CURRICULUM VITAE

MARY C. BROCK
(publishes as MARY C. BARTH)
Atmospheric Chemistry Observations and Modeling / Mesoscale and Microscale Meteorology
National Center for Atmospheric Research
P. O. Box 3000, Boulder, Colorado

1. EDUCATION:

1985 B.S. Chemical Engineering University of Colorado
1991 Ph.D. Atmospheric Sciences University of Washington

2. PROFESSIONAL EXPERIENCE:

1991–1994 Postdoctoral Scientist, (MMM/ACOM, NCAR)
1994–1996 Associate Scientist III, (MMM/ACOM, NCAR)
1996–2016 Scientist I, II, III, (ACOM/MMM, NCAR)
2016–present Senior Scientist, (ACOM/MMM, NCAR)
2008–present ACOM Section head 2008–2013, ACOM Group head 2013-2016, MMM Deputy Section head 2017-present

UNIVERSITY VISITS

2015 Two-month UVisit to Colorado State University (hosts: Dr. Steven Rutledge, Dr. Sue Van den Heever)
2015 Two and one-half week UVisit to Rutgers University (host: Dr. Ann Marie Carlton)

3. SCIENTIFIC ACCOMPLISHMENTS:

Dr. Barth has used numerical models and field campaign data to investigate cloud processes affecting composition. She implemented sulfur chemistry in the Community Climate Model and showed that cloud chemistry was responsible for over half of the sulfate aerosol mass in the troposphere. After adding simple aqueous-phase chemistry to a regional-scale chemistry transport model, Barth showed that aqueous-phase chemistry in marine boundary layer clouds and cloud scattering modification of photolysis rates worked equally together to cause small decreases in ozone mixing ratios. Barth also added gas and aqueous-phase chemistry in a large-eddy simulation model and supervised scientists who showed the impact of small cumulus clouds on chemistry via venting air to higher altitudes and by segregating chemical reactants.

Dr. Barth has spent much of her time over the past 20 years investigating how thunderstorms affect chemical constituents. Via cloud chemistry modeling of thunderstorms and chemistry with the WRF-Chem model, she pointed out the potential role of frozen hydrometeors (ice, snow, hail and graupel) on whether or not soluble trace gases (e.g. acids, peroxides, and aldehydes) are removed via precipitation, motivating field observations to determine how thunderstorms process soluble trace gases. Barth was the primary PI of the Deep Convective Clouds and Chemistry (DC3) field campaign that took place in 2012. This project has produced over 60 papers on storm morphology, stratosphere-troposphere mixing caused by deep convection, lightning, and composition in several thunderstorms as well as specific storm processes, such as wet scavenging and lightning production of nitrogen oxides. Her overview paper of DC3 is a highly cited paper in the Web of Science. Her high-resolution WRF-Chem simulation for the continental US during the 2006 North American Monsoon elucidated the most important geographical regions for ozone production in convective outflow regions noting the role of volatile organic compounds in anthropogenic and biogenic regions such as the Southeast US.

Dr. Barth has led an Earth System Modeling project focused on chemistry and climate in Asia. The project fostered collaborations between Asian scientists and US scientists, evaluated the capabilities of the WRF-Chem model in simulating chemistry in South and Southeast Asia, and produced an important paper on the future air quality in South Asia where ozone and particulate matter are major pollutants in the highly-populated Indo-Gangetic Plain.

Barth's current projects include co-leading with Sara Lance (SUNY-Albany) and Annmarie Carlton (U. California, Irvine) a Cloud Chemistry Initiative focused on organic aqueous chemistry. She is currently completing a box model intercomparison of gas-aqueous chemistry box models. Barth is also quantifying the production of ozone in convective outflow regions in the upper troposphere, where ozone is radiatively active behaving as a greenhouse gas. This work is being done as part of the DC3 and SEAC^{4}RS field experiment analyses and includes an estimation of how much ozone production is affected by cloud physics. Dr. Barth is one of the leaders of the MUSICA model development and NCAR-wide SIMA infrastructure project, which will bring our next generation model infrastructure, enabling research on new science questions such as impacts of local urban and convection regions on continental-scale regions.

4. COMMUNITY SERVICE:

4.1 External Service

- Member of ICCP (2000-2008), NSF/NCAR OFAP (2004-2007), DOE/ARM Climate Research User Facility Board (2006-2008), IGAC SSC (2010-2015), NSF Advisory Committee for Geosciences (2012-2015)
- Secretary of AGU Atmospheric Sciences Section for 2 years
- Guest Associate Editor for *Journal Geophysical Research – Atmospheres* (2014-present)
- Member of the International Commission on Atmospheric Chemistry and Global Pollution (iCACGP) (2015-present)
- Vice-president of iCACGP for representing North America (2019-present)
- Editor for the *Journal of the Atmospheric Sciences* (2019-present)

4.2 NCAR/UCAR Service

- Leader of the Early Career Scientists Assembly (2000-2002)
- Member of the University Relations Committee (2000-2005), UCAR Distinguished Achievement and Outstanding Accomplishments Awards Jury. (2001-2004; Chair, 2002), MMM Director Search Committee (2003-2004), NSF-owned Properties Ad-Hoc Panel (2016-2018), MMM Scientist I/II Hiring Committee (2017)
- Leadership Academy participant (2003)
- Member, Vice Chair, and Chair of the Appointments Review Group (2017-2020)

4.3 Conference and Workshop Organizer

- Member of more than 10 workshops (NCAR/GTP workshops, 1998 and 1999; ACD/MMM Workshop on Modeling Chemistry in Cloud and Mesoscale Models, 2000; Case study leader for 5th and 6th International Cloud Modeling Workshops, 2000 and 2004); NCAR Junior Scientist Forum for Future Scientific Directions, 2003; Programme Committee for the 12th International Global Atmospheric Chemistry Conference, 2012; ACOM Workshop on Health, Agricultural and Water Risks Associated with Air Quality

and Climate in Asia, 2013; SPARC/IGAC sponsored 1st and 2nd Atmospheric Composition and the Asian Monsoon Training Schools, 2015 and 2017; NSF sponsored Whiteface Mountain Cloud Chemistry Workshop, 2016; Community Workshop on Developing requirements for in situ and remote-sensing capabilities in convective and turbulent environments, 2017; Program Committee for the 15th IGAC / 14th iCACGP Conference, 2018; 1st Fundamentals of Atmospheric Chemistry and Aerosol Modeling Workshop, 2018)

- Co-chair of the International Science Programme Committee for the 10th International Global Atmospheric Chemistry Conference, September 2008, Annecy, France.

4.4 Professional Reviews

- Reviewer for 4 funding agencies (NSF, NASA, NOAA, NERC), 2 books, 13 journals, and international activity, Aerosols, Clouds, Precipitation and Climate Science Plan

4.5 Education and Outreach

- Lecturer at 3 NCAR/ASP Summer Colloquia, at the NCAR/ACD – North Carolina A&T Atmospheric Chemistry Class, at two IGAC ACAM Training Schools, at three WRF-Chem tutorials, at the 6th ISAC Summer School (4 lectures), and at the NCAR/ACOM Workshop on Fundamentals of Atmospheric Chemistry and Aerosol Modeling
- Two-week short-course professor, "Tropospheric Chemistry", University of Puerto Rico, 2014
- Mentored over 20 high school, undergraduate, and graduate students since 1997
- Served on thesis committee of 12 Ph.D. students, 1 Masters student, and as Ph.D. external examiner for RMIT (Australia)
- Advised 4 post-doctoral scientists since 2001
- Invited senior scientist speaker at ASCENT (Atmospheric Science Collaborations and Enriching Networks), whose goal was to enhance interactions between female senior scientists and early career scientists with the outcome of developing mentorships between these two groups (2011)

5. HONORS and AWARDS:

- Fellow of the American Meteorological Society (2017)
- UCAR Outstanding Accomplishment Award for Diversity (2015)
- NASA Group Achievement Award for SEAC^{4}RS Field Experiment (2015)
- NCAR Special Recognition Award for leading the Deep Convective Clouds and Chemistry Field Campaign (2012)
- AGU Editor's Citation for Excellence in Refereeing for Journal of Geophysical Research (2007)
- NCAR Special Recognition Award for establishing the Early Career Scientists Assembly (2003)

6. SELECTED PUBLICATIONS:

Author of 88 publications (18 first author), 9 submitted papers, and 34 non-refereed papers. Only refereed publications are given below.

6.1 Ph.D. Dissertation

Date	Advisor	Title
1991	Dr. Dean Hegg	Numerical modeling of cloud chemistry and acid deposition associated with the interactions of two rainbands and some comparisons with observations

6.2 Refereed Journal Articles

*Publication resulting from Ph.D. dissertation

1. **Barth, M. C.**, D. A. Hegg, P. V. Hobbs, J. G. Walega, G. L. Kok, B. G. Heikes, and A. L. Lazrus, 1989: Measurements of atmospheric gas-phase and aqueous-phase hydrogen peroxide concentrations in winter on the east coast of the United States, *Tellus*, **41B**, 61-69.

2. Hegg, D. A., S. A. Rutledge, P. V. Hobbs, **M. C. Barth** and O. Hertzman, 1989: The chemistry of a mesoscale rainband. *Quart. J. Royal Meteor. Soc.*, **115**, 867–886.

*3. **Barth, M. C.**, D. A. Hegg and P. V. Hobbs, 1992: Numerical modeling of cloud and precipitation chemistry associated with two rainbands and some comparisons with observations. *J. Geophys. Res.*, **97**, 5825-5845.

4. **Barth, M. C.**, 1994: Numerical modeling of sulfur and nitrogen chemistry in a narrow cold-frontal rainband: The impact of meteorological and chemical parameters., *J. Appl. Meteor.*, **33**, 855-868.

5. Yuen, P-F., D. A. Hegg, T. V. Larson and **M. C. Barth**, 1996: Parameterization of heterogeneous droplet chemistry for use in bulk cloud models, *J. Appl. Meteor.*, **35**, 679-689.

6. **Barth, M. C.** and D. B. Parsons, 1996: Microphysical processes associated with intense frontal rainbands and the effect of evaporation and melting on frontal dynamics, *J. Atmos. Sci.*, **53**, 1569-1586.

7. **Barth, M. C.** and A. T. Church, 1999: The regional and global distributions and lifetimes of sulfate aerosols from Mexico City and southeast China, *J. Geophys. Res.*, **104**, 30,231- 30,239.

8. Rasch, P. J., **M. C. Barth**, J. T. Kiehl, S. E. Schwartz, and C. M. Benkovitz, 2000: A description of the global sulfur cycle and its controlling processes in the National Center for Atmospheric Research Community Climate Model Version 3, *J. Geophys. Res.*, **105**, 1367-1385.

9. **Barth, M. C.**, P. J. Rasch, J. T. Kiehl, C. M. Benkovitz, and S. E. Schwartz, 2000: Sulfur chemistry in the National Center for Atmospheric Research Community Climate Model: Description, evaluation, features and sensitivity to aqueous chemistry, *J. Geophys. Res.*, **105**, 1387-1415.

10. Kiehl, J. T., T. L. Schneider, P. J. Rasch, **M. C. Barth**, and J. Wong, 2000: Radiative forcing due to sulfate aerosols from simulations with the National Center for Atmospheric Research Community Climate Model (CCM3), *J. Geophys. Res.*, **105**, 1441-1457.

11. Dye, J. E., B. A. Ridley, K. Baumann, W. C. Skamarock, **M. C. Barth**, M. Venticinque, E. Defer, P. Blanchet, C. Thery, P. Laroche, G. Hubler, D. D. Parrish, T. Ryerson, M. Trainer, G. Frost, J. S. Holloway, F. C. Fehsenfeld, A. Tuck, T. Matejka, D. Bartels, S. A. Rutledge, T. Lang, J. Stith, R. Zerr, 2000: An Overview of the STERAO–Deep Convection Experiment with Results for the 10 July Storm, *J. Geophys. Res.*, **105**, 10,023-10,045.

12. Skamarock, W. C., J. Powers, **M. C. Barth**, J. E. Dye, T. Matejka, D. Bartels, K. Baumann, J. Stith, D. D. Parrish, and G. Hubler, 2000: Numerical simulations of the 10 July STERAO/Deep Convection Experiment Convective System: Kinematics and transport, *J. Geophys. Res.*, **105**, 19,973–19,990.

13. Hess, P. G., S. Flocke, J-F Lamarque, **M. C. Barth**, and S. Madronich, 2000: Episodic Modeling of the Chemical Structure of the Troposphere as Revealed during the Spring MLOPEX Intensive, *J. Geophys. Res.*, **105**, 26,809-26,839.

14. Patton, E. G., K. J. Davis, **M. C. Barth**, and P. P. Sullivan, 2001: Decaying scalars emitted by a forest canopy: A numerical study, *Boundary Layer Meteorology*, **100**, 91-129.

15. **Barth, M. C.**, A. L. Stuart, and W. C. Skamarock, 2001: Numerical simulations of the July 10 Stratospheric-Tropospheric Experiment: Radiation, Aerosols and Ozone/Deep Convection storm: Redistribution of soluble tracers, *J. Geophys. Res.*, **106**, 12,381-12,400.

16. Brasseur A.-L., R. Ramaroson, A. Delannoy, W. Skamarock, **M. Barth**, 2002: Three-dimensional calculation of photolysis frequencies in the presence of clouds, *J. Atmos. Chem.*, **41**, 211-237.

17. Liu, C-H and **M. C. Barth**, 2002: Large-eddy simulation of flow and scalar transport in a modeled street canyon, *J. Appl. Meteorol.*, **41**, 660-673.

18. **Barth, M. C.**, P. G. Hess, and S. Madronich, 2002: Effect of marine boundary layer clouds on tropospheric chemistry as analyzed in a regional chemistry transport model, *J. Geophys. Res.*, **107**, (D11), 4126, doi:10.1029/2001JD000468.

19. Skamarock,W. C., J. E. Dye, E. Defer, **M. C. Barth**, J. L. Stith, B. A. Ridley, and K. Baumann, 2003: Observational- and Modeling-Based budget of lightning-produced NOx in a continental thunderstorm*, J. Geophys. Res.*, **108**(D10), 4305, doi10.1029/2002JD002163.

20. **Barth, M. C.**, S. Sillman, R. Hudman, M. Z. Jacobson, C.-H. Kim, A. Monod, and J. Liang, 2003: Summary of the cloud chemistry modeling intercomparison: Photochemical box model simulation, *J. Geophys. Res.*, **108**(D7), 4214, doi:10.1029/2002JD002673.

21. Liu, C-H, **M. C. Barth**, and D. Y. C. Leung, 2004: Large-eddy simulation of flow and pollutant transport in street canyons of different building height to street width ratios, *J. Appl. Meteorol.*, **43**, 1410-1424.

22. Liu, C-H, D. Y. C. Leung and **M. C. Barth**, 2005: On the prediction of air and pollutant exchange rates in street canyons of different aspect ratios using large-eddy simulation, *Atmos. Environ.*, **39**, 1567-1574.

23. Kim, S-W, C-H Moeng, J. C.Weil, and **M. C. Barth**, 2005: Lagrangian particle dispersion modeling of fumigation process using large-eddy simulation, *J. Atmos. Sci.*, **62**, 1932-1946.

24. Vila-Guerau de Arellano, J., S-W Kim, **M. C. Barth**, and E. G. Patton, 2005: Transport and chemical transformations influenced by shallow cumulus over land, *Atmos. Chem. Phys.*, **5**, 3219-3231.

25. **Barth, M.**, J. McFadden, J. Sun, C. Wiedinmyer, P. Chuang, D. Collins, R. Griffin, M. Hannigan, T. Karl, S-W Kim, S. Lasher-Trapp, S. Levis, M. Litvak, N. Mahowald, K. Moore, S. Nandi, E. Nemitz, A. Nenes, M. Potosnak, T. Raymond, J. Smith, C. Still, C. Stroud, Coupling between land ecosystems and the atmospheric hydrologic cycle through biogenic aerosol pathways, *Bull. Amer. Meteor. Soc.*, **86**, 1738-1742, 2005.

26. Kazil, J., E. R. Lovejoy, **M. C. Barth**, K.O'Brien, 2006: Aerosol nucleation over oceans and the role of galactic cosmic rays, *Atmos. Chem. Phys.*, **6**, 4905-4924.

27. **Barth, M. C.**, 2006: The importance of cloud drop representation on cloud photochemistry. *Atmos. Res.*, **82**, 294-309.

28. **Barth, M. C.**, S-W Kim, W. C. Skamarock, A. L. Stuart, K. E. Pickering, L. E. Ott, 2007: Simulations of the redistribution of formaldehyde, formic acid, and peroxides in the July 10, 1996 STERAO deep convection storm. *J. Geophys. Res.*, **112**, D13310, doi:10.1029/2006JD008046.

29. **Barth, M. C.**, S.-W. Kim, C. Wang, K. Pickering, L. Ott, G. Stenchikov, M. Leriche, S. Cautenet, J.-P. Pinty, Ch. Barthe, C. Mari, J. Helsdon, R. Farley, A. Fridlind, A. Ackerman, V. Spiridonov, B. Tosko, 2007: Cloud-scale model intercomparison of chemical constituent transport in deep convection. *Atmos. Chem. Phys.*, **7**, 4709-4731.

30. Kim, S-W, C-H Moeng, J. C. Weil, and **M. C. Barth**, 2007: Comment on "Fumigation of pollutants in and above the entrainment zone into a growing convective boundary layer: A large-eddy simulation". *Atmos. Environ.,* **41**, 7679-7682.

31. Barthe, C. and **M. C. Barth**, 2008: Evaluation of a new lightning-produced NOx parameterization for cloud resolving models and its associated uncertainties. *Atmos. Chem. Phys.*, **8**, 4691-4710.

32. Kim, D., C. Wang, A. Ekman, **M. C. Barth**, and P. Rasch, 2008: Distribution and direct radiative forcing of carbonaceous and sulfate aerosols in an interactive size-resolving aerosol-climate model. *J. Geophys. Res.*, **113**, D16309, doi:10.1029/2007JD009756.

33. Wang C., D. Kim, A. M. L. Ekman, **M. C. Barth**, P. J. Rasch, 2009: Impact of anthropogenic aerosols on Indian summer monsoon, *Geophys. Res. Lett.*, **36**, L21704, doi:10.1029/2009GL040114.

34. Barthe, C., W. Deierling, and **M. C. Barth**, 2010: The estimation of total lightning from various storm parameters: A cloud-resolving model study. *J. Geophys. Res.*, **115**, D24202, doi:10.1029/2010JD014405.

35. Fast, J. D., W. I Gustafson Jr., E. G. Chapman, R. C. Easter, J. P. Rishel, R. A. Zaveri, G. A. Grell, and **M. C. Barth**, 2011: The Aerosol Modeling Testbed: A community tool to objectively evaluate aerosol process modules, *Bull. Atmos. Meteor. Soc.*, **92**, 343-360.

36. Vila-Guerau de Arellano, J., E. G. Patton, T. Karl, K. van den Dries, **M. C. Barth** and J. J. Orlando, 2011: On the diurnal evolution of isoprene and the hydroxyl radical over tropical forests. *J. Geophys. Res.*, **116**, D07304, doi:10.1029/2010JD014857.

37. Kumar, R., M. Naja, G. G. Pfister, **M. C. Barth**, G. Brasseur, 2012: Simulations over South Asia using the Weather Research and Forecasting model with Chemistry (WRF-Chem): Set-up and Meteorological Evaluation, *Geosci. Model Dev.*, **5**, 321-343, doi:10.5194/gmd-5-321-2012.

38. Kim, S.-W., **M. C. Barth**, M. Trainer, 2012: Influence of fair-weather clouds on isoprene chemistry, *J. Geophys. Res.*, **117**, D10302, doi:10.1029/2011JD017099.

39. Kumar, R., M. Naja, G. G. Pfister, **M. C. Barth**, C. Wiedinmyer, and G. P. Brasseur, 2012: Simulations over south Asia using the Weather Research and Forecasting model with Chemistry (WRF-Chem): Chemistry Evaluation and initial results, *Geosci. Model Dev.*, **5**, 619–648, 2012 www.geosci-model-dev.net/5/619/2012/ doi:10.5194/gmd-5-619-2012.

40. **Barth, M. C.**, J. Lee, A. Hodzic, G. Pfister, W. C. Skamarock, J. Worden, J. Wong, and D. Noone, 2012: Thunderstorms and upper troposphere chemistry during the early stages of the 2006 North American Monsoon, *Atmos. Chem. Phys.*, **12**, 11,003-11,026, doi:10.5194/acp-12-11003-2012.

41. Kumar, R., M. Naja, G. G. Pfister, **M. C. Barth**, and G. P. Brasseur, 2013: Source attribution of carbon monoxide in India and surrounding regions during wintertime, *J. Geophys. Res. Atmos.,* 118, doi:10.1002/jgrd.50134.

42. Cummings, K. A., T. L. Huntemann, K. E. Pickering, **M. C. Barth**, W. C. Skamarock, H. Höller, H.-D. Betz, A. Volz-Thomas, and H. Schlager, 2013: Cloud-resolving chemistry simulation of a Hector thunderstorm, *Atmos. Chem. Phys.*, 13, 2757-2777, doi:10.5194/acp-13-2757-2013.

43. Wong, J., **M. C. Barth**, and D. Noone: 2013: Evaluating a lightning parameterization based on cloud-top height for mesoscale numerical model simulations, *Geosci. Model Dev.*, 6, 429-443, doi:10.5194/gmd-6-429-2013.

44. **Barth, M. C.**, A. K. Cochran, M. N. Fiddler, J. M. Roberts, and S. Bililign, 2013: Numerical modeling of cloud chemistry effects on isocyanic acid (HNCO), *J. Geophys. Res.,* 118, 8688–8701, doi:10.1002/jgrd.50661.

45. Kumar, R., **M. C. Barth**, G. G. Pfister, M. Naja, and G. P. Brasseur, 2014: WRF-Chem simulations of a typical pre-monsoon dust storm in northern India: Influences on aerosol optical properties and radiation budget, *Atmos. Chem. Phys.,* **14**, 2431-2446, doi:10.5194/acp-14-2431-2014.

46. Kim, D., C. Wang, A. M. L. Ekman, **M. C. Barth**, and D-I Lee, 2014: The responses of cloudiness to the direct radiative effect of sulfate and carbonaceous aerosols, *J. Geophys. Res.*, **119**, 1172–1185, doi:10.1002/2013JD020529.

47. Homeyer, C., L. Pan, **M. C. Barth**, 2014: Transport from convective overshooting of the extratropical tropopause and the role of large-scale lower stratosphere stability, *J. Geophys. Res.*, **119**, doi:10.1002/2013JD020931.

48. Pfister, G. G., S. Walters, J.-F. Lamarque, J. Fast, **M. C. Barth**, J. Wong, J. Done, G. Holland, C. Bruyere, 2014: Prediction of Future Summertime Ozone over the U.S., *J. Geophys. Res.*, **119***,* doi:10.1002/2013JD020932*.*

49. Kumar, R., **M. C. Barth**, S. Madronich, M. Naja, G. R. Carmichael, G. G. Pfister, C. Knote, G. P. Brasseur, N. Ojha, and T. Sarangi, 2014: Effects of dust aerosols on tropospheric chemistry during a typical pre-monsoon season dust storm in northern India, *Atmos. Chem. Phys.,* **14**, 6813-6834, doi:10.5194/acp-14-6813-2014.

50. Ortega, J., A. Turnipseed, A. B. Guenther, T. G. Karl, D. A. Day, D. Gochis, J. A. Huffman, A. J. Prenni, E. J. T. Levin, S. M. Kreidenweis, P. J. DeMott, Y. Tobo, E. G. Patton, A. Hodzic, Y. Cui, P. C. Harley, R. H. Hornbrook, E. C. Apel, R. K. Monson, A. S. D. Eller, J. P. Greenberg, **M. Barth**, P. Campuzano-Jost, B. B. Palm, J. L. Jimenez, A. C. Aiken, M. K. Dubey, C. Geron, J. Offenberg, M. G. Ryan, P. J. Fornwalt, S. C. Pryor, F. N. Keutsch, J. P. DiGangi, A. W. H. Chan, A. H. Goldstein, G. M. Wolfe, S. Kim, L. Kaser, R. Schnitzhofer, A. Hansel, C. A. Cantrell, R. L. Mauldin III, and J. N. Smith, 2014: Overview of the Manitou Experimental Forest Observatory: site description and selected science results from 2008–2013, *Atmos. Chem. Phys.,* **14**, 6345-6367, doi:10.5194/acp-14-6345-2014.

51. Eidhammer, T., **M. C. Barth**, M. D. Petters, C. Wiedinmyer, A. J. Prenni, 2014: Aerosol impact on summertime convective precipitation in the Rocky Mountain region, *J. Geophys. Res*., **119**, 11,709-11,728, doi:10.1002/2014JD021883.

52. Pan, L. L., C. R. Homeyer, S. Honomichl, B. A. Ridley, M. Weisman, **M. C. Barth**, J. W. Hair, M. A. Fenn, C. Butler, G. S. Diskin, J. H. Crawford, T. B. Ryerson, I. Pollack, J. Peischl, and H. Huntrieser, 2014: Thunderstorms Enhance Tropospheric Ozone by Wrapping and Shedding Stratospheric Air, *Geophys. Res. Lett.*, **41**, 7785– 7790, doi:10.1002/2014GL061921.

53. Amnuaylojaroen, T., **M. C. Barth**, L. K. Emmons, G. R. Carmichael, J. Kreasuwun, S. Prasitwattanaseree, and S. Chantara, 2014: Effect of different emission inventories on modeled ozone and carbon monoxide in Southeast Asia, *Atmos. Chem. Phys.*, **14**, 12,983-13,012, doi:10.5194/acp-14-12983-2014.

54. **Barth, M. C.**, C. A. Cantrell, W. H. Brune, S. A. Rutledge, J. H. Crawford, H. Huntrieser, L. D. Carey, D. MacGorman, M. Weisman, K. E. Pickering, E. Bruning, B. Anderson, E. Apel, M. Biggerstaff, T. Campos, P. Campuzano-Jost, R. Cohen, J. Crounse, D. A. Day, G. Diskin, F. Flocke, A. Fried, C. Garland, B. Heikes, S. Honomichl, R. Hornbrook, L. G. Huey, J. Jimenez, T. Lang, M. Lichtenstern, T. Mikoviny, B. Nault, D. O'Sullivan, L. Pan, J. Peischl, I. Pollack, D. Richter, D. Riemer, T. Ryerson, H. Schlager, J. St. Clair, J. Walega, P. Weibring, A. Weinheimer, P. Wennberg, A. Wisthaler, P. Wooldridge, and C. Ziegler, 2015: The Deep Convective Clouds and Chemistry (DC3) Field Campaign, *Bull. Amer. Meteor. Soc.*, **96**, 1281–1309, doi: http://dx.doi.org/10.1175/BAMS-D-13-00290.1.

55. Kumar, R., **M. C. Barth**, V. S. Nair, G. G. Pfister, S. S. Babu, S. K. Satheesh, K. Krishna Moorthy, G. R. Carmichael, 2015: Sources of black carbon aerosols in South Asia and surrounding regions during the Integrated Campaign for Aerosols, Gases and Radiation Budget, *Atmos. Chem. Phys.,* **15**, 5415-5428, doi:10.5194/acp-15-5415-2015.

56. Apel, E. C., R. S. Hornbrook, A. J. Hills, N. J. Blake, **M. C. Barth**, A. Weinheimer, C. Cantrell, S. A. Rutledge, B. Basarab, J. Crawford, G. Diskin, C. R. Homeyer, T. Campos, F. Flocke, A. Fried, D. R. Blake, W. Brune, I. Pollack, J. Peischl, T. Ryerson, P. O. Wennberg, J. D. Crounse, A. Wisthaler, T. Mikoviny, G. Huey, B. Heikes, D. O'Sullivan and D. D. Riemer, 2015: Upper tropospheric ozone production from lightning NOx-impacted convection: Smoke ingestion case study from the DC3 campaign, *J. Geophys. Res. Atmos.*, **120**, 2505– 2523, doi:10.1002/2014JD022121.

57. Kumar, R., **M. C. Barth**, G. Pfister, V. Nair, S. Ghude, N. Ojha, 2015: What controls the seasonal cycle of black carbon aerosols in India?, *J. Geophys. Res.*, **120**, 7788–7812. doi: 10.1002/2015JD023298.

58. Yang, Q., R. C. Easter, P. Campuzano-Jost, J. L. Jimenez, J. D. Fast, S. J. Ghan, H. Wang, L. K. Berg, **M. C. Barth**, Y. Liu, M. B. Shrivastava, B. Singh, H. Morrison, J. Fan, C. L. Ziegler, M. Bela, E. Apel, G. S. Diskin, T. Mikoviny and A. Wisthaler, 2015: Aerosol transport and wet scavenging in deep convective 1 clouds – a case study and model evaluation using a multiple passive tracer analysis approach, *J. Geophys. Res.*, **120**, 8448–8468, doi:10.1002/2015JD023647.

59. Sarangi, C., S. N. Tripathi, S. Tripathi, **M. C. Barth**, 2015: Simulating aerosol-cloud interactions during a typical monsoon depression over India, *J. Geophys. Res.*, **120**, doi: 10.1002/2015JD023634.

60. Corr, C. A., L. D. Ziemba, E. Scheuer, B. E. Anderson, A. J. Beyersdorf, G. Chen, E.

Crosbie, R. H. Moore, M. Shook, K. L. Thornhill, E. Winstead, R. P. Lawson, **M. C. Barth**, J. R. Schroeder, D. R. Blake, and J. E. Dibb, 2016: Observational evidence for the convective transport of dust over the central United States, *J. Geophys. Res.*, **121**, 1306–1319, doi:10.1002/2015JD023789.

61. Pollack, I. B., C. R. Homeyer, T. B. Ryerson, K. C. Aikin, J. Peischl, E. C. Apel, T. Campos, F. Flocke, R. S. Hornbrook, D. J. Knapp, D. D. Montzka, A. J. Weinheimer, D. Riemer, G. Diskin, G. Sachse, T. Mikoviny, A. Wisthaler, E. Bruning, D. MacGorman, K. A. Cummings, K. E. Pickering, H. Huntrieser, M. Lichtenstern, H. Schlager, and **M. C. Barth**, 2016: Airborne quantification of upper tropospheric NOx production from lightning in deep convective storms over the United States Great Plains, *J. Geophys. Res.*, **121**, 2002– 2028, doi:10.1002/2015JD023941.

62. Huntrieser, H. H. M. Lichtenstern, M. Scheibe, H. Aufmhoff, H. Schlager, T. Pucik, A. Minikin, B. Weinzierl, K. Heimerl, D. Fütterer, B. Rappenglück, L. Ackermann, K. E. Pickering, K. A. Cummings, M. I. Biggerstaff, D. P. Betten, S. Honomichl and **M. C. Barth,** 2016: On the origin of pronounced O_3 gradients in the thunderstorm outflow region during DC3, *J. Geophys. Res.*, **121**, 6600– 6637, doi:10.1002/2015JD024279.

63. Bela, M., **M. C. Barth**, O. B. Toon, A. Fried, C. R. Homeyer, H. Morrison, K. A. Cummings, Y. Li, K. E. Pickering, D. Allen, Q. Yang, P. O. Wennberg, J. D. Crounse, J. M. St. Clair, A. P. Teng, D. O'Sullivan, L. G. Huey, D. Chen, X. Liu, D. Blake, N. Blake, E. Apel, R. S. Hornbrock, F. Flocke, T. Campos, G. Diskin, 2016: Wet Scavenging of Soluble Species in DC3 Deep Convective Storms Using Aircraft Observations and WRF-Chem Simulations, *J. Geophys. Res.*, 121, 4233– 4257, doi:10.1002/2015JD024623.

64. Huntrieser, H. H. M. Lichtenstern, M. Scheibe, H. Aufmhoff, H. Schlager, T. Pucik, A. Minikin, B. Weinzierl, K. Heimerl, I. B. Pollack, J. Peischl, T. B. Ryerson, A. J. Weinheimer, S. Honomichl, B. A. Ridley, M. I. Biggerstaff, D. P. Betten, J. W. Hair, C. F. Butler, M. J. Schwartz and **M. C. Barth,** 2016: Injection of lightning-produced NOx, water vapor, wildfire emissions, and stratospheric air to the UT/LS as observed from DC3 measurements, *J. Geophys. Res.*, 121, 6638– 6668, doi:10.1002/2015JD024273.

65. **Barth, M. C.**, M. M. Bela, A. Fried, P. Wennberg, J. Crounse, J. St. Clair, N. Blake, D. R. Blake, C. R. Homeyer, W. H. Brune, L. Zhang, J. Mao, X. Ren, T. Ryerson, I. B. Pollack, J. Peischl, R. C. Cohen, B. A. Nault, L. G. Huey, X. Liu, and C. A. Cantrell, 2016: Convective Transport and Scavenging of Peroxides by Thunderstorms Observed over the Central U.S. during DC3, *J. Geophys. Res.*, 121, 4272– 4295, doi:10.1002/2015JD024570.

66. Ghude, S. D., D. M. Chate, C. Jena, G. Beig, R. Kumar, **M. C. Barth**, G. G. Pfister, and P. Rao, 2015: Premature mortality in India due to PM2.5 and ozone exposure, *Geophys. Res. Lett.*, 43, doi:10.1002/2016GL068949.

67. Fried, A., **M. C. Barth**, M. Bela, P. Weibring, D. Richter, J. Walega, Y. Li, K. Pickering, E. Apel, R. Hornbrook, A. Hills, D. D. Riemer, N. Blake, D. R. Blake, J. R. Schroeder, Z. J. Luo, J. H. Crawford, J. Olson, S. Rutledge, D. Betten, M. I. Biggerstaff, G. S. Diskin, G. Sachse, T. Campos, F. Flocke, A. Weinheimer, C. Cantrell, I. Pollack, J. Peischl, K. Froyd, A. Wisthaler, T. Mikoviny, and S. Woods, 2016: Convective Transport of formaldehyde to the upper troposphere and lower stratosphere and associated scavenging in thunderstorms over the Central United States during the 2012 DC3 study, *J. Geophys. Res.*, 120, 7430–7460, doi: 10.1002/2015JD024477.

68. Kim, S.-W., **M. C. Barth**, M. Trainer, 2016: Impact of turbulent mixing on isoprene chemistry, *Geophys. Res. Lett.*, 43, 7701–7708, doi:10.1002/2016GL069752.

69. Li, Yang, **M. C. Barth**, G. Chen, E. G. Patton, S-W Kim, A. Wisthaler, T. Mikoviny, A. Fried, R. Clark, A. L. Steiner, 2016: Large-eddy simulation of biogenic VOC chemistry during the DISCOVER-AQ 2011 campaign, *J. Geophys. Res.*, 121, 8083–8105, doi:10.1002/2016JD024942.

70. Sorooshian, A., Taylor Shingler, Ewan Crosbie, **Mary Barth**, Cameron Homeyer, Pedro Campuzano-Jost, Doug A. Day, Jose Jimenez, Kenneth Thornhill, Luke Ziemba, Donald Blake, Alan Fried, 2017: Contrasting aerosol optical and hygroscopic properties in the inflow and outflow of deep convective storms: Analysis of airborne data from DC3, *J. Geophys. Res.*, 122, 4565– 4577, doi:10.1002/2017JD026638.

71. Carlton, A. M., **M. C. Barth**, S. M. Lance, 2017: Designing mountaintop cloud experiments, *Eos*, 98, https://doi.org/10.1029/2017EO072373.

72. Lance, S. M., **M. C. Barth**, A. M. Carlton, 2017: Multiphase chemistry: Experimental design for coordinated measurement and modeling of cloud processing at a mountaintop, *Bull. Meteor. Soc.*, 98, ES163-ES167, doi:10.1175/bams-d-17-0015.1.

73. Li, Yunyao, K. E. Pickering, D. J. Allen, **M. C. Barth**, M. M. Bela, K. A. Cummings, L. D. Carey, R. M. Mecikalski, A. O. Fierro, T. L. Campos, A. J. Weinheimer, G. S. Diskin, M. I. Biggerstaff, 2017: Evaluation of deep convective transport in storms from different convective regimes during the DC3 field campaign using WRF-Chem with lightning data assimilation, *J. Geophys. Res.*, 122, 7140– 7163, doi:10.1002/2017JD026461.

74. Phoenix, D., C. Homeyer, and **M. C. Barth**, 2017: Sensitivity of simulated convection-driven stratosphere-troposphere exchange in WRF-Chem to the choice of physical and chemical parameterization, *Earth and Space Science*, 4, doi:10.1002/2017EA000287.

75. Li, Yang, **M. C. Barth**, E. G. Patton, A. L. Steiner, 2017: Impact of in-cloud aqueous processes on the chemistry and transport of biogenic volatile organic compounds, *J. Geophys. Res.,* 122, 11,131–11,153, doi:10.1002/2017JD026688.

76. Pfister, G. G., P. Reddy, **M. C. Barth**, F. F. Flocke, A. Fried, S. C. Herndon, B. C. Sive, J. T. Sullivan, A. M. Thompson, T. I. Yacovitch, A. J. Weinheimer, A. Wisthaler, 2017: Using observations and source specific model tracers to characterize pollutant transport during FRAPPÉ and DISCOVER-AQ, *J. Geophys. Res.*, 122, doi: 10.1002/2017JD027257.

77. Kumar, R., **M. C. Barth**, G. G. Pfister, L. Delle Monache, J. F. Lamarque, S. Archer-Nicholls, S. Tilmes, S. D. Ghude, C. Wiedinmyer, M. Naja and S. Walters, 2018: How will air quality change in South Asia by 2050?, *J. Geophys. Res.*, 123, 1840-1864, doi: 10.1002 /2017JD027357.

78. Amnuaylojaroen, T., **M. C. Barth**, G. Pfister, and C. Bruyere, 2018: Simulations of Emissions, Air Quality, and Climate Contribution in Southeast Asia for March and December. In: Vadrevu K., Ohara T., Justice C. (eds) *Land-Atmospheric Research Applications in South and Southeast Asia*. Springer Remote Sensing/Photogrammetry. Springer, Cham, doi.org/10.1007/978-3-319-67474-2_12.

79. Bela, M. M., **M. C. Barth**, O. B. Toon, A. Fried, C. Ziegler, K. A. Cummings, Y. Li, K. E. Pickering, C. R. Homeyer, H. Morrison, Q. Yang, R. M. Mecikalski, L. Carey, M. I. Biggerstaff, D. P. Betten, A. A. Alford, 2018: Effects of scavenging, entrainment, and aqueous chemistry on peroxides and formaldehyde in deep convective outflow over the central and Southeast U.S., *J. Geophys. Res.*, **123**, 7594– 7614, doi: 10.1029/2018JD028271.

80. Geerts, B., D. J. Raymond, V. Grubisic, C. A. Davis, **M. C. Barth**, A. Detwiler, P. M. Klein, W-C Lee, P. M. Markowski, G. L. Mullendore, and J. A. Moore, 2018: Recommendations for in situ and remote sensing capabilities in convective and turbulent environments, An Essay accepted by *Bull. Amer. Meteor. Soc.*, https://doi.org/10.1175/BAMS-D-17-0310.1.

81. Li, Y., K. E. Pickering, **M. C. Barth**, M. M. Bela, K. A. Cummings, and D. Allen, 2018: Evaluation of parameterized convective transport of trace gases in simulation of storms observed during the DC3 field campaign, *J. Geophys. Res.*, 123, 11,238–11,261, doi:10.1029/2018JD028779.

82. Li, Yang, **M. C. Barth**, A. L. Steiner, 2019: Comparing turbulent mixing of atmospheric oxidants across model scales, *Atmos. Environ.*, 199, 88-101.

83. Li, Yunyao, K. E. Pickering, **M. C. Barth**, M. M. Bela, K. A. Cummings, and D. J. Allen, 2019: Wet Scavenging in WRF-Chem Simulations of Parameterized Convection for a Severe Storm during the DC3 Field Campaign. *J. Geophys. Res.*, 124, 7413– 7428, doi:10.1029/2019JD030484.

84. **Barth, M. C.**, S. A. Rutledge, W. H. Brune, and C. A. Cantrell, 2019: Introduction to the Deep Convective Clouds and Chemistry (DC3) 2012 Studies. *J. Geophys. Res.*, 124, 8095-8103, doi:10.1029/2019JD030944.

85. Preston, A., H. Fuelberg, and **M. Barth**, 2019: Simulation of Chemical Transport by Typhoon Mireille (1991), *J. Geophys. Res.*. 124, 11614– 11639, doi:10.1029/2019JD030446.

86. Pfister, G., C-T Wang, **M. Barth**, F. Flocke, W. Vizuete, and S. Walters, 2019: Chemical Characteristics and Ozone Production in the Northern Colorado Front Range, *J. Geophys. Res.*, 124, doi:10.1029/2019JD030544.

87. Wu, X., Y. Xu, R. Kumar, and **M. Barth**, 2019: Separating Emission and Meteorological Drivers of mid-21st Century Air Quality Changes in India Based on Multi-year Global-regional Chemistry-Climate Simulations, *J. Geophys. Res.*, 124, doi:10.1029/2019JD030988.

88. Xu, Y., X. Wu, R. Kumar, **M. Barth**, C. Diao, M. Gao, L. Lin, B. Jones, and G. Meehl, 2019: Substantial increase in the joint occurrence and human exposure of Heatwave and High-PM Hazards (HHH) over South Asia in the mid-21st century, accepted by *AGU Advances*.

6.3 Book Chapters

1. Kreidenweis, S., G. Tyndall, **M. Barth**, F. Dentener, J. Lelieveld, and M. Mozurkewich, Chapter 4: Aerosols and Clouds, in **Atmospheric Chemistry and Global Change**, eds. Brasseur, G. P., J. J. Orlando, and G. S Tyndall, 133-179, 1999.

2. Kumar, R., **M. C. Barth,** L. Delle Monache, S Ghude, G. Pfister, M. Naja, G. Brasseur, (2017) An Overview of Air Quality Modeling Activities in South Asia. 27-47. 10.1007/978-3-319-59489-7_2.

6.4 Journal Articles Submitted

1. Fowler, L. D., **M. C. Barth**, K. Alapaty, 2019: Impact of scale-aware deep convection on the cloud liquid and ice water paths and precipitation using the Model for Prediction Across Scales (MPAS-v5.2), submitted to *Geosci. Model Dev.*.

2. Pye, H. O. T., Nenes, A., Alexander, B., Ault, A. P., **Barth, M. C**., Clegg, S. L., Collett Jr., J. L., Fahey, K. M., Hennigan, C. J., Herrmann, H., Kanakidou, M., Kelly, J. T., Ku, I.-T., McNeill, V. F., Riemer, N., Schaefer, T., Shi, G., Tilgner, A., Walker, J. T., Wang, T., Weber, R., Xing, J., Zaveri, R. A., and Zuend, A. 2019: The Acidity of Atmospheric Particles and Clouds, Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2019-889, submitted to *Atmos. Chem. Phys.*.

3. Schwantes, R. H., Emmons, L. K., Orlando, J. J., **Barth, M. C.**, Tyndall, G. S., Hall, S. R., Ullmann, K., St. Clair, J. M., Blake, D. R., Wisthaler, A., and Bui, T. V., 2019: Comprehensive isoprene and terpene chemistry improves simulated surface ozone in the southeastern U.S., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2019-902, submitted to *Atmos. Chem. Phys.*.

4. Choudhury, B. A., M., Konwar, A. Hazra, G. M. Mohan, P. Pithani, S. D. Ghude, A. Deshmukhya, and **M. C. Barth**, 2019: A diagnostic study of cloud physics and lightning flash rates in a severe pre-monsoon thunderstorm over North East India, submitted to *QJRMS.*.

5. Greeshma M. Mohan, Gayatri Vani K, Anupam Hazra, Hemantkumar S. Chaudhari, Samir Pokhrel, S. D. Pawar, Mahen Konwar, Subodh K. Saha, Chandrima Mallick, Subrata K. Das, Sachin Deshpande, Sachin Ghude, **M. C. Barth**, Suryachandra A. Rao, Ravi. S. Nanjundiah and M. Rajeevan, 2019: Towards better simulation of lightning flashes over Maharashtra, India: A cloud-resolving model study with multiple lightning parameterizations, submitted to *J. Geophys. Res.*.

6. G. C. Cuchiara, A. Fried, **M. C. Barth**, M. Bela, C. R. Homeyer, B. Gaubert, J. Walega, P. Weibring, D. Richter, P. Wennberg, J. Crounse, M. Kim, G. Diskin, T. M. Hanisco, A. Beyersdorf, J. Peischl, I. B. Pollack, J. M. St. Clair, G. M. Wolfe, S. Woods, S. Tanelli, T. P. Bui, J. Dean-Day, and G. Huey, 2019: Vertical Transport, Entrainment, and Scavenging Processes Affecting Trace Gases in a Modeled and Observed SEAC4RS Case Study, submitted to *J. Geophys. Res.*.

7. D. Phoenix, C. Homeyer, **M. Barth**, S. Trier, 2019: Mechanisms responsible for stratosphere-to-troposphere transport around a mesoscale convective system anvil, submitted to *J. Geophys. Res.*.

8. Lance, S. M., J. Zhang, J. Schwab, P. Casson, R. Brandt, D. Fitzjarrald, M. Schwab, S. Lu, S.-P. Chen, J. Yun, J. Freedman, B. Shrestha, Q. Min, M. Beauharnois, B. Crandall, E. Joseph, M. Brewer, J. Minder, D. Orlowski, A. Christiansen, A. Carlton, and **M. Barth**, Overview of the CPOC Pilot Study at Whiteface Mountain, NY: Cloud Processing of Organics within Clouds, submitted to *Bull. Amer. Meteor. Soc.*

9. Mishra, A. K., B. Sinha, R. Kumar, **M. Barth**, H. Hakkim, V. Kumar, A. Kumar, S. Datta, A. Guenther, V. Sinha, Trees in croplands are key to air quality, hydrology, and energy fluxes, submitted to *Science*.

10. Pfister, G. G., S. Eastham, **M. Barth**, L. Emmons, D. Jacob, D. Marsh, A. Arellano, B. Aumont, K. Barsanti, A. Conley, N. Davis, J. Fast, A. Fiore, B. Gaubert, St. Goldhaber, C. Granier, G. Grell, M. Guevara, D. Henze, A. Hodzic, X. Liu, J. Orlando, J. Plane, L. Polvani, K. Rosenlof, A. Steiner, and G. Brasseur, A MUlti-Scale Infrastructure for Chemistry and Aerosols – MUSICA, submitted to *Bull. Amer. Meteor. Soc.*

7. INVITED TALKS:

49 invited talks, including 13 seminars at universities and research institutes

1. September 1998: Clouds and Chemistry, Chemistry and Clouds, ASP/NCAR
2. February 2001: Large Eddy Simulations of Isoprene Chemistry in the Convective Boundary Layer, NOAA Aeronomy Laboratory seminar
3. July 2002: The Relative Importance of Aqueous Chemistry to the Global Sulfur Cycle, ASP Summer Colloquium/NCAR
4. July 2002: How Aqueous Chemistry Affects Sulfate Aerosols, ASP Summer Colloquium/NCAR
5. August 2002: Effect of Cloud Chemistry on Boundary Layer Chemistry, Telluride Atmospheric Chemistry Workshop
6. November 2002: Relative Importance of Cloud Chemistry in Deep Convection, University of Wyoming, Dept. of Atmospheric Sciences seminar
7. February 2003: Cloud Processing: What are the links with climate and how well are we modeling them?, Chemistry Climate Interactions Workshop, Santa Fe, NM
8. December 2004: Simulating the Redistribution of Formaldehyde in Deep Convection Using the Weather Research Forecast Model Coupled with Aqueous Chemistry, AGU Fall Meeting, San Francisco, CA
9. February 2006: Cloud Chemistry Simulations of a Thunderstorm, Harvard University, Atmospheric Sciences Seminar
10. March 2006: Cloud Chemistry Simulations of a Thunderstorm, University of South Florida, Environmental Research Interdisciplinary Colloquium
11. October 2006: Convective-Scale Cloud Chemistry Simulations of a Thunderstorm, Colorado State University, Atmospheric Sciences Colloquium
12. October 2006: Convective-Scale Cloud Chemistry Simulations of a Thunderstorm, NOAA/ESRL, Chemical Sciences Division Seminar
13. December 2006: Processing of Chemical Constituents by Deep Convection, AGU Fall Meeting, San Francisco, CA
14. October 2007: Relevance of and challenges in the representation of surface and boundary layer processes in mesoscale chemistry transport models, Expert Workshop on the Relevance of Surface and Boundary Layer Processes for the Exchanges of Reactive- and Greenhouse Gases, Wageningen, Netherlands
15. January 2008: Advances in Cloud Chemistry, Peter V. Hobbs Symposium, AMS annual meeting, New Orleans, Louisiana
16. July 2008: Effect of Deep Convection on Chemical Species Transport in the Central US, International Conference on Clouds and Precipitation, Cancun, Mexico
17. October 2008: Thunderstorms and Chemistry: Cloud-scale simulations to understand the influence of convective outflows on the upper troposphere composition, University of North Dakota, Atmospheric Sciences Seminar
18. January 2009: Deep Convective Clouds and Chemistry (DC3): Description of the proposed field campaign and modeling of lightning NOx in the DC3 study areas, American Meteorological Society annual meeting, Phoenix, Arizona

19. August 2009: Introduction: Biogenic Emissions to the Atmosphere, Gordon Research Conference, Waterville, New Hampshire [introductory talk]
20. August 2010: Atmospheric Chemistry Modeling at High Resolution, ASP Colloquium Lecture, Boulder, Colorado
21. August 2010: Atmospheric Chemistry Modeling at High Resolution, Third International Workshop on Next-Generation Numerical Weather Prediction Models, Jeju Island, Korea
22. October 2010: Thunderstorms and Chemistry: Examining the regional-scale effects on the upper troposphere and precipitation, JPL seminar, Pasadena, California
23. July 2011: Career Path doing Research on Clouds and Chemistry, Atmospheric Science Collaborations and Enriching Networks (ASCENT) talk, Steamboat Springs, Colorado
24. December 2012: Overview of the Deep Convective Clouds and Chemistry Field Experiment, AGU Fall Meeting, San Francisco, California
25. January 2013: Thunderstorms and Atmospheric Chemistry, AMS 12th Annual Student Conference, Austin, Texas
26. January 2013: Overview of the Deep Convective Clouds and Chemistry Field Experiment, AMS 6th Conference on the Meteorological Applications of Lightning Data, Austin, Texas
27. June 2013: Overview of recent advances in understanding the chemical and physical processes associated with thunderstorms, Workshop on Atmospheric Composition and the Asian Summer Monsoon (ACAM), Kathmandu, Nepal
28. January 2014: Thunderstorms and Chemistry – Overview of the DC3 Field Project with a Focus on Scavenging of Soluble Trace Gases, NOAA/ESRL/CSD seminar, Boulder, Colorado
29. August 2014: Evaluation of Regional-Scale Convective Simulations with Airborne Observations from the DC3 Campaign, Atmospheric Composition and Convection Workshop, Pasadena, California.
30. December 2014: Understanding and Prediction of Convective Transport, Scavenging, and Lightning-Produced Nitrogen Oxides Based on DC3 Thunderstorm Cases, AGU Fall Meeting, San Francisco, California.
31. April 2015: Effects of Thunderstorms on Tropospheric Trace Gas Chemistry, Colorado State University Atmospheric Sciences Seminar, Fort Collins, Colorado.
32. August 2015: Thunderstorm Processing of Hydrogen Peroxide and Methyl Hydrogen Peroxide, University of Colorado, Mechanical Engineering Department Seminar, Boulder, Colorado.
33. June 2016: Role of Thunderstorms on Upper Troposphere Ozone – What We Have Learned from DC3, Laboratorie d'Aerologie Seminar, CNRS, Toulouse, France.
34. December 2016: Role of Thunderstorms on Upper Troposphere Ozone – What We Have Learned from DC3, Invited talk at the AGU Fall Meeting, San Francisco, California.
35. January 2017: Role of Thunderstorms on Upper Troposphere Ozone – What We Have Learned from DC3, Invited talk at the 19th Conference on Atmospheric Chemistry, Seattle, Washington.

36. January 2017: Modeling and Analysis of Aerosol-Cloud Interactions in a Severe Convection Case with an Elevated Smoke Plume, Invited talk at the Ninth Symposium on Aerosol-Cloud-Climate Interactions, Seattle, Washington.

37. February 2017: Role of Thunderstorms on Upper Troposphere Ozone – What We Have Learned from DC3, Department of Atmospheric Sciences Seminar, Texas A&M University, College Station, Texas.

38. April 2017: Thunderstorms and Atmospheric Composition: A Meeting of Cloud Physics, Dynamics, Lightning, and Chemistry, Department of Climate and Space Sciences and Engineering Seminar, University of Michigan, Ann Arbor, Michigan.

39. October 2017: Thunderstorms and Atmospheric Composition: A Meeting of Cloud Physics, Dynamics, Lightning, and Chemistry, Department of Atmospheric Science, University of Alabama, Huntsville, Alabama.

40. October 2017: A Community Effort for Furthering Cloud Chemistry Studies, 36th American Association for Aerosol Research Annual Conference, Raleigh, North Carolina.

41. February 2019: Modeling Tropospheric Chemistry, Aerosol Modeling Workshop, Kantary Hills Hotel, Chiang Mai, Thailand, (2019)

42. February 2019: Aerosol Interactions with Radiation and Clouds, Aerosol Modeling Workshop, Kantary Hills Hotel, Chiang Mai, Thailand, (2019)

43. February 2019: Examples of Research and Operational Air Quality Models, Aerosol Modeling Workshop, Kantary Hills Hotel, Chiang Mai, Thailand, (2019)

44. February 2019: Global vs. Regional Chemistry-Climate modeling, Aerosol Modeling Workshop, Kantary Hills Hotel, Chiang Mai, Thailand, (2019)

45. March 2019: Modeling Tropospheric Chemistry and Future Modeling of Air Quality at NCAR/ACOM, International Workshop on Chemistry Climate Interaction [IWCCI], Pune, India, (2019)

46. May 2019: MUSICA & MICM, Progress and Plans, MUSICA Kickoff Meeting, Boulder, Colorado, United States of America, (2019)

47. July 2019: Introducing MUSICA: A New Modeling Infrastructure for Simulation of Chemical Weather and Chemical Climate, IUGG General Assembly, Montreal, Canada.

48. September 2019: Atmospheric Acidity and the Role of Clouds on Air Quality, MAC MAQ Conference, Davis, California.

49. September 2019: Cloud & Chemistry Processes Affecting Atmospheric Composition, Atmospheric & Environmental Chemistry Seminar, Harvard University, Cambridge, Massachusetts.