

KELVIN H. BATES, PH.D.

Assistant Professor, Paul M. Rady Department of Mechanical Engineering, University of Colorado Boulder
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EDUCATION

Ph.D., California Institute of Technology , Pasadena, CA	2017
Chemistry; faculty mentors: Professors John Seinfeld, Paul Wennberg, and Brian Stoltz	
B.S., Davidson College , Davidson, NC	2012
Chemistry & Economics; Phi Beta Kappa, Summa cum Laude	

PROFESSIONAL EXPERIENCE

Assistant Professor	2024 -
Paul M. Rady Department of Mechanical Engineering, University of Colorado, Boulder, CO	
Research Scientist II	2023 - 24
Tropospheric Chemistry group, NOAA Chemical Sciences Laboratory, Boulder, CO	
Project Scientist	2020 - 23
with Professor Tran Nguyen at University of California at Davis, Davis, CA	
Research Associate & Postdoctoral Fellow	2017 - 23
with Professor Daniel Jacob at Harvard University, Cambridge, MA	

TEACHING

Climate Engineering	MCEN 5228	CU Boulder	Instructor of Record	Spring 2025
Chemistry for Energy and Materials Science	MCEN 1024	CU Boulder	Instructor of Record	Fall 2024
Air Pollution	ECI 242	UC Davis	Instructor of Record	Winter 2022
Environmental Fate of Toxicants	ETX 102A	UC Davis	Guest Lecturer	Winter 2021
Fellowship Writing	AGC 298	UC Davis	Guest Lecturer	Fall 2020

AWARDS AND FELLOWSHIPS

UBC Early Career Invited Lecture Award	University of British Columbia	2021
Climate and Global Change Postdoctoral Fellowship	NOAA	2017 - 19
Center for the Environment Postdoctoral Fellowship	Harvard University	2017 - 19
NSF Graduate Research Fellowship	NSF	2014 - 17
Sharp Fellowship	California Institute of Technology	2012 - 13
David Halbert Howard, Jr. Chemistry Award	Davidson College, Dept. of Chemistry	2011
Ernest F. Hollings Undergraduate Scholarship	NOAA	2010 - 12
Davidson Honor Scholarship	Davidson College	2008 - 12
Presidential Scholar	US Department of Education	2008

PUBLICATIONS

(*in press, †group member, ‡co-first-author)

- *55. Fuchs, H., Stainsby, A., Berg, F., Dubus, R., Färber, M., Hofzumahaus, A., Holland, F., **Bates, K. H.**, Brown, S. S., Coggon, M. M., Diskin, G. S., Gkatzelis, G. I., Jernigan, C. M., Peischl, J., Robinson, M. A., Rollins, A. W., Schafer, N. B., Schwantes, R. H., Stockwell, C. E., Veres, P. R., Warnecke, C., Waxman, E. M., Xu, L., Zuraski, K., Wahner, A., and Novelli, A. Advances in OH reactivity instruments for airborne field measurements. Accepted to *Atmos. Meas. Tech.*, 2024.
54. Cooper, O. R., Chang, K.-L., **Bates, K. H.**, Brown, S. S., Chace, W., Coggon, M. M., Gorchov Negron, A. M., Middlebrook, A. M., Peischl, J., Piasecki, A., Schafer, N., Stockwell, C. E., Wang, S., Warnecke, C., Zuraski, K., Miyazaki, K., Payne, V. H., Pennington, E. A., Worden, J. R., Bowman, K. W., and McDonald, B. C. Early-season 2023 wildfires generated record-breaking surface ozone anomalies across the Upper Midwest. *Geophys. Res. Lett.*, 51 (22), e2024GL111481, DOI: 10.1029/2024GL111481, 2024.
53. Travis, K. R., Nault, B. A., Crawford, J. H., **Bates, K. H.**, Blake, D. R., Cohen, R. C., Fried, A., Hall, S. R., Huey, L. G., Lee, Y. R., Meinardi, S., Min, K.-E., Simpson, I. J., and Ullman, K. Impact of improved representation of VOC emissions and production of NO_x reservoirs on modeled urban ozone production. *Atmos. Chem. Phys.*, 24, 9555–9572, DOI: 10.5194/acp-24-9555-2024, 2024.

52. Rowlinson, M. J., Carpenter, L. J., Read, K. A., Punjabi, S., Adedeji, A., Fakes, L., Lewis, A., Richmond, B., Passant, N., Murrells, T., Henderson, B., **Bates, K. H.**, Helmig, D., and Evans, M. J. Revising VOC emissions speciation improves global simulations of ethane and propane. *Atmos. Chem. Phys.*, 24 (14), 8317-8342, DOI: 10.5194/acp-24-8317-2024, 2024.
51. Zhai, S., Jacob, D. J., Franco, B., Clarisse, L., Coheur, P., Shah, V., **Bates, K. H.**, Lin, H., Dang, R., Sulprizio, M., Huey, L., Moore, F. L., Jaffe, D., Liao, H. Transpacific transport of Asian peroxyacetyl nitrate (PAN) observed from satellite: implications for ozone. *Environ. Sci. Technol.*, 58 (22), 9760-9769, DOI: 10.1021/acs.est.4c01980, 2024.
50. **Bates, K. H.**, Evans, M. J., Henderson, B. H., and Jacob, D. J. Impacts of updated rate constants on tropospheric composition. *Geosci. Model Dev.*, 17 (4), 1511-1524, DOI: 10.5194/gmd-17-1511-2024, 2024.
49. Nakagawa, A., **Bates, K. H.**, and Nguyen, T. B. Size-dependent depositional loss of inorganic, organic, and mixed phase particles to Teflon chamber walls under various environmental and chemical conditions. *Aerosol Sci. Technol.*, 58 (2), 170-180, DOI: 10.1080/02786826.2023.2298219, 2024.
48. Coggon, M. M., Stockwell, C. E., Clafin, M. S., Pfannerstill, E. Y., Xu, L., Gilman, J. B., Marcantonio, J., Cao, C., **Bates, K. H.**, Gkatzelis, G. I., Lamplugh, A., Arata, C., Apel, E. C., Hornbrook, R. S., Piel, F., Majlut, F., Blake, D. R., Wisthaler, A., Canagaratna, M., Lerner, B. M., Goldstein, A. H., Mak, J. E., and Warneke, C. Identifying and correcting interferences to PTR-ToF-MS measurements of isoprene and other urban volatile organic compounds. *Atmos. Meas. Tech.*, 17 (2), 801-825, DOI: 10.5194/amt-17-801-2024, 2024.
47. Chen, J., Lane, J. R., **Bates, K. H.**, and Kjaergaard, H. G. Atmospheric gas-phase formation of methanesulfonic acid. *Environ. Sci. Technol.*, 57 (50), 21168-21177, DOI: 10.1021/acs.est.3c07120, 2023.
46. **Bates, K. H.**, Jacob, D. J., Cope, J. D., Chen, X., Millet, D. B., and Nguyen, T. B. Aqueous oxidation of isoprene-derived organic aerosol species as a source of atmospheric formic and acetic acids. *Environ. Sci.: Atmos.*, 3, 1651-1664, DOI: 10.1039/D3EA00076A, 2023.
45. Nguyen, T. B., **Bates, K. H.**, Buenconsejo, R., Charan, S. M., Cavanna, E. E., Cocker, D. R., Day, D. A., DeVault, M. P., Donahue, N. H., Finewax, Z., Habib, L. F., Handschy, A. V., Hildebrandt Ruiz, L., Hou, C.-Y. S., Jimenez, J. L., Joo, T., Klodt, A. L., Kong, W., Le, C., Masoud, C. G., Mayernik, M. S., Ng, N. L., Nienhouse, E. J., Nizkorodov, S. A., Orlando, J. J., Post, J. J., Sturm, P. O., Thrasher, B. L., Tyndall, G. S., Seinfeld, J. H., Worley, S. J., Zhang, X., and Ziemann, P. J. Overview of ICARUS – a curated, open access, online repository for atmospheric simulation chamber data. *ACS Earth Space Chem.*, 7 (6), 1235-1246, DOI: 10.1021/acsearthspacechem.3c00043, 2023.
44. Yang, L. H., Jacob, D. J., Colombi, N. K., Zhai, S., **Bates, K. H.**, Shah, V., Beaudry, E., Yantosca, R. M., Lin, H., Brewer, J. F., Chong, H., Travis, K. R., Crawford, J. H., Lamsal, L., Koo, J.-H., and Kim, J. NO₂ vertical profiles over South Korea and their relation to oxidant chemistry: Implications for geostationary satellite retrievals and the observation of NO₂ diurnal variation from space. *Atmos. Chem. Phys.*, 23, 2465–2481, DOI: 10.5194/acp-23-2465-2023, 2023.
43. Cope, J. D., **Bates, K. H.**, Tran, L. N., Abellar, K. A., and Nguyen, T. B. Sulfur radical formation from the tropospheric irradiation of aqueous sulfate aerosols. *Proc. Nat'l. Acad. Sci.*, 119 (36) e2202857119, DOI: 10.1073/pnas.2202857119, 2022.
42. Choi, J., Henze, D. K., Cao, H., Nowlan, C. R., Abad, G. G., Kwon, H.-A., Lee, H.-M., Oak, Y., Park, R. J., **Bates, K. H.**, Maasackers, J. D., Wisthaler, A., and Weinheimer, A. J. An inversion framework for optimizing non-methane VOC emissions using remote sensing and airborne observations in Northeast Asia during the KORUS-AQ field campaign. *J. Geophys. Res. – Atmos.*, 127 (7), DOI: 10.1029/2021JD035844, 2022.
41. Allen, H. M., **Bates, K. H.**, Crounse, J. D., Kim, M. J., Teng, A. P., Ray, E. A., and Wennberg, P. O. H₂O₂ and CH₃OOH (MHP) in the remote atmosphere: II: Physical and chemical controls. *J. Geophys. Res. – Atmos.*, 127 (6), DOI: 10.1029/2021JD035702, 2022.
40. Shen, L., Jacob, D. J., Santillana, M., **Bates, K. H.**, Zhuang, J., and Chen, W. A machine-learning-guided adaptive algorithm to reduce the computational cost of integrating kinetics in global atmospheric chemistry models: application to GEOS-Chem versions 12.0.0 and 12.9.1. *Geosci. Model Dev.*, 15, 1677-1687, DOI: 10.5194/gmd-15-1677-2022, 2022.
39. **Bates, K. H.**, Burke, G. J. P., Cope, J. D., and Nguyen, T. B. Secondary organic aerosol and organic nitrogen yields from the nitrate radical (NO₃) oxidation of alpha-pinene from various RO₂ fates. *Atmos. Chem. Phys.*, 22, 1467-1482, DOI: 10.5194/acp-22-1467-2022, 2022.
38. Dovrou, E., **Bates, K. H.**, Moch, J. M., Mickleby, L. J., Jacob, D. J., and Keutsch, F. N. Catalytic role of formaldehyde in particulate matter formation. *Proc. Nat'l. Acad. Sci.*, 119 (6), e2113265119; DOI: 10.1073/pnas.2113265119, 2022.
37. **Bates, K. H.**, Jacob, D. J., Li, K., Ivatt, P. D., Evans, M. J., Yan, Y. and Lin, J. Development and evaluation of a new compact mechanism for aromatic oxidation in atmospheric models. *Atmos. Chem. Phys.*, 21, 18351-18374, DOI: 10.5194/acp-21-18351-2021, 2021.
36. **Bates, K. H.**, Cope, J. D., and Nguyen, T. B. Gas-phase oxidation rates and products of 1,2-dihydroxy isoprene. *Environ. Sci. Technol.*, 55 (20), 14294-14304, DOI: 10.1021/acs.est.1c04177, 2021.

35. Dovrou, E., **Bates, K. H.**, Rivera-Rios, J. C., Cox, J. L., Shutter, J. D., and Keutsch, F. N. Towards a chemical mechanism of the oxidation of aqueous sulfur dioxide via isoprene hydroxyl hydroperoxides (ISOPOOH). *Atmos. Chem. Phys.*, 21, 8999-9008, DOI: 10.5194/acp-21-8999-2021, 2021.
34. Cope, J. D., Abellar, K. A., **Bates, K. H.**, Fu, X., and Nguyen, T. B. Aqueous OH Oxidation of Erythritol and Isoprene's 2-Methyltetrols as Sources of Formic and Acetic Acids in the Atmosphere. *ACS Earth Space Chem.*, 5 (6), 1265-1277. DOI: 10.1021/acsearthspacechem.1c00107, 2021.
33. Kwon, H.-A., Park, R. J., Oak, Y., Nowlan, C. R., Janz, S. J., Kowalewski, M. G., Fried, A., Walega, J., **Bates, K. H.**, Choi, J., Blake, D. R., Wisthaler, A., and Woo, J.-H.. Top-down estimates of anthropogenic VOC emissions in South Korea using formaldehyde vertical measurements from aircraft during the KORUS-AQ campaign. *Elem. Sci. Anth.*, 9 (1). DOI: 10.1525/elementa.2021.00109, 2021.
32. Zhai, S., Jacob, D. J., Wang, X., Liu, Z., Wen, T., Shah, V., Li, K., Moch, J. M., **Bates, K. H.**, Song, S., Shen, L., Zhang, Y., Luo, G., Yu, F., Sun, Y., Wang, L., Qi, M., Tao, J., Gui, K., Xu, H., Zhang, Q., Zhao, T., Wang, Y., Lee, H. C., Choi, H., and Liao, H. Control of particulate nitrate air pollution in China. *Nature Geosci.*, 14, 389-395, DOI: 10.1038/s41561-021-00726-z, 2021.
31. **Bates, K. H.**, Jacob, D. J., Wang, S., Hornbrook, R. S., Apel, E. C., Kim, M. J., Millet, D. B., Wells, K. C., Chen, X., Brewer, J. F., Ray, E. A., Commane, R., Diskin, G. S., and Wofsy, S. C. The global budget of atmospheric methanol: new constraints on secondary, oceanic, and terrestrial sources. *J. Geophys. Res. – Atmos.*, 126 (4). DOI: 10.1029/2020JD033439, 2021.
30. Li, K., Jacob, D. J., Liao, H., Qiu, Y., Shen, L., Zhai, S., **Bates, K. H.**, Sulprizio, M. P., Song, S., Lu, X., Zhang, Q., and Zheng, B. Ozone pollution in the North China Plain spreading into the late-winter haze season. *Proc. Nat'l Acad. Sci.*, 118 (10), DOI: 10.1073/pnas.2015797118, 2021.
29. Vasquez, K. T., Crounse, J. D., Schulze, B. C., **Bates, K. H.**, Teng, A. P., Xu, L., and Wennberg, P. O. Rapid hydrolysis of tertiary isoprene nitrate efficiently removes NO_x from the atmosphere. *Proc. Nat'l Acad. Sci.*, 117 (52) 33011-33016. DOI: 10.1073/pnas.2017442117, 2020.
28. Wells, K. C., Millet, D. B., Payne, V. H., Deventer, M. J., **Bates, K. H.**, de Gouw, J. A., Graus, M., Warneke, C., Wisthaler, A., and Fuentes, J. D. Global measurements of isoprene from space: Constraints on emissions and atmospheric oxidation over source regions. *Nature*, 585, 225-233, DOI: 10.1038/s41586-020-2664-3, 2020.
27. Wang, S., Apel, E., Schwantes, R. H., **Bates, K. H.**, Fischer, E., Hornbrook, R., Hills, A., Emmons, L., Tilmes, S., Lamarque, J.-F., Yang, M., Marandino, C., Saltzman, E., de Bruyn, W., Kameyama, S., Tanimoto, H., Omori, Y., Hall, S., Ullmann, K., Ryerson, T., Daube, B., Commane, R., McKain, K., Sweeney, C., Thames, A., Miller, D., Brune, W., Diskin, G., DiCangi, J., and Wofsy, S. Global atmospheric budget of acetone: air-sea exchange and the contribution to the hydroxyl radicals. *J. Geophys. Res. – Atmos.*, 125 (15). DOI: 10.1029/2020JD032553, 2020.
26. Link, M., Nguyen, T. B., **Bates, K. H.**, Müller, J.-F., and Farmer, D. Can isoprene oxidation explain high concentrations of atmospheric formic and acetic acid over forests? *ACS Earth Space Chem.*, 4 (5), 730-740, DOI: 10.1021/acsearthspacechem.0c00010, 2020.
25. Schulze, B. C., Charan, S. M., Kenseth, C. M., Kong, W., **Bates, K. H.**, Williams, W., Metcalf, A. R., Jonsson, H. H., Woods, R., Sorooshian, A., Flagan, R. C., and Seinfeld, J. H. Characterization of aerosol hygroscopicity over the Northeast Pacific Ocean: Impacts on prediction of CCN and stratocumulus cloud droplet number concentrations. *Earth Space Sci.*, 7, e2020EA001098, DOI: 10.1029/2020EA001098, 2020.
24. **Bates, K. H.** and Jacob, D. J. An expanded definition of the odd oxygen family for tropospheric ozone budgets: Implications for ozone lifetime and stratospheric influence. *Geophys. Res. Lett.*, 47, e2019GL084486, DOI: 10.1029/2019GL084486, 2020.
23. Møller, K. H., Kurtén, T., **Bates, K. H.**, Thornton, J. A., and Kjaergaard, H. G. Thermalized epoxide formation in the Atmosphere. *J. Phys. Chem. A*, 123 (49), 10620-10630, DOI: 10.1021/acs.jpca.9b09364, 2019.
22. Dovrou, E., Rivera-Rios, J. C., **Bates, K. H.** and Keutsch, F. N. Sulfate formation via cloud processing from isoprene hydroxyl hydroperoxides (ISOPOOH). *Environ. Sci. Technol.*, 53 (21), 12476-12484, DOI: 10.1021/acs.est.9b04645, 2019.
21. Li, K., Jacob, D. J., Liao, H., Zhu, J., Shah, V., Shen, L., **Bates, K. H.**, Zhang, Q., and Zhai, S. A two-pollutant strategy for improving ozone and particulate air quality in China. *Nature Geosci.* 12, 906-910, DOI: 10.1038/s41561-019-0464-x, 2019.
20. **Bates, K. H.** and Jacob, D. J. A new model mechanism for atmospheric oxidation of isoprene: Global effects on oxidants, nitrogen oxides, organic products, and secondary organic aerosol. *Atmos. Chem. Phys.*, 19, 9613-9640, DOI: 10.5194/acp-19-9613-2019, 2019.
19. Rooney, B., Zhao, R., Wang, Y., **Bates, K. H.**, Pillarisetti, A., Sharma, S., Kundu, S., Bond, T. C., Lam, N., Ozultun, B., Xu, L., Fleming, L. T., Weltman, R., Meinardi, S., Blake, D. R., Nizkorodov, S. A., Edwards, R. D., Yadav, A., Arora, N. K., Smith, K. R., and Seinfeld, J. H. Impacts of household sources on air pollution at village and regional scales in India. *Atmos. Chem. Phys.*, 19, 7719-7742. DOI: 10.5194/acp-19-7719-2019, 2019.

18. Schwantes, R. H., Charan, S. M., **Bates, K. H.**, Huang, Y., Nguyen, T. B., Mai, H., Kong, W., Flagan, R. C., and Seinfeld, J. H. Low-volatility compounds contribute significantly to isoprene sSOA under high-NO conditions. *Atmos. Chem. Phys.*, 19, 7255-7278. DOI: 10.5194/acp-19-7255-2019, 2019.
17. Møller, K. H., **Bates, K. H.**, and Kjaergaard, H. G. The importance of hydrogen shift reactions in atmospheric isoprene oxidation. *J. Phys. Chem. A*, 123 (4), 920-932. DOI: 10.1021/acs.jpca.8b10432, 2019.
16. Li, K., Jacob, D. J., Liao, H., Shen, L., Zhang, Q., and **Bates, K. H.** Anthropogenic drivers of 2013-2017 trends in summer surface ozone in China. *Proc. Nat'l Acad. Sci.*, 116 (2), 422-427, DOI: 10.1073/pnas.1812168116, 2019.
15. Allen, H. M., Teng, A. P., **Bates, K. H.**, Crouse, J. D., Thayer, M., Rivera-Rios, J., Keutsch, F., St. Clair, J. M., and Wennberg, P. O. Kinetics and product yields of the OH driven oxidation of hydroxymethyl hydroperoxide. *J. Phys. Chem. A*, 122 (30), 6292-6302, DOI: 10.1021/acs.jpca.8b04577, 2018.
14. Kalashnikova, O. V., Garay, M. J., Xu, F., **Bates, K. H.**, Kong, S., Kenseth, C., Cappa, C., Siedel, F., Yorks, J., Diner, D. J., Jonsson, H. H., and Seinfeld, J. H. Photopolarimetric sensitivity to black carbon content of wildfire smoke: Results from the 2016 IMPACT-PM field campaign. *J. Geophys. Res. – Atmos.*, 123 (10), 5376-5396, DOI: 10.1029/2017JD028032, 2018.
13. Wennberg, P. O., **Bates, K. H.**, Crouse, J. D., Dodson, L. G., McVay, R. C., Mertens, L. A., Nguyen, T. B., Praske, E., Schwantes, R. H., Smarte, M. D., St. Clair, J. M., Teng, A. P., Zhang, X., and Seinfeld, J. The gas-phase oxidation of isoprene and its first-generation products. *Chem. Rev.*, 118 (7), 3337-3390, DOI: 10.1021/acs.chemrev.7b00439, 2018.
12. Sorooshian, A., MacDonald, A. B., Dadashazar, H., **Bates, K. H.**, Coggon, M. M., Craven, J. S., Crosbie, E., Hersey, S. P., Hodas, N., Lin, J. J., Negrón Marty, A., Maudlin, L. C., Metcalf, A. R., Murphy, S. M., Prabhakar, G., Rissman, T. A., Shingler, T., Varutbangkul, T., Wang, Z., Woods, R. K., Chuang, P. Y., Nenes, A., Jonsson, H. H., Flagan, R. C., and Seinfeld, J. H. A multi-year data set on aerosol-cloud-precipitation-meteorology interactions for marine stratocumulus clouds. *Scientific Data*, 5, 180026, DOI: 10.1038/sdata.2018.26, 2018.
11. **Bates, K. H.**, Nguyen, T. B., Teng, A. P., Crouse, J. D., Kjaergaard, H. G., Stoltz, B. M., Seinfeld, J. H., and Wennberg, P. O. Production and fate of C₄ dihydroxycarbonyl compounds from isoprene oxidation. *J. Phys. Chem. A*, 120 (1), 106-117, DOI: 10.1021/acs.jpca.5b10335, 2016.
10. Wang, Z., Ramirez, M. M., Dadashazar, H., MacDonald, A., Crosbie, E., **Bates, K. H.**, Coggon, M. M., Craven, J. S., Lynch, P., Campbell, J. R., Aghdam, M. A., Woods, R. K., Jonsson, H., Flagan, R. C., Seinfeld, J. H., and Sorooshian, A. Contrasting cloud composition between coupled and decoupled marine boundary layer clouds. *J. Geophys. Res. – Atmos.*, 121 (19), 11679-11691, DOI: 10.1002/2016JD025695, 2016.
9. Nguyen, T. B., Crouse, J. D., Teng, A. P., Coggon, M. M., Schwantes, R. H., **Bates, K. H.**, Zhang, L., Feiner, P., Miller, D. C., Skog, K., Rivera, J., Olson, K., Koss, A., Goldstein, A. H., de Gouw, J., Tyndall, G., Brun, W. H., Keutsch, F. N., Seinfeld, J. H., and Wennberg, P. O. Atmospheric fates of Criegee intermediates in the ozonolysis of isoprene. *Phys. Chem. Chem. Phys.*, 18, 10241-10254, DOI: 10.1039/C6CP00053C, 2016.
8. Liu, Y., Brito, J., Dorris, M., Rivera-Rios, J. C., Seco, R., **Bates, K. H.**, Artaxo, P., Duvoisin, S., Keutsch, F. N., Kim, S., Goldstein, A. H., Guenther, A., Manzi, A.-O., de Souza, R., Springston, S. R., Watson, T. B., McKinney, K. A., and Martin, S. T. Isoprene photochemistry over the Amazon rain forest. *Proc. Nat'l. Acad. Sci.*, 113 (22), 6125-6130, DOI: 10.1073/pnas.1524136113, 2016.
7. Zhang, X., Dalleska, N. F., Huang, D. D., **Bates, K. H.**, Sorooshian, A., Flagan, R. C., and Seinfeld, J. H. Time-resolved molecular characterization of water-soluble organic aerosols by PILS + UPLC/ESI-ToF/MS. *Atmos. Env.*, 130, 180-189. DOI: 10.1016/j.atmosenv.2015.08.049, 2016.
6. St. Clair, J. M., Rivera-Rios, J. C., Crouse, J. D., Knap, H. C., **Bates, K. H.**, Teng, A. P., Jørgensen, S., Kjaergaard, H. G., Keutsch, F. N., and Wennberg, P. O. Kinetics and products for the reaction of the first-generation isoprene hydroxy hydroperoxide (ISOPOOH) with OH. *J. Phys. Chem. A*, 120 (9), 1441-1451. DOI: 10.1021/acs.jpca.5b06532, 2016.
5. Nguyen, T. B., **Bates, K. H.**, Crouse, J. D., Schwantes, R. H., Zhang, X., Kjaergaard, H. G., Surratt, J. D., Lin, P., Laskin, A., Seinfeld, J. H., and Wennberg, P. O. Mechanism of the hydroxyl radical oxidation of methacryloyl peroxyoxynitrate (MPAN) and its pathway toward secondary organic aerosol formation in the atmosphere. *Phys. Chem. Chem. Phys.*, 17, 17914-17926. DOI: 10.1039/C5CP02001H, 2015.
4. Praske, E., Crouse, J. D., **Bates, K. H.**, Kurtén, T., Kjaergaard, H. G., Wennberg, P. O. Atmospheric fate of methyl vinyl ketone: peroxy radical reactions with NO and HO₂. *J. Phys. Chem. A*, 119 (19), 4562-4572. DOI: 10.1021/jp5107058, 2015.
3. **Bates, K. H.**, Crouse, J. D., St. Clair, J. M., Bennett, N. B., Nguyen, T. B., Seinfeld, J. H., Stoltz, B. M., Wennberg, P. O. Gas phase production and loss of isoprene epoxydiols. *J. Phys. Chem. A*, 118 (7), 1237-1246. DOI: 10.1021/jp4107958, 2014.
2. Nguyen, T. B., Crouse, J. D., Schwantes, R. H., Teng, A. P., **Bates, K. H.**, Zhang, X., St. Clair, J. M., Brune, W. H., Tyndall, G. S., Keutsch, F. N., Seinfeld, J. H., Wennberg, P. O. Overview of the Focused Isoprene eXperiments at California Institute of Technology (FIXCIT): mechanistic chamber studies on the oxidation of biogenic compounds. *Atmos. Chem. Phys.*, 14, 13531-13549. DOI: 10.5194/acp-14-13531-2014, 2014.

1. Nguyen, T. B., Coggon, M. M., **Bates, K. H.**, Zhang, X., Schwantes, R. H., Schilling, K. A., Loza, C. L., Flagan, R. C., Wennberg, P. O., Seinfeld, J. H. Organic aerosol formation from the reactive uptake of isoprene epoxydiols (IEPOX) onto non-acidified inorganic seeds. *Atmos. Chem. Phys.*, 14, 3497-3510. DOI: 10.5194/acp-14-3497-2014, 2014.

PRESENTATIONS AND POSTERS

INVITED TALKS

- 2023 Bates, K. H., Impacts of updated GEOS-Chem rate constants on tropospheric composition. Air Quality Modeling Group: Model Applications Meeting, *US EPA*, July, Durham, NC (virtual).
- 2023 Bates, K. H., Particulate pollution as miniature chemical reactors: balancing the budgets of organic aerosol, reactive nitrogen, and organic acids in the atmosphere. Department of Civil & Environmental Engineering, *UC Davis*, March, Davis, CA.
- 2023 Bates, K. H., Particulate pollution as miniature chemical reactors: balancing the budgets of organic aerosol, reactive nitrogen, and organic acids in the atmosphere. Department of Mechanical Engineering, *University of Colorado*, February, Boulder, CO (virtual).
- 2023 Bates, K. H., Particulate pollution as miniature chemical reactors: balancing the budgets of organic aerosol, reactive nitrogen, and organic acids in the atmosphere. Department of Chemical & Environmental Engineering, *University of Arizona*, February, Tucson, AZ.
- 2023 Bates, K. H., Particulate pollution as miniature chemical reactors: balancing the budgets of organic aerosol, reactive nitrogen, and organic acids in the atmosphere. Department of Chemistry, *University of Copenhagen*, February, Copenhagen, Denmark.
- 2022 Bates, K. H., The nighttime chemistry of terpenes: aerosol & organonitrate formation. Atmospheric Chemistry Colloquium, *Massachusetts Institute of Technology*, November, Cambridge, MA (virtual).
- 2022 Bates, K. H., Remote tropospheric measurements and global atmospheric budgets of methanol and ethanol. Air Quality Chemistry & Physics Seminar Series, *UC Davis*, April, Davis, CA.
- 2021 Bates, K. H., Particulate pollution as miniature chemical reactors: balancing the budgets of organic aerosol, reactive nitrogen, and organic acids in the atmosphere, Program in Atmospheres, Oceans, and Climate Lunchtime Seminar, *Massachusetts Institute of Technology*, November, Cambridge, MA (virtual).
- 2021 Bates, K. H., Atmospheric particles as miniature chemical reactors: rethinking the sources and sinks of organic aerosol. Early Career Invited Lecture in Chemistry, *Univ. British Columbia*, September, Vancouver, BC.
- 2019 Bates, K. H., Global implications of a new model mechanism for atmospheric oxidation of isoprene. *Massachusetts Institute of Technology*, April, Cambridge, MA.
- 2019 Bates, K. H., Redefining odd oxygen: a new budget diagnostic for tropospheric ozone. *National Center for Atmospheric Research*, March, Boulder, CO.
- 2018 Bates, K. H., The influence of isoprene on global atmospheric oxidant budgets. *University of Washington*, April, Seattle, WA.
- 2018 Bates, K. H., Atmospheric isoprene oxidation and smog formation in remote environments. *Københavns Universitet*, March, Copenhagen, Denmark.

CONFERENCE TALKS

- 2024 Bates, K. H., *et al.* Comparing AEROMMA & GEOS-Chem to constrain anthropogenic ethanol and other oxygenated VOCs. *American Geophysical Union Fall Meeting*, December, Washington, DC.
- 2024 Bates, K. H., *et al.* A reduced oxidation mechanism of VCP and cooking VOCs for regional-to-global atmospheric modeling. *Atmospheric Chemical Mechanisms Conference*, December, Davis, CA.
- 2022 Bates, K. H., *et al.* Sulfur radical formation from the tropospheric irradiation of aqueous sulfate aerosols. *American Geophysical Union Fall Meeting*, December, Chicago, IL.
- 2022 Bates, K. H., *et al.* Sulfur radical formation from the tropospheric irradiation of aqueous sulfate aerosols. *Atmospheric Chemical Mechanisms Conference*, December, Davis, CA.
- 2022 Bates, K. H., *et al.* Sources and chemistry of ethanol. *International GEOS-Chem Conference*, June, St. Louis, MO.
- 2022 Bates, K. H., *et al.* Organic aerosol photooxidation as a major source of formic and acetic acids to the continental boundary layer. *American Meteorological Society Annual Meeting*, January, Houston, TX (virtual).
- 2021 Bates, K. H., *et al.* Dimer formation and SOA yields from the reaction of α -pinene with NO_3 . *Pacificchem*, December, Honolulu, HI (virtual).

- 2021 Bates, K. H., *et al.* SOA and organic nitrate formation from the reaction of α -pinene with NO₃ under simulated nighttime conditions, *American Association for Aerosol Research*, October, Albuquerque, NM (virtual).
- 2021 Bates, K. H., *et al.* Increased photochemical sinks help balance the SOA budget: experimental evidence and modeling results, *American Association for Aerosol Research*, October, Albuquerque, NM (virtual).
- 2020 Bates, K. H., *et al.* Intercomparison and optimization of aromatic oxidation mechanisms. *Atmospheric Chemical Mechanisms*, November, Davis, CA (virtual).
- 2020 Bates, K. H., *et al.* Organic hydroperoxides and the catalytic role of formaldehyde in atmospheric sulfate formation. *American Chemical Society Fall Meeting*, August, San Francisco, CA (virtual). Invited.
- 2020 Bates, K. H., *et al.* An expanded definition of the odd oxygen family for tropospheric ozone budgets: Implications for ozone lifetime, stratospheric influence, and source tagging. *American Meteorological Society Annual Meeting*, January, Boston, MA. Invited.
- 2019 Bates, K. H., *et al.* Modeling the effects of an updated isoprene oxidation mechanism on organic aerosol, reactive nitrogen, and sulfate budgets. *American Association for Aerosol Research*, October, Portland, OR.
- 2019 Bates, K. H., *et al.* Redefining odd oxygen: a new budget diagnostic for tropospheric ozone. *International GEOS-Chem Conference*, May, Cambridge, MA.
- 2019 Bates, K. H., *et al.* An expanded definition of odd oxygen for improved tropospheric ozone accounting. *American Meteorological Society Annual Meeting*, January, Phoenix, AZ.
- 2017 Bates, K. H., *et al.* Isoprene oxidation mechanisms and secondary organic aerosol formation under HO₂-dominated conditions. *ACCESS XIV*, July, Brookhaven, NY.
- 2017 Bates, K. H., *et al.* Updated isoprene chemistry in GEOS-Chem: mechanisms and impacts. *International GEOS-Chem Conference*, May, Cambridge, MA.
- 2016 Bates, K. H., *et al.* Incorporating recent advances in isoprene photooxidation into GEOS-Chem: Effects on oxidant, NO_x, and VOC budgets. *American Geophysical Union Fall Meeting*, December, San Francisco, CA.
- 2016 Bates, K. H., *et al.* Determinants of isoprene SOA yields from recent comprehensive chamber studies. *American Association for Aerosol Research*, October, Portland, OR.
- 2015 Bates, K. H., *et al.* Secondary organic aerosol yields from isoprene oxidation under low-NO conditions. *American Association for Aerosol Research*, October, Minneapolis, MN.

CONFERENCE POSTERS

- 2024 Bates, K. H., *et al.* Model-measurement comparisons of the AEROMMA field campaign. *International GEOS-Chem Conference*, June, St. Louis, MO.
- 2024 Bates, K. H., *et al.* Where is all the ethanol coming from? *AGES+ Workshop*, May, Boulder, CO.
- 2024 Bates, K. H., *et al.* The global budget of atmospheric ethanol: new constraints from remote measurements. *American Meteorological Society Annual Meeting*, January, Baltimore, MD.
- 2023 Bates, K. H., *et al.* The global budget of atmospheric ethanol: new constraints from remote measurements. *IGAC-iCACGP Early Career Researcher Conference*, November (virtual).
- 2020 Bates, K. H., *et al.* The global budget of atmospheric methanol: new constraints on secondary, oceanic, and terrestrial sources. *American Geophysical Union Fall Meeting*, December, San Francisco, CA (virtual).
- 2019 Bates, K. H., *et al.* Combined volatility-based partitioning and reactive-uptake parameterizations of SOA formation in GEOS-Chem: Application to isoprene. *European Aerosol Conference*, August, Gothenburg, Sweden.
- 2019 Bates, K. H., *et al.* An expanded definition of the odd oxygen family for tropospheric ozone budgets. *Gordon Research Conference on Atmospheric Chemistry*, July, Newry, ME.
- 2018 Bates, K. H., *et al.* Modeling the effects of isoprene oxidation and hydrogen shift reactions on HO_x, NO_x, and ozone. *American Geophysical Union Fall Meeting*, December, Washington, DC.
- 2018 Bates, K. H., *et al.* Coupled gas and particle phase modeling of isoprene SOA formation. *American Association for Aerosol Research*, September, St. Louis, MO.
- 2018 Bates, K. H., *et al.* New constraints on budgets of oxidized volatile organic compounds in the remote troposphere. *iCACGP-IGAC*, September, Takamatsu, Kagawa, Japan.
- 2017 Bates, K. H., *et al.* Modeling the formation of secondary organic aerosol precursors from isoprene. *American Association for Aerosol Research*, October, Raleigh, NC.

- 2017 Bates, K. H., *et al.* A new explicit model of isoprene oxidation. *Gordon Research Conference on Atmospheric Chemistry*, August, Newry, ME.
- 2015 Bates, K. H., *et al.* AMS observations over coastal California from the Biological and Oceanic Atmospheric Study (BOAS). *American Geophysical Union Fall Meeting*, December, San Francisco, CA.
- 2015 Bates, K. H., *et al.* Recent revisions to isoprene photochemistry based on Caltech chamber and field data. *International GEOS-Chem Conference*, May, Cambridge, MA.
- 2014 Bates, K. H., *et al.* Photooxidation products of isoprene epoxydiol (IEPOX) and IEPOX-derived secondary organic aerosol. *American Geophysical Union Fall Meeting*, December, San Francisco, CA.
- 2014 Bates, K. H., *et al.* Photooxidation of isoprene epoxydiol (IEPOX)-derived secondary organic aerosol. *American Association for Aerosol Research*, October, Orlando, FL. (student poster competition winner)
- 2013 Bates, K. H., *et al.* Gas-phase production and loss of isoprene epoxydiols. *American Geophysical Union Fall Meeting*, December, San Francisco, CA.
- 2012 Bates, K. H., *et al.* Signature alkane ratios and hydrocarbon emission estimates for western Kern County oilfields. *American Geophysical Union Fall Meeting*, December, San Francisco, CA.

AFFILIATIONS

American Geophysical Union (AGU)	member	2012 -
American Association for Aerosol Research (AAAR)	member	2014 -
American Meteorological Society	member	2018 -
American Chemical Society	member	2019 -

ACTIVITIES AND LEADERSHIP

Editor, <i>Atmospheric Chemistry & Physics</i>		2024 -
Co-chair, Chemistry Working Group, GEOS-Chem model steering committee		2024 -
Member, Mechanical Engineering Graduate Committee, CU Boulder		2024 -
University coordinating partner, EPA-NOAA CRACMM collaboration team		2024 -
Chemistry subgroup leader, Atmospheric Chemistry Modeling Group, Harvard		2018 - 2023
Coordinator, Atmospheric & Environmental Chemistry Seminar Series, Harvard		2017 - 2019
Resident Associate, Page House, Caltech		2014 - 2017
Communications Officer, Science and Engineering Policy at Caltech (SEPAC)		2015 - 2017
President & Treasurer, Caltech PRISM (LGBTQ organization)		2013 - 2016