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Department of Atmospheric Sciences  
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## ATMOS Briefing - December 23 Issue



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This briefing is for activities that occurred during the November 2023 period.

### Notes from the Head

Greetings and Happy New Year, Atmospheric Sciences! I hope you were able to recharge and enjoy time with loved ones. We've got a busy start to the semester coming up, and I want to mention a few important items:

- Climate position search: The search committee for this position has been working hard setting up our 5 faculty interviews for this position. Itineraries are being finalized and will be distributed to the candidates shortly. Look for an email from Patti to gather feedback about the candidates, as we've done in years past.



- [AMS Annual Meeting in Baltimore, MD](#): The Department will have a table at the Undergrad Career Fair on Sunday afternoon, and don't forget about the Alumni and Friends Reception on Tuesday, January 30, 2024, from 7 - 8 pm at the Hyatt Regency Baltimore Inner Harbor, Frederik Room.
- [Department Name Change](#): The Department's name change to the **Department of Climate, Meteorology & Atmospheric Sciences** will be considered by the Board of Trustees on the afternoon of January 18. Assuming that the name change is approved, we will begin rolling out the name change on social media, our website, and other venues. After final approval, we will provide an updated logo and letterhead, updating signage and banners, and other items such as business cards. We will also be doing a merchandise order for department fleece jackets, polo shirts, hats, and mugs. If there are other items that need to be updated, please review and add them to this [working "punch list" document](#) containing action items for the name change.
- [Grad Recruiting](#): All of the Fall 2024 applications are in and should be populated in GradApps. As of now, we have 94 applicants.
- Please start identifying candidates and let Ryan know if you are interested in making an offer to any students.
  - We would like to hold a grad recruiting event on campus on February 23 or March 1. If you have any conflict with either of those dates, please let me know.
  - Keep students in mind for [Grad College Fellowships](#), who have upcoming round 2 deadlines. Also, nominate students you've offered to for our internal fellowships, see my email from January 8.

I wish everyone a great and productive semester!

Steve Nesbitt

Professor and Head

## Publications

Z. D'Aquino, S. Arabas, J. H. Curtis, A. Vaishnav, N. Riemer, M. West [2023], PyPartMC: A Pythonic interface to a particle-resolved, Monte Carlo aerosol simulation framework, SoftwareX, 25, 101613, DOI: 10.1016/j.softx.2023.101613.

Dominguez, F. et al., Advancing South American Water and Climate Science through Multidecadal Convection-Permitting Modeling. 2024, Bulletin of the American Meteorological

Society, [https:// doi.org/10.1175/BAMS-D-22-0226.1](https://doi.org/10.1175/BAMS-D-22-0226.1)

Droegemeier, K.K., 2023: Demystifying the Academic Research Enterprise: Becoming a Successful Scholar in a Complex and Competitive Environment. MIT Press, Cambridge, 325pp. [https:// mitpress.mit.edu/9780262547079/demystifying-the-academic-research-enterprise/](https://mitpress.mit.edu/9780262547079/demystifying-the-academic-research-enterprise/)

Friedlingstein, P. (Coauthor: A.K. Jain) (2023), Global carbon budget 2023, *Earth System Science Data*, 15, 1–69, <https://doi.org/10.5194/essd-15-1-2023>

Janiszewski, A., R. M. Rauber, G. M. McFarquhar, B. F. Jewett, T. J. Zaremba, and J. York, 2023: A Kinematic Modeling Study of the Re-Organization of Snowfall between Cloud-top Generating Cells and low-level Snow Bands in Midlatitude Winter Storms. *J. Atmos. Sci.*, 80, 2729-2745. doi: <https://doi.org/10.1175/JAS-D-23-0024.1>. 122. Zaremba, T. J., R. M. Rauber, L. D. Girolamo, J. R. Loveridge, and G. M. McFarquhar, 2023: On the Radar Detection of Cloud Seeding Effects in Wintertime Orographic Cloud Systems. *J. Appl. Meteor. Climatol.*, 63, 27–45, [https:// doi.org/10.1175/JAMC-D-22-0154.1](https://doi.org/10.1175/JAMC-D-22-0154.1)

Jones, C. D. et al. (Coauthor: A.K. Jain) (2023). RECCAP2 future component: Consistency and potential for regional assessment to constrain global projections. *AGU Advances*, 4, e2023AV001024. <https://doi.org/10.1029/2023AV001024>

Kou-Giesbrecht, S et al. (Coauthor: A.K. Jain) (2023). Evaluating nitrogen cycling in terrestrial biosphere models: a disconnect between the carbon and nitrogen cycles. *Earth System Dynamics*, 14, 767–795, 2023. <https://doi.org/10.5194/esd-14-767-2023>

Roy, P., R. M. Rauber, L. Di Girolamo, 2023: A closer look at the evolution of supercooled cloud droplet temperature and lifetime in different environmental conditions with implication for ice nucleation in the evaporating regions of cloud., *J. Atmos. Sci.*, 80, 2481-2501. doi: [https:// doi.org/10.1175/JAS-D-22-0239.1](https://doi.org/10.1175/JAS-D-22-0239.1)

Tian, H. et al. (Coauthor: A.K. Jain) (2023). Global Nitrous Oxide Budget 1980–2020, *Earth System Science Data Discussion*. <https://doi.org/10.5194/essd-2023-401>

Zaremba, T. J., R. M. Rauber, L. D. Girolamo, J. R. Loveridge, and G. M. McFarquhar, 2023: On the Radar Detection of Cloud Seeding Effects in Wintertime Orographic Cloud Systems. *J. Appl. Meteor. Climatol.*, 63, 27–45, <https://doi.org/10.1175/JAMC-D-22-0154.1>

Zaremba, T. J., R. M. Rauber, Geerts, B., French, J., Tessendorf, S. A., Xue, L., Friedrich, K., Weeks, C., Rasmussen, R. M., Kunkel, M. L., & Blestrud, D. R. (2022). Vertical Motions in Orographic Cloud Systems over the Payette River Basin. Part 4: Controls on Drop Number Concentrations and Supercooled Liquid Water Content *J. Appl. Meteor., Clim.*, 62, 1389-1413. doi: <https://doi.org/10.1175/JAMC-D-23-0080.1>

# Presentations

Berman, MT, RJ Trapp, SW Nesbitt and L. Di Girolamo, 2023: Understanding the impact of the upper tropospheric/lower stratospheric thermodynamic environment on overshooting top characteristics. Amer. Geophys. Union Fall Meeting, Dec. 10 -15, San Francisco, CA.

D'Aquino, Z., S. Arabas, JH Curtis, Riemer, N., West, M., PyPartMC: A Pythonic interface to a particle-resolved Monte Carlo aerosol simulation framework, International Aerosol Modeling Algorithms Conference, Davis, CA, 7 December 2023

D'Aquino, Z., JH Curtis, , M. West, N. Riemer, "Parametric and structural uncertainties in modeling dry deposition of atmospheric aerosol particles", International Aerosol Modeling Algorithms Conference, Davis, CA, 6 December 2023

De Vera, MV, L. Di Girolamo, G. Zhao, R. Rauber, SW Nesbitt, and G. McFarquhar, 2003: Observations of the macrophysical properties of cumulus cloud fields over the tropical western Pacific. Amer. Geophys. Union Fall Meeting, Dec. 10 -15, San Francisco, CA.

De Vera, MV, L. Di Girolamo, G. Zhao, R. Rauber, SW Nesbitt, and G. McFarquhar, 2023: Observations of the macrophysical properties of cumulus cloud fields sampled during CAMP2Ex from MISR, MODIS and ASTER. MISR Science Team Meeting, Dec. 18-19, Pasadena, CA.

Di Girolamo, L., A. Mitra, and J. Lovelidge, 2023: Towards a 23-year record of two-layered cloud properties through the fusion of Terra-MODIS thermal infrared radiance with MISR stereoscopic heights. Amer. Geophys. Union Fall Meeting, Dec. 10 -15, San Francisco, CA.

Di Girolamo, L., A. Mitra, and J. Lovelidge, 2023: Towards a 23-year record of two-layered cloud properties through the fusion of Terra-MODIS thermal infrared radiance with MISR stereoscopic heights. MISR Science Team Meeting, Dec. 18-19, Pasadena, CA.

Droegemeier, KK, Demystifying the Academic Research Enterprise. Keynote, Public Responsibility in Medicine Annual Meeting, Washington, DC. January 4, 2023.

Droegemeier K. K., AJ Knoedler, Role of International Leadership in Public Policy, Public Responsibility in Medicine Annual Meeting, Washington, DC. January 4, 2023.

Frederick, S., M. Mohebalhojeh, JH Curtis, M. West, N. Riemer, Idealized particle-resolved large-eddy simulations to evaluate the impact of emissions spatial heterogeneity on CCN activity. International Aerosol Modeling Algorithms Conference. Davis, California. December 8, 2023.

Fu, D., et al., 2023: An evaluation of liquid cloud droplet effective radius derived from MODIS, airborne remote sensing, and in situ measurements from CAMP2Ex. MISR Science Team Meeting, Dec. 18-19, Pasadena, CA. Loveridge, J., and L. Di Girolamo, 2023: Insights into stereoscopic cloud top height retrievals and the microphysical interpretation of rainbow scattering from 3D radiative transfer simulations. MISR Science Team Meeting, Dec. 18-19, Pasadena, CA.

Gopalakrishnan, D., JT Allen, RJ Trapp, and E. Robinson, Future changes in severe thunderstorm environments over the United States from CMIP6 models, AGU Fall Meeting, San Francisco, CA, December 2023

Gopalakrishnan, D., C. Cuervo-Lopez, JT Allen, RJ Trapp, and E. Robinson, Evaluation of the skill of CMIP6 models in capturing severe thunderstorm environments over the United States, AGU Fall Meeting, San Francisco, CA, December 2023

Guo, L., X. Yang, Z. Zheng, N. Riemer and C. Tessum, Chemical Surrogate Modeling with Uncertainty Quantification Using Ensemble SINDy, AGU Fall Meeting 2023, San Francisco, Dec 13, 2023

Jain, AK and TZ Lin (2023). Influence of climate extremes and management practices on crop productivity, AGU Fall Meeting 2023, San Francisco, CA., Dec 11-15, 2023.

Jain, AK (2023). Greenhouse Gas Budget of South Asia Region. Workshop entitled *Space-based Greenhouse Gases, Air Quality and Climate Change*, National Remote Sensing Center (NRSC), Indian Space Research Organization (ISRO), Hyderabad, India, Dec 20-21, 2023.

Kim, S., F. Dominguez, Evaluating the Influence of Surface Fluxes on Severe Droughts in the Midwestern United States through Back Trajectories of Moisture and Moist Static Energy, AGU 2023, San Francisco, CA, 13 December 2023.

Knopf, D. A., N. Hiranuma, F. Vogel, N. Umo, N. Nahar Lata, E. Levin, E. Wilbourn, J. Gasparik, Y. Sun, R. Perkins, S. China, Y. Hu, K. Höhler, P. Bogert, R. Wagner, A. Laskin, O. Mohler, N. Riemer, P. J. DeMott, G. Kulkarni, X. Liu and A. M. Fridlind, A combined cloud chamber and single-particle micro-spectroscopic investigation of soil-dust particles serving as ice-nucleating particles, AGU Fall Meeting 2023, San Francisco, Dec 13, 2023

Liu, Y., JH Curtis, ML Dawson, DN Higgins, MV Johnston, N. Riemer, Modeling the seed-dependent particle growth via multiphase reactions with the particle-resolved model PartMC-CAMP Conference: International Aerosol Modeling Algorithms Conference (IAMA) Location: UC Davis Conference Center, Davis, CA Date: December 6-8, 2023

Loveridge, J., and L. Di Girolamo, 2023: Accounting for systematic errors in satellite retrievals in the assessment of variations of cloud properties across the stratocumulus-to-cumulus

transition and the strength of aerosol-cloud interactions. Amer. Geophys. Union Fall Meeting, Dec. 10 -15, San Francisco, CA.

Lundstrom, J., J. Lloveridge, and L. Di Girolamo, 2023: The practical application of Atmospheric Tomography with 3D Radiative Transfer (AT#D) using the Multi-angle Imaging SpectroRadiometer (MISR). Amer. Geophys. Union Fall Meeting, Dec. 10 -15, San Francisco, CA.

Pan, N et al. (Coauthor: A.K. Jain) (2023). National N<sub>2</sub>O emissions (1980-2020) derived from multiple sources of data: magnitudes, trends and drivers. AGU Fall Meeting 2023, San Francisco, CA., Dec 11-15, 2023

Park, M., Z. Zheng, N. Riemer, and C. Tessum, Machine-learned Advection Operator to Accelerate Air Quality Modeling, AGU Fall Meeting 2023, San Francisco, Dec 12, 2023

Riemer, N., JH Curtis, Y. Yao, L. Fierce, TC Bond, J. Ching, Z. Zheng, F. Xu and M. West, Unraveling aerosol mixing state: Enhancing climate impact predictions through particle-resolved simulations, AGU Fall Meeting 2023, San Francisco, Dec 12, 2023 (invited)

Roy, P., R M Rauber, L. Di Girolamo, Evaporating Supercooled Cloud Droplets and Potential Impacts for Ice Nucleation [Online Oral Presentation] Conference - AGU Annual Meeting 2023 Location - San Francisco, CA, Dec 15, 2023

Roy, P., R. Rauber, and L. Di Girolamo, 2023: Evolution of cloud droplet temperature and radius in spatiotemporally varying subsaturated environments with implications for ice nucleation at cloud edges. Amer. Geophys. Union Fall Meeting, Dec. 10 -15, San Francisco, CA.

Shen, W., M. Wang, N. Riemer, Z. Zheng, Y. Liu and X. Dong, Improving Representations of BC Mixing State, CCN Activity and Optical Absorption with Machine Learning in the Community Atmosphere Model Version 6 (CAM6), AGU Fall Meeting 2023, San Francisco, Dec 13, 2023

Trapp, R.J, S. Wang, J. T. Allen, D. Gopalakrishnan, and E. Robinson, "Environment-informed, convection-permitting dynamical downscaling for climate-change projections of hazardous convective weather", AGU Fall Meeting, San Francisco, CA, December 2023.

Wuebbles, D. J., R. Silvern, and K. Gurney, 2023: Carbon Emissions Information for Decision Making: A Look at the Pathway Going Forward. Invited presentation at Annual Meeting of the American Geophysical Union, San Francisco, December 14, 2023.

Xu, X., JH Curtis, and N. Riemer, Investigating impact of surfactants on cloud condensation nuclei activity with a particle-resolved aerosol model International Aerosol Modeling Algorithms Conference, Davis CA, Dec 6-8, 2023

Yang, X., L. Guo, Z. Zheng, N. Riemer and C. Tessum, Atmospheric chemistry surrogate modeling with sparse identification of nonlinear dynamics, AGU Fall Meeting 2023, San Francisco, Dec 13, 2023

## Activities

Professor Nicole Riemer attended the International Aerosol Modeling Algorithms Conference UC Davis, December 6 - 8, 2023, and served on the Technical Program Committee.

Professor Larry Di Girolamo participated in the AGU Fall Meeting in San Francisco, CA.

Professor Larry Di Girolamo participated in the MISR Data User Symposium, Pasadena, CA.

Professor Larry Di Girolamo participated in the MISR Science Team Executive Meeting, Pasadena, CA.

Professor Kelvin Droegemeier represented NSF and gave a presentation on a panel titled "Role of Institutional Leadership in Public Policy" at the Public Responsibility in Medicine and Research Annual Meeting in Washington, DC.

Professor Kelvin Droegemeier spoke and awarded the first place prize at the "Reimagine Our Future" ceremony at UIUC.

Professor Atul Jain was a session chair, Fall 2023 American Geophysical Union (AGU) Meeting, session title "Advances in Modeling the Effects on Land Surfaces Characteristics due to Land Use/Land Cover Changes", San Francisco, CA., Dec 11-15, 2023.

Professor Atul Jain piece for the Illinois News Bureau, "Why are global carbon emissions starting to increase again?" December 5, 2023,

<https://blogs.illinois.edu/view/6231/1480677099>

## Announcements

Professor Atul Jain was awarded the AGU Fellow at an honors ceremony at the AGU Fall Meeting, 2023, San Francisco, CA, Dec 11-15, 2023.



## Seminar Schedule

### Spring 2024:

2/6: Graduate Student, David Lafferty, UIUC

2/13: Graduate Students Matthew Graber and Kyle Killion, UIUC

2/22: **\*Special Seminar:** Rachel Meidl, Rice University

2/24: Graduate Students Gabrielle Christo and Zachary D'Aquino, UIUC

2/27: Graduate Students Samuel Frederick and Joseph Nied, UIUC

3/5: Graduate Student, Alex Adams, UIUC

3/16: Alexandra Anderson-Frey \*Student Choice

3/26: Graduate Student, Michael Sessa, UIUC

4/2: Graduate Students Katie Straus and David Roegner, UIUC

4/9: Graduate Students McKenzie Peters and Maile Sasaki, UIUC

4/11: **\*Special Seminar** - Graduate Students Wenhan Tang and John Lundstrom, UIUC

4/16: Grad Student, Carolina Bieri, UIUC

4/18: **\*Special Seminar** - Graduate Student, Chu-Chun Chen, UIUC

4/23: Clara Deser-Ogura Lecture



## Birthdays

### Happy January Birthday!

#### Faculty:

Ryan Sriver

Don Wuebbles

#### Graduate Students:

Mitchell Lazarow

Sean Matus

Lina Rivelli Zea

Mingshi Yang



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