

# David B. Mechem

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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

08/2013–present	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*

- [–] Mechem, D. B., and S. E. Giangrande, 2017: Controls on cloud properties and precipitation onset for a case of cumulus congestus sampled during MC3E. *J. Geophys. Res. Atmos.*, in review.
- [–] Rémillard, J., A. M. Fridlind, A. S. Ackerman, G. Tselioudis, P. Kollias, **D. B. Mechem**, H. E. Chandler<sup>†</sup>, 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.*, conditionally accepted.

*Published*

- [28] de Szoeko, 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.
- [27] Nelson<sup>†</sup>, 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.
- [26] 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.
- [25] **Mechem, D. B.**, S. E. Giangrande, C. S. Wittman<sup>†</sup>, 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.
- [24] Miller, L. M., N. A. Brunsell, **D. B. Mechem**, F. Gans, A. J. Monaghan, R. Vautard, D. W. Keith, and A. Kleidon, 2015: Two methods for estimating limits to large-scale wind power generation. *Proceedings of the National Academy of Sciences*, doi: 10.1073/pnas.1408251112.
- [23] Wood, R., M. Wyant, C. S. Bretherton, J. Remillard, P. Kollias, J. Fletcher, J. Stemmler, S. de Szoeko, 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.
- [22] Huber<sup>†</sup>, D. B., **D. B. Mechem**, and N. A. Brunsell, 2014: Effects of Great Plains irrigation on regional climate. *Climate*, **2**, 103–128.
- [21] Kogan, Y. L., and **D. B. Mechem**, 2014: A PDF-based microphysics parameterization for shallow cumulus clouds. *J. Atmos. Sci.*, **69**, 1070–1089.
- [20] Cochran, F. V., N. A. Brunsell, and **D. B. Mechem**, 2013: Comparing surface and mid-troposphere CO<sub>2</sub> concentrations from central U.S. grasslands. *Entropy*, **15**, 606–623, doi:10.3390/e15020606.
- [19] **Mechem, D. B.**, and A. J. Oberthaler<sup>†</sup>, 2013: Numerical simulation of tropical cumulus congestus during TOGA COARE. *J. Adv. Model. Earth Syst.*, **5**, 1–15, doi:10.1002/jame.20043.
- [18] de Szoeko, 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.
- [17] 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.

- [16] **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.
- [15] 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.
- [14] 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.
- [13] 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.
- [12] **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.
- [11] **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.
- [10] 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.
- [9] 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.
- [8] **Mechem, D. B.**, and Y. L. Kogan, 2008: A bulk parameterization of giant CCN. *J. Atmos. Sci.*, **65**, 2458–2466.
- [7] **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.
- [6] 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.
- [5] **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.
- [4] **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.
- [3] 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.
- [2] **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.
- [1] **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.

## Informal publications

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

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

## Presentations

Ghate, V., **D. Mechem**, E. Eloranta, M. Cadetdu, 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<sup>†</sup>, L. A., **D. B. Mechem**, S. Wang, and Q. Wang, 2017: Exploring mechanisms governing dissipating coastal stratocumulus using large-eddy simulation. 4.4, 97<sup>th</sup> Annual Meeting of the American Meteorological Society. Seattle, WA, 22–26 January 2017. (oral, McMichael presented)

**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. (oral, Mechem presented)

Yuter, S. E., and **D. B. Mechem**, 2017: Reflections on radar observations of mesoscale precipitation. 3.3. Robert A. Houze, Jr. Symposium, 97<sup>th</sup> 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<sup>†</sup>, 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 Ghate, 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<sup>†</sup>, 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<sup>†</sup>, and Hannah Chandler<sup>†</sup>, 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)
- Cai<sup>†</sup>, L., **D. B. Mechem**, and N. A. Brunsell, 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<sup>†</sup>, 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<sup>†</sup>, 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<sup>†</sup>, D. B., **D. B. Mechem**, and N. A. Brunzell, 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<sup>†</sup>, D. B., **D. B. Mechem**, and N. A. Brunzell, 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<sup>†</sup>, D. B., **D. B. Mechem**, and N. A. Brunzell, 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. deSzoeke, 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<sup>†</sup>, 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. deSzoeke, 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)
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- Childers<sup>†</sup>, M. E., K. M. Donner<sup>†</sup>, 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)
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- 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)

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- 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)

<sup>†</sup> indicates graduate or undergraduate student advisees.

### Field Project Participation

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

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

Jordan Eissner	M.S. Atmospheric Science (starting fall 2017)
Laura Tomkins	M.S. Atmospheric Science (starting fall 2017)
Luke McMichael	M.S. Atmospheric Science (2015–present), will begin Ph.D. Atmospheric Science program in Fall 2017
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**

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 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

Editorial Board Member, *Pure and Applied Geophysics* (2012–present)  
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  
Proposal panel review member for the National Aeronautics and Space  
Administration (2013, 2017), Department of Energy (2013), 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,  
2014  
AMS Cloud Physics Conference organizing committee, Madison, Wisconsin,  
2006

#### Session chair and panelist

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

#### Professional service to the university

##### Department of Geography and Atmospheric Science

Department of Geography and Atmospheric Science Recruiting Day,  
Coordinator (2015–Present)  
Responsible scholarship seminar, Coordinator (2014 - Present)  
Director of Graduate Studies, Director (2014 - Present)  
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 -  
Present)  
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 Brunzell'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 - Present)  
Committee 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–present)  
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 - Present)  
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)