

LARRY WAYNE HOROWITZ

Geophysical Fluid Dynamics Laboratory/NOAA • Princeton University
201 Forrestal Road • Princeton, NJ 08540
(609) 452-6520 • Fax (609) 987-5063 • Larry.Horowitz@noaa.gov • <http://www.gfdl.noaa.gov>

PROFESSIONAL EXPERIENCE

2008-present **PRINCETON UNIVERSITY**, Princeton, New Jersey
Lecturer, Department of Geosciences, Program in Atmospheric and Oceanic Sciences

2001-present **GEOPHYSICAL FLUID DYNAMICS LABORATORY**, Princeton, New Jersey
Physical Scientist
Leader, Atmospheric Chemistry and Climate Group (2012-2018)
Deputy Leader, Earth System Processes and Interactions Division (2018-)

My research focuses on tropospheric trace gases and aerosols. I develop and apply global Earth system models to study the chemical and dynamical processes affecting atmospheric composition.

1999-2001 **GEOPHYSICAL FLUID DYNAMICS LABORATORY**, Princeton, New Jersey
Visiting Scientist, Atmospheric and Oceanic Sciences Program, Princeton University

My work aimed to improve our understanding of the processes controlling tropospheric trace gas distributions. I used global chemical transport models to study the impact of chemistry and transport on ozone and related chemical species.

1997-1999 **NATIONAL CENTER FOR ATMOSPHERIC RESEARCH**, Boulder, Colorado
Postdoctoral Fellow, Advanced Study Program / Atmospheric Chemistry Division

My research focused on simulating the chemistry of ozone and related species in the troposphere. Using a three-dimensional global model, I studied the dependence of ozone on emissions of precursors from anthropogenic and natural sources.

EDUCATION

1993-1997 **HARVARD UNIVERSITY**, Cambridge, Massachusetts
Ph.D. in Atmospheric Chemistry/Applied Mathematics, Division of Engineering and Applied Sciences, degree received November 1997
Committee: Professors Daniel Jacob (advisor), Michael McElroy, Steven Wofsy

My research focused on the tropospheric photochemistry of ozone, nitrogen oxides, and non-methane hydrocarbons. I developed a photochemical mechanism describing the reactions occurring within the continental boundary layer and the global troposphere, for use in chemical models. Using a three-dimensional chemical transport model, I examined the impact of non-methane hydrocarbon chemistry on the global distributions of ozone and nitrogen oxides. Thesis title: The influence of boundary layer chemistry on global tropospheric ozone and nitrogen oxides.

LARRY WAYNE HOROWITZ

- 1991-1993 **HARVARD UNIVERSITY**, Cambridge, Massachusetts
S.M. in Applied Physics, Division of Applied Sciences

Emphasis on the chemistry and physics of the atmosphere. Additional courses in applied mathematics, including numerical techniques.
- Summer 1990 **WEIZMANN INSTITUTE OF SCIENCE**, Rehovot, Israel

Research on spectroscopy in molecular jets, Department of Chemical Physics, Karyn Kupcinec International Science School, funded to attend.
- 1987-1991 **HARVARD COLLEGE**, Cambridge, Massachusetts
A.B. summa cum laude in Chemistry
Advisors: Professors Elias Corey, William Klemperer

HONORS AND AWARDS

- 2022 **Administrator's Award**, National Oceanic and Atmospheric Administration
2017 **Atmospheric Sciences Ascent Award**, American Geophysical Union
2014-2022 **Highly Cited Researcher**, Thomson Reuters / Clarivate Analytics
2012 **Gold Medal**, Department of Commerce
2009 **Outstanding Scientific Paper Award**, National Oceanic and Atmospheric Administration, Office of Oceanic and Atmospheric Research
2009 **Silver Medal**, Department of Commerce
2008 **Administrator's Award**, National Oceanic and Atmospheric Administration
2008 **Editors' Citation** for Excellence in Reviewing, Geophysical Research Letters
2005 **Silver Medal**, Department of Commerce
1993-1996 **NASA Graduate Student Fellowship in Global Change Research**
 Provided funding for tuition, stipend, and travel
1991-1993 **Ernst Habicht Fellowship**, Harvard University
 Provided funding for tuition and stipend
1991 Elected to **Phi Beta Kappa**
1987-1991 **John Harvard Scholarship**, Harvard College, for academic achievement

TEACHING EXPERIENCE

- 2003-present **Princeton University Visiting Lecturer**, Atmospheric and Oceanic Sciences Program
 Atmospheric Chemistry, graduate-level class
- 1992-1997 **Harvard University Teaching Fellow**, Department of Earth and Planetary Sciences
 Environmental Sciences, Professors Brian Farrell and Michael McElroy
 Chemical Oceanography, Professor Heinrich Holland, graduate-level class
 Atmospheric Chemistry, Professor Daniel Jacob
 Environmental Pollution, Professors Raymond Siever and Daniel Jacob
- Fall 1993 **Harvard University Teaching Fellow**, Undergraduate Core Curriculum Program
 The Atmosphere, Professors Michael McElroy and Daniel Jacob

LARRY WAYNE HOROWITZ

1990-1991 **Harvard University Course Assistant**, Department of Mathematics
 Linear Algebra and Differential Equations, Professor Shlomo Sternberg
 Multivariable Calculus, Professor David Kazhdan

PROFESSIONAL SERVICE AND AFFILIATIONS

2021-present **Science Personnel Management Advisory Committee**, GFDL, Member
2017-present **Earth System Working Group**, GFDL Model Development Team, co-Chair
2016-2018 **Fourth National Climate Assessment**, Air Quality Chapter, Author
2016-present **GFDL High-Performance Computing Advisory Group**, Member
2013-present **GFDL Diagnostics and Evaluation Team**, co-Chair (2013-2019)
2013-2018 **Graduate Work Committee**, Atmospheric and Oceanic Sciences, Princeton University
2007-2016 **Personnel Management Advisory Committee (PMAC IV)**, GFDL, Member
 (Chair 2012-2016)
2002-present **Science**, Reviewer
2001-present **Atmospheric Chemistry and Physics**, Reviewer
2001-present **Geophysical Research Letters**, Reviewer
1999-present **Atmospheric Environment**, Reviewer
1999-present **Journal of Atmospheric Chemistry**, Reviewer
1999-present **National Science Foundation, Division of Atmospheric Sciences**, Reviewer
1998-present **Journal of Geophysical Research - Atmospheres**, Reviewer
1998-present **NASA Office of Earth Science, Atmospheric Chemistry Modeling and Analysis
Program and Atmospheric Composition: Campaign Data Analysis and Modeling**,
Reviewer
1996-present **American Geophysical Union**, Member

PUBLICATIONS

Akritidis, D., S. Bacer, P. Zanis, A.K. Georgoulis, S. Chowdhury, L.W. Horowitz, V. Naik, F.M. O'Connor, J. Keeble, P. Le Sager, T. van Noije, P. Zhou, S. Turnock, J.J. West, J. Lelieveld, and A. Pozzer, Strong increase in mortality attributable to ozone pollution under a climate change and demographic scenario, *Environ. Res. Lett.*, *19*, 024041, <https://doi.org/10.1088/1748-9326/ad2162>, 2024.

Allen, R.J., J. Gomez, L.W. Horowitz, and E. Shevliakova, Enhanced future vegetation growth with elevated carbon dioxide concentrations could increase fire activity, *Commun. Earth Environ.*, *5*, 54, <https://doi.org/10.1038/s43247-024-01228-7>, 2024.

Shevliakova, E., S. Malyshev, I. Martinez-Cano, P.C.D. Milly, S.W. Pacala, P. Ginoux, K.A. Dunne, J.P. Dunne, C. Dupuis, K.L. Findell, K. Ghannam, L.W. Horowitz, T.K. Knutson, J.P. Krasting, V. Naik, P. Phillips, N. Zadeh, Y. Yu, F. Zeng, Y. Zeng, The land component LM4.1 of the GFDL Earth System Model ESM4.1: Biophysical and biogeochemical processes and interactions with climate, *J. Adv. Model. Earth Syst.*, in press, 2024.

Yang, W., E. Wallace, G.A. Vecchi, J.P. Donnelly, J. Emile-Geay, G.J. Hakim, L.W. Horowitz, R.M. Sullivan, R. Tardif, P.J. van Hengstum, and T.S. Winkler, Last millennium hurricane activity linked to endogenous climate variability. *Nat. Commun.*, *15*, 816, <https://doi.org/10.1038/s41467-024-45112-6>, 2024.

LARRY WAYNE HOROWITZ

- Ahsan, H., H. Wang, J. Wu, M. Wu, S.J. Smith, S. Bauer, H. Suchyta, D. Olivié, G. Myhre, H. Matsui, H. Bian, J.-F. Lamarque, K. Carslaw, L. Horowitz, L. Regayre, M. Chin, M. Schulz, R.B. Skeie, T. Takemura, and V. Naik, The Emissions Model Intercomparison Project (Emissions-MIP): quantifying model sensitivity to emission characteristics, *Atmos. Chem. Phys.*, **23**, 14,779–14,799, <https://doi.org/10.5194/acp-23-14779-2023>, 2023.
- Chua, G., V. Naik, and L.W. Horowitz, Exploring the Drivers of Tropospheric Hydroxyl Radical Trends in the GFDL AM4.1 Atmospheric Chemistry-Climate Model, *Atmos. Chem. Phys.*, **23**, 4955–4975, <https://doi.org/10.5194/acp-23-4955-2023>, 2023.
- Gao, C.Y., V. Naik, L.W. Horowitz, P. Ginoux, F. Paulot, J. Dunne, M. Mills, V. Aquila, and P. Colarco, Volcanic drivers of stratospheric sulfur in GFDL ESM4, *J. Adv. Model. Earth Syst.*, **15**, e2022MS003532, <https://doi.org/10.1029/2022MS003532>, 2023.
- Gomez, J., R.J. Allen, S.T. Turnock, L.W. Horowitz, K. Tsigaridis, S.E. Bauer, D. Olivié, E.S. Thomson, and P. Ginoux, The projected future degradation in air quality is caused by more abundant natural aerosols in a warmer world, *Commun. Earth Environ.*, **4**(22), DOI:10.1038/s43247-023-00688-7, 2023.
- Morgenstern, O., D.E. Kinnison, M.J. Mills, M. Michou, L.W. Horowitz, P. Lin, M. Deushi, K. Yoshida, F.M. O'Connor, Y. Tang, N.L. Abraham, J. Keeble, F. Dennison, E. Rozanov, T. Egorova, T. Sukhodolov, and G. Zeng, Comparison of Arctic and Antarctic stratospheric dynamics in chemistry versus no-chemistry climate models, *J. Geophys. Res. Atmos.*, **127**, e2022JD037123, <https://doi.org/10.1029/2022JD037123>, 2022.
- Schmidt, G.A., T. Andrews, S.E. Bauer, P.J. Durack, N.G. Loeb, V. Ramaswamy, N.P. Arnold, M.G. Bosilovich, J. Cole, L.W. Horowitz, G.C. Johnson, J.M. Lyman, B. Medeiros, T. Michibata, D. Olonscheck, D. Paynter, S.P. Raghuraman, M. Schulz, D. Takasuka, V. Tallapragada, P.C. Taylor, and T. Ziehn, CERESMIP: A climate modeling protocol to investigate recent trends in the Earth's Energy Imbalance, *Front. Clim.*, **5**:1202161, doi: 10.3389/fclim.2023.1202161, 2023.
- Yang, H., X. Huang, D.M. Westervelt, L. Horowitz, and W. Peng, Socio-demographic factors shaping the future global health burden from air pollution, *Nat. Sustain.*, **6**, 58–68, 2023, <https://doi.org/10.1038/s41893-022-00976-8>
- Zheng, Y., L.W. Horowitz, R. Menzel, D.J. Paynter, V. Naik, J. Li, and J. Mao, Anthropogenic amplification of biogenic secondary organic aerosol production, *Atmos. Chem. Phys.*, **23**, 8993–9007, <https://doi.org/10.5194/acp-23-8993-2023>, 2023.
- Bowman, H., S. Turnock, S.E. Bauer, K. Tsigaridis, M. Deushi, N. Oshima, F.M. O'Connor, L. Horowitz, T. Wu, J. Zhang, D. Kubistin, and D.D. Parrish, Changes in anthropogenic precursor emissions drive shifts in the ozone seasonal cycle throughout the northern midlatitude troposphere, *Atmos. Chem. Phys.*, **22**, 3507–3524, <https://doi.org/10.5194/acp-22-3507-2022>, 2022.
- Morgenstern, O., D.E. Kinnison, M. Mills, M. Michou, L.W. Horowitz, P. Lin, M. Deushi, K. Yoshida, F.M. O'Connor, Y. Tang, N.L. Abraham, J. Keeble, F. Dennison, E. Rozanov, T. Egorova, T. Sukhodolov, and G. Zeng, Comparison of Arctic and Antarctic stratospheric climates in chemistry versus no-chemistry climate models, *J. Geophys. Res. Atmos.*, **127**, e2022JD037123, <https://doi.org/10.1029/2022JD037123>, 2022.

LARRY WAYNE HOROWITZ

- Paulot, F., V. Naik, and L.W. Horowitz, Reduction in near-surface wind speeds with increasing CO₂ may worsen winter air quality in the Indo-Gangetic Plain, *Geophys. Res. Lett.*, *49*, e2022GL099039, <https://doi.org/10.1029/2022GL099039>, 2022.
- Xie, Y., M. Lin, B. Decharme, C. Delire, L.W. Horowitz, D.M. Lawrence, F. Li, and R. Séférian, Tripling of western US particulate pollution from wildfires in a warming climate, *Proc. Natl. Acad. Sci.*, *119*(14), e2111372119, doi:10.1073/pnas.2111372119, 2022.
- Yang, H., X. Huang, D.M. Westervelt, D.M., L. Horowitz, and W. Peng, Socio-demographic factors shaping the future global health burden from air pollution, *Nat. Sustain.*, <https://doi.org/10.1038/s41893-022-00976-8>, 2022.
- Zanis, P., D. Akritidis, S. Turnock, V. Naik, S. Szopa, A.K. Georgoulas, S.E. Bauer, M. Deushi, L.W. Horowitz, J. Keeble, P. Le Sager, F.M. O'Connor, N. Oshima, K. Tsigaridis, and T. van Noije, Climate change penalty and benefit on surface ozone: a global perspective based on CMIP6 earth system models, *Environ. Res. Lett.*, *17*, 024014, 2022.
- Zeng, G., O. Morgenstern, J.H.T. Williams, F.M. O'Connor, P.T. Griffiths, J. Keeble, M. Deushi, L.W. Horowitz, V. Naik, L.K. Emmons, N.L. Abraham, A.T. Archibald, S.E. Bauer, B. Hassler, M. Michou, M.J. Mills, L.T. Murray, N. Oshima, L.T. Sentman, S. Tilmes, K. Tsigaridis, and P.J. Young, Attribution of stratospheric and tropospheric ozone changes between 1850 and 2014 in CMIP6 models, *J. Geophys. Res. Atmos.*, *127*, e2022JD036452, <https://doi.org/10.1029/2022JD036452>, 2022.
- Allen, R.J., L.W. Horowitz, V. Naik, N. Oshima, F.M. O'Connor, S. Turnock, S. Shim, P. Le Sager, T. van Noije, K. Tsigaridis, S.E. Bauer, L.T. Sentman, J.G. John, C. Broderick, M. Deushi, G.A. Folberth, S. Fujimori, and W.J. Collins, Significant climate benefits from near-term climate forcer mitigation in spite of aerosol reductions, *Environ. Res. Lett.*, *16*, 034010, 2021.
- Derwent, R.G., D.D. Parrish, A.T. Archibald, M. Deushi, S.E. Bauer, K. Tsigaridis, D. Shindell, L.W. Horowitz, M.A.H. Khan, D.E. Shallcross, Intercomparison of the representations of the atmospheric chemistry of pre-industrial methane and ozone in earth system and other global chemistry-transport models, *Atmos. Environ.*, *248*, 118248, <https://doi.org/10.1016/j.atmosenv.2021.118248>, 2021.
- Griffiths, P.T., L.T. Murray, G. Zeng, Y.M. Shin, N.L. Abraham, A.T. Archibald, M. Deushi, L.K. Emmons, I.E. Galbally, B. Hassler, L.W. Horowitz, J. Keeble, J. Liu, O. Moeini, V. Naik, F.M. O'Connor, N. Oshima, D. Tarasick, S. Tilmes, S.T. Turnock, O. Wild, P.J. Young, and P. Zanis, Tropospheric ozone in CMIP6 simulations, *Atmos. Chem. Phys.*, *21*, 4187-4218, <https://doi.org/10.5194/acp-21-4187-2021>, 2021.
- He, J., V. Naik, and L.W. Horowitz, Hydroxyl radical (OH) response to meteorological forcing and implication for the methane budget, *Geophys. Res. Lett.*, *48*, e2021GL094140, <https://doi.org/10.1029/2021GL094140>, 2021.
- Keeble, J., B. Hassler, A. Banerjee, R. Checa-Garcia, G. Chiodo, S. Davis, V. Eyring, P.T. Griffiths, O. Morgenstern, P. Nowack, G. Zeng, J. Zhang, G. Bodeker, S. Burrows, P. Cameron-Smith, D. Cugnet, C. Danek, M. Deushi, L.W. Horowitz, A. Kubin, L. Li, G. Lohmann, M. Michou, M.J. Mills, P. Nabat, D. Olivié, S. Park, Ø. Seland, J. Stoll, K.-H. Wieners, and T. Wu, Evaluating stratospheric ozone and water vapor changes in CMIP6 models from 1850 to 2100, *Atmos. Chem. Phys.*, *21*, 5015-5061, <https://doi.org/10.5194/acp-21-5015-2021>, 2021.

LARRY WAYNE HOROWITZ

- Ming, Y., N.G. Loeb, P. Lin, Z. Shen, V. Naik, C.E. Singer, R.X. Ward, F. Paulot, Z. Zhang, N. Bellouin, L.W. Horowitz, P.A. Ginoux, and V. Ramaswamy, Assessing the influence of COVID-19 on the shortwave radiative fluxes over the East Asian marginal seas, *Geophys. Res. Lett.*, **48**, e2020GL091699, <https://doi.org/10.1029/2020GL091699>, 2021.
- Murray, L.T., A.M. Fiore, D.T. Shindell, V. Naik, and L.W. Horowitz, Large uncertainties in global hydroxyl projections tied to fate of reactive nitrogen and carbon, *Proc. Natl. Acad. Sci.*, **118**, e2115204118, doi:10.1073/pnas.2115204118, 2021.
- Paulot, F., D. Paynter, V. Naik, S. Malyshev, R. Menzel, and L.W. Horowitz, Global modeling of hydrogen using GFDL-AM4.1: Sensitivity of soil removal and radiative forcing, *Int. J. Hydrog. Energy*, <https://doi.org/10.1016/j.ijhydene.2021.01.088>, **46**(24), 13,446-13,460, 2021.
- Thornhill, G., W. Collins, D. Oliv  , R.B. Skeie, A. Archibald, S. Bauer, R. Checa-Garcia, S. Fiedler, G. Folberth, A. G  rmondson, L. Horowitz, J.-F. Lamarque, M. Michou, J. Mulcahy, P. Nabat, V. Naik, F.M. O'Connor, F. Paulot, M. Schulz, C.E. Scott, R. S  f  rian, C. Smith, T. Takemura, S. Tilmes, K. Tsigaridis, and J. Weber, Climate-driven chemistry and aerosol feedbacks in CMIP6 Earth system models, *Atmos. Chem. Phys.*, **21**, 1105-1126, <https://doi.org/10.5194/acp-21-1105-2021>, 2021.
- Thornhill, G.D., W.J. Collins, R.J. Kramer, D. Oliv  , R.B. Skeie, F.M. O'Connor, N.L. Abraham, R. Checa-Garcia, S.E. Bauer, M. Deushi, L.K. Emmons, P.M. Forster, L.W. Horowitz, B. Johnson, J. Keeble, J.-F. Lamarque, M. Michou, M.J. Mills, J.P. Mulcahy, G. Myhre, P. Nabat, V. Naik, N. Oshima, M. Schulz, C.J. Smith, T. Takemura, S. Tilmes, T. Wu, G. Zeng, and J. Zhang, Effective radiative forcing from emissions of reactive gases and aerosols—a multi-model comparison, *Atmos. Chem. Phys.*, **21**, 853-874, <https://doi.org/10.5194/acp-21-853-2021>, 2021.
- Allen, R.J., S. Turnock, P. Nabat, D. Neubauer, U. Lohmann, D. Oliv  , N. Oshima, M. Michou, T. Wu, J. Zhang, T. Takemura, M. Schulz, K. Tsigaridis, S.E. Bauer, L. Emmons, L. Horowitz, V. Naik, T. van Noije, T. Bergman, J.-F. Lamarque, P. Zanis, I. Tegen, D.M. Westervelt, P. Le Sager, P. Good, S. Shim, F. O'Connor, D. Akritidis, A.K. Georgoulias, M. Deushi, L.T. Sentman, S. Fujimori, and W.J. Collins, Climate and air quality impacts due to mitigation of non-methane near-term climate forcers, *Atmos. Chem. Phys.*, **20**, 9641-9663, <https://doi.org/10.5194/acp-20-9641-2020>, 2020.
- Baublitz, C.B., A.M. Fiore, O.E. Clifton, J. Mao, J. Li, G. Correa, Daniel M. Westervelt, L.W. Horowitz, F. Paulot, and A.P. Williams, Sensitivity of tropospheric ozone over the Southeast USA to dry deposition, *Geophys. Res. Lett.*, **47**, e2020GL087158, <https://doi.org/10.1029/2020GL087158>, 2020.
- Clifton, O.E., D.L. Lombardozzi, A.M. Fiore, F. Paulot, and L.W. Horowitz, Stomatal conductance influences interannual variability and long-term changes in regional cumulative plant uptake of ozone, *Environ. Res. Lett.*, **15**, 114059, 2020.
- Clifton, O.E., F. Paulot, A.M. Fiore, L.W. Horowitz, G. Correa, C.B. Baublitz, S. Fares, I. Goded, A.H. Goldstein, C. Gruening, A.J. Hogg, B. Loubet, I. Mammarella, J.W. Munger, L. Neil, P. Stella, J. Uddling, T. Vesala, and E. Weng, Influence of dynamic ozone dry deposition on ozone pollution, *J. Geophys. Res. Atmos.*, **125**, e2020JD032398, <https://doi.org/10.1029/2020JD032398>, 2020.

LARRY WAYNE HOROWITZ

- Dunne, J.P., L.W. Horowitz, A.J. Adcroft, P. Ginoux, I.M. Held, J.G. John, J.P. Krasting, S. Malyshev, V. Naik, F. Paulot, E. Shevliakova, C.A. Stock, N. Zadeh, V. Balaji, C. Blanton, K.A. Dunne, C. Dupuis, J. Durachta, R. Dussin, P.P.G. Gauthier, S.M. Griffies, H. Guo, R.W. Hallberg, M. Harrison, J. He, W. Hurlin, C. McHugh, R. Menzel, P.C.D. Milly, S. Nikonov, D.J. Paynter, J. Ploshay, A. Radhakrishnan, K. Rand, B.G. Reichl, T. Robinson, D.M. Schwarzkopf, L.T. Sentman, S. Underwood, H. Vahlenkamp, M. Winton, A.T. Wittenberg, B. Wyman, Y. Zeng, and M. Zhao, The GFDL Earth System Model version 4.1 (GFDL-ESM4.1): Overall coupled model description and simulation characteristics, *J. Adv. Model. Earth Syst.*, *12*, e2019MS002015, <https://doi.org/10.1029/2019MS002015>, 2020.
- He, J., V. Naik, L.W. Horowitz, E. Dlugokencky, and K. Thoning, Investigation of the global methane budget over 1980-2017 using GFDL-AM4.1, *Atmos. Chem. Phys.*, *20*, 805-827, <https://doi.org/10.5194/acp-20-805-2020>, 2020.
- Horowitz, L.W., V. Naik, F. Paulot, P.A. Ginoux, J.P. Dunne, J. Mao, J. Schnell, X. Chen, J. He, J.G. John, M. Lin, P. Lin, S. Malyshev, D. Paynter, E. Shevliakova, M. Zhao, The GFDL Global Atmospheric Chemistry-Climate Model AM4.1: Model Description and Simulation Characteristics, *J. Adv. Model. Earth Syst.*, *12*, e2019MS002032, <https://doi.org/10.1029/2019MS002032>, 2020.
- Jacobson, T.W.P., W. Yang, G.A. Vecchi, and L.W. Horowitz, Impact of volcanic aerosol hemispheric symmetry on Sahel rainfall, *Clim. Dyn.*, *55*, 1733-1758, <https://doi.org/10.1007/s00382-020-05347-7>, 2020.
- Lin, M., L.W. Horowitz, Y. Xie, F. Paulot, S. Malyshev, E. Shevliakova, A. Finco, G. Gerosa, D. Kubistin, and K. Pilegaard, Vegetation feedbacks during drought exacerbate ozone air pollution extremes in Europe, *Nat. Clim. Chang.*, *10*, 444-451, doi:10.1038/s41558-020-0743-y, 2020.
- Morgenstern, O., F.M. O'Connor, B.T. Johnson, G. Zeng, J.P. Mulcahy, J. Williams, J. Teixeira, M. Michou, P. Nabat, L.W. Horowitz, V. Naik, L.T. Sentman, M. Deushi S.E. Bauer, K. Tsigaridis, D.T. Shindell, and D.E. Kinnison, Reappraisal of the climate impacts of ozone-depleting substances, *Geophys. Res. Lett.*, *47*, e2020GL088295, <https://doi.org/10.1029/2020GL088295>, 2020.
- Paulot, F., D. Paynter, M. Winton, P. Ginoux, M. Zhao, and L.W. Horowitz, Revisiting the impact of sea salt on climate sensitivity, *Geophys. Res. Lett.*, *47*, e2019GL085601, <https://doi.org/10.1029/2019GL085601>, 2020.
- Paulot, F., C. Stock, J.G. John, N. Zadeh, and L.W. Horowitz, Ocean ammonia outgassing: Modulation by CO₂ and anthropogenic nitrogen deposition, *J. Adv. Model. Earth Syst.*, *12*, e2019MS002026, <https://doi.org/10.1029/2019MS002026>, 2020.
- Schnell, J.L., V. Naik, L.W. Horowitz, F. Paulot, P. Ginoux, M. Zhao, and D.E. Horton, Corrigendum to "Air quality impacts from the electrification of light-duty passenger vehicles in the United States" [Atmos. Environ. 208 (2019) 95–102], *Atmos. Environ.*, *229*, 117487, <https://doi.org/10.1016/j.atmosenv.2020.117487>, 2020.
- Skeie, R.B., G. Myhre, Ø. Hodnebrog, P.J. Cameron-Smith, M. Deushi, M.I. Hegglin, L.W. Horowitz, R.J. Kramer, M. Michou, M.J. Mills, D.J.L. Olivé, F.M. O'Connor, D. Paynter, B.H. Samset, A. Sellar, D. Shindell, T. Takemura, S. Tilmes, and T. Wu, Historical total ozone radiative forcing derived from CMIP6 simulations, *npj Clim. Atmos. Sci.*, *3*, 32, <https://doi.org/10.1038/s41612-020-00131-0>, 2020.

LARRY WAYNE HOROWITZ

- Stevenson, D.S., A. Zhao, V. Naik, F.M. O'Connor, S. Tilmes, G. Zeng, L.T. Murray, W.J. Collins, P. Griffiths, S. Shim, L.W. Horowitz, L. Sentman, and L. Emmons, Trends in global tropospheric hydroxyl radical and methane lifetime since 1850 from AerChemMIP, *Atmos. Chem. Phys.*, **20**, 12,905-12,920, <https://doi.org/10.5194/acp-20-12905-2020>, 2020.
- Turnock, S.T., R.J. Allen, M. Andrews, S.E. Bauer, L. Emmons, P. Good, L. Horowitz, M. Michou, P. Nabat, V. Naik, D. Neubauer, F.M. O'Connor, D. Olivié, M. Schulz, A. Sellar, T. Takemura, S. Tilmes, K. Tsigaridis, T. Wu, and J. Zhang, Historical and future changes in air pollutants from CMIP6 models, *Atmos. Chem. Phys.*, **20**, 14547-14579, <https://doi.org/10.5194/acp-20-14547-2020>, 2020.
- Westervelt, D.M., N.R. Mascioli, A.M. Fiore, A.J. Conley, J.-F. Lamarque, D.T. Shindell, G. Faluvegi, M. Previdi, G. Correa, and L.W. Horowitz, Local and remote mean and extreme temperature response to regional aerosol emissions reductions, *Atmos. Chem. Phys.*, **20**, 3009-3027, <https://doi.org/10.5194/acp-20-3009-2020>, 2020.
- Xie, Y., M. Lin, and L.W. Horowitz, Summer PM_{2.5} pollution extremes caused by wildfires over the western United States during 2017-2018, *Geophys. Res. Lett.*, **47**, e2020GL089429, 2020. <https://doi.org/10.1029/2020GL089429>
- 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.*, **20**, 10,379-10,400, <https://doi.org/10.5194/acp-20-10379-2020>, 2020.
- Held, I.M., H. Guo, A. Adcroft, J.P. Dunne, L.W. Horowitz, J. Krasting, E. Shevliakova, M. Winton, M. Zhao, M. Bushuk, A.T. Wittenberg, B. Wyman, B. Xiang, R. Zhang, W. Anderson, V. Balaji, L. Donner, K. Dunne, J. Durachta, P.P.G. Gauthier, P. Ginoux, J.-C. Golaz, S.M. Griffies, R. Hallberg, L. Harris, M. Harrison, W. Hurlin, J. John, P. Lin, S.-J. Lin, S. Malyshev, R. Menzel, P.C.D. Milly, Y. Ming, V. Naik, D. Paynter, F. Paulot, V. Ramawsamy, B. Reichl, T. Robinson, A. Rosati, C. Seman, L.G. Silvers, S. Underwood, and N. Zadeh, Structure and performance of GFDL's CM4.0 climate model, *J. Adv. Model. Earth Syst.*, **11**, <https://doi.org/10.1029/2019MS001829>, 2019.
- Irvine, P., K. Emanuel, J. He, L.W. Horowitz, G. Vecchi, and D. Keith, Halving warming with idealized solar geoengineering moderates key climate hazards, *Nature Clim. Change*, **9**, 295-299, doi:10.1038/s41558-019-0398-8, 2019.
- Lin, M., S. Malyshev, E. Shevliakova, F. Paulot, L.W. Horowitz, S. Fares, T.N. Mikkelsen, and L. Zhang, Sensitivity of ozone dry deposition to ecosystem-atmosphere interactions: A critical appraisal of observations and simulations, *Global Biogeochem. Cycles*, **33**, 1264-1288, <https://doi.org/10.1029/2018GB006157>, 2019.
- Qin, Y., Y. Fang, X. Li, V. Naik, L.W. Horowitz, J. Liu, N. Scovronick, and D.L. Mauzerall, Source attribution of black carbon affecting regional air quality, premature mortality and glacial deposition in 2000, *Atmos. Environ.*, **206**, 144-155, doi:10.1016/j.atmosenv.2019.02.048, 2019.
- Schnell, J.L., V. Naik, L.W. Horowitz, F. Paulot, P. Ginoux, M. Zhao, and D.E. Horton, Air quality impacts from the electrification of light-duty passenger vehicles in the United States, *Atmos. Environ.*, **208**, 95-102, 2019.

LARRY WAYNE HOROWITZ

- Yang, W., G. Vecchi, S. Fueglistaler, L.W. Horowitz, D.J. Luet, Á.G. Muñoz, D. Paynter, and S. Underwood, Climate impacts from large volcanic eruptions in a high-resolution climate model: The importance of forcing structure, *Geophys. Res. Lett.*, *46*, 7690-7699, <https://doi.org/10.1029/2019GL082367>, 2019.
- Conley, A.J., D.M. Westervelt, J.F. Lamarque, A.M. Fiore, D. Shindell, G. Correa, G. Faluvegi, and L.W. Horowitz, Multimodel surface temperature responses to removal of U.S. sulfur dioxide emissions, *J. Geophys. Res. Atmos.*, *123*, 2773-2796, <https://doi.org/10.1002/2017JD027411>, 2018.
- Dhomse, S., D. Kinnison, M.P. Chipperfield, I. Cionni, M. Hegglin, N.L. Abraham, H. Akiyoshi, A.T. Archibald, E.M. Bednarz, S. Bekki, P. Braesicke, N. Butchart, M. Dameris, M. Deushi, S. Frith, S.C. Hardiman, B. Hassler, L.W. Horowitz, R.-M. Hu, P. Jöckel, B. Josse, O. Kirner, S. Kremser, U. Langematz, J. Lewis, M. Marchand, M. Lin, E. Mancini, V. Marécal, M. Michou, O. Morgenstern, F.M. O'Connor, L. Oman, G. Pitari, D.A. Plummer, J.A. Pyle, L.E. Revell, E. Rozanov, R. Schofield, A. Stenke, K. Stone, K. Sudo, S. Tilmes, D. Vioni, Y. Yamashita, and G. Zeng, Estimates of ozone return dates from Chemistry-Climate Model Initiative simulations, *Atmos. Chem. Phys.*, *18*, 8409-8438, <https://doi.org/10.5194/acp-18-8409-2018>, 2018.
- Fiore, A. M., E.V. Fischer, G.P. Milly, S. Pandey Deolal, O. Wild, D.A. Jaffe, J. Staehelin, O.E. Clifton, D. Bergmann, W. Collins, F. Dentener, R.M. Doherty, B.N. Duncan, B. Fischer, S. Gilge, P.G. Hess, L.W. Horowitz, A. Lupu, I.A. MacKenzie, R. Park, L. Ries, M.G. Sanderson, M.G. Schultz, D.T. Shindell, M. Steinbacher, D.S. Stevenson, S. Szopa, C. Zellweger, and G. Zeng, Peroxy acetyl nitrate (PAN) measurements at northern midlatitude mountain sites in April: A constraint on continental source-receptor relationships, *Atmos. Chem. Phys.*, *18*, 15345-15361, <https://doi.org/10.5194/acp-18-15345-2018>, 2018.
- Li, J., J. Mao, A.M. Fiore, R.C. Cohen, J.D. Crounse, A.P. Teng, P.O. Wennberg, B.H. Lee, F.-D. Lopez-Hilfiker, J.A. Thornton, J. Peischl, I.B. Pollack, T.B. Ryerson, P. Veres, J.M. Roberts, J.A. Neuman, J.B. Nowak, G.M. Wolfe, T.F. Hanisco, A. Fried, H.B. Singh, J. Dibb, F. Paulot, and L.W. Horowitz, Decadal changes in summertime reactive oxidized nitrogen and surface ozone over the Southeast United States, *Atmos. Chem. Phys.*, *18*, 2341-2361, doi:10.5194/acp-18-2341-2018, 2018.
- Mao, J., A. Carlton, R.C. Cohen, W.H. Brune, S.S. Brown, G.M. Wolfe, J.L. Jimenez, H.O.T. Pye, N. Lee Ng, L. Xu, V.F. McNeill, K. Tsigradis, B.C. McDonald, C. Warneke, A. Guenther, M.J. Alvarado, J. de Gouw, L.J. Mickley, E.M. Leibensperger, R. Mathur, C.G. Nolte, R.W. Portmann, N. Unger, M. Tosca, and L.W. Horowitz, Southeast Atmosphere Studies: learning from model-observation syntheses, *Atmos. Chem. Phys.*, *18*, 2615-2651, <https://doi.org/10.5194/acp-18-2615-2018>, 2018.
- Nolte, C.G., P.D. Dolwick, N. Fann, L.W. Horowitz, V. Naik, R.W. Pinder, T.L. Spero, D.A. Winner, and L.H. Ziska, Air Quality, in *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)], U.S. Global Change Research Program, Washington, DC, USA, pp. 512-538, doi: 10.7930/NCA4.2018.CH13, 2018.
- Paulot, F., S. Malyshev, T. Nguyen, J.D. Crounse, E. Shevliakova, and L.W. Horowitz, Representing sub-grid scale variations in nitrogen deposition associated with land use in a global Earth System Model: implications for present and future nitrogen deposition fluxes over North America, *Atmos. Chem. Phys.*, *18*, 17963-17978, <https://doi.org/10.5194/acp-18-17963-2018>, 2018.

LARRY WAYNE HOROWITZ

- Paulot, F., D. Paynter, P. Ginoux, V. Naik, and L.W. Horowitz, Changes in the aerosol direct radiative forcing from 2001 to 2015: Observational constraints and regional mechanisms, *Atmos. Chem. Phys.*, *18*, 13265-13281, <https://doi.org/10.5194/acp-18-13265-2018>, 2018.
- Paynter, D., T.L. Frölicher, L.W. Horowitz, and L.G. Silvers, Equilibrium climate sensitivity obtained from multimillennial runs of two GFDL climate models, *J. Geophys. Res. Atmos.*, *123*, 1921-1941, <https://doi.org/10.1002/2017JD027885>, 2018.
- Rieder, H.E., A.M. Fiore, O.E. Clifton, G. Correa, L.W. Horowitz, and V. Naik, Combining model projections with site-level observations to estimate changes in distributions and seasonality of ozone in surface air over the U.S.A., *Atmos. Environ.*, *193*, 302-315, doi:10.1016/j.atmosenv.2018.07.042, 2018.
- Schnell, J. L., V. Naik, L.W. Horowitz, F. Paulot, J. Mao, P. Ginoux, M. Zhao, and K. Ram, Exploring the relationship between surface PM_{2.5} and meteorology in Northern India, *Atmos. Chem. Phys.*, *18*, 10157-10175, <https://doi.org/10.5194/acp-18-10157-2018>, 2018.
- Turner, A.J., I. Fung, V. Naik, L.W. Horowitz, and R.C. Cohen, Modulation of hydroxyl variability by ENSO in the absence of external forcing, *Proc. Natl. Acad. Sci.*, *115*, 8931-8936, doi:10.1073/pnas.1807532115, 2018.
- Westervelt, D.M., A.J. Conley, A.M. Fiore, J.-F. Lamarque, D.T. Shindell, M. Previdi, N.R. Mascioli, G. Faluvegi, G. Correa, and L.W. Horowitz, Connecting regional aerosol emissions reductions to local and remote precipitation responses, *Atmos. Chem. Phys.*, *18*, 12461-12475, <https://doi.org/10.5194/acp-18-12461-2018>, 2018.
- Zhao, M., J.-C. Golaz, I.M. Held, H. Guo, V. Balaji, R. Benson, J.-H. Chen, X. Chen, L.J. Donner, J.P. Dunne, K. Dunne, J. Durachta, S.-M. Fan, S.M. Freidenreich, S.T. Garner, P. Ginoux, L.M. Harris, L.W. Horowitz, J.P. Krasting, A.R. Langenhorst, Z. Liang, P. Lin, S.-J. Lin, S.L. Malyshev, E. Mason, P.C.D. Milly, Y. Ming, V. Naik, F. Paulot, D. Paynter, P. Philipps, A. Radhakrishnan, V. Ramaswamy, T. Robinson, D. Schwarzkopf, C.J. Seman, E. Shevliakova, Z. Shen, H. Shin, L.G. Silvers, J.R. Wilson, M. Winton, A.T. Wittenberg, B. Wyman, B. Xiang, The GFDL global atmosphere and land model AM4.0/LM4.0: 1. Simulation characteristics with prescribed SSTs, *J. Adv. Model. Earth Syst.*, *10*, <https://doi.org/10.1002/2017MS001208>, 2018.
- Zhao, M., J.-C. Golaz, I.M. Held, H. Guo, V. Balaji, R. Benson, J.-H. Chen, X. Chen, L.J. Donner, J.P. Dunne, K. Dunne, J. Durachta, S.-M. Fan, S.M. Freidenreich, S.T. Garner, P. Ginoux, L.M. Harris, L.W. Horowitz, J.P. Krasting, A.R. Langenhorst, Z. Liang, P. Lin, S.-J. Lin, S.L. Malyshev, E. Mason, P.C.D. Milly, Y. Ming, V. Naik, F. Paulot, D. Paynter, P. Philipps, A. Radhakrishnan, V. Ramaswamy, T. Robinson, D. Schwarzkopf, C.J. Seman, E. Shevliakova, Z. Shen, H. Shin, L.G. Silvers, J.R. Wilson, M. Winton, A.T. Wittenberg, B. Wyman, B. Xiang, The GFDL global atmosphere and land model AM4.0/LM4.0: 2. Model description, sensitivity studies, and tuning strategies, *J. Adv. Model. Earth Syst.*, *10*, <https://doi.org/10.1002/2017MS001209>, 2018.
- Choi, H.-D., H. Liu, J.H. Crawford, D.B. Considine, D.J. Allen, B.N. Duncan, L.W. Horowitz, J.M. Rodriguez, S.E. Strahan, L. Zhang, X. Liu, M.R. Damon, and S.D. Steenrod, Global O₃-CO correlations in a chemistry and transport model during July-August: Evaluation with TES satellite observations and sensitivity to input meteorological data and emissions, *Atmos. Chem. Phys.*, *17*, 8429-8452, doi:10.5194/acp-17-8429-2017, 2017.

LARRY WAYNE HOROWITZ

- Clifton, O.E., A.M. Fiore, J.W. Munger, S. Malyshev, L.W. Horowitz, E. Shevliakova, F. Paulot, L.T. Murray, and K. L. Griffin, Interannual variability in ozone removal by a temperate deciduous forest, *Geophys. Res. Lett.*, *44*, 542-552, doi:10.1002/2016GL070923, 2017.
- Guo, Y., J. Liu, D.L. Mauzerall, X. Li, L.W. Horowitz, W. Tao, and S. Tao, Long-lived species enhance summertime attribution of North American ozone to upwind sources, *Environ. Sci. Technol.*, *51*, doi:10.1021/acs.est.6b05664, 2017.
- Li, Z., J. Liu, D.L. Mauzerall, X. Li, S. Fan, L.W. Horowitz, C. He, K. Yi, and S. Tao, A potential large and persistent black carbon forcing over Northern Pacific inferred from satellite observations, *Sci. Rep.*, *7*, 43429, doi:10.1038/srep43429, 2017.
- Lin, M., L.W. Horowitz, R. Payton, A.M. Fiore, and G. Tonnesen, US surface ozone trends and extremes from 1980-2014: Quantifying the roles of rising Asian emissions, domestic controls, wildfires, and climate, *Atmos. Chem. Phys.*, doi:10.5194/acp-17-2943-2017, 2017.
- Mao, J., S. Fan, and L.W. Horowitz, Soluble Fe in aerosols sustained by gaseous HO₂ uptake, *Environ. Sci. Technol. Lett.*, *4*, 98-104, 2017.
- Morgenstern, O., M.I. Hegglin, E. Rozanov, F.M. O'Connor, N.L. Abraham, H. Akiyoshi, A.T. Archibald, S. Bekki, N. Butchart, M.P. Chipperfield, M. Deushi, S.S. Dhomse, R.R. Garcia, S.C. Hardiman, L.W. Horowitz, P. Jöckel, B. Josse, D. Kinnison, M. Lin, E. Mancini, M.E. Manyin, M. Marchand, V. Marécal, M. Michou, L.D. Oman, G. Pitari, D.A. Plummer, L.E. Revell, D. Saint-Martin, R. Schofield, A. Stenke, K. Stone, K. Sudo, T.Y. Tanaka, S. Tilmes, Y. Yamashita K. Yoshida, and G. Zeng, Review of the global models used within phase 1 of the Chemistry-Climate Model Initiative (CCMI), *Geosci. Model Dev.*, *10*, 639-671, doi:10.5194/gmd-10-639-2017, 2017.
- Naik, V., L.W. Horowitz, M.D. Schwarzkopf, and M. Lin, Impact of volcanic aerosols on stratospheric ozone recovery, *J. Geophys. Res.*, *122*, doi:10.1002/2016JD025808, 2017.
- Paulot, F., S. Fan, and L.W. Horowitz, Contrasting seasonal response of sulfate aerosols to declining SO₂ emissions in the Eastern U.S.: Implications for the efficacy of SO₂ emission controls, *Geophys. Res. Lett.*, *44*, 455-464, doi:10.1002/2016GL070695, 2017.
- Paulot, F., D. Paynter, P. Ginoux, V. Naik, S. Whitburn, M. Van Damme, L. Clarisse, P.-F. Coheur, and L.W. Horowitz, Gas-aerosol partitioning of ammonia in biomass burning plumes: Implications for the interpretation of spaceborne observations of ammonia and the radiative forcing of ammonium nitrate, *Geophys. Res. Lett.*, *44*, 8084-8093, doi:10.1002/2017GL074215, 2017.
- Prather, M.J., X. Zhu, C.M. Flynn, S.A. Strode, J.M. Rodriguez, S.D. Steenrod, J. Liu, J.-F. Lamarque, A.M. Fiore, L.W. Horowitz, J. Mao, L.T. Murray, D.T. Shindell, and S.C. Wofsy, Global Atmospheric Chemistry – Which Air Matters, *Atmos. Chem. Phys.*, doi:10.5194/acp-17-9081-2017, *17*, 9081-9102, 2017.
- Saikawa, E., H. Kim, M. Zhong, Y. Zhao, G. Janssens-Manehout, J.-I. Kurokawa, Z. Klimont, F. Wagner, V. Naik, L. Horowitz, and Q. Zhang, Comparison of emissions inventories of anthropogenic air pollutants in China, *Atmos. Chem. Phys.*, *17*, 6393-6421, doi:10.5194/acp-17-6393-2017, 2017.
- Shen, Z., Y. Ming, L. Horowitz, V. Ramaswamy, and M. Lin, On the seasonality of Arctic black carbon, *J. Climate*, *30*, 4429-4441, doi:10.1175/JCLI-D-16-0580.1, 2017.

LARRY WAYNE HOROWITZ

- Silva, R.A., J.J. West, J.-F. Lamarque, D.T. Shindell, W.J. Collins, G. Faluvegi, G.A. Folberth, L.W. Horowitz, T. Nagashima, V. Naik, S.T. Rumbold, K. Sudo, T. Takemura, D. Bergmann, P. Cameron-Smith, R.M. Doherty, B. Josse, I.A. MacKenzie, D.S. Stevenson, and G. Zeng, Future global mortality from changes in air pollution attributable to climate change, *Nature Clim. Change*, doi:10.1038/nclimate3354, 2017.
- Silva, R.A., J.J. West, J.-F. Lamarque, D.T. Shindell, W.J. Collins, G. Faluvegi, G.A. Folberth, L.W. Horowitz, T. Nagashima, V. Naik, S.T. Rumbold, K. Sudo, T. Takemura, D. Bergmann, P. Cameron-Smith, R.M. Doherty, B. Josse, I.A. MacKenzie, D.S. Stevenson, and G. Zeng, Corrigendum: Future global mortality from changes in air pollution attributable to climate change, *Nature Clim. Change*, doi:10.1038/nclimate3427, 2017.
- Westervelt, D.M., A.J. Conley, A.M. Fiore, J.-F. Lamarque, D. Shindell, M. Previdi, G. Faluvegi, G. Correa, and L.W. Horowitz, Multimodel precipitation responses to removal of U.S. sulfur dioxide emissions, *J. Geophys. Res.*, *122*, 5024-5038, doi:10.1002/2017JD026756, 2017.
- Barnes, E. A., A.M. Fiore, and L.W. Horowitz, Detection of trends in surface ozone in the presence of climate variability, *J. Geophys. Res. Atmos.*, *121*, 6112–6129, doi:10.1002/2015JD024397, 2016.
- Knutson, T.R., R. Zhang, and L.W. Horowitz, Prospects for a prolonged slowdown in global warming in the early 21st century, *Nature Commun.*, *7*, 13676, doi:10.1038/ncomms13676, 2016.
- Li, J., J. Mao, K.-E. Min, R.A. Washenfelter, S.S. Brown, J. Kaiser, F.N. Keutsch, R. Volkamer, G.M. Wolfe, T.F. Hanisco, I.B. Pollack, T.B. Ryerson, M. Graus, J.B. Gilman, B.M. Lerner, C. Warneke, J.A. de Gouw, A.M. Middlebrook, J. Liao, A. Welti, B.H. Henderson, V.F. McNeill, S.R. Hall, K. Ullmann, L.J. Donner, F. Paulot, and L.W. Horowitz, Observational constraints on glyoxal production from isoprene oxidation and its contribution to organic aerosol over the Southeast United States, *J. Geophys. Res.*, *121*, 9849-9861, 2016.
- Liu, H., D.B. Considine, L.W. Horowitz, J.H. Crawford, J.M. Rodriguez, S.E. Strahan, M.R. Damon, S.D. Steenrod, X. Xu, J. Kouatchou, C. Carouge, and R.M. Yantosca, Using beryllium-7 to assess cross-tropopause transport in global models, *Atmos. Chem. Phys.*, *16*, 4641-4659, doi:10.5194/acp-16-4641-2016, 2016.
- Mao, J., A. Carlton, R.C. Cohen, W.H. Brune, J.L. Jimenez, H.O.T. Pye, N.L. Ng, B. McDonald, C. Warneke, J. de Gouw, L.J. Mickley, E.M. Leibensperger, R. Mathur, and **L. Horowitz**, Southeast Atmosphere Studies: learning from model-observation syntheses, *Atmos. Chem. Phys. Discuss.*, doi:10.5194/acp-2016-1063, in review, 2016.
- Parrish, D.D., I.E. Galbally, J.-F. Lamarque, V. Naik, L. Horowitz, D.T. Shindell, S.J. Oltmans, R. Derwent, H. Tanimoto, C. Labuschagne, M. Cupeiro, Seasonal cycles of O₃ in the marine boundary layer: Observation and model simulation comparisons, *J. Geophys. Res. Atmos.*, *121*, 538-557, doi:10.1002/2015JD024101, 2016.
- Paulot, F., P. Ginoux, W.F. Cooke, L.J. Donner, S. Fan, M.-Y. Lin, J. Mao, V. Naik, and L.W. Horowitz, Sensitivity of nitrate aerosols to ammonia emissions and to nitrate chemistry: Implications for present and future nitrate optical depth, *Atmos. Chem. Phys.*, *16*, 1459-1477, doi:10.5194/acp-16-1459-2016, 2016.
- Schnell, J.L., M.J. Prather, B. Josse, V. Naik, L.W. Horowitz, G. Zeng, D.T. Shindell, and G. Faluvegi, Effect of climate change on surface ozone over North America, Europe, and East Asia, *Geophys. Res. Lett.*, *43*, doi:10.1002/2016GL068060, 2016.

LARRY WAYNE HOROWITZ

- Silva, R.A., J.J. West, J.-F. Lamarque, D.T. Shindell, W.J. Collins, S. Dalsoren, G. Faluvegi, G. Folberth, L.W. Horowitz, T. Nagashima, V. Naik, S.T. Rumbold, K. Sudo, T. Takemura, D. Bergmann, P. Cameron-Smith, I. Cionni, R.M. Doherty, V. Eyring, B. Josse, I.A. MacKenzie, D.S. Plummer, M. Righi, D.S. Stevenson, S. Strode, S. Szopa, and G. Zeng, The effect of future ambient air pollution on human premature mortality to 2100 using output from the ACCMIP model ensemble, *Atmos. Chem. Phys.*, *16*, 9847-9862, doi:10.5194/acp-16-9847-2016, 2016.
- Westervelt, D.M., L.W. Horowitz, V. Naik, A.P.K. Tai, A.M. Fiore, and D.L. Mauzerall, Quantifying PM_{2.5}-meteorology sensitivities in a global climate model, *Atmos. Environ.*, *142*, 43-56, 2016.
- Wolfe, G.M., J. Kaiser, T.F. Hanisco, F.N. Keutsch, J.A. de Gouw, J.B. Gilman, M. Graus, C.D. Hatch, J. Holloway, L.W. Horowitz, B.H. Lee, B.M. Lerner, F. Lopez-Hilfiker, J. Mao, M.R. Marvin, J. Peischl, I.B. Pollack, J.M. Roberts, T.B. Ryerson, J.A. Thornton, P.R. Veres, and C. Warneke, Formaldehyde production from isoprene oxidation across NO_x regimes, *Atmos. Chem. Phys.*, *16*, 2597-2610, doi:10.5194/acp-16-2597-2016, 2016.
- Zhang, Y., J.H. Bowden, Z. Adelman, V. Naik, L.W. Horowitz, S.J. Smith, and J.J. West, Co-benefits of global and regional greenhouse gas mitigation on U.S. air quality in 2050, *Atmos. Chem. Phys.*, *16*, 9533-9548, doi:10.5194/acp-16-9533-2016, 2016.
- Zhong, M., E. Saikawa, Y. Liu, V. Naik, L.W. Horowitz, M. Takigawa, Y. Zhao, N.-H. Lin, and E.A. Stone, Air quality modeling with WRF-Chem v3.5 in East Asia: Sensitivity to emissions and evaluation of simulated air quality, *Geosci. Model Dev.*, *9*, 1201-1218, doi:10.5194/gmd-9-1201-2016, 2016.
- Fan, S.-M., L.M. Harris, and L.W. Horowitz, Atmospheric energy transport to the Arctic 1979-2012, *Tellus A*, *67*, 25482, 2015.
- Lin, M., A.M. Fiore, L.W. Horowitz, A.O. Langford, S. J. Oltmans, D. Tarasick, H.E. Reider, Climate variability modulates western U.S. ozone air quality in spring via deep stratospheric intrusions, *Nature Commun.*, *6*, doi:10.1038/ncomms8105, 2015.
- Lin, M., L.W. Horowitz, O.R. Cooper, D. Tarasick, S. Conley, L.T. Iraci, B. Johnson, T. Leblanc, I. Petropavlovskikh, and E.L. Yates, Revisiting the evidence of increasing springtime ozone mixing ratios in the free troposphere over western North America, *Geophys. Res. Lett.*, *42*, 8719-8728, doi:10.1002/2015GL065311, 2015.
- Rieder, H.E., A.M. Fiore, L.W. Horowitz, and V. Naik, Projecting policy-relevant metrics for high summertime ozone pollution events over the eastern United States due to climate and emission changes during the 21st century, *J. Geophys. Res. Atmos.*, *120*, 784-800, doi:10.1002/2014JD022303, 2015.
- Schnell, J.L., M.J. Prather, B. Josse, V. Naik, L.W. Horowitz, P. Cameron-Smith, D. Bergmann, G. Zeng, D.A. Plummer, K. Sudo, T. Nagashima, D.T. Shindell, G. Faluvegi, and S.A. Strode, Use of North American and European air quality networks to evaluate global chemistry-climate modeling of surface ozone, *Atmos. Chem. Phys.*, *15*, 10581-10596, doi:10.5194/acpd-15-10581-2015, 2015.
- Westervelt, D.M., L.W. Horowitz, V. Naik, J.-C. Golaz, and D.L. Mauzerall, Radiative forcing and climate response to projected 21st century aerosol decreases, *Atmos. Chem. Phys.*, *15*, 12681-12703, doi:10.5194/acp-15-12681-2015, 2015.

LARRY WAYNE HOROWITZ

- Clifton, O. E., A.M. Fiore, G. Correa, L.W. Horowitz, and V. Naik, Twenty-first century reversal of the surface ozone seasonal cycle over the northeastern United States, *Geophys. Res. Lett.*, 41, doi:10.1002/2014GL061378, 2014.
- Cooper, O.R., D.D. Parrish, J. Ziemke, N.V. Balashov, M. Cupeiro, I.E. Galbally, S. Gilge, L. Horowitz, N.R. Jensen, J.-F. Lamarque, V. Naik, S.J. Oltmans, J. Schwab, D.T. Shindell, A.M. Thompson, V. Thouret, Y. Wang, and R.M. Zbinden, Global distribution and trends of tropospheric ozone: An observation-based review, *Elem. Sci. Anth.*, 2: 000029, doi:10.12952/journal.elementa.000029, 2014.
- Fiore, A.M., J.T. Oberman, M.Y. Lin, L. Zhang, O.E. Clifton, D.J. Jacob, V. Naik, L.W. Horowitz, J.P. Pinto, G.P. Milly, Estimating North American background ozone in U.S. surface air with two independent global models: Variability, uncertainties, and recommendations, *Atmos. Environ.*, 96, 284-300, doi:10.1016/j.atmosenv.2014.07.045, 2014.
- Li, X., J. Liu, D.L. Mauzerall, L.K. Emmons, S. Walters, L.W. Horowitz, and S. Tao, Effects of trans-Eurasian transport of air pollutants on surface ozone concentrations over Western China, *J. Geophys. Res. Atmos.*, 119, doi:10.1002/2014JD021936, 2014.
- Lin, M., L.W. Horowitz, S.J. Oltmans, A.M. Fiore, and S. Fan, Tropospheric ozone trends at Mauna Loa Observatory tied to decadal climate variability, *Nature Geoscience*, 7(2), DOI:10.1038/ngeo2066, 2014.
- Merlis, T.M., I.M. Held, G.L. Stenchikov, F. Zeng, and L.W. Horowitz, Constraining transient climate sensitivity using coupled climate model simulations of volcanic eruptions, *J. Clim.*, 27, 7781-7795, doi:10.1175/JCLI-D-14-00214.1, 2014.
- Parrish, D. D., J.-F. Lamarque, V. Naik, L. Horowitz, D.T. Shindell, J. Stachelin, R. Derwent, O.R. Cooper, H. Tanimoto, A. Volz-Thomas, S. Gilge, H.-E. Scheel, M. Steinbacher, and M. Fröhlich, Long-term changes in lower tropospheric baseline ozone concentrations: Comparing chemistry-climate models and observations at northern midlatitudes, *J. Geophys. Res.*, 119, doi:10.1002/2013JD021435, 2014.
- Rotstayn, L.D., E.L. Plymin, M.A. Collier, O. Boucher, J.-L. Dufresne, J.-J. Luo, K. von Salzen, S.J. Jeffrey, M.-A. Foujols, Y. Ming, and L.W. Horowitz, Declining aerosols in CMIP5 projections: Effects on atmospheric temperature structure and midlatitude jets, *J. Clim.*, 27, 6960-6977, 2014.
- Shen, Z., J. Liu, L.W. Horowitz, D.K. Henze, S. Fan, H. Levy II, D.L. Mauzerall, J.-T. Lin, and S. Tao, Analysis of transpacific transport of black carbon during HIPPO-3: Implications for black carbon aging, *Atmos. Chem. Phys.*, 14(12), DOI:10.5194/acp-14-6315-2014, 2014.
- Austin, J., L.W. Horowitz, M.D. Schwarzkopf, R.J. Wilson, and H. Levy II, Stratospheric ozone and temperature simulated from the preindustrial era to the present day, *J. Climate*, 26, 3528-3543, DOI:10.1175/JCLI-D-12-00162.1, 2013.
- Bowman, K.W., D.T. Shindell, H.M. Worden, J.F. Lamarque, P.J. Young, D.S. Stevenson, Z. Qu, M. de la Torre, D. Bergmann, P.J. Cameron-Smith, W.J. Collins, R. Doherty, S.B. Dalsøren, G. Faluvegi, G. Folberth, L.W. Horowitz, B.M. Josse, Y.H. Lee, I.A. MacKenzie, G. Myhre, T. Nagashima, V. Naik, D.A. Plummer, S.T. Rumbold, R.B. Skeie, S.A. Strode, K. Sudo, S. Szopa, A. Voulgarakis, G. Zeng, S.S. Kulawik, A.M. Aghedo, and J.R. Worden, Evaluation of ACCMIP outgoing longwave radiation from tropospheric ozone using TES satellite observations, *Atmos. Chem. Phys.*, 13, 4057-4072, doi:10.5194/acp-13-4057-2013, 2013.

LARRY WAYNE HOROWITZ

- Eyring, V., J.M. Arblaster, I. Cionni, J. Sedláček, J. Perlwitz, P.J. Young, S. Bekki, D. Bergmann, P. Cameron-Smith, W.J. Collins, G. Faluvegi, K.-D. Gottschaldt, L.W. Horowitz, D.E. Kinnison, J.-F. Lamarque, D.R. Marsh, D. Saint-Martin, D.T. Shindell, K. Sudo, S. Szopa, and S. Watanabe, Long-term ozone changes and associated climate impacts in CMIP5 simulations, *J. Geophys. Res.*, *118*, 5029-5060, doi:10.1002/jgrd.50316, 2013.
- Fang, Y., V. Naik, L.W. Horowitz, and D.L. Mauzerall, Air pollution and associated human mortality: the role of air pollutant emissions, climate change and methane concentration increases from the preindustrial period to present, *Atmos. Chem. Phys.*, *13*, 1377-1394, doi:10.5194/acp-13-1377-2013, 2013.
- Fang, Y., A.M. Fiore, J.-F. Lamarque, L.W. Horowitz, and M. Lin, Using synthetic tracers as a proxy for summertime PM_{2.5} air quality over the Northeastern United States in physical climate models, *Geophys. Res. Lett.*, *40*, 755-760, doi:10.1002/grl.50162, 2013.
- Fang, Y., D.L. Mauzerall, J. Liu, A.M. Fiore, and L.W. Horowitz, Impacts of 21st century climate change on global air pollution-related premature mortality, *Climatic Change*, *121*(2), DOI:10.1007/s10584-013-0847-8, 2013.
- Golaz, J.-C., L.W. Horowitz, and H. Levy II, Cloud tuning in a coupled climate model: Impact on 20th century warming, *Geophys. Res. Lett.*, *40*, 2246-2251, doi:10.1002/grl.50232, 2013.
- He, C., J. Liu, A.G. Carlton, S. Fan, L.W. Horowitz, H. Levy II, and S. Tao, Evaluation of factors controlling global secondary organic aerosol production from cloud processes, *Atmos. Chem. Phys.*, *13*, 1913-1926, doi:10.5194/acp-13-1913-2013, 2013.
- Lamarque, J.-F., D.T. Shindell, B. Josse, P.J. Young, I. Cionni, V. Eyring, D. Bergmann, P. Cameron-Smith, W.J. Collins, R. Doherty, S. Dalsoren, G. Faluvegi, G. Folberth, S.J. Ghan, L.W. Horowitz, Y.H. Lee, I.A. MacKenzie, T. Nagashima, V. Naik, D. Plummer, M. Righi, S.T. Rumbold, M. Schulz, R.B. Skeie, D.S. Stevenson, S. Strode, K. Sudo, S. Szopa, A. Voulgarakis, and G. Zeng, The Atmospheric Chemistry and Climate Model Intercomparison Project (ACCMIP): overview and description of models, simulations and climate diagnostics, *Geosci. Model Dev.*, *6*, 179-206, doi:10.5194/gmd-6-179-2013, 2013.
- Lee, Y. H., J.-F. Lamarque, M.G. Flanner, C. Jiao, D.T. Shindell, T. Berntsen, M.M. Bisiaux, J. Cao, W.J. Collins, M. Curran, R. Edwards, G. Faluvegi, S. Ghan, L.W. Horowitz, J.R. McConnell, J. Ming, G. Myhre, T. Nagashima, V. Naik, S.T. Rumbold, R.B. Skeie, K. Sudo, T. Takemura, F. Thevenon, B. Xu, and J.-H. Yoon, Evaluation of preindustrial to present-day black carbon and its albedo forcing from Atmospheric Chemistry and Climate Model Intercomparison Project (ACCMIP), *Atmos. Chem. Phys.*, *13*, 2607-2634, doi:10.5194/acp-13-2607-2013, 2013.
- Levy, H. II, L.W. Horowitz, M.D. Schwarzkopf, Y. Ming, J.-C. Golaz, V. Naik, and V. Ramaswamy, The roles of aerosol direct and indirect effects in past and future climate change, *J. Geophys. Res.*, *118*, 4521-4532, doi:10.1002/jgrd.50192, 2013.
- Mao, J., L.W. Horowitz, V. Naik, S. Fan, J. Liu, and A.M. Fiore, Sensitivity of tropospheric oxidants to biomass burning emissions: implications for radiative forcing, *Geophys. Res. Lett.*, *40*, 1241-1246, doi:10.1002/grl.50210, 2013.

LARRY WAYNE HOROWITZ

- Mao, J., F. Paulot, D.J. Jacob, R.C. Cohen, J.D. Crounse, P.O. Wennberg, C.A. Keller, R.C. Hudman, M.P. Barkley, and L.W. Horowitz, Ozone and organic nitrates over the eastern United States: Sensitivity to isoprene chemistry, *J. Geophys. Res. Atmos.*, *118*, 11,256-11,268, doi:10.1002/jgrd.50817, 2013.
- Nabat, P., S. Somot, M. Mallet, I. Chiapello, J.J. Morcrette, F. Solmon, S. Szopa, F. Dulac, W. Collins, S. Ghan, L.W. Horowitz, J.F. Lamarque, Y.H. Lee, V. Naik, T. Nagashima, D. Shindell, and R. Skeie, A 4-D climatology (1979-2009) of the monthly tropospheric aerosol optical depth distribution over the Mediterranean region from a comparative evaluation and blending of remote sensing and model products, *Atmos. Meas. Tech.*, *6*, 1287-1314, doi:10.5194/amt-6-1287-2013, 2013.
- Naik, V., A. Voulgarakis, A.M. Fiore, L.W. Horowitz, J.-F. Lamarque, M. Lin, M.J. Prather, P.J. Young, D. Bergmann, P.J. Cameron-Smith, I. Cionni, W.J. Collins, S.B. Dalsøren, R. Doherty, V. Eyring, G. Faluvegi, G.A. Folberth, B. Josse, Y.H. Lee, I.A. MacKenzie, T. Nagashima, T.P.C. van Noije, D.A. Plummer, M. Righi, S.T. Rumbold, R. Skeie, D.T. Shindell, D. Stevenson, S. Strode, K. Sudo, S. Szopa, and G. Zeng, Preindustrial to present-day changes in tropospheric hydroxyl radical and methane lifetime from the Atmospheric Chemistry and Climate Model Intercomparison Project (ACCMIP), *Atmos. Chem. Phys.*, *13*, 5277-5298, doi:10.5194/acp-13-5277-2013, 2013.
- Naik, V., L.W. Horowitz, A.M. Fiore, P. Ginoux, J. Mao, A.M. Aghedo, and H. Levy II, Impact of preindustrial to present-day changes in short-lived pollutant emissions on atmospheric composition and climate forcing, *J. Geophys. Res.*, *118*, doi:10.1002/jgrd.50608, 2013.
- Shindell, D.T., J.-F. Lamarque, M. Schulz, M. Flanner, C. Jiao, M. Chin, P.J. Young, Y.H. Lee, L. Rotstayn, N. Mahowald, G. Milly, G. Faluvegi, Y. Balkanski, W.J. Collins, A.J. Conley, S. Dalsoren, R. Easter, S. Ghan, L. Horowitz, X. Liu, G. Myhre, T. Nagashima, V. Naik, S.T. Rumbold, R. Skeie, K. Sudo, S. Szopa, T. Takemura, A. Voulgarakis, J.-H. Yoon, and F. Lo, Radiative forcing in the ACCMIP historical and future climate simulations, *Atmos. Chem. Phys.*, *13*, 2939-2974, doi:10.5194/acp-13-2939-2013, 2013.
- Silva, R.A., J.J. West, Y. Zhang, S.C. Anenberg, J.-F. Lamarque, D.T. Shindell, W.J. Collins, S. Dalsoren, G. Faluvegi, G. Folberth, L.W. Horowitz, T. Nagashima, V. Naik, S. Rumbold, R. Skeie, K. Sudo, T. Takemura, D. Bergmann, P. Cameron-Smith, I. Cionni, R.M. Doherty, V. Eyring, B. Josse, I.A. MacKenzie, D. Plummer, M. Righi, D.S. Stevenson, S. Strode, S. Szopa, and G. Zeng, Global premature mortality due to anthropogenic outdoor air pollution and the contribution of past climate change, *Environ. Res. Lett.*, *8*, 034005, doi:10.1088/1748-9326/8/3/034005, 2013.
- Stevenson, D.S., P.J. Young, V. Naik, J.-F. Lamarque, D.T. Shindell, A. Voulgarakis, R.B. Skeie, S.B. Dalsoren, G. Myhre, T.K. Berntsen, G.A. Folberth, S.T. Rumbold, W.J. Collins, I.A. MacKenzie, R.M. Doherty, G. Zeng, T.P.C. van Noije, A. Strunk, D. Bergmann, P. Cameron-Smith, D.A. Plummer, S.A. Strode, L. Horowitz, Y.H. Lee, S. Szopa, K. Sudo, T. Nagashima, B. Josse, I. Cionni, M. Righi, V. Eyring, A. Conley, K.W. Bowman, O. Wild, and A. Archibald, Tropospheric ozone changes, radiative forcing and attribution to emissions in the Atmospheric Chemistry and Climate Model Inter-comparison Project (ACCMIP), *Atmos. Chem. Phys.*, *13*, 3063-3085, doi:10.5194/acp-13-3063-2013, 2013.

LARRY WAYNE HOROWITZ

- Su, H., J.H. Jiang, C. Zhai, V.S. Perun, J.T. Shen, A. del Genio, L.S. Nazarenko, L.J. Donner, L. Horowitz, C. Seman, C. Morcrette, J. Petch, M. Ringer, J. Cole, K. von Salzen, M. dos Santos Mesquita, T. Iversen, J.E. Kristjansson, A. Gettelman, L. Rotstayn, S. Jeffrey, J.-L. Dufresne, M. Watanabe, H. Kawai, T. Koshiro, T. Wu, E.M. Volodin, T. L'Ecuyer, J. Teixeira, and G.L. Stephens, Diagnosis of regime-dependent cloud simulation errors in CMIP5 models using "A-Train" satellite observations and reanalysis data, *J. Geophys. Res.*, *118*, doi:10.1029/2012JD018575, 2013.
- Turner, A.J., A.M. Fiore, L.W. Horowitz, V. Naik, and M. Bauer, Summertime cyclones over the Great Lakes Storm Track from 1860-2100: variability, trends, and association with ozone pollution, *Atmos. Chem. Phys.*, *12*, 13,565-13,578, doi:10.5194/acp-13-565-2013, 2013.
- Voulgarakis, A., V. Naik, J.-F. Lamarque, D.T. Shindell, P.J. Young, M.J. Prather, O. Wild, R.D. Field, D. Bergmann, P. Cameron-Smith, I. Cionni, W.J. Collins, S.B. Dalsøren, R.M. Doherty, V. Eyring, G. Faluvegi, G.A. Folberth, L.W. Horowitz, B. Josse, I.A. MacKenzie, T. Nagashima, D.A. Plummer, M. Righi, S.T. Rumbold, D.S. Stevenson, S.A. Strode, K. Sudo, S. Szopa, and G. Zeng, Analysis of present day and future OH and methane lifetime in the ACCMIP simulations, *Atmos. Chem. Phys.*, *13*, 2563-2587, doi:10.5194/acp-13-2563-2013, 2013.
- West, J.J., S.J. Smith, R.A. Silva, V. Naik, Y. Zhang, Z. Adelman, M.M. Fry, S. Anenberg, L.W. Horowitz, and J.-F. Lamarque, Co-benefits of mitigating global greenhouse gas emissions for future air quality and human health, *Nature Climate Change*, *3*, 885-889, doi:10.1038/nclimate2009, 2013.
- Winton, M., A. Adcroft, S.M. Griffies, R.W. Hallberg, L.W. Horowitz, and R.J. Stouffer, Influence of ocean and atmosphere components on simulated climate sensitivities, *J. Climate*, *26*, 231-245, doi:10.1175/JCLI-D-12-00121.1, 2013.
- Young, P.J., A.T. Archibald, K.W. Bowman, J.-F. Lamarque, V. Naik, D.S. Stevenson, S. Tilmes, A. Voulgarakis, O. Wild, D. Bergmann, P. Cameron-Smith, I. Cionni, W.J. Collins, S.B. Dalsøren, R.M. Doherty, V. Eyring, G. Faluvegi, L.W. Horowitz, B. Josse, Y.H. Lee, I.A. MacKenzie, T. Nagashima, D.A. Plummer, M. Righi, S.T. Rumbold, R.B. Skeie, D.T. Shindell, S.A. Strode, K. Sudo, S. Szopa, and G. Zeng, Pre-industrial to end 21st century projections of tropospheric ozone from the Atmospheric Chemistry and Climate Model Intercomparison Project (ACCMIP), *Atmos. Chem. Phys.*, *13*, 2063-2090, doi:10.5194/acpd-13-2063-2013, 2013.
- Fan, S.-M., J.P. Schwarz, J. Liu, D.W. Fahey, P. Ginoux, L.W. Horowitz, H. Levy II, Y. Ming, J.R. Spackman, Inferring ice formation processes from global-scale black carbon profiles observed in the remote atmosphere and model simulations, *J. Geophys. Res.*, *117*, D23205, doi:10.1029/2012JD018126, 2012.
- Fiore, A.M., V. Naik, D.V. Spracklen, A. Steiner, N. Unger, M. Prather, D. Bergmann, P.J. Cameron-Smith, I. Cionni, W.J. Collins, S. Dalsøren, V. Eyring, G.A. Folberth, P. Ginoux, L.W. Horowitz, B. Josse, J.-F. Lamarque, I.A. MacKenzie, T. Nagashima, F.M. O'Connor, M. Righi, S.T. Rumbold, D.T. Shindell, R.B. Skeie, K. Sudo, S. Szopa, T. Takemura, and G. Zeng, Global air quality and climate, *Chem. Soc. Rev.*, *41*(19), DOI:10.1039/C2CS35095E, 2012.
- Jiang, J.H., H. Su, C. Zhai, V.S. Perun, A. Del Genio, L.S. Nazarenko, L.J. Donner, L. Horowitz, C. Seman, J. Cole, A. Gettelman, M.A. Ringer, L. Rotstayn, S. Jeffrey, T. Wu, F. Brient, J.-L. Dufresne, H. Kawai, T. Koshiro, M. Watanabe, T.S. L'Ecuyer, E.M. Volodin, T. Iversen, H. Drange, M.D.S. Mesquita, W.G. Read, J.W. Waters, B. Tian, J. Teixeira, and G.L. Stephens, Evaluation of cloud and water vapor simulations in CMIP5 climate models using NASA "A-Train" satellite observations, *J. Geophys. Res.*, *117*, D14105, doi:10.1029/2011JD017237, 2012.

LARRY WAYNE HOROWITZ

- John, J.G., A.M. Fiore, V. Naik, L.W. Horowitz, and J.P. Dunne, Climate versus emission drivers of methane lifetime against loss by tropospheric OH from 1860-2100, *Atmos. Chem. Phys.*, *13*, 12,021-12,036, doi:10.5194/acpd-12-12021-2012, 2012.
- Koffi, B., M. Schulz, F.-M. Bréon, J. Griesfeller, D. Winker, Y. Balkanski, S. Bauer, T. Berntsen, M. Chin, W.D. Collins, F. Dentener, T. Diehl, R. Easter, S. Ghan, P. Ginoux, S. Gong, L.W. Horowitz, T. Iversen, A. Kirkevåg, D. Koch, M. Krol, G. Myhre, P. Stier, and T. Takemura, Application of the CALIOP layer product to evaluate the vertical distribution of aerosols estimated by global models: AeroCom phase I results, *J. Geophys. Res.*, *117*, D10201, doi:10.1029/2011JD016858, 2012.
- Li, J.-L. F., D.E. Waliser, W.-T. Chen, B. Guan, T. Kubar, G. Stephens, H.-Y. Ma, M. Deng, L. Donner, C. Seman, and L. Horowitz, An observationally based evaluation of cloud ice water in CMIP3 and CMIP5 GCMs and contemporary reanalyses using contemporary satellite data, *J. Geophys. Res.*, *117*, D16105, doi:10.1029/2012JD017640, 2012.
- Lin, M., A.M. Fiore, L.W. Horowitz, O.R. Cooper, V. Naik, J. Holloway, B.J. Johnson, A.M. Middlebrook, S.J. Oltmans, I.B. Pollack, T.B. Ryerson, J.X. Warner, C. Wiedinmyer, J. Wilson, and B. Wyman, Transport of Asian ozone pollution into surface air over the western United States in spring, *J. Geophys. Res.*, *117*, D00V07, doi:10.1029/2011JD016961, 2012.
- Lin, M., A.M. Fiore, O.R. Cooper, L.W. Horowitz, A.O. Langford, H. Levy II, B.J. Johnson, V. Naik, S.J. Oltmans, and C.J. Senff, Springtime high surface ozone events over the western United States: Quantifying the role of stratospheric intrusions, *J. Geophys. Res.*, *117*, D00V22, doi:10.1029/2012JD018151, 2012.
- Liu, J., L.W. Horowitz, S. Fan, A.G. Carlton, and H. Levy II, Global in-cloud production of secondary organic aerosols: Implementation of a detailed chemical mechanism in the GFDL atmospheric model AM3, *J. Geophys. Res.*, *117*, D15303, doi:10.1029/2012JD017838, 2012.
- Ocko, I.B., V. Ramaswamy, P. Ginoux, Y. Ming, and L.W. Horowitz, Sensitivity of scattering and absorbing aerosol direct radiative forcing to physical climate factors, *J. Geophys. Res.*, *117*, D20203, doi:10.1029/2012JD018019, 2012.
- Rasmussen, D.J., A.M. Fiore, V. Naik, L.W. Horowitz, S.J. McGinnis, and M.G. Schultz, Surface ozone-temperature relationships in the eastern US: A monthly climatology for evaluating chemistry-climate models, *Atmos. Environ.*, *47*, 142-153, doi:10.1016/j.atmosenv.2011.11.021, 2012.
- West, J.J., A.M. Fiore, and L.W. Horowitz, Scenarios of methane emission reductions to 2030: Abatement costs and co-benefits to ozone air quality and human mortality, *Climatic Change*, doi:10.1007/s10584-012-0426-4, 2012.
- Anenberg, S.C., J.J. West, L.W. Horowitz, and D.Q. Tong, The global burden of air pollution on mortality: Anenberg et al. Respond, *Environ. Health Perspect.*, *119*, 158-159, doi:10.1289/ehp.1003276R, 2011.
- Avnery, S., D.L. Mauzerall, J. Liu, and L.W. Horowitz, Global crop yield reductions due to surface ozone exposure: 1. Year 2000 crop production losses and economic damage, *Atmos. Environ.*, *45*, 2284-2296, doi:10.1016/j.atmosenv.2010.11.045, 2011.
- Avnery, S., D.L. Mauzerall, J. Liu, L.W. Horowitz, Global crop yield reductions due to surface ozone exposure: 2. Year 2030 potential crop production losses and economic damage under two scenarios of O₃ pollution, *Atmos. Environ.*, *45*, 2297-2309, doi:10.1016/j.atmosenv.2011.01.002, 2011.

LARRY WAYNE HOROWITZ

- Donner, L.J., B.L. Wyman, R.S. Hemler, L.W. Horowitz, Y. Ming, M. Zhao, J.-C. Golaz, P. Ginoux, S.-J. Lin, M.D. Schwarzkopf, J. Austin, G. Alaka, W.F. Cooke, T.L. Delworth, S.M. Freidenreich, C. T. Gordon, S.M. Griffies, I.M. Held, W.J. Hurlin, S.A. Klein, T.R. Knutson, A.R. Langenhorst, H.-C. Lee, Y. Lin, B.I. Magi, S.L. Malyshev, P.C.D. Milly, V. Naik, M.J. Nath, R. Pincus, J.J. Ploshay, V. Ramaswamy, C.J. Seman, E. Shevliakova, J.J. Sirutis, W.F. Stern, R.J. Stouffer, R.J. Wilson, M. Winton, A.T. Wittenberg, and F. Zeng, The dynamical core, physical parameterizations, and basic simulation characteristics of the atmospheric component AM3 of the GFDL global coupled model CM3, *J. Clim.*, *24*, 3484-3519, doi:10.1175/2011JCLI3955.1, 2011.
- Fang, Y., A.M. Fiore, L.W. Horowitz, A. Gnanadesikan, I. Held, G. Chen, G. Vecchi, and H. Levy, The impacts of changing transport and precipitation on pollutant distributions in a future climate, *J. Geophys. Res.*, *116*, D18303, doi:10.1029/2011JD015642, 2011.
- Golaz, J.-C., M. Salzmann, L.J. Donner, L.W. Horowitz, Y. Ming, and M. Zhao, Sensitivity of the aerosol indirect effect to subgrid variability in the cloud parameterization of the GFDL atmosphere general circulation model AM3, *J. Clim.*, *24*, 3145-3160, doi:10.1175/2010JCLI3945.1, 2011.
- Griffies, S.M., M. Winton, L.J. Donner, L.W. Horowitz, S.M. Downes, R. Farneti, A. Gnanadesikan, W.J. Hurlin, H.-C. Lee, Z. Liang, J.B. Palter, B.L. Samuels, A.T. Wittenberg, B.L. Wyman, J. Yin, and N. Zadeh, GFDL's CM3 coupled climate model: Characteristics of the ocean and sea ice simulations, *J. Clim.*, *24*, 3520-3544, doi: 10.1175/2011JCLI3964.1, 2011.
- Huneus, N., M. Schulz, Y. Balkanski, J. Griesfeller, J. Prospero, S. Kinne, S. Bauer, O. Boucher, M. Chin, F. Dentener, T. Diehl, R. Easter, D. Fillmore, S. Ghan, P. Ginoux, A. Grini, L. Horowitz, D. Koch, M.C. Krol, W. Landing, X. Liu, N. Mahowald, R. Miller, J.-J. Morcrette, G. Myhre, J.E. Penner, J. Perlwitz, P. Stier, T. Takemura, and C. Zender, Global dust model intercomparison in AeroCom phase I, *Atmos. Chem. Phys.*, *11*, 7781-7816, doi:10.5194/acp-11-7781-2011, 2011.
- Liu, J., S. Fan, L.W. Horowitz, and H. Levy II, Evaluation of factors controlling long-range transport of black carbon to the Arctic, *J. Geophys. Res.*, *116*, D04307, doi:10.1029/2010JD015145, 2011.
- Rasmussen, D.J., A.M. Fiore, V. Naik, L.W. Horowitz, S.J. McGinnis, M.G. Schultz, Surface ozone-temperature relationships in the eastern US: A monthly climatology for evaluating chemistry-climate models, *Atmos. Environ.*, *47*, 142-153, doi:10.1016/j.atmosenv.2011.11.021, 2011.
- Saikawa, E., J. Kurokawa, M. Takigawa, J. Borken-Kleefeld, D.L. Mauzerall, L.W. Horowitz, and T. Ohara, The impact of China's vehicle emissions on regional air quality in 2000 and 2020: a scenario analysis, *Atmos. Chem. Phys.*, *11*, 9465-9484, doi:10.5194/acp-11-9465-2011, 2011.
- Anenberg, S.C., L.W. Horowitz, D.Q. Tong, and J.J. West, An estimate of the global burden of anthropogenic ozone and fine particulate matter on premature human mortality using atmospheric modeling, *Environ Health Perspect.*, doi:10.1289/ehp.0901220, 2010.
- Anenberg, S.C., J.J. West, L.W. Horowitz, and D.Q. Tong, The global burden of air pollution on mortality: Anenberg et al. respond, *Environ Health Perspect.*, doi:10.1289/ehp.1002397R, 2010.
- Anenberg, S.C., J.J. West, L.W. Horowitz, and D.Q. Tong, The global burden of air pollution on mortality: Anenberg et al. respond, *Environ Health Perspect.*, doi:10.1289/ehp.1003276R, 2010.
- Fang, Y., A.M. Fiore, L.W. Horowitz, H. Levy II, Y. Hu, and A.G. Russell, Sensitivity of the NO_y budget over the United States to anthropogenic and lightning NO_x in summer, *J. Geophys. Res.*, *115*, D18312, doi:10.1029/2010JD014079, 2010.

LARRY WAYNE HOROWITZ

- Koch, D., M. Schulz, S. Kinne, T.C. Bond, Y. Balkanski, S. Bauer, T. Berntsen, O. Boucher, M. Chin, A. Clarke, N. De Luca, F. Dentener, T. Diehl, O. Dubovik, R. Easter, D.W. Fahey, J. Feichter, D. Fillmore, S. Freitag, S. Ghan, P. Ginoux, S. Gong, L. Horowitz, T. Iversen, A. Kirkevåg, Z. Klimont, Y. Kondo, M. Krol, X. Liu, C. McNaughton, R. Miller, V. Montanaro, N. Moteki, G. Myhre, J.E. Penner, Ja. Perlwitz, G. Pitari, S. Reddy, L. Sahu, H. Sakamoto, G. Schuster, J.P. Schwarz, Ø. Seland, J.R. Spackman, P. Stier, N. Takegawa, T. Takemura, C. Textor, J.A. van Aardenne, and Y. Zhao, Corrigendum to "Evaluation of black carbon estimations in global aerosol models" published in *Atmos. Chem. Phys.*, 9, 9001-9026, 2009, *Atmos. Chem. Phys.*, 10, 79-81, 2010.
- Naik, V., A.M. Fiore, L.W. Horowitz, H.B. Singh, C. Wiedinmyer, A. Guenther, J.A. de Gouw, D.B. Millet, P.D. Goldan, W.C. Kuster, and A. Goldstein, Observational constraints on the global atmospheric budget of ethanol, *Atmos. Chem. Phys.*, 10, 5361-5370, doi:10.5194/acp-10-5361-2010, 2010.
- Saikawa, E., V. Naik, L.W. Horowitz, J. Liu, D.L. Mauzerall, Corrigendum to: "Present and potential future contributions of sulfate, black and organic carbon aerosols from China to global air quality, premature mortality and radiative forcing" [Atmos. Environ. 43 (2009) 2814-2822], *Atmos. Environ.*, 44, 4528, doi:10.1016/j.atmosenv.2010.07.009, 2010.
- Fang, Y., A.M. Fiore, L.W. Horowitz, A. Gnanadesikan, H. Levy, Y. Hu, and A.G. Russell, Estimating the contribution of strong daily export events to total pollutant export from the United States in summer, *J. Geophys. Res.*, 114, D23302, doi:10.1029/2008JD010946, 2009.
- Fiore, A.M., F.J. Dentener, O. Wild, C. Cuvelier, M.G. Schultz, P. Hess, C. Textor, M. Schulz, R. Doherty, L.W. Horowitz, I.A. MacKenzie, M.G. Sanderson, D.T. Shindell, D.S. Stevenson, S. Szopa, R. Van Dingenen, G. Zeng, C. Atherton, D. Bergmann, I. Bey, G. Carmichael, B.N. Duncan, G. Faluvegi, G. Folberth, M. Gauss, S. Gong, D. Hauglustaine, T. Holloway, I.S.A. Isaksen, D.J. Jacob, J.E. Jonson, J. W. Kaminski, T.J. Keating, A. Lupu, E. Marmer, V. Montanaro, R. Park, G. Pitari, K.J. Pringle, J.A. Pyle, S. Schroeder, M.G. Vivanco, P. Wind, G. Wojcik, S. Wu, and A. Zuber, Multimodel estimates of intercontinental source-receptor relationships for ozone pollution, *J. Geophys. Res.*, 114, D04301, doi:10.1029/2008JD010816, 2009.
- Koch, D., M. Schulz, S. Kinne, T.C. Bond, Y. Balkanski, S. Bauer, T. Berntsen, O. Boucher, M. Chin, A. Clarke, N. De Luca, F. Dentener, T. Diehl, O. Dubovik, R. Easter, D.W. Fahey, J. Feichter, D. Fillmore, S. Freitag, S. Ghan, P. Ginoux, S. Gong, L. Horowitz, T. Iversen, A. Kirkevåg, Z. Klimont, Y. Kondo, M. Krol, X. Liu, C. McNaughton, R. Miller, V. Montanaro, N. Moteki, G. Myhre, J.E. Penner, Ja. Perlwitz, G. Pitari, S. Reddy, L. Sahu, H. Sakamoto, G. Schuster, J.P. Schwarz, Ø. Seland, J.R. Spackman, P. Stier, N. Takegawa, T. Takemura, C. Textor, J.A. van Aardenne, and Y. Zhao, Evaluation of black carbon estimations in global aerosol models, *Atmos. Chem. Phys.*, 9, 9001-9026, 2009.
- Liu, J., D.L. Mauzerall, L.W. Horowitz, P. Ginoux, and A.M. Fiore, Evaluating inter-continental transport of fine aerosols: (1) Methodology, global aerosol distribution and optical depth, *Atmos. Environ.*, 43, 4327-4338, 2009.
- Liu, J., D.L. Mauzerall, and L.W. Horowitz, Evaluating inter-continental transport of fine aerosols: (2) Global health impact, *Atmos. Environ.*, 43, 4339-4347, 2009.

LARRY WAYNE HOROWITZ

- Livingstone, P.L., K. Magliano, K. Gurer, P.D. Allen, K.M. Zhang, Q. Ying, B.S. Jackson, A. Kaduwela, M. Kleeman, L.F. Woodhouse, K. Turkiewicz, L.W. Horowitz, K. Scott, D. Johnson, C. Taylor, G. O'Brien, J. DaMassa, B.E. Croes, F. Binkowski, D. Byun, Simulating PM concentration during a winter episode in a subtropical valley: Sensitivity simulations and evaluation methods, *Atmos. Environ.*, **43**, 5971-5977, doi:10.1016/j.atmosenv.2009.07.033, 2009.
- Saikawa, E., V. Naik, L.W. Horowitz, J. Liu, and D.L. Mauzerall, Present and potential future contributions of sulfate, black and organic carbon aerosols from China to global air quality, premature mortality and radiative forcing, *Atmos. Environ.*, **43**, 2814-2822, 2009.
- West, J.J., V. Naik, L.W. Horowitz, and A.M. Fiore, Effect of regional precursor emission controls on long-range ozone transport -- Part 1: short-term changes in ozone air quality, *Atmos. Chem. Phys.*, **9**, 6077-6093, 2009.
- West, J.J., V. Naik, L.W. Horowitz, and A.M. Fiore, Effect of regional precursor emission controls on long-range ozone transport -- Part 2: steady-state changes in ozone air quality and impacts on human mortality, *Atmos. Chem. Phys.*, **9**, 6095-6107, 2009.
- Ellingsen, K., M. Gauss, R. Van Dingenen, F.J. Dentener, L. Emberson, A.M. Fiore, M.G. Schultz, D.S. Stevenson, M.R. Ashmore, C.S. Atherton, D.J. Bergmann, I. Bey, T. Butler, J. Drevet, H. Eskes, D.A. Hauglustaine, I.S.A. Isaksen, L.W. Horowitz, M. Krol, J.F. Lamarque, M.G. Lawrence, T. van Noije, J. Pyle, S. Rast, J. Rodriguez, N. Savage, S. Strahan, K. Sudo, S. Szopa, and O. Wild, Global ozone and air quality: A multi-model assessment of risks to human health and crops, *Atmos. Chem. Phys. Discuss.*, **8**, 2163-2223, 2008.
- Fiore, A., J. West, L. Horowitz, V. Naik, and M.D. Schwarzkopf, Characterizing the tropospheric ozone response to methane emission controls and the benefits to climate and air quality, *J. Geophys. Res.*, **113**, D08307, doi:10.1029/2007JD009162, 2008.
- Heald, C.L., D.K. Henze, L.W. Horowitz, J. Feddema, J.-F. Lamarque, A. Guenther, P.G. Hess, F. Vitt, J.H. Seinfeld, A.H. Goldstein, and I. Fung, 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, 2008.
- Holloway, H., T. Sakurai, Z. Han, S. Ehlers, S.N. Spak, L.W. Horowitz, G.R. Carmichael, D.G. Streets, Y. Hozumi, H. Ueda, S.U. Park, C. Fung, M. Kajino, N. Thongboonchoo, M. Engardt, C. Bennet, H. Hayami, K. Sartelet, Z. Wang, K. Matsuda, M. Amann, MICS-Asia II: Impact of global emissions on regional air quality in Asia, *Atmos. Environ.*, **42**, 3543-3561, doi:10.1016/j.atmosenv.2007.10.022, 2008.
- Levy, H., II, M.D. Schwarzkopf, L. Horowitz, V. Ramaswamy, and K. Findell, Strong sensitivity of late 21st century climate to projected changes in short-lived air pollutants, *J. Geophys. Res.*, **113**, D06102, doi:10.1029/2007JD009176, 2008.
- Liu, J., D.L. Mauzerall, and L.W. Horowitz, Source-receptor relationships between East Asian sulfur dioxide emissions and Northern Hemisphere sulfate concentrations, *Atmos. Chem. Phys.*, **8**, 3721-3733, 2008.
- Parrington, M., D.B.A Jones, K.W. Bowman, L.W. Horowitz, A.M. Thompson, D.W. Tarasick, and J.C. Witte, Estimating the summertime tropospheric ozone distribution over North America through assimilation of observations from the Tropospheric Emission Spectrometer, *J. Geophys. Res.*, **113**, D18307, doi:10.1029/2007JD009341, 2008.

LARRY WAYNE HOROWITZ

- Sanderson, M.G., F.J. Dentener, A.M. Fiore, C. Cuvelier, T.J. Keating, A. Zuber, C.S. Atherton, D.J. Bergmann, T. Diehl, R.M. Doherty, B.N. Duncan, P. Hess, L.W. Horowitz, D.J. Jacob, J.-E. Jonson, J.W. Kaminski, A. Lupu, I.A. MacKenzie, E. Mancini, E. Marmer, R. Park, G. Pitari, M. J. Prather, K.J. Pringle, S. Schroeder, M.G. Schultz, D.T. Shindell, S. Szopa, O. Wild, and P. Wind, A multi-model study of the hemispheric transport and deposition of oxidised nitrogen, *Geophys. Res. Lett.*, **35**, L17815, doi:10.1029/2008GL035389, 2008.
- Shindell, D., H. Levy II, M.D. Schwarzkopf, L. Horowitz, J.-F. Lamarque, and G. Faluvegi, Multi-model projections of climate change from short-lived emissions due to human activities, *J. Geophys. Res.*, **113**, D11109, doi:10.1029/2007JD009152, 2008.
- Shindell, D.T., M. Chin, F. Dentener, R.M. Doherty, G. Faluvegi, A.M. Fiore, P. Hess, D.M. Koch, I.A. MacKenzie, M.G. Sanderson, M.G. Schultz, M. Schulz, D.S. Stevenson, H. Teich, C. Textor, D.J. Bergmann, I. Bey, H. Bian, C. Cuvelier, B.N. Duncan, G. Folberth, L.W. Horowitz, J. Jonson, J.W. Kaminski, E. Marmer, R. Park, K.J. Pringle, S. Schroeder, S. Szopa, T. Takemura, G. Zeng, T.J. Keating, and A. Zuber, A multi-model assessment of pollution transport to the Arctic, *Atmos. Chem. Phys.*, **8**, 5353-5372, 2008.
- United States Climate Change Science Program (CCSP), *Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols*. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. H. Levy II, D.T. Shindell, A. Gilliland, M.D. Schwarzkopf, L.W. Horowitz, (eds.). Department of Commerce, NOAA's National Climatic Data Center, Washington, D.C., USA, 100 pp., 2008.
- Donner, L.J., L.W. Horowitz, A.M. Fiore, C.J. Seman, D.R. Blake, and N.J. Blake, Transport of radon-222 and methyl iodide by deep convection in the GFDL atmospheric model AM2, *J. Geophys. Res.*, **112**, D17303, doi:10.1029/2006JD007548, 2007.
- Gloor, M., E.J. Dlugokencky, C.A.M. Brenninkmeijer, L. Horowitz, D. Hurst, G. Dutton, C. Crevoisier, T. Mashida, and P. Tans, Three-dimensional SF₆ data and tropospheric transport simulation: Signals, modeling accuracy, and implications for inverse modeling, *J. Geophys. Res.*, **112**, D15112, doi:10.1029/2006JD007973, 2007.
- Horowitz, L.W., A.M. Fiore, G.P. Milly, R.C. Cohen, A. Perring, P.J. Wooldridge, P.G. Hess, L.K. Emmons, and J.-F. Lamarque, Observational constraints on the chemistry of isoprene nitrates over the eastern United States, *J. Geophys. Res.*, **112**, D12S08, doi:10.1029/2006JD007747, 2007.
- Mena-Carrasco, M., Y. Tang, G. Carmichael, T. Chai, N. Thongboonchoo, E. Campbell, S. Kulkarni, L. Horowitz, J. Vukovich, M. Avery, W. Brune, J. Dibb, L. Emmons, F. Flocke, G. Sachse, D. Tan, R.E. Shetter, R. Talbot, D. Streets, G. Frost, and D. Blake, Improving regional ozone modeling through systematic evaluation of errors using the aircraft observations during the International Consortium for Atmospheric Research on Transport and Transformation, *J. Geophys. Res.*, **112**, D12S19, doi:10.1029/2006JD007762, 2007.
- Ming, Y., V. Ramaswamy, L.J. Donner, V.T.J. Phillips, S.A. Klein, P.A. Ginoux, and L.W. Horowitz, Modeling the interactions between aerosols and liquid water clouds with a self-consistent cloud scheme in a general circulation model, *J. Atmos. Sci.*, **64**, 1189-1209, 2007.
- Naik, V., D.L. Mauzerall, L.W. Horowitz, M.D. Schwarzkopf, V. Ramaswamy, and M. Oppenheimer, On the sensitivity of radiative forcing from biomass burning aerosols and ozone to emission location, *Geophys. Res. Lett.*, **34**, L03818, doi:10.1029/2006GL028149, 2007.

LARRY WAYNE HOROWITZ

- Singh, H.B., L. Salas, D. Herlth, R. Kolyer, E. Czech, M. Avery, J.H. Crawford, R.B. Pierce, G.W. Sachse, D.R. Blake, R.C. Cohen, T.H. Bertram, A. Perring, P.J. Wooldridge, J. Dibb, G. Huey, R.C. Hudman, S. Turquety, L.K. Emmons, F. Flocke, Y. Tang, G.R. Carmichael, and L.W. Horowitz, Reactive nitrogen distribution and partitioning in the North American troposphere and lowermost stratosphere, *J. Geophys. Res.*, *112*, D12S04, doi:10.1029/2006JD007664, 2007.
- Tang, Y., G.R. Carmichael, N. Thongboonchoo, T. Chai, L.W. Horowitz, R.B. Pierce, J.A. Al-Saadi, G. Pfister, J.M. Vukovich, M.A. Avery, G.W. Sachse, T.B. Ryerson, J.S. Holloway, E.L. Atlas, F.M. Flocke, R.J. Weber, L.G. Huey, J.E. Dibb, D.G. Streets, and W.H. Brune, The influence of lateral and top boundary conditions on regional air quality prediction: A multi-scale study coupling regional and global chemical transport models, *J. Geophys. Res.*, *112*, D10S18, doi:10.1029/2006JD007515, 2007.
- Textor, C., M. Schulz, S. Guibert, S. Kinne, Y. Balkanski, S. Bauer, T. Bernsten, T. Berglen, O. Boucher, M. Chin, F. Dentener, T. Diehl, J. Feichter, D. Fillmore, P. Ginoux, S. Gong, A. Grini, J. Hendricks, L. Horowitz, P. Huang, I.S.A. Isaksen, T. Iversen, S. Kloster, D. Koch, A. Kirkevåg, J.E. Kristjansson, M. Krol, A. Lauer, J.F. Lamarque, X. Liu, V. Montanaro, G. Myhre, J.E. Penner, G. Pitari, M.S. Reddy, Ø. Seland, P. Stier, T. Takemura, and X. Tie, The effect of harmonized emissions on aerosol properties in global models -- an AeroCom experiment, *Atmos. Chem. Phys.*, *7*, 4489-4501, 2007
- West, J.J., A.M. Fiore, V. Naik, L.W. Horowitz, M.D. Schwarzkopf, and D.L. Mauzerall, Ozone air quality and radiative forcing consequences of changes in ozone precursor emissions, *Geophys. Res. Lett.*, *34*, L06806, doi:10.1029/2006GL029173, 2007.
- Bates, T.S., T.L. Anderson, T. Baynard, T. Bond, O. Boucher, G. Carmichael, A. Clarke, C. Erlick, H. Guo, L. Horowitz, S. Howell, S. Kulkarni, H. Maring, A. McComiskey, A. Middlebrook, K. Noone, C.D. O'Dowd, J. Ogren, J. Penner, P.K. Quinn, A.R. Ravishankara, D.L. Savoie, S.E. Schwartz, Y. Shinozuka, Y. Tang, R.J. Weber, Y. Wu, Aerosol direct radiative effects over the northwest Atlantic, northwest Pacific, and North Indian Oceans: estimates based on in-situ chemical and optical measurements and chemical transport modeling, *Atmos. Chem. Phys.*, *6*, 1657-1732, 2006.
- Crevoisier, C., M. Gloor, E. Gloaguen, L.W. Horowitz, J.L. Sarmiento, C. Sweeney and P.P. Tans, A direct carbon budgeting approach to infer carbon sources and sinks. Design and synthetic application to complement the NACP observation network, *Tellus B*, *58*(5), 366-375, doi: 10.1111/j.1600-0889.2006.00214.x, 2006.
- Delworth, T.L., A. Rosati, R.J. Stouffer, K.W. Dixon, J. Dunne, K.L. Findell, P. Ginoux, A. Gnanadesikan, C.T. Gordon, S.M. Griffies, R. Gudgel, M.J. Harrison, I.M. Held, R.S. Hemler, L.W. Horowitz, S.A. Klein, T.R. Knutson, S.-J. Lin, V. Ramaswamy, M.D. Schwarzkopf, J.J. Sirutis, M.J. Spelman, W.F. Stern, M. Winton, A.T. Wittenberg, B. Wyman, A.J. Broccoli, V. Balaji, J. Russell, R. Zhang, J.A. Beesley, J. Liu, W.F. Cooke, J.W. Durachta, A.R. Langenhorst, H.-C. Lee, F. Zeng, K.A. Dunne, P.C.D. Milly, P.J. Kushner, S.L. Malyshev, and E. Shevliakova, GFDL s CM2 global coupled climate models Part 1: Formulation and simulation characteristics, *J. Climate*, *19*(5), 643-674, 2006.

LARRY WAYNE HOROWITZ

- Dentener, F., J. Drevet, J.F. Lamarque, I. Bey, B. Eickhout, A.M. Fiore, D. Hauglustaine, L.W. Horowitz, M.Krol, U.C. Kulshrestha, M. Lawrence, C. Galy-Lacaux, S. Rast, D. Shindell, D. Stevenson, T. van Noije, C. Atherton, N. Bell, D. Bergman, T. Butler, J. Cofala, B. Collins, R. Doherty, K. Ellingsen, J. Galloway, M. Gauss, V. Montanaro, J.F. Müller, G. Pitari, J. Rodriguez, M. Sanderson, F. Solmon, S. Strahan, M. Schultz, K. Sudo, S. Szopa, and O. Wild, Nitrogen and sulfur deposition on regional and global scales: A multimodel evaluation, *Global Biogeochem. Cycles*, *20*, GB4003, doi:10.1029/2005GB002672, 2006.
- Dentener, F., D. Stevenson, K. Ellingsen, T. van Noije, M. Schultz, M. Amann, C. Atherton, N. Bell, D. Bergmann, I. Bey, L. Bouwman, T. Butler, J. Cofala, W. Collins, R. Doherty, J. Drevet, R. Doherty, B. Eickhout, H. Eskes, A. Fiore, M. Gauss, D. Hauglustaine, L. Horowitz, I.S.A. Isaksen, B. Josse, M. Lawrence, M.Krol, J.F. Lamarque, V. Montanaro, J.F. Müller, V.H. Peuch, G. Pitari, J. Pyle, S. Rast, J. Rodriguez, M. Sanderson, N.H. Savage, D. Shindell, S. Strahan, S. Szopa, K. Sudo, R. Van Dingenen, O. Wild, and G. Zeng, The global atmospheric environment for the next generation, *Environ. Sci. & Technol.*, *40*, 3586-3594, 2006.
- Fiore, A.M., L.W. Horowitz, E.J. Dlugokencky, and J.J. West, Impact of meteorology and emissions on methane trends, 1990-2004, *Geophys. Res. Lett.*, *33*, L12809, doi:10.1029/2006GL026199, 2006.
- Ginoux, P., L.W. Horowitz, V. Ramaswamy, I.V. Geogdzhayev, B.N. Holben, G. Stenchikov, and X. Tie, Evaluation of aerosol distribution and optical depth in the GFDL coupled model CM2.1 for present climate, *J. Geophys. Res.*, *111*, D22210, doi:10.1029/2005JD006707, 2006.
- Horowitz, L.W., Past, present, and future concentrations of tropospheric ozone and aerosols: Methodology, ozone evaluation, and sensitivity to aerosol wet removal, *J. Geophys. Res.*, *111*, D22211, doi:10.1029/2005JD006937, 2006.
- Kinne, S., M. Schulz, C. Textor, S. Guibert, Y. Balkanski, S. E. Bauer, T. Berntsen, T. F. Berglen, O. Boucher, M. Chin, W. Collins, F. Dentener, T. Diehl, R. Easter, J. Feichter, D. Fillmore, S. Ghan, P. Ginoux, S. Gong, A. Grini, J. Hendricks, M. Herzog, L. Horowitz, I. Isaksen, T. Iversen, A. Kirkevåg, S. Kloster, D. Koch, J. E. Kristjansson, M. Krol, A. Lauer, J. F. Lamarque, G. Lesins, X. Liu, U. Lohmann, V. Montanaro, G. Myhre, J.E. Penner, G. Pitari, S. Reddy, O. Seland, P. Stier, T. Takemura, X. Tie, An AeroCom initial assessment optical properties in aerosol component modules of global models, *Atmos. Chem. Phys.*, *6*, 1815-1834, 2006.
- Shindell, D.T., G. Faluvegi, D.S. Stevenson, M.C. Krol, L.K. Emmons, J.-F. Lamarque, G. Pétron, F.J. Dentener, K. Ellingsen, M.G. Schultz, O. Wild, M. Amann, C.S. Atherton, D.J. Bergmann, I. Bey, T. Butler, J. Cofala, W.J. Collins, R.G. Derwent, R.M. Doherty, J. Drevet, H.J. Eskes, A.M. Fiore, M. Gauss, D.A. Hauglustaine, L.W. Horowitz, I.S.A. Isaksen, M.G. Lawrence, V. Montanaro, J.-F. Müller, G. Pitari, M.J. Prather, J.A. Pyle, S. Rast, J.M. Rodriguez, M.G. Sanderson, N.H. Savage, S.E. Strahan, K. Sudo, S. Szopa, N. Unger, T.P.C. van Noije, and G. Zeng, Multi-model simulations of carbon monoxide: Comparison with observations and projected near-future changes, *J. Geophys. Res.*, *111*, D19306, doi:10.1029/2006JD007100, 2006.
- Stevenson, D.S., F.J. Dentener, M.G. Schultz, K. Ellingsen, T.P.C. van Noije, O. Wild, G. Zeng, M. Amann, C.S. Atherton, N. Bell, D.J. Bergmann, I. Bey, T. Butler, J. Cofala, W.J. Collins, R.G. Derwent, R.M. Doherty, J. Drevet, H.J. Eskes, A.M. Fiore, M. Gauss, D.A. Hauglustaine, L.W. Horowitz, I.S.A. Isaksen, M.C. Krol, J.-F. Lamarque, M.G. Lawrence, V. Montanaro, J.-F. Mueller, G. Pitari, M.J. Prather, J.A. Pyle, S. Rast, J.M. Rodriguez, M.G. Sanderson, N.H. Savage, D.T. Shindell, S.E. Strahan, K. Sudo, S. Szopa, Multi-model ensemble simulations of present-day and near-future tropospheric ozone, *J. Geophys. Res.*, *111*, D08301, doi:10.1029/2005JD006338, 2006.

LARRY WAYNE HOROWITZ

- Textor, C., M. Schulz, S. Guibert, S. Kinne, Y. Balkanski, S. Bauer, T. Berntsen, T. Berglen, O. Boucher, M. Chin, F. Dentener, T. Diehl, R. Easter, H. Feichter, D. Fillmore, S. Ghan, P. Ginoux, S. Gong, A. Grini, J. Hendricks, L. Horowitz, P. Huang, I. Isaksen, T. Iversen, S. Kloster, D. Koch, A. Kirkevåg, J.E. Kristjansson, M. Krol, A. Lauer, J.F. Lamarque, X. Liu, V. Montanaro, G. Myhre, J. Penner, G. Pitari, S. Reddy, Ø. Seland, P. Stier, T. Takemura, and X. Tie, Analysis and quantification of the diversities of aerosol life cycles within AeroCom, *Atmos. Chem. Phys.*, **6**, 1777-1813, 2006.
- van Noije, T.P.C., H.J. Eskes, F.J. Dentener, D.S. Stevenson, K. Ellingsen, M.G. Schultz, O. Wild, M. Amann, C.S. Atherton, D.J. Bergmann, I. Bey, K. F. Boersma, T. Butler, J. Cofala, J. Drevet, A.M. Fiore, M. Gauss, D.A. Hauglustaine, L.W. Horowitz, I.S.A. Isaksen, M.C. Krol, J.-F. Lamarque, M.G. Lawrence, R.V. Martin, V. Montanaro, J.-F. Müller, G. Pitari, M.J. Prather, J.A. Pyle, A. Richter, J.M. Rodriguez, N.H. Savage, S. E. Strahan, K. Sudo, S. Szopa, and M. van Roozendaal., Multi-model ensemble simulations of tropospheric NO₂ compared with GOME retrievals for the year 2000, *Atmos. Chem. Phys.*, **6**, 2943-2979, 2006.
- West, J.J., A.M. Fiore, L.W. Horowitz, and D.L. Mauzerall Global health benefits of mitigating ozone pollution with methane emission controls , *Proc. Natl. Acad. Sci.*, **103**(11), 3988-3993, doi:10.1073/pnas.0600201103, 2006.
- Brasseur, G., A. Guenther, and L. Horowitz, Atmospheric chemistry in the tropics, in *Climate Change and Africa*, edited by P.S. Low, Cambridge Univ. Press, New York, pp. 60-68, 2005.
- Fiore, A.M., L.W. Horowitz, D.W. Purves, H. Levy II, M.J. Evans, Y. Wang, Q. Li, and R.M. Yantosca, Evaluating the contribution of changes in isoprene emissions to surface ozone trends over the eastern United States, *J. Geophys. Res.*, **110**, D12303, doi:10.1029/2004JD005485, 2005.
- Lamarque, J.F., J.T. Kiehl, G.P. Brasseur, T. Butler, P. Cameron-Smith, W.D. Collins, W.J. Collins, C. Granier, D. Hauglustaine, P.G. Hess, E.A. Holland, L. Horowitz, M.G. Lawrence, D. McKenna, P. Merilees, M.J. Prather, P.J. Rasch, D. Rotman, D. Shindell, and P. Thornton, Assessing future nitrogen deposition and carbon cycle feedback using a multi-model approach: Analysis of nitrogen deposition, *J. Geophys. Res.*, **110**, D19303, doi:10.1029/2005JD005825, 2005.
- Liu, J., D.L. Mauzerall, L.W. Horowitz, Analysis of seasonal and interannual variability in transpacific transport, *J. Geophys. Res.*, **110**, D04302, doi:10.1029/2004jd005207, 2005.
- Ming, Y., V. Ramaswamy, P.A. Ginoux, L.W. Horowitz, and L.M. Russell, Geophysical Fluid Dynamics Laboratory general circulation model investigation of the indirect radiative effects of anthropogenic sulfate aerosol, *J. Geophys. Res.*, **110**, D22206, doi:10.1029/2005JD006161, 2005.
- Ming Y., V. Ramaswamy, P.A. Ginoux, and L.W. Horowitz, Direct radiative forcing of anthropogenic organic aerosols, *J. Geophys. Res.*, **110**, D20208, doi:10.1029/2004JD005573, 2005.
- Naik, V., D. Mauzerall, L. Horowitz, M.D. Schwarzkopf, V. Ramaswamy, and M. Oppenheimer, Net radiative forcing due to changes in regional emissions of tropospheric ozone precursors, *J. Geophys. Res.*, **110**, D24306, doi:10.1029/2005JD005908, 2005.
- Cooper, O.R., C. Forster, D.D. Parrish, E. Dunlea, G. Hübler, F.C. Fehsenfeld, J.S. Holloway, S.J. Oltmans, B.J. Johnson, A. Wimmers and L. Horowitz, On the life-cycle of a stratospheric intrusion and its dispersion into polluted warm conveyor belts, *J. Geophys. Res.*, **109**, D23S09, doi:10.1029/2003JD004006, 2004.

LARRY WAYNE HOROWITZ

- Fan, S.-M., L.W. Horowitz, H. Levy II, and W.J. Moxim, Impact of air pollution on wet deposition of mineral dust aerosols, *Geophys. Res. Lett.*, *31*, L02104, doi:10.1029/2003GL018501, 2004.
- Geophysical Fluid Dynamics Laboratory (GFDL) Global Atmospheric Model Development Team (GAMDT), The new Geophysical Fluid Dynamics Laboratory (GFDL) global atmosphere and land model AM2/LM2: Evaluation with prescribed SST simulations, *J. Climate*, *17*(24), 4641-4673, 2004.
- Goldstein, A.H., D.B. Millet, M. McKay, L. Jaegle, L. Horowitz, O. Cooper, R. Hudman, D.J. Jacob, S. Oltmans, and A. Clarke, Impact of Asian emissions on observations at Trinidad Head, California, during ITCT 2K2, *J. Geophys. Res.*, *109*, D32S17, doi:10.1029/2003JD004406R, 2004.
- Tang, Y., G.R. Carmichael, L.W. Horowitz, I. Uno, J.-H. Woo, D.G. Streets, D. Dabdub, G. Kurata, A. Sandu, J. Allan, E. Atlas, F. Flocke, L.G. Huey, R.O. Jakoubek, D.B. Millet, P.K. Quinn, J.M. Roberts, D.R. Worsnop, A. Goldstein, S. Donnelly, S. Schaffler, V. Stroud, K. Johnson, M.A. Avery, H.B. Singh, E.C. Apel, Multiscale simulations of tropospheric chemistry in the eastern Pacific and on the U.S. West Coast during spring 2002, *J. Geophys. Res.*, *109*, D23S11, doi:10.1029/2004JD004513, 2004.
- Emmons, L.K., P. Hess, A. Klonecki, X. Tie, L. Horowitz, J.-F. Lamarque, D. Kinnison, G. Brasseur, E. Atlas, E. Browell, C. Cantrell, F. Eisele, R.L. Mauldin, J. Merrill, B. Ridley, and R. Shetter, Budget of tropospheric ozone during TOPSE from two chemical transport models, *J. Geophys. Res.*, *108*(D8), 8372, doi:10.1029/2002JD002665, 2003.
- Gauss, M., G. Myhre, G. Pitari, M.J. Prather, I.S.A. Isaksen, T.K. Berntsen, G.P. Brasseur, F.J. Dentener, R.G. Derwent, D.A. Hauglustaine, L.W. Horowitz, D.J. Jacob, M. Johnson, K.S. Law, L.J. Mickley, J.-F. Müller, P.-H. Plantévin, J.A. Pyle, H.L. Rogers, D.S. Stevenson, J.K. Sundet, M. van Weele, and O. Wild, Radiative forcing in the 21st century due to ozone changes in the troposphere and the lower stratosphere, *J. Geophys. Res.*, *108*(D9), 4292, doi:10.1029/2002JD002624, 2003.
- Horowitz, L.W., S. Walters, D.L. Mauzerall, L.K. Emmons, P.J. Rasch, C. Granier, X.X. Tie, J.-F. Lamarque, M.G. Schultz, G.S. Tyndall, J.J. Orlando, and G.P. Brasseur, A global simulation of tropospheric ozone and related tracers: Description and evaluation of MOZART, version 2, *J. Geophys. Res.*, *108*(D24), 4784, doi:10.1029/2002JD002853, 2003.
- Prather, M., M. Gauss, T. Berntsen, I. Isaksen, J. Sundet, I. Bey, G. Brasseur, F. Dentener, R. Derwent, D. Stevenson, L. Grenfell, D. Hauglustaine, L. Horowitz, D. Jacob, L. Mickley, M. Lawrence, R. von Kuhlmann, J.-F. Müller, G. Pitari, H. Rogers, M. Johnson, J. Pyle, K. Law, M. van Weele, and O. Wild, Fresh air in the 21st Century?, *Geophys. Res. Lett.*, *30*(2), 1100, doi:10.1029/2002GL016285, 2003.
- Tie, X., L. Emmons, L. Horowitz, G. Brasseur, B. Ridley, E. Atlas, C. Stroud, P. Hess, A. Klonecki, S. Madronich, R. Talbot, and J. Dibb, Effect of sulfate aerosol on tropospheric NO_x and ozone budgets: Model simulations and TOPSE evidence, *J. Geophys. Res.*, *108*(D4), 8364, doi:10.1029/2001JD001508, 2003.
- Wei, C.-F., V.R. Kotamarthi, O.J. Oguniola, L.W. Horowitz, S. Walters, D.J. Wuebbles, M.A. Avery, D.R. Blake, E.V. Browell, and G.W. Sachse, Seasonal variability of ozone mixing ratios and budgets in the tropical Southern Pacific: A GCTM perspective, *J. Geophys. Res.*, *107*, 8235, doi:10.1029/2001JD000772, 2002. [printed *108*(D2), 2003]

LARRY WAYNE HOROWITZ

- Contributing author to: Prather, M. and D. Ehhalt, Atmospheric chemistry and greenhouse gases, in *Climate Change 2001: The Scientific Basis*, J.T. Houghton et al., eds., Cambridge University Press, pp. 239-287, 2001.
- Tie, X., G. Brasseur, L. Emmons, L. Horowitz, and D. Kinnison, Effects of aerosols on tropospheric oxidants: A global model study, *J. Geophys. Res.*, *106*, 22,931-22,964, 2001.
- Mauzerall, D.L., D. Narita, H. Akimoto, L. Horowitz, S. Walters, D. Hauglustaine, G. Brasseur, Seasonal characteristics of tropospheric ozone production and mixing ratios over East Asia: A global three-dimensional chemical transport model analysis, *J. Geophys. Res.*, *105*, 17,895-17,910, 2000.
- Spivakovsky, C.M., J.A. Logan, S.A. Montzka, Y.J. Balkanski, M. Foreman-Fowler, D.B.A. Jones, L.W. Horowitz, A.C. Fusco, C.A.M. Brenninkmeijer, M.J. Prather, S.C. Wofsy, and M.B. McElroy, Three-dimensional climatological distribution of tropospheric OH: Update and evaluation, *J. Geophys. Res.*, *105*, 8931-8980, 2000.
- Horowitz, L.W., and D.J. Jacob, Global impact of fossil fuel combustion on atmospheric NO_x, *J. Geophys. Res.*, *104*, 23,823-23,840, 1999.
- Horowitz, L.W., J. Liang, G.M. Gardner, and D.J. Jacob, Export of reactive nitrogen from North America during summertime: Sensitivity to hydrocarbon chemistry, *J. Geophys. Res.*, *103*, 13,451- 13,476, 1998.
- Liang, J., L.W. Horowitz, D.J. Jacob, Y. Wang, A.M. Fiore, J.A. Logan, G.M. Gardner, and J.W. Munger, Seasonal budgets of reactive nitrogen species and ozone over the United States, and export fluxes to the global atmosphere, *J. Geophys. Res.*, *103*, 13,435-13,450, 1998.
- Olson, J., M. Prather, T. Berntsen, G. Carmichael, R. Chatfield, P. Connell, R. Derwent, L. Horowitz, S. Jin, M. Kanakidou, P. Kasibhatla, R. Kotamarthi, M. Kuhn, K. Law, J. Penner, L. Perliski, S. Sillman, F. Stordal, A. Thompson, and O. Wild, Results from the Intergovernmental Panel on Climatic Change photochemical model intercomparison (PhotoComp), *J. Geophys. Res.*, *102*, 5979-5991, 1997.
- Staffelbach, T., A. Neftel, and L.W. Horowitz, Photochemical oxidant formation over southern Switzerland, 2, Model results, *J. Geophys. Res.*, *102*, 23,363-23,373, 1997.
- Hirsch, A.I., J.W. Munger, D.J. Jacob, L.W. Horowitz, and A.H. Goldstein, Seasonal variation of the ozone production efficiency per unit NO_x at Harvard Forest, Massachusetts, *J. Geophys. Res.*, *101*, 12,659-12,666, 1996.
- Jacob, D.J., L.W. Horowitz, J.W. Munger, B.G. Heikes, R.R. Dickerson, R.S. Artz, and W.C. Keene, Seasonal transition from NO_x- to hydrocarbon-limited conditions for ozone production over the eastern United States in September, *J. Geophys. Res.*, *100*, 9315-9324, 1995.
- Munger, J.W., D.J. Jacob, B.C. Daube, L.W. Horowitz, W.C. Keene, and B.G. Heikes, Formaldehyde, glyoxal, and methylglyoxal in air and cloudwater at a rural mountain site in central Virginia, *J. Geophys. Res.*, *100*, 9325-9333, 1995.

PRESENTATIONS

- Climate Science Workshop, Princeton Learning Cooperative, Princeton, NJ, May 2022.
- Sensitivity of ozone dry deposition to ecosystem-atmosphere interactions: A critical appraisal of observations and simulations, AGU Fall Meeting, San Francisco, CA, December 2019.

LARRY WAYNE HOROWITZ

Climate Change, Fifth Grade Class, Millstone River School, Plainsboro, NJ, March 2019.

Historical evolution of climate, air quality, and aerosol effective radiative forcing in GFDL's CM4 and ESM4 coupled models, AGU Fall Meeting, Washington, DC, December 2018.

Effective radiative forcing and climate response from aerosols and ozone in GFDL-CM3 coupled chemistry-climate model, AGU Fall Meeting, New Orleans, LA, December 2017.

Quality controlling CMIP datasets at GFDL, AGU Fall Meeting, New Orleans, LA, December 2017.

Impacts of ozone changes on climate in GFDL-CM3, Ozone-climate workshop, Massachusetts Institute of Technology, June 2016.

The influence of short-lived air pollutants on climate, Princeton University, Science, Technology and Environmental Policy program seminar, December 2012.

Historical and Future Climate Change Simulated by GFDL's CM3 Coupled Model, NOAA Geophysical Fluid Dynamics Laboratory, seminar, May 2012.

Tropospheric chemistry and climate, Geosciences Department, Princeton University, seminar, April 2008.

Observational constraints on the chemistry of isoprene nitrates over the eastern United States, Department of Environmental Sciences, Rutgers University, seminar, April 2007.

Impact of meteorology and emissions on methane trends, 1990-2004, AGU Joint Assembly, Baltimore, MD, May 2006.

MOZART Photochemistry and Transport Modeling for ICARTT, ICARTT Data Analysis Workshop, Durham, NH, August 2005.

Tropospheric ozone and aerosols, GFDL/Hadley Centre Meeting, Princeton, NJ, November 2003.

Tropospheric chemistry and aerosol modeling in AM2, NCAR-GFDL Model Development Meeting, Princeton, NJ, October 2003.

MOZART-2 modeling in ITCT 2K2 and 2K4, Planning Meeting for Summer 2004 Atmospheric Research Campaigns, Durham, NH, April 2003.

Trans-Pacific transport of pollution during ITCT 2K2, ITCT 2K2 Data Workshop, Boulder, CO, March 2003.

Chemical weather forecasts using the MOZART-2 global model in ITCT 2K2, AGU Fall Meeting, San Francisco, CA, December 2002.

Ozone and aerosol modeling: Radiative forcing and air quality, GFDL-NOAA Meeting, Princeton, NJ, November 2002.

Ozone and aerosol modeling: Radiative forcing and air quality, NOAA/OAR Senior Research Council Meeting, Princeton, NJ, November 2002.

Ozone and aerosol modeling: Radiative forcing and air quality, NCAR/GFDL Joint Atmospheric Model Development Workshop, November 2002.

Chemical transport models and applications, NOAA/OAR Aerosol-Tropospheric Ozone Research Workshop, Boulder, CO, October 2002.

Budget of tropospheric ozone in MOZART-2, Max Planck Institute for Meteorology, Hamburg, Germany, June 2002.

Overview of MOZART-2, ITCT 2K2 Planning Meeting, Boulder, CO, November 2001.

Status of MOZART-2, MOZART Workshop, Boulder, CO, November 2001.

Global simulation of tropospheric ozone and related tracers: Description and evaluation of MOZART, version 2, AGU Spring Meeting, Boston, MA, May 2001.

A global simulation of tropospheric ozone and related tracers: Description and evaluation of MOZART, version 2, MOZART Workshop, NCAR, Boulder, CO, April 2001.

MOZART-2: Recent updates and comparison with observations, MOZART Workshop, UIUC, Urbana-Champaign, IL, September 2000.

MOZART-2: Model evaluation and recent updates, MOZART Workshop, Nederland, CO, May 2000.

MOZART-2: Model description and evaluation, MOZART Workshop, Max Planck Institute for Meteorology, Hamburg, Germany, January 2000.

LARRY WAYNE HOROWITZ

Update on model development at NCAR and status of IPCC effort, NCAR/LLNL Model Symposium, NCAR, Boulder, CO, October 1999.

Global simulation of tropospheric ozone using MOZART-2, NCAR/ASP Research Report, Boulder, CO, October 1999.

Current status of MOZART-2, MOZART Workshop, NCAR, Boulder, CO, September 1999.

Tropical tropospheric ozone: The role of biomass burning and lightning, NCAR/ACD Research Report, Boulder, CO, July 1999

Model Simulation of Tropical Tropospheric Ozone, and Its Dependence on Biomass Burning, Lightning, and Convection, AGU Spring Meeting, Boston, MA, June 1999.

Tropospheric ozone in the tropics: The role of biomass burning and lightning, NCAR/ASP Presentation, Boulder, CO, May 1999.

2-D and 3-D chemical transport modelling: Preliminary results and future plans for the MOZART-2 model, NCAR/ASP Research Report, Boulder, CO, October 1998.

Tropospheric ozone in the tropics: The role of convection, NCAR/ASP Research Report, Boulder, CO, May 1998.

Update on recent work on the MOZART model, NCAR/ACD Presentation, Boulder, CO, March 1998.

The impact of fossil fuel combustion on the global distributions of tropospheric nitrogen oxides and ozone, AGU Fall Meeting, San Francisco, CA, December 1997.

The effect of non-methane hydrocarbons on the export of reactive nitrogen from North America during summertime, AGU Fall Meeting, San Francisco, CA, December 1996.