

MEIYUN LIN

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Princeton University Forrestal Campus (GFDL 250), 201 Forrestal Road, Princeton, NJ 08540

PROFESSIONAL EXPERIENCE

Princeton University, Atmospheric and Oceanic Sciences (2010.06-present)

Associate Research Scholar: Global climate – air quality linkages

University of Wisconsin-Madison, Center for Sustainability and the Global Environment
(2008.03-2010.05)

Postdoctoral Scientist: Global-to-regional scale air pollution transport

University of Tokyo, Center for Climate System Research (2007.10-2008.02)

Postdoctoral Scientist: Long-range transport of sulfate and nitrate aerosols over East Asia

University of Tokyo, Institute for Industrial Science (2004.09-2007.09)

Graduate researcher: Air pollution and acid rain over East Asia

EDUCATION

Ph.D. 2007 Department of Civil Engineering, University of Tokyo, Japan

M. E. 2004 Department of Environmental Engineering, Dalian University of Technology, China

B. E. 2001 Department of Environmental Science and Engineering, Sichuan University, China

MEDIA REPORTS AND RESEARCH HIGHLIGHTS

- May 12, 2015. [Nature Communications](#) published Lin's work that identifies a link between La Niña and western US deep stratospheric ozone intrusions. The paper was highlighted in NOAA Research and multiple media outlets including [Environment & Energy News](#).
- January 26, 2014. [Nature Geoscience](#) published Lin's work that solves the mystery of Hawaiian ozone changes since the 1970s. The paper was featured in [Nature's News & Views](#), [Princeton Journal Watch](#), and multiple media outlets
- June 12, 2013. [The U.S. House Subcommittee on Environment Hearing](#). Lin MY et al [2012b], on stratospheric intrusions and the challenges for the western states to achieve more stringent ozone standards, was cited by multiple expert testimonies.
- January 1, 2013. Lin MY et al. [2012a] ranked [JGR's top 1 most cited paper](#) for all 2753 articles published in 2012.
- December, 2012. [NOAA's top research accomplishments of 2012](#) included Lin MY et al. [2012a].
- March 6, 2012. [New York Times Greenblog](#). Meiyun Lin interviewed on Asian pollution and western U.S. ozone air quality.
- March 5, 2012. [NOAA Research](#). Meiyun Lin interviewed on Asian pollution and western U.S. ozone air quality.
- March 5, 2012. [Nature News](#). Meiyun Lin interviewed on using NASA satellites to forecast Asian pollution events over the western U.S.
- March 1, 2012. [Science Magazine ScienceShot](#). Richard A. Kerr, a senior reporter, wrote about Lin et al [2012a] on imported Asian pollution.

- February 17, 2012. *Lin MY et al* [2012a] selected as [AGU Editors' highlight](#).

FUNDED EXTERNAL AWARD

- Lesley Ott (PI), Bryan Duncan (Co-I), [Meiyun Lin](#) (Co-I), Anne Thompson (Co-I), Yasuko Yoshida (Co-I), J. Eric Nielsen (Co-I). “Statistics for stratospheric influence on surface GHGs during NASA's North American field campaign: A study with aircraft & satellite data and high-resolution global models”. NASA, Total budget: \$416,964, Princeton sub-award (PI Meiyun Lin): \$101,451 (7/1/2014-6/30/2017)
- Owen Cooper (PI) and [Meiyun Lin](#) (Co-PI). “Exploring emission versus climate drivers of tropospheric ozone variability and trends over northern mid-latitudes from space”, NASA Atmospheric Composition, Total budget: \$233,529, Princeton sub-award (PI Meiyun Lin): \$141,722 (3/1/2014-2/29/2016)
- Chris Emery, William Koshak, and [Meiyun Lin](#), “Investigation of Global Modeling and Lightning NO_x Emissions as Sources of Regional Background Ozone in Texas”, State of Texas, Total budget: \$145,712, Princeton sub-award (PI Meiyun Lin): \$9,810 (10/1/2012-9/30/2013)

ENGAGEMENTS IN COMMUNITY RESEARCH ACTIVITIES

- PI for GFDL-AM3 model, Chemistry-Climate Model Initiative (2013-present)
- PI for GFDL-AM3 model, Hemispheric Transport of Air Pollution Phase 2 (Contributing to AeroCom) (2011-present)
- Member/Co-Investigator, [NASA Air Quality Applied Sciences Team](#) (2011-2016)
- Contributor, [U.S. EPA Integrated Science Assessment \(ISA\) for Ozone and Related Photochemical Oxidants 2013 \(2011-2013\)](#)
- Section Co-Chair, American Geophysical Union (AGU) Fall Meeting 2011: Impacts of baseline ozone and particulate matter on surface air quality (2011)
- Reviewers for *J. of Geophys. Res.*, *Geophys. Res. Lett.*, *Atmos. Chem. and Phys.*, *Environ. Res. Lett.*, *Atmos. Environ.*, *Environ. Sci. & Tech*, *Science of The Total Environment*

PEER-REVIEWED PUBLICATIONS

List of first-authored publications since coming to Princeton (5)

Meiyun Lin, L.W. Horowitz, O.R. Cooper, D. Tarasick, S. Conley, L.T. Iraci, B. Johnson, T. Leblanc, I. Petropavlovskikh, E.L. Yates: *Revisiting the evidence of increasing springtime ozone mixing ratios in the free troposphere over western North America*, **Geophysical Research Letter**, 42, doi:10.1002/2015GL065311, 2015 ([PDF](#) | [Supporting info](#))

Meiyun Lin, 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 Communications**, 6:7105, doi:10.1038/ncomms8105 (2015) ([PDF](#) | [Supporting Info](#))

Meiyun Lin, L.W. Horowitz, S. J. Oltmans, A.M. Fiore, S. Fan. *Tropospheric ozone trends at Manna Loa Observatory tied to decadal climate variability*, [Nature Geoscience](#), 7, 136-143, doi:10.1038/NGEO2066 (2014) ([Cited by 30+ times on Google Scholar](#)) ([PDF](#))

Meiyun Lin, A. M. Fiore , O. R. Cooper , L. W. Horowitz , A. O. Langford , Hiram Levy II , B. J. Johnson , V. Naik , S. J. Oltmans , C. Senff. *Springtime high surface ozone events over the western United States: Quantifying the role of stratospheric intrusions*, [J. Geophys. Res.](#), doi:10.1029/2012JD018151 (2012b) ([Cited by 60+ times on Google Scholar](#)) ([PDF](#))

Meiyun Lin, A. M. Fiore, L. W. Horowitz, O. R. R. Cooper, V. Naik, J. S. Holloway, B. J. J. Johnson, A. M. Middlebrook, S. J. J. Oltmans, I. B. Pollack, T. B. Ryerson, J. 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.](#), doi:10.1029/2011JD016961 (2012a) ([AGU Editors' Highlight; Cited by 90+ times, Google Scholar](#))

List of **co-authored** publications since coming to Princeton (12)

Lesley E. Ott, Bryan N. Duncan, Anne M. Thompson, Glenn Diskin, Zachary Fasnacht, Andrew O. Langford, **Meiyun Lin**, Andrea M. Molod, J. Eric Nielsen, Sally E. Pusede, Andrew J. Weinheimer, Yasuko Yoshida. *Frequency and Impact of Summertime Stratospheric Intrusions over Maryland during DISCOVER-AQ (2011): New Evidence from NASA's GEOS-5 Simulations*, submitted to [J. Geophys. Res.](#), August 5, 2015.

F. Paulot, P. Ginoux, W. F. Cooke, L. J. Donner, S. Fan, **M. 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*, submitted to [Atmospheric Chemistry and Physics](#), August 2015

R. Fine, M.B Miller; J. Burley; D. Jaffe; R. B. Pierce; **Meiyun Lin**; M. S Gustin. *Variability and sources of surface ozone at rural sites in Nevada, USA: Results from two years of the Nevada Rural Ozone Initiative (Nvroi)*, [Science of the Total Environment](#), doi:10.1016/j.scitotenv.2014.12.027 (2014)

B. Brown-Steiner, P.G. Hess, **Meiyun Lin**. *On the capabilities and limitations of GCCM Simulations of Summertime Regional Air Quality: A Diagnostic Analysis of Ozone and Temperature Simulations in the U.S. Using CESM and CAM-Chem*, [Atmospheric Environment](#), doi:10.1016/j.atmosenv.2014.11.001 (2014)

A.O. Langford, C.J. Senff, R.J. Alvarez II, J. Brioude, O.R. Cooper, J.S. Holloway, **M.Y. Lin**, R.D. Marchbanks, R.B. Pierce, S.P. Sandberg, A.M. Weickmann , E.J. Williams. *An overview of the 2013 Las Vegas Ozone Study (LVOS): Impact of stratospheric intrusions and long-range transport on surface air quality*. [Atmospheric Environment](#), doi: 10.1016/j.atmosenv.2014.08.040 (2014)

A.M. Fiore, J.T. Oberman, **Meiyun Lin**, L. Zhang, O.E. Clifton, D.J. Jacob, V. Naik, L.W. Horowitz, J.P. Pinto (2014): *Estimating North American background ozone in U.S. surface air with two independent global models: Variability, uncertainties, and recommendations*, [Atmos. Environ](#), V96, Pages 284-300, DOI: 10.1016/j.atmosenv.2014.07.045 (2014)

- Zoogman, P., Jacob, D. J., Chance, K., Liu, X., **Lin, M.**, Fiore, A., and Travis, K. *Monitoring high-ozone events in the US Intermountain West using TEMPO geostationary satellite observations*, **Atmos. Chem. Phys.**, 14, 6261-6271, doi:10.5194/acp-14-6261-2014 (2014).
- B.N. Duncan, A. I Prados, L. Lamsal, Y. Liu, D. Streets, P. Gupta, E. Hilsenrath, R. Kahn, JE Nielsen, A. Beyersdorf, S. Burton, AM Fiore, J Fishman, D Henze, C Hostetler, NA Krotkov, P. Lee, **Meiyun Lin**, S. Pawson, G. Pfister, KE Pickering, B. Pierce, Y. Yoshida, L. Ziemba. *Satellite data of atmospheric pollution for U.S. air quality applications: Examples of applications, summary of data end-user resources, answers to FAQs, and common mistakes to avoid*. **Atmospheric Environment**, 94, 647–662, DOI: 10.1016/j.atmosenv.2014.05.061 (2014).
- Fiore, A.M., R. B. Pierce, R. Dickerson, **M. Lin**. Detecting and attributing episodic high background ozone events. *Environmental Manager* (February 2014)
- Lapina K., D. K. Henze, J. B. Milford, M. Huang, **Meiyun Lin**, A. Fiore, G. Carmichael, G. G. Pfister and K. Bowman. *Assessment of source contributions to seasonal vegetative exposure to ozone in the U.S.*, **J. Geophys. Res.**, DOI: 10.1002/2013JD020905 (2014)
- Fang, Y., A.M. Fiore, J.-F. Lamarque, L. W. Horowitz, and **Meiyun Lin** (2013), *Using synthetic tracers as a proxy for summertime PM2.5 air quality over the Northeastern United States in physical climate models*, **Geophys. Res. Lett.**, 40, 755–760, doi:10.1002/grl.50162.
- Naik, V., Voulgarakis, A., Fiore, A. M., Horowitz, L. W., Lamarque, J.-F., **Lin, M.**, Prather, M. J. + 25 coauthors: *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.

List of publications before coming to Princeton (6)

- Lin, M.**, T. Holloway, G. R. Carmichael., A. M. Fiore, *Quantifying pollution inflow and outflow over East Asia in spring with regional and global models*. **Atmos. Chem. Phys.**, 10, 4221-4239, 2010
- Lin, M.**, T. Holloway, T. Oki, D.G. Streets, and A. Richter (2009). *Multi-scale model analysis of boundary layer ozone over East Asia*. **Atmos. Chem. Phys.**, 9, 3277-3301.
- Lin, Meiyun**, T. Oki, M. Bengtsson, S. Kanae, T. Holloway, D.G. Streets, *Long-range transport of acidifying substances in East Asia Part I: Model evaluation and sensitivity studies*. **Atmospheric Environment** 42 (24), 5939-5955, 2008, doi:10.1016/j.atmosenv.2008.04.008
- Lin, Meiyun**, T. Oki, M. Bengtsson, S. Kanae, T. Holloway, D.G. Streets. *Long-range transport of acidifying substances in East Asia Part II: Source-receptor relationships*. **Atmospheric Environment** 42 (24), 5956-5967, 2008, doi:10.1016/j.atmosenv.2008.03.039
- Lin, Meiyun**, T. Oki, and M. Bengtsson. *Long-range Transport and Transformations of Acidifying Substances over East Asia in Spring Time*. *Annual Journal of Hydraulic Engineering (JSCE)*, Vol.51, 91-96, 2007
- Lin, Meiyun**, S. Zhang, and Y. Chen. *Distance-to-Target Weighting in Life Cycle Impact Assessment Based on Chinese Environmental Policy for the Period 1995-2005*. **International Journal of Life Cycle Assessment**. 10 (6), 393-398, 2005

Book Chapters and Reports (1)

UN Task Force on Hemispheric Transport of Air Pollution (2010). **Meiyun Lin** served as a contributing author to *Chapter 4: “Global and Regional Modeling”*. In: *Hemispheric Transport of Air Pollution 2010 (HTAP 2010) - Part A Ozone and Particulate Matter*, pp. 135-198, UNECE Air Pollution Studies No. 17 (ISSN 1014-4625), www.htap.org

Invited Talks and Selected Oral Presentations (First-authored)

Spring 2016, **Harvard University Atmospheric Science Seminar** (*Invited speaker*)

Spring 2016, **MIT Atmospheric Science Seminar** (*Invited speaker*)

Oct-7, 2015, **IGAC/SPARC Chemistry Climate Model Initiative Workshop, Italy: *The Role of Climate, the Stratosphere, and Emissions on US Surface O₃ Trends and Extremes*** (*Invited*)

Sep-18, 2015, **Meteorology And Climate - Modeling for Air Quality (MAC-MAQ)**, UC Davis Air Quality Research Center: *Detecting changes in US background ozone means and extremes amidst climate variability* (*Invited*)

Aug-20, 2015, **Western States Air Resources Council**. Key drivers of western US surface ozone means and extremes: Climate variability, stratospheric intrusions, and Asian pollution (*Invited seminar*)

May-11, 2015, **HTAP: Modeling Air Quality from the Global to Local Scales, NCAR**: Establishing process-oriented constraints on global models for ozone source attribution: Lessons from GFDL AM3

May-13, 2015, **Western Regional Air Partnership (WRAP), NCAR**: Key drivers of western US surface ozone variability over recent decades: Stratospheric intrusions, Asian pollution, and Climate variability (*Invited*)

Apr-21, 2015, **NASA AIRS Science Team Meeting, JPL, Pasadena**: Challenges in quantifying sources and variability of lower tropospheric ozone over western N. America: Perspectives from satellites and models (*Invited keynote speaker*)

Apr-1, 2015, **Yosemite Transboundary Ozone Pollution Conference**: Quantifying Asian influence on Western U.S. surface ozone exceedances and long-term trends (*Invited*)

Feb-19, 2015, **CENRS Air Quality Research Subcommittee**: Key drivers of Western U.S. surface ozone variability over recent decades: Stratospheric intrusions, Asian pollution, and climate (*Invited*)

Dec-15, 2014, **American Geophysical Union Fall Meeting**: Key drivers of Western U.S. surface ozone variability from 1980-2050: From extreme events to background trends (*Invited*)

Dec-19, 2014, **American Geophysical Union Fall Meeting**: Role of climate variability on tropospheric ozone (*Invited*)

June 2014, **NASA Air Quality Applied Sciences Team (AQAST) Meeting**, Harvard University: Year-to-year variability in Western U.S. high-ozone events tied to stratospheric influence: Implications for seasonal prediction to aid regional air quality planning.

May 2014, **IGAC/SPARC Chemistry-Climate Model Initiative Workshop**, Lancaster, UK: Role of climate variability on tropospheric ozone variability and trends (*Invited*)

- Dec 2013, **UN Task Force on Hemispheric Transport of Air Pollution (HTAP)**, San Francisco. Influence of decadal climate variability on hemispheric pollution transport.
- Aug 2013, **Hiram “Chip” Levy Symposium**, Princeton: Footprints of decadal climate variability in ozone at Manna Loa Observatory
- July 2013, **Western Regional Air Partnership (WRAP)-Western Air Quality Modeling Workshop**, Boulder: Asian and stratospheric influences on Western U.S. ozone variability and trends (*Invited*)
- Dec 2012, **American Geophysical Union (AGU) Fall Meeting 2012**, San Francisco: Developing space-based indicators of stratospheric influence on Western U.S. high surface ozone events
- Nov 2012, **NASA Sounder Science Team Meeting**, Maryland: Predicting Western U.S. high surface ozone events from Asian pollution and stratospheric intrusions: Exploration of AIRS Data (*Invited*)
- Oct 2012, **Western States Air Resources Council (WESTAR)-Western Ozone Transport Workshop**, Nevada: Daily to decadal variability in sources of springtime surface ozone events over the western United States: stratospheric intrusions, Asian pollution, and fires (*Invited*)
- Oct 2012, **NASA Aura Science Team Meeting**, Pasadena: Identifying and forecasting deep stratospheric ozone intrusions over the western United States from space (*Invited*)
- June 2012, **NASA Air Quality Applied Sciences Team (AQAAT) Meeting**, Wisconsin: Strong stratospheric influence on springtime surface high-O₃ events over the western United States in spring: Not-so-rare events?
- May 2012, **California’s South Coast Air Quality Management District (SCAQMD)**, Ontario: Global sources of local ozone pollution in Southern California (*Invited seminar*)
- May 2012, **NOAA Earth System Research Laboratory**, Chemical Science Division, Boulder: Background ozone over the United States in 1980-2010: origin, extremes, and long-term changes (*Invited seminar*)
- Feb 2012, **UN Task Force on Hemispheric Transport of Air Pollution (TF HTAP)-2011-2015 Work Plan Meeting**, Pasadena: Transport of Asian ozone pollution into surface air over the western United States in spring
- Dec 2011, **American Geophysical Union (AGU) Fall Meeting 2011**, San Francisco: Variability and changes in tropospheric ozone over the western United States (1980-2010): Exploring the roles of stratosphere-to-troposphere transport and El Nino-Southern Oscillation
- Nov 2011, **NASA AQAAT Meeting, EPA Research Triangle Park**: Estimating background ozone and its specific components over the United States to support NAAQS-setting, implementation, and attainment planning.
- Nov 2011, **NASA AQAAT Meeting, EPA Research Triangle Park**: Model Intercomparison of background ozone to inform NAAQS setting and implementation
- Oct. 2011, **NOAA Geophysical Fluid Dynamics Laboratory Science Symposium**, Princeton: Stratospheric impacts on ground-level ozone air quality over the western United States.

- July 2011, **NOAA Senior Research Council**, Princeton: Asian and stratospheric impacts on tropospheric ozone over western North America: means, extremes and the role of ENSO (*Invited*)
- Apr 2011, **International Workshop on Tropospheric Ozone Changes**, Toulouse, France: Trends and variability of tropospheric ozone at northern mid-latitudes in 1980-2010: Exploring the role of emissions, ENSO and STE
- Dec 2010, **AGU Fall Meeting 2010**, San Francisco: Impacts of Asian emissions on ozone air quality over the western United States
- Oct. 2009, **University of Tokyo, Institute of Industrial Science**, Japan: Connections between air pollution and the hydrological cycle
- Oct. 2009, **Hong Kong Polytechnic University**, Hong Kong, China: Multi-scale model analysis of air pollution in Asia
- Oct. 2009, **Acid Deposition Monitoring Network in East Asia (EANET)** - Regional Scientific Workshop, Japan: Multi-scale model analysis of EANET Data (*Invited*)
- June 2009, **United Nations TF HTAP** - Linkages between regional and global modeling, air quality and climate change, Paris, France: Quantifying pollution inflow and outflow over East Asia through coupling regional and global models
- Feb 2009, **International Institute for Applied Systems Analysis (IIASA), Austria** - 11th workshop for Model Inter-comparison Study for Asia: Inter-comparison of two regional atmospheric chemistry models (WRF-Chem and CMAQ) for East Asia
- Nov 2008, **University of Wisconsin-Madison, Center for Climate Research** -Climate, People, and Environment Program Seminar: What controls the seasonality of boundary layer ozone in Asia?
- Oct 2008, **United Nations TF HTAP, Vietnam**: Regional impacts of hemispheric air pollution transport
- Feb 2008, **International Institute for Applied Systems Analysis (IIASA), Austria** -10th workshop for Model Inter-comparison Study for Asia: Evaluating gaseous pollutants and source-receptor relationships for reactive nitrogen deposition in East Asia (*Invited*)