

# Curriculum Vitae

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## **Education**

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

## **Professional Experience**

08/2007–present Assistant Professor, Department of Geography, University of Kansas  
01/2011–present Adjunct Assistant Professor, Department of Marine, Earth, and Atmospheric Sciences, North Carolina State University, Raleigh, NC  
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  
11/2002 Guest Lecturer, METR 5233 (Graduate cloud physics), 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  
09/1994–12/1994 Teaching Assistant, Department of Atmospheric Sciences, University of Washington, Seattle, WA  
09/1989–08/1993 Meteorological Technician, National Severe Storms Laboratory, Norman, OK

## **Presentations, Posters, and Meeting Participation**

08/2010 AMS Conference on Agricultural and Forest Meteorology  
07/2010 AMS Conferences on Cloud Physics and Radiation, Portland, OR  
12/2009 American Geophysical Union Annual Meeting, San Francisco, CA  
08/2009 Conference on Mesoscale Processes, Salt Lake City, UT  
12/2008 American Geophysical Union Annual Meeting, San Francisco, CA  
12/2008 Kansas Energy and Environmental Policy Advisory Group Meeting, Topeka, Kansas

10/2008 Department of Chemical and Petroleum Engineering, University of Kansas, Lawrence, KS

07/2008 International Conference on Clouds and Precipitation, Cancún, Mexico

03/2008 ARM Program Science Team Meeting, Norfolk, VA

01/2008 American Meteorological Society Annual Meeting, New Orleans, Louisiana

04/2007 Department of Geography, University of Kansas, Lawrence, KS

03/2007 ARM Program Science Team Meeting, Monterey, CA

03/2007 Department of Earth and Atmospheric Sciences, St. Louis University, St. Louis, MO

03/2007 Department of Geosciences, Texas Tech University, Lubbock, TX

02/2007 Department of Geosciences, University of Nebraska, Lincoln, NE

11/2006 National Weather Center, University of Oklahoma, Norman, OK

11/2006 ARM Cloud Properties Working Group, Annapolis, MD

09/2006 Oklahoma Supercomputing Symposium, Norman, OK

09/2006 Joint GCSS-GPCI/BLCI-RICO Workshop, NASA/GISS, New York, NY

07/2006 AMS Conferences on Cloud Physics and Radiation, Madison, WI

03/2006 ARM Program Science Team Meeting, Albuquerque, NM

11/2005 Department of Atmospheric and Oceanic Sciences, University of Wisconsin, Madison, WI

10/2005 AMS Conference on Radar Meteorology, Albuquerque, NM

09/2005 National Severe Storms Laboratory, Norman, OK

05/2005 Pan-GCSS Meeting on Clouds, Models, and Climate, Athens, Greece

03/2005 ARM Program Science Team Meeting, Daytona Beach, FL

01/2005 Naval Research Laboratory, Monterey, CA

07/2004 International Conference on Clouds and Precipitation (ICCP), Bologna, Italy

03/2004 ARM Program Science Team Meeting, Albuquerque, NM

02/2004 Rain In Cumulus over the Ocean (RICO) planning meeting, Boulder, CO

10/2003 Joint meeting of GCSS and ARM WGs, Broomfield, CO

08/2003 AMS Conference on Coastal Atmospheric and Oceanic Prediction and Processes, Seattle, WA (Session chair)

08/2003 AMS Conference on Radar Meteorology, Seattle, WA

07/2003 Department of Atmospheric Sciences, University of Washington, Seattle, WA

04/2003 ARM Program Science Team Meeting, Broomfield, CO

09/2002 Naval Research Laboratory, Monterey, CA

06/2002 AMS Conferences on Cloud Physics and Radiation

05/2002 Pan-GCSS Meeting on Clouds, Models, and Climate, Kananaskis, Alberta, Canada

04/2002 ARM Program Science Team Meeting, St. Petersburg, FL

03/2002 DYCOMS-II data meeting, Boulder, CO

11/2001 AMS Conference on Coastal Atmospheric and Oceanic Prediction and Processes, St. Petersburg, FL

03/2001 Atmospheric Radiation Measurement Program Science Team Meeting, Atlanta, GA

12/2000 Naval Research Laboratory, Monterey, CA

06/2000 International Conference on Clouds and Precipitation (ICCP), Reno, NV

04/2000 FIRE-SHEBA meeting, Boulder, CO

11/1999 AMS Conference on Coastal Atmospheric and Oceanic Prediction and Processes, New Orleans, LA

### **Field Project Participation**

07/2001 Dynamics and Chemistry of Marine Stratocumulus (DYCOMS-II)  
12/1995 Coastal Observation and Simulation with Topography Experiment (COAST-II)

### **Funded Proposals**

“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]

"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]

"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]

“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]

“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]

### **Professional Societies and Service**

Member, American Meteorological Society

Member, American Geophysical Union

Reviewer for *Acta Geophysica*, *Atmospheric Chemistry and Physics*, *Atmospheric Research*, *Boundary Layer Meteorology*, *Geophysical Research Letters*, *Journal of Applied Meteorology*, *Journal of the Atmospheric Sciences*, *Journal of Geophysical Research*, *Journal of Glaciology*, *Meteorology and Atmospheric Physics*, *Monthly Weather Review*, *Quarterly Journal of the Royal Meteorological Society*, and *Weather and Forecasting*

Reviewer for National Science Foundation proposals

Reviewer for Oxford University Press

Session chair: Fifth Conference on Coastal Atmospheric and Oceanic Prediction and Processes, 6-8 Aug. 2003, Seattle, WA, American Meteorological Society

Session chair: 13th Conference on Mesoscale Processes, 17-20 August 2009, Salt Lake City, UT, American Meteorological Society

Session chair: 12th Conference on Cloud Physics, 28 June–2 July 2010, Portland, OR, American Meteorological Society

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

J. Michael Young award for academic advising in the College of Liberal Arts and Sciences

## **Publications**

### *Formal*

- 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.
- 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.
- 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.**, 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, Y. L., Z. N. Kogan, and **D. B. Mechem**, 2007: Assessing the errors of microphysical retrievals based on Doppler radar parameters. *J. Hydrometeor.*, **8**, 665-677.
- 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**, 2009: Fidelity of analytic drop size distributions in drizzling stratiform clouds based on large-eddy simulation. *J. Atmos. Sci.*, **66**, 2335-2348.
- 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.
- 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. Climatology.*, in press.

*In review*

- 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.*, in review.
- Kogan, Y. L., **D. B. Mechem**, and K. Choi, 2011: Effects of sea-salt aerosols on precipitation in simulations of shallow cumulus. *J. Atmos. Sci.*, in review.
- 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.*, in review.

*Informal (Selected)*

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

Huber, 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.

**Mechem, D. B.**, S. E. Yuter, and S. P. deSzoeki, 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.

**Mechem, D. B.**, 2010: Clouds. *Encyclopedia of Geography*, B. Warf, Ed., in press.