Steven S. Brown | Curriculum Vitae

NOAA Chemical Sciences Laboratory
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Education

Ph.D., University of Wisconsin, Madison, WI, 1996; Advisor: F. Fleming Crim
B.A., Dartmouth College, Hanover, NH, 1989; Summa Cum Laude, Phi Beta Kappa

Professional Experience

September 2019-present: Leader, Tropospheric Chemistry Program, NOAA Chemical Sciences Laboratory
October 2005-present: Federal Research Chemist, NOAA Chemical Sciences Laboratory
June 2014-present: Adjoint Professor of Chemistry, University of Colorado
October 2000-September 2005: Research Scientist, NOAA Aeronomy Laboratory, and Cooperative Institute for Research in the Environmental Sciences, University of Colorado
October 1997-September 2000: National Research Council Senior Research Fellow with Dr. A. R. Ravishankara, NOAA Aeronomy Laboratory

Honors and Awards

NOAA Bronze Medal Award (Highest level granted by the Undersecretary for Oceans and Atmospheres), 2020, 2018
NOAA Office of Atmospheric Research, Best Scientific Paper Award, 2017
Harold I. Schiff Lecture, York University, Toronto, Ontario, 2015
Colorado Governor's Award for High Impact Research, 2014
McElvain Lecture, University of Wisconsin, 2013
CIRES Outstanding Performance Award, University of Colorado, 2003
Presidential Early Career Award for Scientists and Engineers, White House Office of Science and Technology Policy, 2002
National Research Council Post-Doctoral Fellowship, 1997-2000
Proctor & Gamble Fellowship, University of Wisconsin, 1994 – 1995
National Science Foundation Predoctoral Fellowship, 1991-1994
University of Wisconsin University Fellowship, 1990-1991
Samuel M. McElvain Fellowship, University of Wisconsin, 1990
Elden Bennett Hartshorn Medal & AIC Award, Dartmouth College, 1989

Professional Affiliations

American Geophysical Union (AGU)
European Geophysical Union (EGU)
Royal Society of Chemistry (RSC)
American Chemical Society (ACS)
American Association for the Advancement of Science (AAAS)

Field Study Principal Investigator or Lead Scientist

Principal Investigator, NOAA Twin Otter Aircraft Deployment, "NOAA-NASA FIREX-AQ", Boise, Idaho, July – September 2019

Lead Scientist, "Utah Winter Fine Particulate Study," NOAA Twin Otter aircraft study in Salt Lake City, Utah, January-February 2017

Co-Principal Investigator (with Joel Thornton, University of Washington), "Wintertime Investigation of Emissions, Transport and Reactivity (WINTER)," NSF C-130 Aircraft, Langley, Virginia, February – March 2015

Lead Scientist, "Nitrogen Oxides, Aerosols and Halogens on a Tall Tower" (NACHTT) field campaign, Erie, CO, February – March 2011

Lead Scientist, "Activation of Continental Chloride by Reactive Oxides of Nitrogen in Midwinter (ACCRONIM)," Boulder, CO, February 2009

Conference Organization

Co-Organizer (with Randall Goldsmith, University of Wisconsin and Gerard Wysocki, Princeton University), 13th International Symposium on Cavity Enhanced Spectroscopy, Madison, WI, June 2019

Co-Chair (with Professor Sally Ng, Georgia Tech), Special Symposium on the Effect of NO_x and SO_2 on BVOC Oxidation and Organic Aerosol Formation, American Association for Aerosol Research Annual Conference, Portland, OR October 2016

Co-Chair (with Professor Frank Keutsch, Harvard University), Symposium on Spectroscopy in Atmospheric Chemistry, International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL, June 2016

Co-Chair (with Dr. Rebecca Washenfelder, NOAA), 11th International Symposium on Cavity Enhanced Spectroscopy, Boulder, CO, June 2015

Co-Chair (with Professor Sally Ng, Georgia Tech), IGAC Workshop on Nitrate Radicals and Biogenic Hydrocarbons, Atlanta, GA, June 2015

Organizing Committee, Conference on Light Energy and the Environment, Sponsored by the Optical Society of America, Canberra, Australia, December 2014

Co-Chair (with Professor Yinon Rudich, Weizmann Institute of Science, Israel), Gordon Research Conference on Atmospheric Chemistry, Mt. Snow, VT, July 2013

Organized sessions at American Meteorological Society (AMS) Meetings, including "Air Quality and Climate Impacts of Biomass Burning", January 2021; "Regional Air Quality," January 2020.

Organized sessions at American Geophysical Union (AGU) Meetings, including "Air quality during the COVID-19 pandemic, December 2020; "Air Quality in Urban Airsheds during Winter", December 2017; "Wintertime Atmospheric Chemistry," December 2015; "Air Quality in Asia", December 2014; "Tropospheric Halogens: Sources, Multiphase Chemistry and Impacts, December 2011; "Day and Night Chemical Processing in Polluted Atmospheres," December 2007.

Organized symposia at American Chemical Society (ACS) Meetings, including "Chemistry of Atmospheric Nitrogen Containing Compounds," ACS National Meeting, San Francisco, CA, August 2014; "Atmospheric Chemistry and Climate," ACS National Meeting, Boston, MA, August 2010.

Committee and Editorial Service

Editor, Atmospheric Chemistry and Physics, September 2013 – present
Journal reviewer within the last 5 years for Atmospheric Chemistry and Physics, Atmospheric Environment, Atmospheric Measurement Techniques, Analytical Chemistry, Elementa, Environmental Chemistry, Environmental Science & Technology, International Journal of Chemical Kinetics, Journal of Geophysical Research, Geophysical Research Letters, Journal of Physical Chemistry, Physical Chemistry Chemical Physics, Nature, Proceedings of the National Academy of Sciences, Reviews of Scientific Instruments, Science, Science of the Total Environment
Proposal Reviewer within the last 5 years for the Department of Energy (DOE), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), National Oceanic and Atmospheric Administration (NOAA), Research Corporation, University of California, Berkeley, Deutsche Forschungsgemeinschaft (DFG – German Research Foundation), EUOROCHAMP, Natural Environment Research Council (NERC, Great Britain)
Service on NSF & NASA review panels 2020, 2013, 2010, 2008

Community Service & Outreach Activities

University of Colorado "Wizards" Public Lecture for Elementary Age Children, "The Chemistry of the Atmosphere," December 2014, 2016, 2018
Science Fair Judge, Peak to Peak High School, 2008, 2009, 2010
Colorado Regional Science Fair Judge, 2019

Senior Scientists, Post-Doctoral Fellows, Students and Sabbatical Visitors

Senior research scientists and engineers
Caroline Womack (CIRES Research Scientist at NOAA)

Current post-doctoral fellows and graduate students
Michael Robinson (1st year graduate student, University of Colorado, Department of Chemistry)
Zach Decker (5th year graduate student, University of Colorado, Department of Chemistry)

Previous Students and Post-Doctoral Fellows & Current Positions
Mattias Aldener (Scientist, FOI, Stockholm, Sweeden)
Hans D. Osthoff (Professor, University of Calgary, Calgary, Canada)
Jonathan E. Flad (Professor, Ohio State University ATI, Wooster, Ohio, USA)
Hendrik Fuchs (Research Scientist, Forschungszentrum Jülich, Germany)
Roberto Sommariva (University of Leeds, UK)
Nicholas L. Wagner (Research Scientist, CIRES & NOAA CSL)
Cora J. Young (Associate Professor, York University, Toronto, Ontario, Canada)
Tara F. Kahan, jointly with Veronica Vaida (Associate Professor, University of Saskatchewan, Canada)
Peter M. Edwards (Research Scientist, University of York, UK)
Alexis R. Atwood (Droplet Measurement Technologies, Boulder, CO)
Kyung-Eun Min (Professor, Gwangju Institute of Technology, Korea)
Robert J. Wild (University of Innsbruck, Austria)

Dorothy Fibiger (California Air Resources Board, Sacramento, CA)
Kyle Zarzana (Research Scientist, University of Colorado, Boulder, CO)
Erin McDuffie (Graduate Student, currently a AAAS policy fellow, Washington D.C.)
William P. Dubé (Engineer, Currently in Auckland, NZ)
Rebecca Washenfelder (Post-doc, currently Federal Research Scientist, NOAA CSL)
Jaime Green (Graduate Student, NCA&T, currently at University of North Carolina)

Graduate Students Hosted & CU Thesis Advisors
Karl J. Feierabend (Veronica Vaida)
Daniel K. Havey (Veronica Vaida)
Ryan Thalman (Rainer Volkamer)
Kyle Zarzana (Maggie Tolbert)
Jessica Axson (Veronica Vaida)

Undergraduate Students Fellows and Home Institution
Maya R. Nunley, NOAA EPP Fellow from Clark Atlanta University, 2005
Thomal Langel, NOAA Hollings Fellow from the University of Wisconsin, 2010
Taylor Brownlee, NOAA Hollings Fellow from the University of Arizona, 2011
Reed Wommack, NOAA Hollings Fellow from Dartmouth College, 2013
Brigitte Rooney, NOAA Hollings Fellow from the University of Colorado, 2014
Maurice Roots, NOAA Hollings Fellow from Hampton University, 2018
Wyndom Chace, NOAA Hollings Fellow from Williams College, 2020

Sabbatical Visitors
Professor Juliane L. Fry, Reed College, Portland Oregon, 2011-2012
Professor Robert McLaren, York University, Toronto, Ontario, 2011-2012

Academic Courses

University of Colorado, Chemistry 4511, Physical Chemistry I
Spring 2016, 2018
University of Colorado, Chemistry 5161, Graduate Analytical Spectroscopy
Spring 2020, Fall 2020

Analytical Instrument Development

Cavity Ring Down Spectroscopy for NO_3 and N_2O_5
First *in-situ* detector for nighttime nitrogen oxides and one of the first applications of CRDS in atmospheric sensing. Instrument(s) have flown on 5 aircraft campaigns.
N. L. Wagner *et al.*, *Atmos. Meas. Tech.* **4**, 1227 (2011)
W. P. Dubé *et al.*, *Rev. Sci. Instr.* **77**, 034101 (2006)
S. S. Brown, *et al*. *Rev. Sci. Instr.* **73**, 3291 (2002)

Cavity Ring Down Spectroscopic Measurements of NO_2, NO, O_3 and NO_y
High sensitivity measurement for NO_2, and first demonstration of conversions to NO, O_3 and total reactive nitrogen (NO_y). Flown on 3 aircraft campaigns.
R. J. Wild *et al.*, *Environ. Sci. Technol.* **48**, 9609 (2014).

R. A. Washenfelder *et al*., *Environ. Sci. Technol.* **45**, 2938 (2011).
H. Fuchs *et al.*, *Environ. Sci. Technol.* **43**, 7831 (2009).

Broadband Cavity Enhanced Spectroscopy for UV-VIS absorbing gases
Optical cavities, light emitting diodes (LED) and grating spectrometers / CCD detectors with applications to all structured UV-VIS absorbers.
R. A. Washenfelder *et al.*, *Atmos. Meas. Tech.* **9**, 41 (2016).
K. E. Min *et al.*, *Atmos. Meas. Tech.* **9**, 423 (2016).
R. A. Washenfelder, *et al*., *Atmos. Chem. Phys.* **8**, 7779 (2008).

Aerosol Optical Properties
Broadband CES and single wavelength CRDS instruments for aerosol extinction, with spectrally resolved, high sensitivity UV aerosol extinction.
A. R. Attwood *et al.*, *Geophysical Research Letters* **41**, 7701 (2014).
R. A. Washenfelder, *et al*. *Atmos. Meas. Tech.* **6**, 861 (2013).
T. Baynard *et al.*, *Aerosol Science and Technology* **41**, 447 (Apr, 2007).

Patents

U.S. Patent Number 9804138, Measurement of Total Reactive Nitrogen NO_y, Together with NO_2, NO, and O_3, via Cavity Ring-Down Spectroscopy

External Collaborators and Research Projects

Yinon Rudich, Weizmann Institute, Israel
U.S. Israel Binational Science Foundation Grant to investigate sources of brown carbon aerosol and new instrumentation for aerosol optical properties
Joel Thornton, University of Washington, Seattle Washington
WINTER (Wintertime Investigation of Transport, Emissions and Reactivity), project co-PI supported through multi investigator NSF grant
Kelley Barsanti, UCR, Riverside, California
Nighttime chemistry of biomass burning emissions
NOAA Atmospheric Chemistry and Climate Cycle Program
Kyung-Eun Min, Gwangju Institute of Science and Technology (GIST), Korea
Nighttime Chemistry from the Seoul Tower
Peter Edwards, University of York, UK
Collaborative proposal for new instrumentation to investigate global halogen cycles through ERC program
Hendrik Fuchs, Forschungszentrum Jülich, Germany
International collaboration for studies at SAPHIR environmental chamber
Keding Lu, Peeking University, China
Developing white paper for studies of nighttime chemistry in the context of major field campaigns in China
Tao Wang, Hong Kong Polytechnic University, China
Field studies of nighttime chemical processes in Hong Kong, China
Wahid Mellouki, CNRS, Orleans, France
Laboratory and field studies of nitrate radicals
Veronica Vaida, University of Colorado, Boulder, CO

Development of spectroscopic instrumentation and laboratory studies of atmospheric spectroscopy supported by CIRES innovative research proposal

Julianne Fry, Reed College, Portland, Oregon

José Jimenez, University of Colorado, Boulder, CO

Laboratory and field studies of organic aerosol and nitrate supported through NOAA NOAA Atmospheric Chemistry and Climate Cycle program

Andy Ruth, University College Cork, Ireland & Andreas Zahn, Karlsruhe Institute of Technology, Germany

Development of new instrument for measurement of N_2O_5 in the upper troposphere from CARIBIC supported by grant from the Irish National Science Foundation

Nga Lee Ng, Georgia Institute of Technology, Atlanta, GA

Organized symposia on nitrate radicals and biogenic hydrocarbons supported by IGAC. Developing white paper for field and laboratory studies of anthropogenic-biogenic interactions

Solomon Bililign, North Carolina A&T, Greensboro, NC

Analysis of field campaign data and co-advising of Ph.D. Students

S. Brown appointed as Adjunct professor in Department of Energy and Environmental Systems to advise Ph.D. students at NC A&T

Recent and Forthcoming Presentations

"The Dark Side of Atmospheric Chemistry", Virtual Presentation to the Nachtung Society, Berlin, Germany, September 2020.

"New Insights into Urban winter Air Quality and Heterogeneous Chemistry from Recent Aircraft Campaigns," U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, January 2020.

"Nitryl Chloride in the Urban Winter: Results from Recent Aircraft Campaigns," Session on Atmospheric Chemistry of Halogens, 22nd Conference on Atmospheric Chemistry, 100th American Meteorological Society Meeting, Boston, Massachusetts, January 2020.

"Heterogeneous Atmospheric Chemistry of Nitrogen Oxides: New Insights from Recent Aircraft Campaigns," School of Chemistry Seminar Program, University College Cork, Cork, Ireland, November 2019.

"Adventures in Atmospheric Spectroscopy: Trace Gases, Aerosols, Air Pollution and Wildfires," Dartmouth College, Special Symposium in Honor of Prof. Charles Young, October 2019

"Aircraft Measurements in Polluted Winter Boundary Layers: Opportunities and Challenges for Western Mountain Basins," Air Quality Research in the Western U.S. (AQUARIUS) Workshop, University of Utah, Salt Lake City Utah, September 2019.

"Air Quality, Heterogeneous Chemistry and Odd Oxygen: New Insights into Urban Winter from Recent Aircraft Campaigns," Harvard University, Atmospheric & Environmental Chemistry Seminar, September 2019

"Applications of Cavity Enhanced Spectroscopy to Atmospheric Field Measurements and Aircraft Research," 13th International Symposium on Cavity Enhanced Spectroscopy, Madison, Wisconsin, June 2019

"Atmospheric Oxidation after Dark: The Unseen Interactions between Humans and the Biosphere," University of Wisconsin-Madison, February 2019

"First in-situ Observations of N_2O_5 and $ClNO_2$ in the Upper Atmosphere: Results from ATom," American Geophysical Union Fall Meeting, Washington, D.C., December 2018

"Odd Oxygen, Odd Nitrogen and their Role Urban Winter Atmospheric Chemistry," Analytical Chemistry Seminar, University of Wisconsin-Madison, September 2018

"Cavity Enhanced Spectroscopy of NO_2: Towards a New Standard for Atmospheric Reactive Nitrogen and Ozone," Field Laser Applications in Industry and Research, Assissi, Italy, September 2018

"Winter," Workshop on New Directions in Gas Phase Atmospheric Chemistry, Telluride, Colorado, July 2018

"Nighttime Radical Chemistry and Oxidation," Peking University, Beijing, China, June 2018

"Wintertime Reactive Nitrogen Chemistry," Alaskan Pollution and Chemical Analysis (ALPACA) Workshop, Fairbanks, Alaska, May 2018

"WINTER and UWFPS: Two Recent Aircraft Studies of Winter Air Quality," Air Quality Research Subcommittee Meeting, Washington, D.C., April 2018

"Air Quality Research in the U.S. and at the NOAA Chemical Sciences Division," Project Meeting and International Workshop for Photochemical Air Pollution in Highly Urbanized Subtropical Regions, Hong Kong Polytechnic University, Hong Kong, China, February 2018

"Aircraft Measurements in a Winter Boundary Layer," American Geophysical Union Fall Meeting, New Orleans, Louisiana, December 2017

"Nighttime Chemistry in East Asian Megacities," 5th Annual Meeting on Regional Air Quality Modeling (5-RAQMS), Guangzhou, China, November 2017

"A Tale of Two Basins: Winter Air Quality in Utah and the Western U.S.," Civil & Environmental Engineering Seminar, Washington State University, Pullman, Washington, October 2017

"Megacities, Forests and Fires: Nighttime Chemical Complexity across Different Atmospheres," Gordon Research Conference on Atmospheric Chemistry, Sunday River, Maine, August 2017

"Cavity Enhanced Spectroscopy for Atmospheric Chemistry in the Anthropocene," Faraday Discussion on Chemistry in the Anthropocene, York, UK, May 2017

"New Insights into Wintertime Atmospheric Chemistry," Analytical Chemistry Seminar, Colorado State University, Fort Collins, Colorado, March 2017

"Wintertime Atmospheric Chemistry: Understanding Sources of Oxidants and Particulate Matter," University of Utah Department of Atmospheric Sciences, Salt Lake City, Utah, November 2016

"Measurement of nitrogen oxides using cavity ring down spectroscopy," IAGOS Meeting on Atmospheric Composition, Manchester, England, October 2016

"Nocturnal oxidation of biogenic VOC: new insights from nighttime aircraft measurements," Rice University, Houston, TX, September 2016

"Nighttime Chemistry during Winter and Summer," Workshop on New Directions in Gas Phase Atmospheric Chemistry, Telluride, CO, July 2016

"The Air Quality Impacts of Western U.S. Oil and Gas Development," University of Wisconsin, Madison, July 2016

"Nitrogen Oxides in the Cold and Dark: New Directions in Winter Air Pollution," American Chemical Society Regional Meeting, Anchorage, AK, June 2016

"Nocturnal oxidation of biogenic VOC: new insights from nighttime aircraft measurements," CNRS, Orleans, France, May 2016

"The Air Quality Impacts of North American Oil and Gas Development," Weizmann Institute of Science, Rehovot, Israel, March 2016

"The impact of $ClNO_2$ on nitrogen oxides and oxidants in a global model," American Geophysical Union Meeting, San Francisco, CA, December 2015

"Nighttime aircraft measurements in polluted, biogenic-emitting regions: What have we learned?," IGAC Workshop on Nitrate Radicals and Biogenic Volatile Organic Compounds, Georgia Institute of Technology, Atlanta, Georgia, June 2015

"Constraints on Nighttime Oxidation of Biogenic Hydrocarbons from Aircraft Observations in the Southeast U.S.," Southeast Atmosphere Study Modeling Workshop, NOAA Geophysical Fluid Dynamics Laboratory, Princeton, NJ, June 2015

"The Atmospheric Chemistry of Winter," Harold I. Schiff Lecture, York University, Ontario, Canada, May 2015

"The Dark Side of Atmospheric Chemistry: A Decade of Nighttime Aircraft Measurements of NO_3 and N_2O_5," National Institute for Environmental Research, Incheon, South Korea, May 2015

Publications

Research ID: https://publons.com/researcher/I-1762-2013/

Submitted, Discussion or In Press

226. Coggon, M.M., G.I. Gkatzelis, B.C. McDonald, J.B. Gilman, R.H. Schwantes, N. Abuhassan, K.C. Aikin, m. Arend, T.A. Berkoff, S.S. Brown, T.L. Campos, R.F. Dickerson, G. Gronoff, J. Hurley, G. Isaacman-Vanwerz, A. Koss, M. Li, S. McKeen, F. Moshary, J. Peischl, V. Pospislova, X. Ren, A. Wilson, Y. Wu, M. Trainer, and C. Warneke, *Volatile chemical product emissions enhance ozone and modulate urban chemistry.* PNAS, 2021. **submitted**.
225. Vereecken, L., P. Carlsson, F. Bernard, S.S. Brown, C. Cho, N. Friedrich, H. Fuchs, J.M. Liebmann, W. Mellouki, A. Novelli, D. Reimer, R. Tillmann, L. Zhou, A. Kiendler-Scharr, and A. Wahner, *Theoretical and experimental study of peroxy and alkoxy radicals in the NO_3-initiated oxidation of isoprene.* Phys. Chem. Chem. Phys., 2020. **submitted**.
224. Wu, R., L. Vereecken, E. Tsiligiannis, S. Kang, S.R. Albrecht, L. Hantschke, D. Zhao, A. Novelli, H. Fuchs, R. Tillmann, T. Hohaus, P.T.M. Carlsson, J. Shenolikar, F. Bernard, J.N. Crowley, J.L. Fry, B. Brownwood, J.A. Thornton, S.S. Brown, A. Kiendler-Scharr, A. Wahner, M. Hallquist, and T.F. Mentel, *Molecular composition and volatility of multi-generation products formed from isoprene oxidation by nitrate radical.* Atmos. Chem. Phys. Discuss., 2020. **2020**: p. 1-37.
223. Womack, C.C., K.M. Manfred, N.L. Wagner, G. Adler, A. Franchin, K.D. Lamb, A.M. Middlebrook, J.P. Schwarz, C.A. Brock, S.S. Brown, and R.A. Washenfelder, *Complex refractive indices in the ultraviolet and visible spectral region for highly absorbing non-spherical biomass burning aerosol.* Atmos. Chem. Phys. Discuss., 2020. **2020**: p. 1-29.
222. Brownwood, B., A. Turdziladze, T. Hohaus, R. Wu, T.F. Mentel, P.T.F. Carlsson, E. Tsiligiannis, M. Hallquist, S. Andres, L. Hantschke, D. Reimer, F. Rohrer, R. Tillmann, B. Winter, J. Liebmann, S.S. Brown, A. Kiendler-Scharr, A. Novelli, H. Fuchs, and J.L. Fry, *Gas-particle partitioning and SOA yields oforganonitrate products from NO3-initiated oxidationof isoprene under varied chemical regimes.* ACS Earth and Space Chemistry, 2020. **submitted**.
221. He, Q., Z. Fang, O. Shoshamin, S.S. Brown, and Y. Rudich, *Scattering and Absorption Cross-sections of Atmospheric Gases in the Ultraviolet-Visible Wavelength Range (307-725 nm).* Atmos. Chem. Phys. Discuss., 2020. **2020**: p. 1-32.
220. Francoeur, C., B. McDonald, J. Gilman, K. Zarzana, B. Dix, S. Brown, J. de Gouw, G. Frost, M. Li, S. McKeen, J. Peischl, I. Pollack, T. Ryerson, C. Thompson, C. Warneke, and M. Trainer, *Quantifying Methane and Ozone Precursor Emissions from Oil and Gas Production Regions across the Contiguous US.* Environ. Sci. Technol., 2020. **submitted**.
219. Hallar, A.G., S.S. Brown, E.T. Crosman, K. Barsanti, C. Cappa, J.C. Lin, J. Murphy, J. Horel, L. Mitchell, J. Fast, V. Aneja, R. Bahreini, R. Banta, C. Bray, A. Brewer, D. Caulton, J. de Gouw, S.F.J. De Wekker, D. Farmer, I. Faloona, C.J. Gaston, S. Hoch, H. Homes, F. Hopkins, N.N. Karle, J.T. Kelly, K. Kelly, N. Lareau, K. Lu, R.L.I. Mauldin,

D.V. Mallia, R. Martin, D. Mendoza, H.J. Oldroyd, Y. Pichugina, K.A. Pratt, P. Saide, P. Silva, W.R. Simpson, B. Stephens, J. Stutz, A. Sullivan, and C.C. Womack, *Coupled Air Quality and Boundary-Layer Meteorology in Western U.S. Basins during Winter: Design and Rationale for a Comprehensive Study.* Bulletin of the American Meteorological Society, 2020. **submitted**.

218. Green, J.R., M.N. Fiddler, D.L. Fibiger, M.E. E., J. Aquino, T. Campos, V. Shah, L. Jaeglé, J.A. Thornton, J. DiGangi, G.M. Wolfe, S. Bililign, and S.S. Brown, *Wintertime Formaldehyde: Airborne Observations and Source Apportionment over the Eastern United States.* J. Geophys. Res., 2020. **submitted**.
217. Li, C., Q. He, Z. Fang, S.S. Brown, A. Laskin, S. Cohen, and Y. Rudich, *Laboratory insights into the diel cycle of optical and chemical transformations of biomass burning brown carbon aerosol.* Environ. Sci. Technol., 2020. **submitted**.
216. Hansen, R.F., S.M. Griffith, S. Dusanter, J.B. Gilman, M. Graus, W.C. Kuster, P.R. Veres, J.A. de Gouw, C. Warneke, R.A. Washenfelder, C.J. Young, S.S. Brown, S.L. Alvarez, F.J. H., N.E. Grossberg, B. Lefer, B. Rappenglueck, and P.S. Stevens, *Measurements of Total OH Reactivity during CalNex-LA.* J. Geophys. Res., 2020. **submitted**.
215. He, Q., S. Tomaz, C. Li, M. Zhu, D. Meidan, M. Riva, S. Brown, C. George, X. Wang, and Y. Rudich, *Optical Properties of Secondary Organic Aerosol Produced by Nitrate Radical Oxidation of Biogenic Volatile Organic Compounds.* ACS Central Science, 2020. **submitted**.
214. Hrdina, A., J.G. Murphy, A.G. Hallar, J.C. Lin, A. Moravek, R. Bares, R.C. Petersen, A. Franchin, A.M. Middlebrook, L. Goldberger, B.H. Lee, M. Baasandorj, and S.S. Brown, *The Role of Coarse Aerosol Particles as a Sink of HNO_3 in Wintertime Pollution Events in the Salt Lake Valley.* Atmos. Chem. Phys. Discuss., 2020. **2020**: p. 1-27.

Published

213. Dewald, P., J.M. Liebmann, N. Friedrich, J. Shenolikar, J. Schuladen, F. Rohrer, D. Reimer, R. Tillmann, A. Novelli, C. Cho, K. Xu, R. Holzinger, F. Bernard, L. Zhou, W. Mellouki, S.S. Brown, H. Fuchs, J. Lelieveld, and J.N. Crowley, *Evolution of NO_3 reactivity during the oxidation of isoprene.* Atmos. Chem. Phys., 2020. **20**(17): p. 10459-10475.
212. Zhang, L., M. Lin, A.O. Langford, L.W. Horowitz, C.J. Senff, E. Klovenski, Y. Wang, R.J. Alvarez Ii, I. Petropavlovskikh, P. Cullis, C.W. Sterling, J. Peischl, T.B. Ryerson, S.S. Brown, Z.C.J. Decker, G. Kirgis, and S. Conley, *Characterizing sources of high surface ozone events in the southwestern US with intensive field measurements and two global models.* Atmos. Chem. Phys., 2020. **20**(17): p. 10379-10400.
211. Roberts, J.M., C.E. Stockwell, R.J. Yokelson, J. de Gouw, Y. Liu, V. Selimovic, A.R. Koss, K. Sekimoto, M.M. Coggon, B. Yuan, K.J. Zarzana, S.S. Brown, C. Santin, S.H. Doerr, and C. Warneke, *The nitrogen budget of laboratory-simulated western US wildfires during the FIREX 2016 Fire Lab study.* Atmos. Chem. Phys., 2020. **20**(14): p. 8807-8826.
210. Tan, Z., A. Hofzumahaus, K. Lu, S.S. Brown, F. Holland, L.G. Huey, A. Kiendler-Scharr, X. Li, X. Liu, N. Ma, K.-E. Min, F. Rohrer, M. Shao, A. Wahner, Y. Wang, A.

Wiedensohler, Y. Wu, Z. Wu, L. Zeng, Y. Zhang, and H. Fuchs, *No Evidence for a Significant Impact of Heterogeneous Chemistry on Radical Concentrations in the North China Plain in Summer 2014.* Environmental Science & Technology, 2020. **54**(10): p. 5973-5979.

209. Rollins, A.W., P.S. Rickly, R.S. Gao, T.B. Ryerson, S.S. Brown, J. Peischl, and I. Bourgeois, *Single-photon laser-induced fluorescence detection of nitric oxide at sub-parts-per-trillion mixing ratios.* Atmos. Meas. Tech., 2020. **13**(5): p. 2425-2439.
208. Yu, C., Z. Wang, M. Xia, X. Fu, W. Wang, Y.J. Tham, T. Chen, P. Zheng, H. Li, Y. Shan, X. Wang, L. Xue, Y. Zhou, D. Yue, Y. Ou, J. Gao, K. Lu, S.S. Brown, Y. Zhang, and T. Wang, *Heterogeneous N_2O_5 reactions on atmospheric aerosols at four Chinese sites: improving model representation of uptake parameters.* Atmos. Chem. Phys., 2020. **20**(7): p. 4367-4378.
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