

Colette L. Heald

*Department of Civil and Environmental Engineering
Department of Earth, Atmospheric and Planetary Sciences
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PROFESSIONAL APPOINTMENTS

Professor Department of Civil and Environmental Engineering and Department of Earth, Atmospheric and Planetary Sciences, MIT, Cambridge, MA	July 2018-present
Associate Department Head Department of Civil and Environmental Engineering, MIT, Cambridge, MA	July 2016-2018
Associate Professor (with tenure as of July 2015) Department of Civil and Environmental Engineering and Department of Earth, Atmospheric and Planetary Sciences, MIT, Cambridge, MA	July 2012-2018
Assistant Professor Department of Civil and Environmental Engineering, MIT, Cambridge, MA	Spring 2012
Assistant Professor Department of Atmospheric Science, Colorado State University, Fort Collins, CO	2008-2011
NOAA Global and Climate Change Postdoctoral Fellow University of California, Berkeley, CA	2006-2007

EDUCATION

Ph.D., Earth and Planetary Sciences , Harvard University, Cambridge, USA	June 2005
B.Sc., Engineering Physics : Queen's University, Kingston, Canada	June 2000

AWARDS AND HONOURS

Committed to Caring Faculty, MIT	2020
Editor's Citation for Excellence in Refereeing, Geophysical Research Letters	2017
Maseeh Excellence in Teaching Award, MIT	2016
Fellow of the American Geophysical Union	2015
James B. Macelwane Medal, American Geophysical Union	2015
Invitee to World Economic Forum in Davos	2015
Mitsui Career Development Associate Professorship, MIT	2014-2017
Crutzen award: Best Paper at the Young Scientist's Conference on Global Change	2006
NOAA Postdoctoral Fellowship in Climate and Global Change	2006-2007
Atmospheric Chemistry Colloquium for Emerging Senior Scientists participant	2005
NASA Earth System Science Fellowship	2003-2005
NSERC Postgraduate Scholarship	2000-2004

TEACHING

1.841: Atmospheric Composition in the Changing Earth System (Graduate), MIT	2012-2020
1.085: Air Pollution (Undergraduate), MIT	2012-2019
1.013: Senior Civil and Environmental Engineering Design (Undergraduate), MIT	2014
1.S992: Sensor Network Design (Undergraduate), MIT	2013
1.092: Travelling Research Environmental eXperience (TREX, Undergraduate), MIT	2013, 2015
ATS 621: Atmospheric Chemistry (Graduate), CSU	2008-2011

ATS 681: <i>Interpreting satellite observations of atmospheric composition</i> (Graduate), CSU	2010
ATS 762: <i>Biosphere-Chemistry-Climate Interactions</i> (Graduate), CSU	2009

UNIVERSITY SERVICE

MIT

Chair, Department Graduate Education Committee	2019-
Member, MIT Climate Symposia Organizing Committee	2018-
Co-chair, School of Engineering Faculty Gender Equity Committee	2018-
Associate Department Head, Department of Civil and Environmental Engineering	2016-18
Chair, Department Undergraduate Education Committee	2016-18
Dean Search Committee, School of Engineering	2017
School of Engineering Representative to the Subcommittee on the Communications Requirement (SOCR)	2015-17
Chair, Rising Stars in Civil and Environmental Engineering workshop	2015-19
Faculty Representative on the Advisory Council of the MIT Activities Committee	2013-16
Department Faculty Search Committee	2012-16
Department Space Management Council	2014

Colorado State University

Department Faculty Search Committee	2010-11
Faculty Council Representative	2009-11
Department Curriculum Committee	2008-11
Department Website Committee	2008-09
Department Colloquia co-organizer	2008-10
Department Student Awards Committee	2008

PROFESSIONAL ACTIVITIES

Member, the American Geophysical Union (AGU), the American Chemical Society (ACS), the American Association for Aerosol Research (AAAR), the American Meteorological Society (AMS), and the American Association for the Advancement of Science (AAAS)

Elected Member-at-Large, Atmospheric & Hydrospheric Sciences Section, AAAS	2020-24
Co-chair, Gordon Research Conference, Atmospheric Chemistry	2019-23
Science Community Cohort for NASA Aerosol and Cloud-Convection and Precipitation Observing Systems study (SCC-A-CCP)	2018-21
Advisory Committee on Geosciences, National Science Foundation	2018-20
National Academy of Sciences Committee on the Future of Atmospheric Chemistry	2015-16
NCAR Atmospheric Chemistry Center for Observational Research and Data (ACCORD) Science Committee	2014-16
Community Earth System Model (CESM) Advisory Board	2013-17
International Global Atmospheric Chemistry Scientific Steering Committee	2013-18
Co-Chair of Aerosols Working Group, International GEOS-Chem Steering Committee	2009-
Associate Editor, <i>Journal of Geophysical Research – Atmospheres</i>	2011-14
Program Committee, Faraday Meeting, <i>Atmospheric Chemistry in the Anthropocene</i>	2017
Co-Chair of Scientific Program Committee, IGAC Conference	2016-18
Convener and Member of Scientific Program Committee, IGAC Conference session “ <i>Chemistry in a Changing Climate</i> ”	2013-14
Convener, Fall AGU session “ <i>Multi-sensor and Model Aerosol Data Synergy for Climate and Air Quality Applications</i> ”	2013
Convener and Member of Scientific Program Committee, Goldschmidt session “ <i>Biosphere-Atmosphere Interactions</i> ”	2012-13
Co-organizer of Summer Telluride Science Workshop “ <i>Organic Particles in the Atmosphere</i> ”	2012

Convener, Fall AGU session “Interactions Between Tropospheric Chemistry and Climate”	2011
Convener, Fall AGU session “Sources, Evolution and Sinks of Organics in the Troposphere”	2010
Convener, IGAC session “Observing atmospheric composition”	2010
Convener, Fall AGU session “Sources, Evolution and Sinks of Organics in the Troposphere”	2008
Convener, Fall AGU session “Chemistry Climate Interactions”	2006

Regular Reviewer:

Journals: *Atmospheric Chemistry and Physics*, *Geophysical Research Letters*, *Journal of Geophysical Research*, *Nature*, *Nature Climate Change*, *Nature Geoscience*, *Proceedings of the National Academy of Sciences*, and *Science*

Grant Agencies: NOAA, NSF, NASA, DoE, NERC (UK), NSERC (Canada), NWO (Netherlands)

ADVISING

- MS & MEng students advised: Bonne J. Ford (2008-2010), Ashley R. Berg (2010-2012), Luke D. Schiferl (2010-2012), Flora Su (2016-2018)
- PhD students advised: Bonne J. Ford (2011-2014), Luke D. Schiferl (2012-2017), Xuan Wang (2012-2017), Sam J. Silva (2014-2019), Sidhant Pai (2017-), Therese Carter (2017-), Ishir Dutta (2019-)
- Research staff & postdocs: Kateryna Lapina (2009-2010), David A. Ridley (2009-2018), Leigh Munchak (2010-2011), Maria Val Martin (2011-2014), Qi Chen (2012-2014), Amos P.K. Tai (2012-2013), William C. Porter (2013-2017), Jeffrey A. Geddes (2014-15), Sarah A. Safieddine (2015-2017), Ruud H. Janssen (2017-2018), Katherine R. Travis (2017-2019), Chloe Y. Gao (2019-), Ka Ming Fung (2019-)

PUBLICATIONS (* designates work of student or postdoc supervised)

1. L. Clapham, **C. Heald**, T.Krause, D.L. Atherton and P. Clark (1999), Origin of a magnetic easy axis in pipeline steel, *J. of App. Phys.*, 86, 3, 1574-1580.
2. Q. Li, D. J. Jacob, R. M. Yantosca, **C. L. Heald**, H. B. Singh, M. Koike, Y. Zhao, G. W. Sachse, D. G. Streets (2003), A Global 3-D Model Evaluation of the Atmospheric Budgets of HCN and CH₃CN: Constraints From Aircraft Measurements Over the Western Pacific, *J. Geophys. Res.*, 108(D21) 8827, doi:10.1029/2002JD003075.
3. Jacob, D. J., J. H. Crawford, M. M. Kleb, V. S. Connors, R. J. Bendura, J. L. Raper, G. W. Sachse, J. C. Gille, L. Emmons, and **C. L. Heald** (2003), The Transport and Chemical Evolution over the Pacific (TRACE-P) aircraft mission: design, execution, and first results, *J. Geophys. Res.*, 108(D20) 8781, doi:10.1029/2002JD003276.
4. Palmer, P. I., D. J. Jacob, D. B. A. Jones, **C. L. Heald**, R. M. Yantosca, J. A. Logan, Glen W. Sachse, D. G. Streets (2003), Inverting for emissions of carbon monoxide from Asia using aircraft observations over the western Pacific, *J. Geophys. Res.*, 108(D21), 8828, doi:10.1029/2003JD003397.
5. **Heald, C. L.**, D. J. Jacob, P. I. Palmer, M. J. Evans, G. W. Sachse, H. B. Singh and D. R. Blake (2003), Biomass burning emission inventory with daily resolution: application to aircraft observations of Asian outflow, *J. Geophys. Res.*, 108(D21), 8811, doi:10.1029/2002JD003082.
6. **Heald, C. L.**, D. J. Jacob, A. M. Fiore, L. Emmons, J. C. Gille, G. W. Sachse, E. V. Browell, M. A. Avery, S. A. Vay, J. H. Crawford, D. J. Westberg, D. R. Blake, H. B. Singh, S. T. Sandholm, R. W. Talbot, H. E. Fuelberg (2003), Transpacific satellite and aircraft observations of Asian pollution, *J. Geophys. Res.*, 108 (D24), 4804, doi:10.1029/2003JD003507.
7. Crawford, J. H., **C. L. Heald**, H. E. Fuelberg, D. Morse, L. K. Emmons, G. W. Sachse, G. Chen, J. Olsen., C. Kittaka, and A. J. Hamlin (2003), Exploring the relationship between MOPITT and in situ observations of CO based on a large-scale feature sampled during TRACE-P, *J. Geophys. Res.*, 109, D15S04, doi:10.1029/2003JD004308.
8. Hudman, R. C., D. J. Jacob, O. C. Cooper, M. J. Evans, **C. L. Heald**, R. J. Park, F. Fehsenfeld, F. Flocke, J. Holloway, G. Hubler, K. Kita, M. Koike, Y. Kondo, A. Neuman, J. Nowak, S. Oltmans, D. Parrish, J. M. Roberts, and T. Ryerson (2004), Ozone production in transpacific Asian pollution plumes and implications for ozone air quality in California, *J. Geophys. Res.*, 109 (D23), D23S18, doi:10.1029/2004JD004978.

9. **Heald, C. L.**, D. J. Jacob, D. B. A. Jones, P. I. Palmer, J. A. Logan, D. G. Streets, G. W. Sachse, J. C. Gille, R. N. Hoffman, and T. Nehrkorn (2004), Comparative inverse analysis of satellite (MOPITT) and aircraft (TRACE-P) observations to estimate Asian sources of carbon monoxide, *J. Geophys. Res.*, 109, (D23), D23306, doi:10.1029/2004JD005185.
10. Li, Q.B., D. J. Jacob, R. J. Park, Y. X. Wang, **C. L. Heald**, R. Hudman, R. M. Yantosca, R.V. Martin, and M. J. Evans (2005), Outflow pathways for North American pollution in summer: A global 3-D model analysis of MODIS and MOPITT observations, *J. Geophys. Res.*, 110, D10301, doi:10.1029/2004JD005039.
11. **Heald, C.L.**, D.J. Jacob, R.J. Park, L.M. Russell, B.J. Huebert, J.H. Seinfeld, H. Liao and R.J. Weber (2005), A large organic aerosol source in the free troposphere missing from current models, *Geophys. Res. Lett.*, 32, L18809, doi:10.1029/2005GL023831.
12. **Heald, C.L.**, D.J. Jacob, R.J. Park, B. Alexander, T.D. Fairlie, D.A. Chu, R.M. Yantosca (2006), Transpacific transport of Asian anthropogenic aerosols and its impact on surface air quality in the United States, *J. Geophys. Res.*, 111, D14310, doi:10.1029/2005JD006847.
13. **Heald, C.L.**, D.J. Jacob, S. Turquety, R.C. Hudman, R.J. Weber, A.P. Sullivan, R.E. Peltier, E.L. Atlas, J.A. de Gouw, C. Warneke, J.S. Holloway, J.A. Neuman, F.M. Flocke, and J.H. Seinfeld (2006), Concentrations and sources of organic carbon aerosol in the free troposphere over North America, *J. Geophys. Res.*, 111, D23S47, doi:10.1029/2006JD007705.
14. van Donkelaar, A., R.V. Martin, R.J. Park, **C.L. Heald**, T.-M. Fu, H. Liao, and A. Guenther (2007), Model evidence for a significant source of secondary organic aerosol from isoprene, *Atmos. Env.*, 41, 1267-1274.
15. Turquety, S., D.J. Jacob, J.A. Logan, R.C. Hudman, R.M. Yevich, F. Leung, **C.L. Heald**, R.M. Yantosca, S. Wu, L.K. Emmons, D.P. Edwards, G.W. Sachse (2007), Inventory of boreal fire emissions for North America: importance of peat burning and pyro-convective injection, *J. Geophys. Res.*, 112, doi:10.1029/2006JD007281, 2007.
16. Millet, D.B., D.J. Jacob, T.M. Fu, T.P. Kurosu, K. Chance, **C.L. Heald**, A. Guenther (2007), Spatial distribution of isoprene emissions from North America derived from formaldehyde column measurements by the OMI satellite sensor, *J. Geophys. Res.*, 113, D02307, doi:10.1029/2007JJ008950.
17. **Heald, C.L.**, D.K. Henze, L.W. Horowitz, J. Feddema, J.-F. Lamarque, A. Guenther, P.G. Hess, F. Vitt, A.H. Goldstein, I. Fung and J.H. Seinfeld (2008), Predicted change in global secondary organic aerosol concentrations in response to future climate, emissions, and land-use change, *J. Geophys. Res.*, 113, D05211, doi:10.1029/2007JD009092.
18. Henze, D.K., J.H. Seinfeld, N.L. Ng, J.H. Kroll, T.-M. Fu, D.J. Jacob, and **C.L. Heald** (2008), Global modeling of secondary organic aerosol formation from aromatic hydrocarbons: high- vs low-yield pathways, *Atmos. Chem. and Phys.*, 8, 2405-2421.
19. **Heald, C.L.**, et al. (2008), Total Observed Organic Carbon (TOOC): A Synthesis of North American Observations, *Atmos. Chem. and Phys.*, 8, 2007-2025.
20. Kopacz, M.A., D.J. Jacob, D.K. Henze, **C.L. Heald**, and D.G. Streets (2009), Comparison of adjoint and analytical inversion methods for constraining Asian sources of carbon monoxide using satellite (MOPITT) measurements of CO columns, *J. Geophys. Res.*, 114, D04305, doi:10.1029/2007JD009264.
21. Goldstein, A.H., C.D. Koven, **C.L. Heald**, I. Fung (2009), Biogenic Carbon and Anthropogenic Pollutants Combine to Form a Cooling Haze over the Southeastern US, *Proceedings of the National Academy of Sciences*, 106 (22), 8835-8840.
22. Fu, T.-M., D.J. Jacob, **C. L. Heald** (2009), Aqueous-phase reactive uptake of dicarbonyls as a source of organic aerosol over eastern North America, *Atmospheric Environment*, 43, 1814-1822.
23. Dunlea, E.J., P.F. DeCarlo, A.C. Aiken, J.R. Kimmel, R.E. Peltier, R.J. Weber, J. Tomlison, D.R. Collins, Y. Shinozuka, C.S. McNaughton, S.G. Howell, A.D. Clarke, L.K. Emmons, E.C. Apel, G.G. Pfister, A. van Donkelaar, R.V. Martin, D.B. Millet, **C.L. Heald**, J.L. Jimenez (2009), Evolution of Asian Aerosols during Transpacific Transport in INTEX-B, *Atmospheric Chemistry and Physics*, 9, 7257-7287.
24. **Heald, C.L.**, M. J. Wilkinson, R.K. Monson, C.A. Alo, G. Wang, A. Guenther (2009), Response of isoprene emission to ambient CO₂ changes and implications for global budgets, *Global Change Biology*, 15, 4, 1127-1140.

25. Prenni, A.J., M.D. Petters, S.M. Kreidenweis, **C.L. Heald**, S.T. Martin, P. Artaxo, R.M. Garland, A.G. Wollny, U. Poschl (2009), Wet season ice nuclei budget in the Amazon Basin: Biogenic emissions and Saharan dust, *Nature Geosciences*, 2, doi:10.1038/ngeo517.
26. Martin, S.T., M.O. Andreae, P. Artaxo, D. Baumgardner, Q. Chen, A.H. Goldstein, A. Guenther, **C.L. Heald**, O.L. Mayol-Bracero, P.H. McMurray, T. Pauliquevis, U. Poschl, K.A. Prather, G.C. Roberts, S.R. Saleska, M.A. Silva Dias, D.V. Spracklen, E. Swietlicki, I. Trebs (2009), Sources and Properties of Amazonian Aerosol Particles, *Reviews of Geophysics*, 48, RG2002, doi:10.1029/2008RG000280..
27. **Heald, C.L.**, D.V. Spracklen (2009), Atmospheric budget of primary biological aerosol particles from fungal sources, *Geophysical Research Letters*, 36, L09806, doi:10.1029/2009GL037493.
28. Jones, D. B. A., K. W. Bowman, J. A. Logan, **C. L. Heald**, J. Liu, M. Luo, J. Worden, and J. Drummond (2009), The zonal structure of tropical O₃ and CO as observed by the Tropospheric Emission Spectrometer in November 2004 – Part 1: Inverse modeling of CO emissions, *Atmospheric Chemistry and Physics*, 9, 3547-3562.
29. Chen, Q., D.K. Farmer, J. Schneider, S.R. Zorn, **C.L. Heald**, T.G. Karl, A. Guenther, J.D. Allan, N. Robinson, H. Coe, J.R. Kimmel, T. Pauliquevis, S. Borrmann, U. Poschl, M.O. Andreae, P. Artaxo, J.L. Jimenez and S.T. Martin (2009) Mass Spectral Characterization of Submicron Biogenic Organic Particles in the Amazon Basin, *Geophys. Res. Lett.*, 36, L20806, doi:10.1029/2009GL039880.
30. **Heald, C.L.**, J.H. Kroll, J.L. Jimenez, K.S. Docherty, P.F. DeCarlo, A.C. Aiken, Q. Chen, S.T. Martin, D.K. Farmer, P. Artaxo (2010), A simplified description of the evolution of organic aerosol composition in the atmosphere, *Geophys. Res. Lett.*, 37, L08803, doi:10.1029/2010GL042737.
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31. **Heald, C.L.**, D. A. Ridley, S. M. Kreidenweis, E. E. Drury (2010), Satellite observations cap the atmospheric organic aerosol budget, *Geophys. Res. Lett.*, 37, L24808, doi:10.1029/2010GL045095.
32. Jiang, Z. D.B.A. Jones, M.A. Kopacz, J. Liu, D.K. Henze, **C.L. Heald** (2011), Quantifying the impact of model errors on top-down estimates of carbon monoxide emissions using satellite observations, *J. Geophys. Res.*, 116, D15306, doi:10.1029/2010JD015282.
33. Smirnov, A., et al. (2011), Maritime Aerosol Network as a component of AERONET – first results and comparison with global aerosol models and satellite retrievals, *Atmospheric Measurement Techniques*, 4, 583-597.
34. *Lapina, K., **C.L. Heald**, D. V. Spracklen, S.R. Arnold, J.D. Allan, H. Coe, G. McFiggans, S.R. Zorn, F. Drewnick, T.S. Bates, L. N. Hawkins, L.M. Russell, A. Smirnov, C.D. O'Dowd, A. Hind (2011), Investigating organic aerosol loading in the remote marine environment, *Atmos. Chem. and Phys.*, 11, 8847-8860.
35. Mahowald, N., D.S. Ward, S. Kloster, M.G. Flanner, **C.L. Heald**, N.G. Heavens, P.G. Hess, J.-F. Lamarque, P.Y. Chuang (2011), Aerosol impacts on climate and biogeochemistry, *Annual Reviews of Environment and Resources*, 36, 45-74, DOI: 10.1146/annurev-environ-042009-094507.
36. **Heald, C.L.**, et al. (2011), Exploring atmospheric organic aerosol: Comparing 17 aircraft field campaigns with a global model, *Atmos Chem Phys*, 11, 12673-12696, doi:10.5194/acp-11-12673-2011.
37. Lamarque, J.-F., L.K. Emmons, P.G. Hess, D.E. Kinnison, S. Tilmes, F. Vitt, **C.L. Heald**, E.A. Holland, P. H. Lauritzen, J. Neu, J. Orlando, P. Rasch, G. Tyndall (2012) CAM-chem: description and evaluation of interactive atmospheric chemistry in CESM, *Geoscientific Model Development*, 5, 369-411, doi:10.5194/gmd-5-369-2012.
38. *Ridley, D.A., **C.L. Heald**, and B. Ford (2012), North African Dust Export and Impacts: An Integrated Satellite and Model Perspective, *J. Geophys. Res.*, 117, D02202, doi:10.1029/2011JD016794.
39. *Ford, B. and **C. L. Heald** (2012), An A-Train and Model Perspective on the Vertical Distribution of Pollution Transport in the Northern Hemisphere, *J. Geophys. Res.*, 117, D06211, doi:10.1029/2011JD016977.
40. Guenther, A., X. Jiang, **C.L. Heald**, T. Sakulyanontvittaya, T. Duhl, L. Emmons, and X. Wang (2012) The Model of Emissions of Gases and Aerosols from Nature version 2.1 (MEGAN2.1): An extended and updated framework for modeling biogenic emissions, *Geoscientific Model Development*, 5, 1471-1492, doi:10.5194/gmd-5-1471-2012.

41. **Heald, C.L.**, J.L. Collett, Jr. T. Lee, K.B. Benedict, F.M. Schwandner, Y. Li, L. Clarisse, D.R. Hurtmans, M. Van Damme, C. Clerbaux, P.-F. Coheur, H.O.T. Pye (2012), Atmospheric ammonia and particulate inorganic nitrogen over the United States, *Atmos Chem Phys.*, 12, 10295-10312.
42. *Berg, A.R., **C.L. Heald**, K. E. Huff Hartz, A. G. Hallar, A. J. H. Meddens, J. A. Hicke, J.-F. Lamarque, and S. Tilmes (2013), The Impact of Bark Beetle Infestations on Monoterpene Emissions and Secondary Organic Aerosol Formation in Western North America, *Atmos. Chem. Phys.*, 13, 3149-3161, doi:10.5194/acp-13-3149-2013.
43. *Ford, B. and **C.L. Heald** (2013), Aerosol loading in the Southeastern United States: reconciling surface and satellite observations, *Atmos. Chem. Phys.*, 13, 9269-9283, doi:10.5194/acp-13-9269-2013.
44. Kharol, S.K., R.V. Martin, S. Philip, S. Vogel, D.K. Henze, D. Chen, Y. Wang, Q. Zhang and **C.L. Heald** (2013), Persistent Sensitivity of Asian Aerosol to Emissions of Nitrogen Oxides, *Geophys. Res. Lett.* 40, doi:10.1002/grl.50234.
45. *Ridley, D.A., **C.L. Heald**, J.R. Pierce, M.J. Evans (2013), Towards resolution-independent dust emissions in global models, *Geophys. Res. Lett.*, 40, 2873-2877, doi:10.1002/grl.50409
46. *Val Martin, M., C.L. Heald, B. Ford, A.J. Prenni and C. Wiedinmyer. (2013), A decadal satellite analysis of the origins and impacts of smoke in Colorado, *Atmos. Chem. Phys.*, 13, 7429-7439, doi:10.5194/acp-13-7429-2013.
47. *Tai, A.P.K., L.J. Mickley, S. Wu, **C.L. Heald** (2013), Effect of CO₂ inhibition on biogenic isoprene emission: implications for air quality under 2000-to-2050 changes in climate, vegetation and land use, *Geophys. Res. Lett.*, 40, 3479–3483, doi:10.1002/grl.50650.
48. Van Damme, M., L. Lieven, **C.L. Heald**, D. Hurtmans, Y. Ngadi, C. Clerbaux, A.J. Dolman, J.W. Erisman, P.F. Coheur (2014), Global Distributions and Trends of Atmospheric Ammonia (NH₃) from IASI Satellite Observations, *Atmos. Chem. Phys.*, 14, 2905–2922, doi:10.5194/acp-14-2905-2014.
49. *Schiferl, L.D., **C.L. Heald**, J.B. Nowak, J.S. Holloway, J.A. Neuman, R. Bahreini, I.B. Pollack, T.B. Ryerson, C. Wiedinmyer, J.G. Murphy (2014), An Investigation of Ammonia and Inorganic Particulate Matter in California during the CalNex Campaign, *J. Geophys. Res.*, 119, 1883–1902, doi:10.1002/2013JD020765.
50. **Heald, C.L.**, D.A. Ridley, J.H. Kroll, S.R.H. Barrett, K.E. Cady-Pereira, M.J. Alvarado, C. D. Holmes (2014), Contrasting the direct radiative effect and direct radiative forcing of aerosols, *Atmos. Chem. Phys.*, 14, 5513-5527, doi:10.5194/acp-14-5513-2014.
51. Spracklen, D.V. and **C.L. Heald** (2014), The contribution of fungal spores and bacteria to regional and global aerosol number and ice nucleation immersion freezing rates, *Atmos. Chem. Phys.*, 14, 9051–9059, doi:10.5194/acp-14-9051-2014.
52. *Ridley, D.A., **C.L. Heald**, J.M. Prospero (2014), What controls the recent changes in African mineral dust aerosol across the Atlantic?, *Atmos. Chem. Phys.*, 14, 5735-5747, doi:10.5194/acp-14-5735-2014.
53. *Val Martin, M., **C.L. Heald**, S.R. Arnold (2014), Coupling dry deposition to vegetation phenology in the Community Earth System Model (CESM): Implications for the simulation of surface O₃, *Geophys. Res. Lett.*, 41, doi:10.1002/2014GL059651.
54. *Tai, A.P.K., M. Val Martin, **C.L. Heald** (2014), Threat to future global food security from climate change and ozone air pollution, *Nature Climate Change*, doi:10.1038/nclimate2317.
55. *Wang, X., **C.L. Heald**, D.A. Ridley, J.P. Schwarz, J.R. Spackman, A.E. Perring, H. Coe, D. Liu, and A.D. Clarke (2014), Exploiting Simultaneous Observational Constraints on Mass and Absorption to Estimate the Global Direct Radiative Forcing of Black Carbon and Brown Carbon, *Atmos. Chem. Phys.*, 14, 10989-11010, doi:10.5194/acp-14-10989-2014.
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56. Perring, A.E., J.P. Schwarz, D. Baumgardner, M.T. Hernandez, D.V. Spracklen, **C.L. Heald**, R.S. Gao, G. Kok, G.R. McMeeking, J. McQuaid, D.W. Fahey (2014), Airborne observations of regional variation in fluorescent aerosol across the United States, *J. Geophys. Res.*, 120, doi:10.1002/2014JD022495.
57. *Val Martin, M., **C.L. Heald**, J.-F. Lamarque, S. Tilmes, L.K. Emmons, and B.A. Schichtel (2014), How emissions, climate, and land use change will impact mid-century air quality over the United States: A focus on effects at National Parks, *Atmos. Chem. and Phys.*, 15, 2805-2823, doi:10.5194/acp-15-2805-2015.

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97. *Silva, S.J., **C.L. Heald**, A. Guenther (2020), Development of a Reduced Complexity Plant Canopy Physics Surrogate Model for use in Chemical Transport Models: A Case Study with GEOS-Chem v12.3.0, *Geo. Mod. Dev. Discuss.*, in review.
98. *Silva, S.J., D.A. Ridley, **C.L. Heald** (2020), Exploring the Constraints on Aerosol Sources and Transport in the North Atlantic from Island Sites, *J. Geophys. Res.*, submitted.

CONFERENCE PRESENTATIONS

Atmospheric Chemistry Gordon Research Conference (Newry, ME, July 2019), European Geophysical Union (Vienna, Austria April 9, 2019), American Association for Aerosol Research Conference (Raleigh, NC, October 19, 2017, invited), American Chemical Society National Meeting (Washington, DC, August 22, 2017, invited to Presidential Symposium), Gordon Research Conference on Atmospheric Chemistry (Newry, ME, August 2017, invited), Canadian Society for Chemistry Conference (Toronto, Canada, May 2017, invited), American Geophysical Union Fall Meeting (San Francisco, CA, December 2016, invited), American Geophysical Union Fall Meeting (San Francisco, CA, December 2015, invited), American Chemical Society Conference (Denver, March 2015, invited), World Economic Forum (Davos, Switzerland, January 2015, invited), American Meteorological Society Conference (Phoenix, AZ, January 2015, invited keynote), American Geophysical Union Fall Meeting (San Francisco, CA, December 2014, invited), Atmospheric Chemistry Gordon Research Conference (Mt Snow, VT, July 2013), American Geophysical Union Fall Meeting (San Francisco, CA, December 2012, invited), Biogenic Hydrocarbon Gordon Research Conference (Lewiston, ME, June 2012, invited), American Meteorological Society Meeting (New Orleans, LA, January 2012, invited), Goldschmidt Conference (Prague, Czech Republic, August 2011, invited), Atmospheric Chemistry Gordon Research Conference (Mt Snow, VT, July 2011, invited), International Global Atmospheric Chemistry Conference (Halifax, Canada, July 2010), Fall American Geophysical Union (San Francisco, CA, December 2009), Atmospheric Chemistry Gordon Research Conference (Waterville Valley, NH, August 2009), Goldschmidt Conference (Davos, Switzerland, June 2009), American Geophysical Union Fall Meeting (San Francisco, CA, December 2008, invited), International Global Atmospheric Chemistry Conference (Annecy, France, September 2008), Atmospheric Chemistry Gordon Research Conference (Big Sky, MT, August 2007), International Union of Geodesy and Geophysics Conference (Perugia, Italy, July 2007), Biogenic Hydrocarbon Gordon Research Conference (Ventura, CA, February 2007), Young Scientists' Conference on Global Change (Beijing, China, November 2006), iLEAPS Meeting (Boulder, CO, January 2006), American Geophysical Union Fall Meeting (San Francisco, CA, 2005), AAAR Meeting (Austin, TX, October 2005, invited), Atmospheric Chemistry Gordon Research Conference (Big Sky, MT, September 2005), European Geophysical Union Conference (Vienna, Austria, April 2005), American Geophysical Union

Spring Meeting (Montreal, Canada, May 2004), American Geophysical Union Fall Meeting (San Francisco, CA, December 2003), EGS/American Geophysical Union Conference (Nice, France, April 2003), International Global Atmospheric Chemistry Conference (Heraklion, Greece, September 2002)

INVITED SEMINARS

Harvard University (November 2019), ETH, Zurich (May 2019), Institute for Advanced Sustainability (November 2018), Forschungszentrum Jülich (October 2018), Max-Planck Institute for Chemistry (September 2018), University of Leeds (August 2018), University of Colorado (March 2017), Stony Brook University (March 2017), Stockholm University (May 2016), NOAA-Geophysical Fluid Dynamics Laboratory (February 2016), Carnegie Mellon University (March 2015), Lamont-Doherty Earth Observatory (October 2014), Harvard University (April 2014), University of California, Berkeley (February 2014), University of Southern California (November 2013), Cornell University (April 2013), University of Toronto (March 2013), Queen's University (January 2013), Dalhousie University (August 2012), Oxford University (May 2012), Harvard University (February 2012), University of Washington (November 2011), MIT (March 2011), Reed College (October 2010), University of Cambridge (June 2010), University of Leeds (June 2010), Michigan Technological University (October 2009), Aerodyne Research, Inc. (April 2009), National Oceanic and Atmospheric Administration (June 2008), National Center for Atmospheric Research (May 2008), Stanford University (October 2006), Colorado State University (May 2006), Stony Brook University (April 2006), York University (November 2005), University of Toronto (November 2005), Harvard University (April 2005), NOAA-Geophysical Fluid Dynamics Laboratory (November 2004)

MEETINGS/WORKSHOPS

Department of Energy ARM/ASR PI Meeting (Rockville, MD, June 2019), 9th International GEOS-Chem Meeting (Cambridge, MA, May 2019), New Insights Into Gas Phase Chemistry Workshop (Telluride, CO, July 2018), Global Food+ Symposium (Boston, MA, February 2018), Dry Deposition Workshop (Lamont, NY, October 2017), Chemistry-Climate Modeling Initiative Meeting (Toulouse, France, June 2017), 8th International GEOS-Chem Meeting (Cambridge, MA, May 2017), International Global Atmospheric Chemistry Conference (Breckenridge, CO, September 2016), Organic Particles in the Atmosphere Workshop (Telluride, CO, July 2016), Biogenic Hydrocarbon Gordon Research Conference (Girona, Spain, June 2016), International Aerosol Modeling Algorithms Meeting (Davis, CA, December 2015), 7th International GEOS-Chem Meeting (Cambridge, MA, May 2015), ACCORD Workshop (Boulder, March 2015), International Global Atmospheric Chemistry Conference (Natal, Brazil, September 2014), Organic Particles in the Atmosphere Workshop (Telluride, CO, July 2014), 17th annual CESM Workshop (Breckenridge, CO, June 2013), 6th International GEOS-Chem Meeting (Cambridge, MA, May 2013), Organic Particles in the Atmosphere Workshop (Telluride, CO, July 2012), 16th annual CESM Workshop (Breckenridge, CO, June 2011), SOAS Workshop (New Brunswick, NJ, May 2011), 5th International GEOS-Chem Meeting (Cambridge, MA, May 2011), Chemistry-Climate Working Group Meeting (NCAR, March 2011), Organic Particles in the Atmosphere Workshop (Telluride, CO, July 2010), "Atmospheric Chemistry in the Tropics: Marine, Biosphere and Climate Connections" (Royal Society, UK, June 2009), GEOS-Chem User's Meeting (Harvard University, April 2009), Chemistry-Climate Working Group Meeting (NCAR, March 2009), TES Science Team Meeting (Boulder, CO, February 2009), "Biogenic Secondary Organic Aerosols: Observations to Global Modeling" (Tovetorp, Sweden, August 2008), Organic Particles in the Atmosphere Workshop (Telluride, CO, July 2008), AMAZE-08 Science Team Meeting (Boulder, CO, July 2008), 13th Annual CCSM Workshop (Breckenridge, CO, June 2008), Aerosols in the Amazon (Manaus, Brazil, February 2008), Chemistry-Climate Working Group Meeting (NCAR, February 2008), BEACHON workshop (NCAR, November 2007), "Biogenic Secondary Organic Aerosols: Observations to Global Modeling" (Hyytiälä, Finland, July 2007), 12th Annual CCSM Workshop (Breckenridge, CO, June 2007), GEOS-Chem user's Meeting (Harvard University, April 2007), TES Science Team Meeting (JPL, Nov 2006), Biogenic Hydrocarbon Workshop (NCAR, Oct 2006), 11th Annual CCSM Workshop (Breckenridge, CO, June 2006), CCSM Chemistry-Climate Working Group Meeting (NCAR, March 2006), ICARTT Science Team Meeting (Durham, NH, Aug 2005), 10th Annual CCSM Workshop (Breckenridge, CO, June 2005), GEOS-Chem

User's Meeting (Harvard University, April 2005), NASA Aura Science Team Meeting (Lanham, Maryland, March 2003), TRACE-P Data Workshop (Norfolk, VA, June 2002), NASA IDS Meeting (Duke University, April 2002), MOPITT Science Team Meeting (NCAR, Feb 2002)
