdinov, Y. Kogan, D. C. Lewellen, **D. Mechem**, K. Nakamura, A. Noda, B. Shipway, J. Slawinska, S. Wang, and A. Wyszogrodzki, 2011: Controls on precipitation and cloudiness in simulations of trade-wind cumulus as observed during RICO. *J. Adv. Model. Earth Syst.*, **3**, M04001, doi:10.3894/JAMES.2011.3.5.
- Mechem, D. B.**, Y. L. Kogan, and D. M. Schultz, 2010a: Large-eddy observation of post-cold-frontal continental stratocumulus. *J. Atmos. Sci.*, **67**, 3368–3383.
- Mechem, D. B.**, Y. L. Kogan, and D. M. Schultz, 2010b: Large-eddy simulation of post-cold-frontal continental stratocumulus. *J. Atmos. Sci.*, **67**, 3835–3853.
- Kogan, Y. L., Z. N. Kogan, and **D. B. Mechem**, 2009: Fidelity of analytic drop size distributions in drizzling stratiform clouds based on large-eddy simulation. *J. Atmos. Sci.*, **66**, 2335–2348.
- Li, Y., Y. L. Kogan, and **D. B. Mechem**, 2008: An idealized modeling study of the effect of continental air mass aerosol parameters on marine stratocumulus. *Atmos. Res.*, **88**, 157–167.
- Mechem, D. B.**, and Y. L. Kogan, 2008: A bulk parameterization of giant CCN. *J. Atmos. Sci.*, **65**, 2458–2466.
- Mechem, D. B.**, Y. L. Kogan, M. Ovtchinnikov, A. B. Davis, K. F. Evans, and R. G. Ellingson, 2008: Multi-dimensional longwave forcing of boundary layer cloud systems. *J. Atmos. Sci.*, **65**, 3963–3977.
- Kogan, Y. L., Z. N. Kogan, and **D. B. Mechem**, 2007: Assessing the errors of

microphysical retrievals based on Doppler radar parameters. *J. Hydrometeorol.*, **8**, 665-677.

Mechem, D. B., S. S. Chen, and R. A. Houze, Jr., 2006: Momentum transport processes in the stratiform regions of mesoscale convective systems over the western Pacific warm pool. *Quart. J. Roy. Meteor. Soc.*, **132**, 709-736.

Mechem, D. B., P. C. Robinson, and Y. L. Kogan, 2006: Processing of cloud condensation nuclei by collision-coalescence in a mesoscale model. *J. Geophys. Res.*, **111**, D18204, doi: 10.1029/2006JD007183.

Kogan, Z. N., **D. B. Mechem**, and Y. L. Kogan, 2005: Assessment of variability in continental low stratiform clouds based on observations of radar reflectivity. *J. Geophys. Res.*, **110**, D18205, doi: 10.1029/2005JD005982.

Mechem, D. B., and Y. L. Kogan, 2003: Simulating the transition from drizzling marine stratocumulus to boundary layer cumulus with a mesoscale model. *Mon. Wea. Rev.*, **131**, 2342- 2360.

Mechem, D. B., R. A. Houze, Jr., and S. S. Chen, 2002: Layer inflow into precipitating convection over the western tropical Pacific. *Quart. J. Roy. Meteor. Soc.*, **128**, 1997-2030.

† indicates graduate or undergraduate student advisees.

Non-peer-reviewed publications

Hickmon, N.L., Varadharajan, C., Hoffman, F.M., Collis, S. and Wainwright, H.M., 2022. *Artificial Intelligence for Earth System Predictability (AI4ESP) Workshop Report* (No. ANL-22/54). Argonne National Lab.(ANL), Argonne, IL (United States). (**D. B. Mechem** on writing team for Atmospheric Modeling Chapter)

U.S. DOE. 2019. Atmospheric Radiation Measurement (ARM) User Facility ARM Mobile Facility Workshop Report, DOE/SC-0197 Office of Biological and Environmental Research, U.S. Department of Energy Office of Science, Germantown, Maryland, USA. (**D. B. Mechem** on writing team, together with Hickmon, N., R. Wood, G. Zhang, M. Jensen, S. Klein, L.-Y. Leung, and P. Zuidema)

Mechem, D. B., 2013: Review of *An Introduction to Dynamic Meteorology*, 5th Edition. *Bull. Amer. Meteor. Soc.*, **94**, 1917–1919.

Mechem, D. B., 2010: Clouds. *Encyclopedia of Geography*, B. Warf, Ed., SAGE publications.

Presentations

Zhang, Z., D. B. Mechem, J. C. Chiu, and J. A. Covert, 2024: An analysis of uncertainties in warm rain parameterizations in climate models based on in situ

- measurements. 104th Annual Meeting of the American Meteorological Society, Baltimore, MD, 28 January–1 February 2024. (13B.1, oral, Zhang presented)
- Eissner, J. M., and D. B. Mechem, 2023: Identifying synoptic controls on boundary layer thermodynamic and cloud structure using NRL COAMPS. 103rd Annual Meeting of the American Meteorological Society, Denver, CO, 08–12 January 2023. (12B.4A, oral, Eissner presented)
- Eissner, J. M., D. B. Mechem, and V. P. Ghate, 2023: Developing an analysis framework for evaluating boundary-layer clouds associated with midlatitude synoptic systems in NRL COAMPS. Cloud Post-Processing and Verification Workshop, Naval Research Laboratory, Boulder, CO, 13–14 September 2023. (Mechem presented)
- Eissner, J. M., D. B. Mechem, and V. P. Ghate, 2023: Developing an analysis framework for evaluating boundary-layer clouds associated with midlatitude synoptic systems in NRL COAMPS. *DoD cloud post-processing and verification workshop*, 13–14 September 2023, Boulder, CO (oral, Mechem presented).
- Mechem, D. B., and J. M. Eissner, Identifying synoptic controls on boundary-layer thermodynamic and cloud structure using NRL COAMPS. *ONR Basic and Applied Research (BAR) Review*, 13 March 2023, Presentations on-site at NRL Monterey and remotely, Office of Naval Research (oral, Mechem presented).
- Mechem, D. B., J. A. Covert, Z. Zhang, and B. D. Greb, 2023: Using ARM observations to constrain cloud processing of CCN in boundary-layer clouds over the Eastern North Atlantic. *Proc. from the 2023 Joint ARM User Facility and ASR PI Meeting*, 7–10 August 2023, Rockville, MD, U.S. Department of Energy. (PI poster, Mechem presented)
- Zhang, Z., L. Oreopoulos, M. Lebsock, D. B. Mechem, and J. A. Covert, 2023: Understanding the microphysical control and spatial-temporal variability of warm rain probability using Cloudsat and MODIS observations. 103rd Annual Meeting of the American Meteorological Society, Denver, CO, 8–12 January 2023. (10A.2, oral, Zhang presented)
- Zhang, Z., D. B. Mechem, and J. A. Covert, 2023: An analysis of uncertainties in warm rain parameterizations in climate models based on in situ measurements. *Proc. from the 2023 Joint ARM User Facility and ASR PI Meeting*, 7–10 August 2023, Rockville, MD, U.S. Department of Energy. (PI poster, Zhang presented)
- Covert, J. A., D. B. Mechem, and Z. Zhang, 2022: Using large-eddy simulation to explore the influence of liquid water and cloud-drop concentration joint variability on stratocumulus autoconversion rate. American Meteorological Society Collective Madison Meeting, Madison, WI, 08–12 August 2022. (375, poster, Covert presented)
- Covert, J., D. B. Mechem, and Z. Zhang, 2022: How the joint variability of liquid water and cloud droplet concentration influences area-mean autoconversion

- rates in stratocumulus. *Proc. from the 2022 Joint ARM User Facility and ASR PI Meeting*, 24–28 October 2022, Rockville, MD, U.S. Department of Energy. (PI poster, Mechem presented)
- Covert, J. A., D. B. Mechem, and Z. Zhang, 2022: Influence of the joint variability of liquid water and cloud droplet concentration on area-mean autoconversion rates in large-eddy simulations of stratocumulus. American Geophysical Union Fall Meeting, Chicago, IL, 12–16 December 2022. (A12N–1279, poster, Covert presented)
- Ekpetere, K., J. M. Coll, X. Li, J. Kastens, and D. B. Mechem, 2022: Spatial-temporal capability of IMERG gridded precipitation dataset for estimating probable maximum precipitation. American Geophysical Union Fall Meeting, Chicago, IL, 12–16 December 2022. (H43C-07, oral, Ekpetere presented)
- Jin, Q., Z. J. Horning, D. B. Mechem, and S. E. Yuter, Exploring dynamic and thermodynamic properties of the environment during periods of rapid cloud-clearing over the southeast Atlantic in a high-resolution mesoscale model. American Geophysical Union Fall Meeting, Chicago, IL, 12–16 December 2022. (A25I–1841, poster, Horning presented)
- Mechem, D. B., 2022: “LES in ARM and ASR: From GEWEX to LASSO.” Department of Energy Atmospheric System Research (DOE ASR) “Future of LES” Workshop, 04/25–04/26. (oral plenary presentation, Mechem)
- Mechem, D. B., 2022: “The impact joint variability of liquid water and droplet concentration on grid-mean autoconversion and enhancement factor, *Proc. from the 2022 Joint ARM User Facility and ASR PI Meeting*, Warm boundary-layer process working group breakout, 24–28 October 2022, Rockville, MD, U.S. Department of Energy. (oral, Mechem presented)
- Yuter, S. E., M. A. Miller, and D. B. Mechem, 2022: Marine stratocumulus cloud liquid water path diurnal and seasonal variations in the southeast Pacific and southeast Atlantic. American Geophysical Union Fall Meeting, Chicago, IL, 12–16 December 2022. (A24C-04, oral, Yuter presented)
- Zhang, Z., D. B. Mechem, J. Covert, L. Oreopoulos, and M. Lebsock, 2022: Using the in situ measurements and satellite observations to better understand subgrid warm rain processes. *Proc. from the 2022 Joint ARM User Facility and ASR PI Meeting*, 24–28 October 2022, Rockville, MD, U.S. Department of Energy. (poster, Zhang presented)
- Zhang, Z., L. Oreopoulos, M. Lebsock, D. B. Mechem, and J. A. Covert, 2022: Understanding the microphysical control and spatial-temporal variability of warm rain probability using Cloudsat and MODIS observations. American Geophysical Union Fall Meeting, Chicago, IL, 12–16 December 2022. (A12H–01, oral, Zhang presented)

- Zhang, Z., D. B. Mechem, V. E. Larson, Y. Liu, M. Witte, and X. Dong, 2022: Understanding the impacts of subgrid cloud property variations on warm rain simulations in climate models based on satellite observations, in situ measurements and large-eddy simulations. American Geophysical Union Fall Meeting, Chicago, IL, 12–16 December 2022. (A16D–02, oral, Zhang presented)
- Covert, J., D. B. Mechem, and Z. Zhang, 2021: Understanding the physical mechanisms governing the variability of liquid water in stratocumulus using large-eddy simulation and in-situ observations. American Geophysical Union Fall Meeting, New Orleans, LA, 13–17 December 2021. (A55K-1550)
- McMichael, L., and D. B. Mechem, 2021: Examining the composite structure of the environment-cloud interface in sheared flows. *Proc. from the 2021 Joint ARM User Facility and ASR PI Meeting*, 21–24 June 2021, U.S. Department of Energy. (online)
- McMichael, L., and D. B. Mechem, 2021: Shallow cumulus spatial structure and cloud-edge mixing properties in sheared flows. American Geophysical Union Fall Meeting, New Orleans, LA, 13–17 December 2021. (A45Q-2079)
- Wang, J., et al. (including D. B. Mechem), 2021: Aerosol properties and processes in the Eastern North Atlantic. *Proc. from the 2021 Joint ARM User Facility and ASR PI Meeting*, 21–24 June 2021, U.S. Department of Energy. (online)
- Zhang, Z., D. B. Mechem, and J. Covert, 2021: Characterizing the subgrid variations of the microphysical properties of marine boundary layer clouds using in situ measurement, LES simulation and remote sensing data. *Proc. from the 2021 Joint ARM User Facility and ASR PI Meeting*, 21–24 June 2021, U.S. Department of Energy. (online)
- Zhang, Z., Q. Song, D. Mechem, V. Larson, J. Wang, Y. Liu, M. Witte, X. Dong, and P. Wu, 2021: Vertical dependence of horizontal variation of cloud microphysics: Observations from the ACE-ENA field campaign and implications for warm rain simulation in climate models. 101st Annual Meeting of the American Meteorological Society. Virtual, 10–15 January 2021. (presentation 5.7)
- Giangrande, S., D. Wang, and **D. B. Mechem**, 2020: Cloud regimes over the Amazon Basin: Perspectives from the GoAmazon2014/5 campaign. *Proc. from the 2020 Joint ARM User Facility and ASR PI Meeting*, 23–26 June 2020, U.S. Department of Energy. (online)
- Mechem, D. B.**, and V. P. Ghatge, 2020: Properties and evolution of open cellular convection over the Eastern North Atlantic. American Geophysical Union Fall Meeting, San Francisco, CA, 1–17 December 2020. (A118–0008)
- Mechem, D. B.**, and V. P. Ghatge, 2020: Cloud, precipitation, and aerosol properties for open cellular convection associated with a cold-air outbreak over the Eastern North Atlantic. 100th Annual Meeting of the American Meteorological Society. Boston, MA, 12–16 January 2020. (1428)

- Mechem, D. B.**, J. Eissner, L. McMichael, M. Jensen, and S. Giangrande, 2020: Scrutinizing entrainment behaviors from multi-sensor DOE ARM measurements and large-eddy simulation. *Proc. from the 2020 Joint ARM User Facility and ASR PI Meeting*, 23–26 June 2020, U.S. Department of Energy. (online)
- Wang, Y., and Co-authors (including **D. B. Mechem**), 2020: Impact of Seasonal Variabilities and Synoptic Conditions on Vertical Profiles of Trace Gas and Aerosol Properties over the Eastern North Atlantic. *Proc. from the 2020 Joint ARM User Facility and ASR PI Meeting*, 23–26 June 2020, U.S. Department of Energy. (online)
- Zhang, Z., Q. Song, **D. B. Mechem**, V. E. Larson, J. Wang, X. Dong, and P. Wu, 2020: Vertical Dependence of Horizontal Variation of Cloud Microphysics: Observations from the ACE-ENA field campaign and implications for warm rain simulation in climate models. American Geophysical Union Fall Meeting, San Francisco, CA, 1–17 December 2020. (A193–08)
- Eissner, J., **D. B. Mechem**, and M. P. Jensen, 2019: Factors governing cloud growth and entrainment rates in shallow cumulus and congestus during GoAmazon 2014/2015. American Geophysical Union Fall Meeting, San Francisco, CA, 9–13 December 2019. (oral, Eissner presented)
- Guider, C., W. Huang, C. Krause, **D. Mechem**, N. Shankar, E. Van Vleck, and M. Zhang, 2019: Data assimilation with adaptive moving meshes. SIAM Conference on Applications of Dynamical Systems. Snowbird, Utah, USA, 19-23 May 2019. (poster, Krause presented)
- Ghate, V., P. M. P. Cadetdu, M. Jensen, **D. B. Mechem**, A. A. Matthews, F. J. Reis, and E. B. Azevedo, 2019: Boundary Layer Thermodynamic Decoupling at the ARM ENA Site. *Proc. of the Tenth Atmospheric System Research (ASR) Science Team Meeting*, 10–13 Jun 2019, U.S. Department of Energy, Rockville, MD. (poster, Ghate presented).
- Giangrande, S., D. Wang, M. Bartholomew, M. Jensen, and **D. Mechem**, 2019: Midlatitude Oceanic Cloud and Precipitation Properties as Sampled By the ARM Eastern North Atlantic Observatory. *Proc. of the Tenth Atmospheric System Research (ASR) Science Team Meeting*, 10–13 Jun 2019, U.S. Department of Energy, Rockville, MD. (poster, Giangrande presented)
- Giangrande, S. E., D. Wang, **D. B. Mechem**, L. Machado, T. Biscaro, G., Elsaesser, 2019: Synoptic and cloud Regimes over the Amazon basin: Perspectives from the GoAmazon2014/5 campaign. Proc. American Geophysical Union Fall Meeting, San Francisco, CA, 9–13 December 2019. (poster, Wang presented)
- McMichael, L., and **D. B. Mechem**, 2019: Evaluation of subsiding cloud shells in sheared environments and associated impacts on entrainment/detrainment. Proc. American Geophysical Union Fall Meeting, San Francisco, CA, 9–13 December 2019. (poster, McMichael presented)

- Mechem, D. B.**, 2019: Large-Eddy simulation of cloud and drizzle properties in the 18 July ACE-ENA Stratocumulus case. ACE-ENA Workshop. Brookhaven National Laboratory, Upton, NY, 29–30 January 2019.
- Mechem, D. B.**, 2019: What drives precipitation initiation in marine stratocumulus? Brookhaven National Laboratory, Upton, NY, 17 October 2019. (oral, invited)
- Mechem, D. B.**, V. P. Ghatge, L. McMichael[†], J. Eissner[†], M. Jensen, and S. Giangrande, 2019: Characterizing the Impact of Entrainment Rate in Stratocumulus from ARM Observations and Large-Eddy Simulations. *Proc. of the Tenth Atmospheric System Research (ASR) Science Team Meeting*, 10–13 Jun 2019, U.S. Department of Energy, Rockville, MD. (poster and invited oral, Mechem presented)
- Tomkins[†], L. M., **D. B. Mechem**, S. E. Yuter, M. A. Miller, and S. R. Rhodes, 2019: WRF simulations of episodes of stratocumulus clearing over the southeast Atlantic. 99th Annual Meeting of the American Meteorological Society. Phoenix, AZ, 6–10 January 2019, 1.6. (oral, Tomkins presented and was the recipient of an outstanding student presentation award in the Aerosol-Cloud-Climate Symposium)
- Wang, J., and co-authors [including **D. B. Mechem**], 2019: Overview and Early results of Aerosol and Cloud Experiments in Eastern North Atlantic (ACE-ENA). *Proc. of the Tenth Atmospheric System Research (ASR) Science Team Meeting*, 10–13 Jun 2019, U.S. Department of Energy, Rockville, MD. (poster, Wang presented)
- Wang, J., and co-authors [including **D. B. Mechem**], 2019: Impact of seasonal variabilities and synoptic conditions on vertical profiles of trace gas and aerosol properties over the eastern North Atlantic. Proc. American Geophysical Union Fall Meeting, San Francisco, CA, 9–13 December 2019. (poster, Wang presented)
- Zhang, Z., D. B. Mechem, V. E. Larson, M. Wang, and X. Dong, 2019: Characterizing the variability and co-variability of the microphysical properties of marine boundary layer clouds: In situ measurements from ACE-ENA and implication for climate models. Proc. American Geophysical Union Fall Meeting, San Francisco, CA, 9–13 December 2019. (poster, Zhang presented)
- Giangrande, S. E., M. P. Jensen, D. Wang, M. J. Bartholomew, J. C. Hardin, **D. B. Mechem**, and R. Wood, 2018: Midlatitude oceanic cloud precipitation properties as sampled by the ARM eastern North Atlantic observatory. Proc. American Geophysical Union Fall Meeting, San Francisco, CA, 10–14 December 2018. (oral, Giangrande presented)
- Mechem, D. B.**, 2018: Using observations to improve simulations of shallow-to-deep cloud transitions. Michigan Technological University, Houghton, MI, 8 October 2018. (oral, invited)
- Mechem, D. B.**, 2018: Confronting low-cloud simulations with observations. Argonne National Laboratory, Chicago, IL, 20 April 2018. (oral)

- Mechem, D. B.**, and S. E. Giangrande, 2018: Environmental controls on the transition from shallow cumulus to congestus sampled during MC3E. 98th Annual Meeting of the American Meteorological Society. Austin, TX, 7–11. January 2018. (oral, Mechem presented)
- Mechem, D. B.**, and S. E. Giangrande, 2018: The Challenge of identifying environmental controls on the transition from shallow cumulus to congestus sampled during MC3E. *Proc. of the Ninth Atmospheric System Research (ASR) Science Team Meeting*, 19–23 March 2018, U.S. Department of Energy, Tysons Corner, VA. (oral, Mechem presented)
- Wang, J., et al. (including **D. B. Mechem**), 2018, Aerosol, cloud, and precipitation interactions in the eastern North Atlantic. *Proc. of the Ninth Atmospheric System Research (ASR) Science Team Meeting*, 19–23 March 2018, U.S. Department of Energy, Tysons Corner, VA. (poster, Wang presented)
- Mechem, D. B.**, J. Eissner[†], and M. Jensen, 2018: Cloud growth and entrainment rates in shallow cumulus and congestus during GoAmazon 2014/2015. *Proc. of the Ninth Atmospheric System Research (ASR) Science Team Meeting*, 19–23 March 2018, U.S. Department of Energy, Tysons Corner, VA. (poster, Mechem presented)
- Wood, R.**, and co-authors [incl. D. B. Mechem], 2018: Aerosol, cloud, and precipitation interactions over the eastern North Atlantic. Proc. American Geophysical Union Fall Meeting, San Francisco, CA, 10–14 December 2018. (oral, Wood presented)
- Ghate, V., **D. Mechem**, E. Eloranta, M. Cadet, and M. Jensen, 2017: Stratocumulus-to-cumulus transition: A case study from the MAGIC field campaign. *Proc. of the Eighth Atmospheric System Research (ASR) Science Team Meeting*, 13–17 March 2017, U.S. Department of Energy, Vienna, VA. (poster, Ghate presented)
- Jensen, M., S. Giangrande, C. Gostic, V. Ghate, **D. Mechem**, and T. Toto, 2017: Environmental conditions controlling the shallow-to-deep transition in convective clouds during GoAmazon 2014/2015. *Proc. of the Eighth Atmospheric System Research (ASR) Science Team Meeting*, 13–17 March 2017, U.S. Department of Energy, Vienna, VA. (oral, Jensen presented)
- McMichael[†], L. A., **D. B. Mechem**, S. Wang, and Q. Wang, 2017: Exploring mechanisms governing dissipating coastal stratocumulus using large-eddy simulation. 4.4, 97th Annual Meeting of the American Meteorological Society. Seattle, WA, 22–26 January 2017. (oral, McMichael presented)
- Mechem, D. B.**, 2017: Constraining process models with observations. Department of Geography and Atmospheric Science weekly colloquium.
- Mechem, D.**, and S. Giangrande, 2017: Evaluating similar large-eddy simulation representations of cloud regime transitions against DOE ARM observations. *Proc.*

- of the Eighth Atmospheric System Research (ASR) Science Team Meeting, 13-17 March 2017, U.S. Department of Energy, Vienna, VA. (poster, Mechem presented)
- Mechem, D. B.**, E. Van Vleck, and T. Gebhardt, 2017: Model hierarchy for deep convection. *Mathematical Problems in Radiation and Convection*, SAMSI-RENCI, University of North Carolina. (oral, Mechem, Van Vleck, and Gebhardt presented together.)
- Yuter, S. E., and **D. B. Mechem**, 2017: Reflections on radar observations of mesoscale precipitation. 3.3. Robert A. Houze, Jr. Symposium, 97th Annual Meeting of the American Meteorological Society. Seattle, WA, 22–26 January 2017. (oral, Yuter presented)
- Mechem, David B.**, 2017: Why do we care about clouds and turbulence? Department of Physics and Astronomy weekly colloquium, University of Kansas, 27 February 2017. (oral)
- Chandler[†], Hannah, **David B. Mechem**, Ann M Fridlind, and Andrew S Ackerman, 2016, "Using Large-Eddy Simulation to Explore Microphysical Precursor Conditions for Precipitation Initiation in Marine Stratocumulus," Proc. American Geophysical Union Fall Meeting, San Francisco, CA, December 12, 2016 - December 16, 2016. (poster, Mechem presented)
- Jensen, Michael P, Cari Gostic, Scott E. Giangrande, **David B Mechem**, Virendra P Ghatge, and Tami Toto, 2016, "The Shallow-to-Deep Transition in Convective Clouds During GoAmazon 2014/5," Proc. American Geophysical Union Fall Meeting, San Francisco, CA, December 12, 2016 - December 16, 2016. (Oral, Jensen presented)
- Van Vleck, Erik S., Nathaniel A Brunsell, and **David B Mechem**, 2016, "Dimension reduction methods for improving weather and climate models," Advances in Mathematical and Computational Climate Modeling Workshop, Sponsored by the U.S. Department of Energy, Office of Science Biological and Environmental Research (BER) and Advanced Scientific Computing Research (ASCR), Washington D.C., September 12, 2016 - September 13, 2016. (poster, Van Vleck presented)
- Jasmine, Remillard, Kollias Pavlos, Fridlind Ann, Ackerman Andrew, Tselioudis George, **Mechem David**, Chandler Hannah[†], Luke Edward, Chuang Patrick, Witte Michael, Wood Robert, and Ayers Kirk, 2016, "Use of W-band Doppler spectra and in situ measurements to evaluate marine stratocumulus drizzle size distribution properties predicted by two large-eddy simulation codes with bin microphysics," 17th International Conference on Clouds and Precipitation, Manchester, UK, July 25, 2016 - July 29, 2016. (poster, Fridlind presented)
- Mechem, David B**, 2016, "Clouds and Climate," KU Red Hot Research, University of Kansas, Lawrence, KS, March 25, 2016. (oral)
- Mechem, David B**, 2016, "Constraining process models with observations," Research

- visit to Brookhaven National Laboratory, Upton, NY, February 4, 2016. (oral)
- Yuter, Sandra, Casey Burleyson, Simon de Szoeke, John Hader, **David Mechem**, Matthew Miller, and Matthew Parker, 2016, "Overview of Mesoscale Organization," ASR Workshop on Marine Low Clouds, Brookhaven National Laboratory, Upton, NY, January 27, 2016 - January 29, 2016. (oral, Yuter presented)
- Fridlind, Ann, Jasmine Remillard, Andrew Ackerman, George Tselioudis, **David Mechem**, Pavlos Kollias, Ed Luke, Patrick Chuang, Mikael Witte, and Robert Wood, 2015, "Observational constraint of drizzle properties and processes in two LES models with size-resolved microphysics," Proc. American Geophysical Union Fall Meeting, San Francisco, CA, December 14, 2015 - December 18, 2015. (oral, Fridlind presented)
- Mechem, David B.**, 2015, "Evaluation of Warm-Rain Microphysical Parameterizations in COAMPS Simulations of the Cloudy Marine Boundary Layer," Fifth ONR DRI Workshop on Unified Parameterization, Monterey, CA, August 20, 2015 - August 21, 2015. (oral)
- Mechem, David B.**, Matthew A. Miller, Sandra E. Yuter, Simon P. de Szoeke, Carly S. Wittman[†], and Hannah Chandler[†], 2015, "Occurrence of aerosol regimes and sustained low cloudiness over the Eastern North Atlantic as a function of synoptic regime," 2015 Joint User Facility and PI Science Team Meeting, Vienna, VA, March 16, 2015 - March 19, 2015. (poster, Mechem presented)
- Mechem, D. B.**, S. E. Giangrande, and D. D. Turner, 2014, "The role of cold pools in mesoscale organization of shallow cumulus and congestus," Proc. American Geophysical Union Fall Meeting, San Francisco, CA, December 15, 2014 - December 19, 2014. (oral, Mechem presented)
- Nelson[†], K., and **D. B. Mechem**, 2014, "Evaluation of warm-rain microphysical parameterizations in cloudy boundary layer transitions," Proc. American Geophysical Union Fall Meeting, San Francisco, CA, December 15, 2014 - December 19, 2014. (Poster, Nelson presented)
- Cai[†], L., **D. B. Mechem**, and N. A. Brunzell, 2014: Extreme events over the continuous United States portrayed in a CESM1–WRF dynamical downscaling framework, Preprints, 26th Conference on Climate Variability and Change, Atlanta, GA, Amer. Meteor. Soc., 108. (poster, Cai presented)
- de Szoeke, S., S. Yuter, and **D. Mechem**, 2013: Vertical velocity retrievals in marine stratocumulus clouds. *Proc. of the Fourth Atmospheric System Research (ASR) Science Team Meeting*, U.S. Department of Energy, Potomac, MD. (oral, de Szoeke presented)
- Giangrande, S., **D. Mechem**, P. Borque, and P. Kollias, 2013: Insights from preliminary modeling and observational evaluation of a precipitating continental cumulus event observed during the MC3E field campaign. *Proc. of the Fourth*

- Atmospheric System Research (ASR) Science Team Meeting*, U.S. Department of Energy, Potomac, MD. (poster, Giangrande presented)
- Kogan, Y., **D. B. Mechem**, and K. Y. Choi, 2013: Effects of sea-salt aerosols on precipitation in trade-wind cumulus. Preprints, *25th Conference on Climate Variability and Change*, Austin, TX, Amer. Meteor. Soc., 775. (poster, Mechem presented)
- Mechem, D. B.**, and N. A. Brunzell, 2013: Assessing regional behavior of extreme value statistics from NARCCAP. Preprints, *25th Conference on Climate Variability and Change*, Austin, TX, Amer. Meteor. Soc., 108. (poster, Mechem presented)
- Mechem, D. B.**, M. Miller, S. Yuter, S. de Szoeke, and C. S. Fish[†], 2013: Characterizing cloud properties and synoptic variability over the Azores using self-organizing maps. *Proc. of the Fourth Atmospheric System Research (ASR) Science Team Meeting*, U.S. Department of Energy, Potomac, MD. (poster, Fish presented)
- de Szoeke, S., S. Yuter, and **D. Mechem**, 2012: Determining conditions for stratocumulus clouds at the Azores. *Proc. of the Third Atmospheric System Research (ASR) Science Team Meeting*, U.S. Department of Energy, Arlington, VA. (poster, Mechem presented)
- Hirmas, D. R., N. A. Brunzell, and **D. B. Mechem**, 2012. Optimization of soil structure under differing climatic regimes. In Abstracts, Intern. Annu. Meet., ASA-CSSA-SSSA, Cincinnati, OH. 21-24 Oct. 2012. ASA, Madison, WI. (oral, Hirmas presented)
- Kogan, Y. L., **D. B. Mechem**, and K. Choi, 2012: Do stronger surface winds produce more precipitation in shallow cumulus over the ocean? Procs, *16th International Conference on Clouds and Precipitation*, Leipzig, Germany, International Commission on Clouds and Precipitation. (poster, Mechem presented)
- Mechem, D. B.**, 2012: Toward an improved representation of cloud regime transitions in regional models. Second *ONR DRI Workshop on Unified Parameterization*, Monterey, CA. (oral)
- Mechem, D. B.**, S. P. de Szoeke, and S. E. Yuter, 2012: What parameters control marine boundary layer cloud properties over the northeast Atlantic? *1st Pan-GASS meeting*, Boulder, CO, 10–14 September, (oral and poster, Mechem presented)
- Mechem, D. B.**, S. E. Yuter, and S. P. de Szoeke, 2012: Characteristics of low cloud variability over the Azores. *Proc. of the Third Atmospheric System Research (ASR) Science Team Meeting*, U.S. Department of Energy, Arlington, VA. (poster, Mechem presented)
- Mechem, D. B.**, S. E. Yuter, and S. P. de Szoeke, 2012: What drives low cloud variability over the Azores? Procs, *16th International Conference on Clouds and Precipitation*, Leipzig, Germany, International Commission on Clouds and Precipitation. (poster, Mechem presented)
- Wood, W., C. S. Bretherton, C. R. Mechoso, R. A. Weller, B. J. Huebert, H. Coe, B. A.

- Albrecht, P. H. Daum, D. Leon, A. Clark, P. Zuidema, C. W. Fairall, G. Allen, S. de Szoeke, G. Feingold, J. Kazil, S. Yuter, R. George, A. Berner, C. Terai, G. Painter, H. Wang, and **D. Mechem**, 2012: The VOCALS Regional Experiment: Cloud–precipitation interactions in marine boundary layer cloud. *Procs, 16th International Conference on Clouds and Precipitation*, Leipzig, Germany, International Commission on Clouds and Precipitation. (poster, Wood presented)
- Yuter, S., M. Miller, S. de Szoeke, and **D. Mechem**, 2012: Comparison of factors modulating marine stratocumulus in the northeast Atlantic and southeast Pacific. *Proc. of the Third Atmospheric System Research (ASR) Science Team Meeting*, U.S. Department of Energy, Arlington, VA. (poster, Yuter presented)
- Bishop[†], P. R., **D. B. Mechem**, S. E. Yuter, S. P. de Szoeke, and C. Burleyson, 2011: Mesoscale variability of turbulence-generating mechanisms in southeast-Pacific stratocumulus. *Preprints, 14th Conference on Mesoscale Processes*, Los Angeles, CA, Amer. Meteor. Soc., P1.21. (poster, Bishop presented)
- Brunsell, N. A., C. J. Wilson, and **D. B. Mechem**, 2011: Assessing regional scale variability in North American extreme weather events. DOE CESM PI Meeting, Washington, D. C. (poster, Brunsell presented)
- Clark[†], K. R., and **D. B. Mechem**, 2011: Interactive precipitation feedbacks in an unforced single-column model. *WCRP Open Science Conference*, Denver, CO, World Climate Research Programme, C33/W249A. (poster, Clark presented)
- de Szoeke, S. P., N. Elmer, S. E. Yuter, and **D. B. Mechem**, 2011: Drizzle classification with cloud radar. *Gordon Research Conference on Radiation and Climate*, Colby College, Waterville, ME. Gordon Research Conferences. (oral, de Szoeke presented)
- Mechem, D. B.**, 2011: Improving mesoscale prediction of shallow convection and cloud regime transitions in Navy prediction systems. *ONR DRI Workshop on Unified Parameterization*, Monterey, CA. (oral)
- Mechem, D. B.**, and N. A. Brunsell, 2011: Preliminary results from a regional climate modeling framework for investigating North American extremes. *Proc. American Geophysical Union Fall Meeting*, San Francisco, CA, AGU. (poster, Mechem presented)
- Mechem, D. B.**, S. E. Yuter, and S. P. deSzoeke, 2011: Numerical simulation of heavily drizzling cloud regimes in VOCALS. *3rd VOCALS Science Meeting*, Miami, FL. (oral, Mechem presenting)
- Mechem, D. B.**, S. E. Yuter, S. P. de Szoeke, and C. Burleyson, 2011: Isolating contributions to the diurnal cycle in southeast-Pacific stratocumulus. *Preprints, 14th Conference on Mesoscale Processes*, Los Angeles, CA, Amer. Meteor. Soc., 12.6. (oral, Mechem presenting)
- Mechem, D. B.**, S. E. Yuter, S. P. de Szoeke, C. D. Burleyson, and P. R. Bishop, 2011:

VOCALS/Southeast Pacific science: Factorial analysis of mechanisms governing the diurnal cycle in southeast-Pacific stratocumulus. *WCRP Open Science Conference*, Denver, CO, World Climate Research Programme, C12/M57A.

(poster, Mechem presenting)

Brunsell, N. A., and **D. B. Mechem**, 2010: Assessing the role of surface heterogeneity on energy balance partitioning and land-atmosphere feedbacks, *Preprints, 29th Conference on Agricultural and Forest Meteorology*, Keystone, CO, Amer. Meteor. Soc., 7B.5. (oral, Brunsell presenting)

Huber[†], D. B., **D. B. Mechem**, and N. A. Brunsell, 2010: Influence of irrigation on mid-summer convective rainfall in the Great Plains, *Preprints, 29th Conference on Agricultural and Forest Meteorology*, Keystone, CO, Amer. Meteor. Soc., P1.27. (poster, Huber presenting)

Huber[†], D. B., **D. B. Mechem**, and N. A. Brunsell, 2010: Effects of irrigation on Great Plains and Midwest precipitation processes. Annual Meeting, AAG Great Plains/Rocky Mountain Division, Lawrence, KS, Session 1.3, Association of American Geographers. (oral, Huber presenting)

Huber[†], D. B., **D. B. Mechem**, and N. A. Brunsell, 2010: Effects of irrigation on Great Plains and Midwest precipitation processes. *Energy, Climate, and the Future: The role of Kansas*, 2010 Kansas Statewide EPSCoR Conference, Lawrence, KS, Kansas EPSCoR. (oral, Mechem presenting)

Mechem, D. B., S. E. Yuter, and S. P. deSzoeker, 2010: Thermodynamic and aerosol controls on eastern Pacific stratocumulus precipitation processes in VOCALS, *Preprints, 13th Conference on Cloud Physics*, Portland, OR, Amer. Meteor. Soc., 9.7. (oral, Mechem presenting)

Mechem, D. B., and A. J. Oberthaler[†], 2009: The role of cumulus congestus in the tropical western Pacific. *Preprints, 13th Conference on Mesoscale Processes*, Salt Lake City, UT, Amer. Meteor., Soc. 7.4. (oral, Mechem presenting)

Melnikov, V., P. B. Chilson, and **D. B. Mechem**, 2009: Extending the capabilities of the polarimetric WSR-88D: Observations of cirrus clouds and moist layers. *Preprints, 33rd Conference on Radar Meteorology*, Williamsburg, VA, Amer. Meteor. Soc., CD-ROM, P3.1.

Yuter, S. E., **D. B. Mechem**, C. W. Fairall, and W. A. Brewer, 2009: Unexpectedly strong convection under an inversion-topped marine boundary layer. *Preprints, 13th Conference on Mesoscale Processes*, Salt Lake City, UT, Amer. Meteor., Soc. 10.6. (oral, Yuter presenting)

Mechem, D. B., S. E. Yuter, S. P. deSzoeker, and C. W. Fairall, 2009: Near-LES modeling of eastern Pacific stratocumulus drizzle and cloud variability in VOCALS. *Proc. American Geophysical Union Fall Meeting*, San Francisco, CA, AGU. (poster, Mechem presenting)

Mechem, D. B., and Y. L. Kogan, 2008a: Scalings for precipitation and coalescence

- scavenging obtained from simulations of trade cumulus. Preprints, *15th International Conference on Clouds and Precipitation*, Cancún, Mexico, International Commission on Clouds and Precipitation. (poster, Mechem presenting)
- Mechem, D. B.**, and Y. L. Kogan, 2008b: Structure and persistence of post-frontal stratus in numerical models. Proc. of the Eighteenth Atmospheric Radiation Measurement (ARM) Science Team Meeting, Ed. By D. Carrothers, U.S. Department of Energy, Richland, WA. (poster, Mechem presenting)
- Mechem, D. B.**, and Y. L. Kogan, 2008c: Simple scaling relationships of coalescence processing obtained from simulations of trade cumulus. *Proc. American Geophysical Union Fall Meeting*, San Francisco, CA, AGU. (poster, Mechem presenting)
- Kogan, Y. L. , Z. N. Kogan, and **D. B. Mechem**, 2007: Parameterization of cloud drop distributions by analytical functions. *Gordon Research Conference on Radiation and Climate*, Colby-Sawyer College, New London NH, July 29-August 3, 2007. (poster, Kogan presenting)
- Kogan, Y. L., and **D. B. Mechem**, 2007: Approximation of cloud drop distributions by analytic functions. *Proc. of the Seventeenth Atmospheric Radiation Measurement (ARM) Science Team Meeting*, Ed. By D. Carrothers, U.S. Department of Energy, Richland, WA. (poster, Kogan presenting)
- Mechem, D. B.**, and Y. L. Kogan, 2007: Large eddy observation and LES of liquid stratus over the ACRF. Proc. of the Seventeenth Atmospheric Radiation Measurement (ARM) Science Team Meeting, Ed. By D. Carrothers, U.S. Department of Energy, Richland, WA. (poster, Kogan presenting)
- Kogan, Y.**, Z. Kogan, and D. Mechem, 2007: Assessing precipitation flux in low layer clouds using Doppler radars. *Proc. American Geophysical Union Fall Meeting*, San Francisco, CA, AGU. (poster, Z. Kogan presenting)
- Melnikov, V. M., D. S. Zrnich, R. J. Doviak, Y. L. Kogan, P. B. Chilson, and **D. B. Mechem**, 2007: The WSR-88D observes nonprecipitating clouds. *Preprints, 33rd Conference on Radar Meteorology*, Cairns, Australia, Amer. Meteor. Soc., CD-ROM, P6A.3.
- Kogan, Y. L., Z. N. Kogan, and **D. B. Mechem**, 2006: Sensitivity of the retrieval of stratocumulus cloud liquid water and precipitation flux to Doppler radar parameters. Preprints, *12th Conference on Cloud Physics*, Madison, WI, Amer. Meteor. Soc., CD-ROM, P1.17. (poster, Y. Kogan presented)
- Kogan, Z. N., Y. L. Kogan, and **D. B. Mechem**, 2006: Scale dependence of variability in continental stratiform clouds. Preprints, *12th Conference on Cloud Physics*, Madison, WI, Amer. Meteor. Soc., CD-ROM, P1.24. (poster, Z. Kogan presented)
- Mechem, D. B.**, and Y. L. Kogan, 2006a: Improving the representation of aerosol-cloud-precipitation interactions in numerical models. *Proc. of the Sixteenth Atmospheric Radiation Measurement (ARM) Science Team Meeting*, Ed. by D.

- Carrothers, U.S. Department of Energy. Richland, WA. (oral, Mechem presented)
- Mechem, D. B.**, and Y. L. Kogan, 2006b: Bulk parameterization of giant CCN. Preprints, *12th Conference on Cloud Physics*, Madison, WI, Amer. Meteor. Soc., CD-ROM, P1.3. (poster, Mechem presented)
- Mechem, D. B.**, and Y. L. Kogan, 2006c: Three-dimensional aspects of droplet nucleation. Preprints, *12th Conference on Cloud Physics*, Madison, WI, Amer. Meteor. Soc., CD-ROM, 1.2. (oral, Mechem presented)
- Childers[†], M. E., K. M. Donner[†], and **D. B. Mechem**, 2005: Toward a diurnal climatology of cold season turbulence statistics in continental stratocumulus as observed by the ARM MMCR. *Proc. of the Fifteenth Atmospheric Radiation Measurement (ARM) Science Team Meeting*, 14-18 March 2005, Daytona Beach, FL. (poster, Mechem presented)
- Kogan, Z. N., **D. B. Mechem**, and Y. L. Kogan, 2005: Variability of continental stratiform clouds and its scale dependence based on millimeter-wave radar data. Preprints, *32nd Conference on Radar Meteorology*, Albuquerque, NM, Amer. Meteor. Soc., CD-ROM, P2R.10. (poster, Z. Kogan presented)
- Kogan, Y. L., Z. N. Kogan, and **D. B. Mechem**, 2005: The enhancement of radar retrievals by the use of higher moments of drop spectrum. Preprints, *32nd Conference on Radar Meteorology*, Albuquerque, NM, Amer. Meteor. Soc., CD-ROM, P2R.6. (poster, Y. Kogan presented)
- Mechem, D. B.**, and Y. L. Kogan, 2005a: Representing cloud processing of aerosols in numerical models. *Proc. of the Fifteenth Atmospheric Radiation Measurement (ARM) Science Team Meeting*, 14-18 March 2005, Daytona Beach, FL. (poster, Mechem presented)
- Mechem, D. B.**, and Y. L. Kogan 2005b: Turbulence structure of cold season continental stratocumulus as observed by the ARM MMCR. Preprints, *32nd Conference on Radar Meteorology*, Albuquerque, NM, Amer. Meteor. Soc., CD-ROM, P2R.1. poster, Mechem presented)
- Mechem, D. B.**, M. Ovtchinnikov, Y. L. Kogan, K. F. Evans, A. B. Davis, R. F. Cahalan, E. E. Takara, and R. G. Ellingson, 2004: Multi-dimensional longwave radiative forcing of PBL cloud systems. *Proc. of the Fourteenth Atmospheric Radiation Measurement (ARM) Science Team Meeting*, 22-26 March 2004, Albuquerque, NM. (poster, Mechem presented)
- Kogan, Z. N., **D. B. Mechem**, and Y. L. Kogan, 2004: Characterizing stratiform cloud variability from millimeter-wave radar data. *Proc. of the Fourteenth Atmospheric Radiation Measurement (ARM) Science Team Meeting*, 22-26 March 2004, Albuquerque, NM. (poster, Z. Kogan presented)
- Mechem, D. B.**, M. Ovtchinnikov, Y. L. Kogan, K. F. Evans, A. B. Davis, R. F. Cahalan, E. E. Takara, and R. G. Ellingson, 2004: Multi-dimensional longwave radiative forcing of PBL cloud systems. Preprints, *14th International Conference on*

Clouds and Precipitation, Bologna, Italy, International Commission on Clouds and Precipitation, 1533-1536. (poster, Mechem presented)

Mechem, D. B., and Y. L. Kogan, 2003: Drizzle-induced mesoscale variability of boundary layer clouds in a regional forecast model. Preprints, *AMS Fifth Conference on Coastal Atmospheric and Oceanic Prediction and Processes*, Seattle, WA, 6-8 August 2003, Amer. Meteor. Soc. (oral, Mechem presented)

Kogan, Z. N., **D. B. Mechem**, and Y. L. Kogan, 2003a: The effect of precipitation on variability of low stratiform clouds over ARM SGP site. *Proc. of the Thirteenth Atmospheric Radiation Measurement (ARM) Science Team Meeting*, 31 March-4 April 2003, Broomfield, CO. (poster, Z. Kogan presented)

Kogan, Z. N., **D. B. Mechem**, and Y. L. Kogan, 2003b: Radar study on variability of continental low stratiform clouds. *Proc. of the 31st AMS International Conference on Radar Meteorology*, 6-12 August 2003, Seattle, WA, Amer. Meteor. Soc. (poster, Z. Kogan presented)

Mechem, D. B., M. Ovtchinnikov, Y. L. Kogan, K. F. Evans, A. B. Davis, R. F. Cahalan, E. E. Takara, and R. G. Ellingson, 2003: Simulation of PBL cloud fields with interactive multi-dimensional longwave radiative forcing. *Proc. of the Thirteenth Atmospheric Radiation Measurement (ARM) Science Team Meeting*, 31 March-4 April 2003, Broomfield, CO. (oral, Mechem presented)

Mechem, D. B., Y. L. Kogan, and M. R. Poellot, 2002: Large eddy simulation of post-frontal boundary layers in the ARM 2000 Cloud IOP. *Proc. of the Twelfth Atmospheric Radiation Measurement (ARM) Science Team Meeting*, 8-12 April 2002, St. Petersburg, FL. (poster, Mechem presented)

Mechem, D. B., M. Ovtchinnikov, Y. L. Kogan, A. B. Davis, R. F. Cahalan, E. E. Takara, and R. G. Ellingson, 2002: Multi-dimensional broadband IR radiative forcing of marine stratocumulus in a large eddy simulation model. Preprints, *11th Conference on Cloud Physics*, 3-7 June 2002, Ogden, UT, Amer. Meteor. Soc. (oral, Mechem presented)

Ovtchinnikov, M., **D. B. Mechem**, T. P. Ackerman, R. F. Cahalan, A. B. Davis, R. Ellingson, K. F. Evans, Y. L. Kogan, and E. Takara, 2002: Longwave cooling rates in inhomogeneous stratocumulus clouds: 3D radiation transfer versus independent pixel approximation calculations. Preprints, *11th Conference on Cloud Physics*, 3-7 June 2002, Ogden, UT, Amer. Meteor. Soc. (poster, Ovtchinnikov presented)

Mechem, D. B., and Y. L. Kogan, 2001: Representation of marine stratocumulus in regional forecast models: Role of subgrid inhomogeneity. *AMS Fourth Conference on Coastal Atmospheric and Oceanic Prediction and Processes*, 6-9 November 2001, St. Petersburg, FL, Amer. Meteor. Soc. (oral, Mechem presented)

Mechem, D., Y. Kogan, and F. Kong, 2000: A new microphysical parameterization for marine stratocumulus clouds in regional forecast models. *Proc. of the 13th*

International Conference on Clouds and Precipitation, Reno, NV, 14-18 August 2000, International Commission on Clouds and Precipitation. (poster, Mechem presented)

Kogan, Y., and **D. Mechem**, 1999: On formulation of microphysical processes for marine stratocumulus in regional forecast models. Preprints, *AMS Third Conference on Coastal Atmospheric and Oceanic Prediction and Processes*, New Orleans, LA, 3-5 November 1999, Amer. Meteor. Soc. (oral, Mechem presented)

† indicates graduate or undergraduate student advisees.

Funded Proposals

“Using ARM observations and large-eddy simulation to constrain cloud processing of CCN in boundary-layer clouds over the Eastern North Atlantic” [PI, 8/1/2022–7/31/2025, Department of Energy, Office of Biological and Environmental Research, Atmospheric System Research Program, \$617,631]

“Improving regional model representation of cloudy boundary layers across midlatitude synoptic systems in NRL COAMPS” [PI, 4/1/2020–3/31/2023, Office of Naval Research, \$368,321]

“Characterizing the variation and covariation of cloud microphysical properties and implications for simulation of subgrid-scale warm-rain processes in Earth System Models” [co-I Mechem, PI Zhibo Zhang, U. Maryland – Baltimore County, 9/1/2019–8/31/2022, Department of Energy, Office of Biological and Environmental Research, Atmospheric System Research Program, \$598,016, KU portion \$242,744]

“Collaborative Research: Mechanisms governing synoptic-scale rapid cloud dissipation in subtropical marine stratocumulus clouds” [PI, 9/1/2017–8/31/2021, NCE granted until 8/31/2023, National Science Foundation, \$407,304]

“Scrutinizing entrainment and mass flux closures in shallow cumulus parameterizations using cloud-radar observations and large-eddy simulation” [PI, 8/15/2016–8/14/2019, Department of Energy, Office of Biological and Environmental Research, Atmospheric System Research Program, \$525,432, NCE through 8/14/2021]

“ARM Climate Research Facility Request LASIC: Layered Atlantic Smoke Interactions with Clouds” [Co-I, 4/1/2016–3/31/2017, Department of Energy]

“The Midwest Mathematics and Climate Conference” [Co-PI, 5/15/2015–5/14/2016, National Science Foundation, \$24,000]

“Improving mesoscale prediction of shallow convection and cloud regime transitions in NRL COAMPS” (renewal) [PI, 8/1/2014–6/30/2017, Office of Naval Research, \$105,210]

“Collaborative Research: Cloudiness transitions within shallow marine clouds near the Azores” [PI, 9/15/2011–9/14/2014, Department of Energy, Office of Biological and Environmental Research, Climate and Environmental Sciences Division, \$329,071]

“Improving mesoscale prediction of shallow convection and cloud regime transitions in NRL COAMPS” [PI, 8/1/2011–7/31/2014, Office of Naval Research, \$279,860]

“Assessing Regional Scale Variability in Extreme Value Statistics Under Altered Climate Scenarios” [co-PI, 1/2011–12/2013, Department of Energy, Office of Biological and Environmental Research, Climate and Environmental Sciences Division, \$510,554]

“Drizzle and Cloudiness Transitions in Southeast Pacific Marine Stratocumulus” [PI, 8/2010–7/2013, NOAA Climate Prediction Program for the Americas, \$312,206]

“Aerosol and Thermodynamic Control of Southeast Pacific Marine Stratocumulus” [PI, 7/2010–6/2012, General Research Fund, University of Kansas, \$4500]

“Understanding Climate Change in the Great Plains: Source, Impact, and Mitigation” [Collaborator, KU PI: J. Feddema, 7/2009-2014, KU subcontract to NSF EPSCoR, \$1,086,575]

“Regional modeling infrastructure for assessing precipitation feedbacks in climate change scenarios” [PI, 4/2009-2011, New Faculty General Research Fund, University of Kansas, \$7870.70]

“Improvement of the Cloud Physics formulation in the U.S. Navy Coupled Ocean/Atmosphere Mesoscale Prediction System” [Co-PI, 2/2003-2008, Office of Naval Research, \$889,393]

Field Project Participation

07/2001	Dynamics and Chemistry of Marine Stratocumulus (DYCOMS-II)
12/1995	Coastal Observation and Simulation with Topography Experiment (COAST-II)
06–07/2017	Aerosol and Cloud Experiments in the Eastern North Atlantic (ACE-ENA)

Supervision of graduate students (chair or co-chair of committee)

Zach Horning	M.S. Atmospheric Science (2021–present)
Justin Covert	Ph.D. Atmospheric Science (2020–present)
Jordan Eissner	M.S. Atmospheric Science (2017–2020), Ph.D. Atmospheric Science (2020–present, Comprehensive Exam passed March 2023) M.S. Thesis title: Factors governing cloud growth and entrainment rates in shallow cumulus and cumulus congestus during GoAmazon2014/15
Luke McMichael	M.S. Atmospheric Science (2015–2017), Ph.D. Atmospheric Science (2017–2022) M.S. Thesis title: Assessing the mechanisms governing the daytime evolution of marine stratocumulus using large-eddy simulation [winner of College of Liberal Arts and Sciences Best Thesis Award] Ph.D. dissertation title: Shallow cumulus and the mass flux framework
Laura Tomkins	M.S. Atmospheric Science (2017–2019) Thesis title: Regional flow conditions associated with stratocumulus cloud-clearing events over the southeast Atlantic
Prescott Bishop	M.S. Atmospheric Science (2011–2017) Thesis title: The influence of longwave cloud-top cooling on marine stratocumulus cloud transitions
Hannah Chandler	M.S. Atmospheric Science (2014–2016) Thesis title: Microphysical precursor conditions leading to precipitation initiation in marine stratocumulus
Kevin Nelson	M.S. Atmospheric Science (2012–2015) Thesis title: Evaluation of warm-rain microphysical parameterizations in mesoscale simulations of the cloudy marine boundary layer

Carly Wittman (Fish)	M.S. Atmospheric Science (2012–2014) Thesis title: Characterizing synoptic and cloud variability in the northern Atlantic using self-organizing maps
Lei Cai	M.S. Atmospheric Science (2011–2014) Thesis title: Extreme events over the continuous United States portrayed in a CESM–WRF dynamical downscaling framework
Halley Holmes	M.S. Atmospheric Science (incomplete)
Kathryn Clark	M.S. Atmospheric Science (2010–2013) Thesis title: Exploring the sensitivity of precipitation behavior using a single-column model
David Huber	M.S. Atmospheric Science (2009– 2011) Thesis title: Effects of Great Plains irrigation on regional climate

Supervision of undergraduate research

Bridget Greb (2022), Evan Dizenzo (2019), Katherine Berislavich (2019), Tyler Harrington (2018–2019), Darren Moring (2017), Chris Sims (2015), Sasha Glanville (2012), Carly Fish (employed as undergraduate research associate from 2011–2012), Michael Shook (2011, honors), James Frizzell (2011), Jared McWilliams (2011), Andrew Oberthaler (2010, honors), Jessie Lundquist (2009, honors)

Teaching experience

ATMO 220 – Unusual Weather
 ATMO 640 – Dynamic Meteorology
 ATMO 660 – Advanced Dynamic Meteorology
 ATMO 680 – Physical Meteorology
 ATMO 606 – Forecasting Practicum – Private Industry
 ATMO 607 – Forecasting Internship – National Weather Service
 ATMO 697 – Seminar for Seniors
 ATMO 720 – Atmospheric Numerical Modeling

METR 3223 – Physical Meteorology II, School of Meteorology, University of Oklahoma

Professional service outside the university

Professional organizations

Member, American Meteorological Society

Member, American Geophysical Union

Editorships and scientific committees

Editor, *Journal of the Atmospheric Sciences* (2019–present)

Editorial Board Member, *Pure and Applied Geophysics* (2012–2018)

University Representative, University Corporation for Atmospheric Research (UCAR) member (2012–present)

Member AMS Committee on Cloud Physics (Scientific and Technologies Activities Commission, 2006–2012)

Reviewing

Reviewer for manuscripts submitted to *Acta Geophysica*, *Atmospheric Chemistry and Physics*, *Atmospheric Research*, *Boundary Layer Meteorology*, *Geophysical Research Letters*, *Journal of Applied Meteorology [and Climatology]*, *Journal of Atmospheric and Oceanic Technology*, *Journal of the Atmospheric Sciences*, *Journal of Geophysical Research*, *Journal of Glaciology*, *Journal of the Meteorological Society of Japan*, *Meteorology and Atmospheric Physics*, *Monthly Weather Review*, *Quarterly Journal of the Royal Meteorological Society*, and *Weather and Forecasting*

Reviewer for proposal submissions to the National Science Foundation, Department of Energy, National Aeronautics and Space Administration, National Sciences and Engineering Research Council of Canada, Deutsche Forschungsgemeinschaft (German Research Foundation), and U.S. DOE laboratory solicitations

Reviewer for Pacific Northwest National Laboratory Scientific Focus Area panel review, November 2021.

Proposal panel review member for the National Aeronautics and Space Administration (2013, 2017), Department of Energy (2013, 2021), and National Science Foundation (2013)

Reviewer of journal articles for NOAA OAR paper award (2016)

“Red Team” reviewer for Brookhaven National Laboratory Scientific Focus Area (SFA) proposal (2016)

Conference organization

Co-Chair of Midwest Mathematics and Climate Conference, Lawrence, Kansas, 2015

AMS Cloud Physics Conference organizing committee, Madison, Wisconsin, 2006

Session chair and panelist

Session leader/rapporteur, Department of Energy Artificial Intelligence for Earth

System Predictability (AI4ESP) workshop, October-November 2021.
Panelist, Midwest Mathematics and Climate Conference, 30 April–2 May 2015
Session chair, 16th International Conference on Clouds and Precipitation, 30
July–3 August 2012, Leipzig, Germany, International Commission on Clouds
and Precipitation
13th Conference on Mesoscale Processes, 17-20 August 2009, Salt Lake City, UT,
American Meteorological Society
12th Conference on Cloud Physics, 28 June–2 July 2010, Portland, OR, American
Meteorological Society
Fifth Conference on Coastal Atmospheric and Oceanic Prediction and Processes,
6-8 Aug. 2003, Seattle, WA, American Meteorological Society
Panelist, Conference on Sustainability, Kansas State University, Manhattan,
Kansas, 5 September 2012

Service to the community (selected)

Cool Science Art Exhibition Celebration, Science City at Union Station, Kansas
City, MO (September 8, 2022)
Science on a Sphere Presentation, Science City at Union Station, Kansas City, MO
(March 26, 2022)
TV interview, with Kris Ketz from KMBC, Kansas City about tornado alley
(April 9, 2021)
Radio interview with Dave Mitchell from KKFI, Kansas City community radio,
on Hurricane Harvey and global climate change". (November 3, 2017)

Professional service to the university

Department of Geography and Atmospheric Science

Department of Geography and Atmospheric Science Recruiting Day,
Coordinator (2015–2018)
Responsible scholarship seminar, Coordinator (2014 - 2018)
Director of Graduate Studies, Director (2014 - 2018)
Coordinator for miscellaneous departmental and student applications. Identify
awards for students and faculty (e.g., University Graduate Fellowship (UGF);
Masters thesis award; KU departmental scholarships; Wilbur scholarship;
Chancellor's doctoral fellowships; Scholarly Achievement Awards). (2014 -
2018)
Faculty search committee (Atmospheric Science), Chair (2015 - 2016)
Coordinator for graduate student orientation (part of DGS duties) (2015)
Faculty mentor for Prof. David Rahn, Faculty Mentor (2014 - Present)

Committee for Nate Brunsell's promotion application, Member (2014)
Graduate student orientation research presentation, Presenter (2014)
Responsible scholarship seminar, Presenter (2012 - 2014)
Faculty mentor for Prof. David Rahn, Faculty Mentor (2014 - 2017)
Committee member for Nate Brunsell's promotion application, Member (2014)
Graduate student orientation research presentation, Presenter (2014)
Responsible scholarship seminar, Presenter (2012 - 2014)
Colloquium Committee, Chair (2012–2013)

College of Liberal Arts and Sciences (CLAS)

CLAS Graduate Studies Committee, Chair (2017–2018)
Search/interview committee for IT staff member for Earth Science, Math, and
Economics, Member (2017)
PSP subcommittee on CLAS Graduate Studies Committee, Chair (2016 - 2017)
CLAS Graduate Studies Committee, Member (2015 - 2018)
Search/interview committee for IT Coordinator (lead IT), Member (2016)
Liberal Arts and Sciences Advisory Board, Member (2013 - 2014)

University

KU Research Computing Executive Advisory Committee, Member (2015 -
Present)
Co-sponsor of 2-day Software Carpentry Workshop, Coordinator (November 15,
2016 -November 16, 2016)
Faculty reviewer for 2015 Graduate Teaching Assistant Award, Faculty reviewer
(April 2015)
Search Committee: EPSCoR data manager, Member (2013 - 2014)
Executive Committee: NSF EPSCoR Climate Change and Mitigation, Member
(2012 - 2014)