

## DR. VAISHALI NAIK

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### Research Interests

Chemistry-Climate interactions, Atmosphere-Biosphere interactions, Global Earth System Modeling

### Education

<b>University of Illinois at Urbana-Champaign, Illinois</b> <i>Doctor of Philosophy</i> , Atmospheric Science	1999-2003
<b>University of Illinois at Urbana-Champaign, Illinois</b> <i>Master of Science</i> , Atmospheric Science	1996-1999
<b>University of Delhi, Delhi, India</b> <i>Bachelor of Science</i> , Chemistry with Honors	1992-1995

### Professional Experience

<b>Senior Physical Scientist</b> NOAA Geophysical Fluid Dynamics Laboratory (GFDL)	2024-present
<b>Research Physical Scientist</b> NOAA Geophysical Fluid Dynamics Laboratory (GFDL)	2016-2024
<b>Project Scientist</b> University Corporation for Atmospheric Research (UCAR)/NOAA GFDL	2011-2015
<b>Scientist</b> High Performance Computing Inc (HPTi)/NOAA GFDL	2009-2011
<b>Research Scientist (part-time)</b> Atmos Research and Consulting, Lubbock, TX	2008-2009
<b>Associate Research Scholar</b> Woodrow Wilson School, Princeton University Program in Atmospheric and Oceanic Sciences, Princeton University	2006-2007
<b>Postdoctoral Research Associate</b> Woodrow Wilson School, Princeton University	2003-2006
<b>Graduate Research Fellow</b> Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign	2000-2003
<b>Graduate Research Assistant</b> Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign	1996-2000

### Honors

AGU Piers Sellers Global Environmental Change Mid-Career Award	2023
Department of Commerce, Silver Medal for scientific leadership in leading, drafting, coordinating, and communicating the findings of the reports of the IPCC's Sixth Assessment Report	2023
NOAA Administrator's award for advancing the understanding of the Earth System by developing and applying NOAA's state-of-the-art Coupled Carbon-Chemistry-Climate model	2022
Reuter's Hot List of Influential Climate Scientists	2021

## Professional Activities

- **Member**, Scientific Steering Committee, Composition Air quality Climate Interactions Initiative (CACTI): Emissions to Response, March 2023-present
- **Co-Lead** of the CMIP7 Climate Forcings Task Team, Nov 2022-present
- **Co-Chair** of the GFDL-AM5 Model Development Team, Feb 2022-present
- **Member**, Organizing Committee for WCRP Future of Climate Modeling Workshop, March 21 – 24, 2022
- **Panelist**, Discussion on the Intergovernmental Panel on Climate Change (IPCC) Working Group I 6th Assessment Report: “Climate Change 2021: The Physical Science Basis, American Geophysical Union (AGU) Fall Meeting, New Orleans, LA, December 13, 2021
- **Member**, Organizing Committee Tri-MIPathon – the third joint AerChemMIP/RFMIP/PDRMIP Workshop, Virtual, December 1-3, 2021.
- **Contributing Author**, Fifth U.S. National Climate Assessment (NCA5), Earth System Processes Chapter, 2021-2023
- **Science Advisor for EOS Atmospheric Science**, AGU, 2021-2024
- **Member**, NCAR CESM Advisory Board, 2021-present
- **Lead Author** (2018-2020) and **Convening Lead Author** (2021) on Chapter 6 (Short-lived Climate Forcers), and **Lead Author** on the Technical Summary and **Drafting Author** on the Summary for Policymakers of the Intergovernmental Panel on Climate Change Assessment Report 6 (IPCC-AR6) Working Group I, 2018-2021
- **Member**, AerChemMIP Scientific Steering Committee, September 2019-present
- **Member**, Organizing Committee Tri-MIP-athlon – the second joint AerChemMIP/RFMIP/PDRMIP Workshop in support of CMIP6, Princeton, NJ, June 12-14, 2019
- **Co-Lecturer**, NCAR ACOM-organized workshop on Fundamentals of Atmospheric Chemistry and Aerosol Modeling, Boulder, CO, August 13-15, 2018
- **Invited Expert**, Expert Meeting on Short-lived Climate Forcers (EM-SLCF), Geneva, Switzerland, May 28-31, 2018
- **Panelist**, Discussion on Model Biases and other Challenging Issues at the GFDL Fall Science Symposium, Princeton, NJ, November 2, 2017
- **Expert Reviewer** for the World Meteorological Organization (WMO) 2018 Scientific Assessment of Ozone Depletion Report, 2017
- **Expert Reviewer** for Hindu Kush Himalayan Monitoring and Assessment Programme (HIMAP), 2017.
- **Participant**, NOAA OAR Forum on Atmospheric Chemistry/Air Composition and Ecosystem Modeling, Silver Spring, MD, June 15-16, 2017
- **Contributing Author**, Fourth U.S. National Climate Assessment (NCA4), Air Quality Chapter, 2017-2018
- **Member**, GFDL Research Council, 2017-2018
- **Co-Lead** on Chapter 7 of the Tropospheric Ozone Assessment Report (TOAR), **Contributing Author** on Chapters 1 and 2, 2015-2017
- **Member**, GFDL Early Career Scientist Committee, 2015-2016
- **Contributing Author** to Chapter 11 (Near-term Climate Change: Projections and Predictability) and Annex II of the Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC-AR5) Working Group I Climate Change 2013: The Physical Science Basis, 2013
- **Expert Reviewer** for second order draft of the IPCC-AR5 Working Group I, 2012.
- **Model PI and Analysis Co-Lead** on hydroxyl and methane lifetime in the Atmospheric Chemistry and Climate Model Intercomparison Project (ACCMIP), in support of the IPCC AR5 (2011-2013)
- **Member**, GFDL Computer User’s Advisory Board (CUAB), 2010-2013
- **Participant**, Dissertations Initiative for the Advancement of Climate Change Research (DISCCRS II), March 26–April 2 2006, Pacific Grove, CA
- **Co-convenor** of special session in 2005 Joint Assembly, May 23-27, New Orleans, LA

## **Journal Referee**

Atmospheric Chemistry and Physics, Earth Interactions, Environmental Science & Technology, Geophysical Research Letters, Environmental Research Letters, Global Environmental Change, Journal of Geophysical Research, Atmospheric Environment, Nature, Science, Chemosphere, Chemical Society Reviews, and Current Pollution Reports

### **Proposal Referee**

National Science Foundation (NSF), National Aeronautics and Space Administration (NASA), American Association for the Advancement of Science (AAAS) on behalf of Indo-US Science and Technology Forum, Department of Energy (DOE), Environmental Protection Agency (EPA), and Swiss National Science Foundation (FNSNF)

### **Professional Society Membership**

American Geophysical Union (AGU), Earth System Women's Network (ESWN), Sound Science Initiative of Union of Concerned Scientists

### **Advising/Teaching**

#### **Postdoctoral Scientists**

- **Shipeng Zhang**, Princeton University (2023-)  
**Project:** Stratospheric Sulfur Aerosols in GFDL Earth System Model for assessing chemistry-climate impacts of aerosol injections
- **Yuchao (Chloe) Gao**, Princeton University (2020-2022)  
**Project:** Stratospheric Sulfur Aerosols in GFDL Earth System Model for assessing chemistry-climate impacts of aerosol injections (*now at Fudan University*)
- **Jian He**, Princeton University (2017-2020) (*now at University of Colorado, Boulder/NOAA Chemical Sciences Laboratory*)  
**Project:** Drivers of trends and variability in atmospheric methane
- **Jordan Schnell**, Princeton University (2016-2017) (*now at University of Colorado, Boulder/NOAA Global Systems Laboratory*)  
**Project:** Air quality and climate extremes

#### **Doctoral Student Dissertation Committee**

- **Alkiviadis Kalisoras**, (Department of Geology of Aristotle University of Thessaloniki), 2022-present
- **Glen Chua** (Atmospheric and Oceanic Sciences Program, Princeton University), 2020-present
- **Maryam Abdi-Oskouei** (Center for Global and Regional Environmental Research, University of Iowa), 2016-2018 (*now at UCAR*)
- **Jean Guo** (Department of Earth & Environmental Sciences, Columbia University), 2015-2018 (*now at Ramboll*)
- **Meredith M. Fry** (Department of Environmental Sciences and Engineering, University of North Carolina), 2010-2013 (*now at U.S.EPA*)

#### **Graduate Student Interns**

- **Maryam Abdi-Oskouei** (Center for Global and Regional Environmental Research, University of Iowa), CICS Research Internship Fellow, Jun-Aug, 2016

#### **Undergraduate Student Interns**

- **Johanna Vonderhust**, (Monmouth University) co-mentor for NOAA Hollings Fellow, Jun-Aug, 2021
- **Nana Yaa Takiya Afreh** (Bronx Community College, CUNY), CIMES Diversity Internship, Jun-Aug 2019
- **Shaun Howe** (Department of Atmospheric Sciences and Meteorology, Cornell University), Jun-Aug 2015
- **Fernanda Ramos-Garces** (University of Puerto Rico at Mayagüez, Puerto Rico), NOAA Center for Atmospheric Sciences (NCAS) Summer Research Fellow, Jun-Aug 2013
- **Allison Stone** (Department of Geosciences, Princeton University), 2005-2006
- **Guest lecturer** for Global Biogeochemical Cycles, a graduate level course in the Department of Atmospheric Sciences

## **Publications**

### ***Peer-reviewed***

Fiedler, S., **V. Naik**,...,G. Myhre, and P. M. Forster, Interactions between atmospheric composition and climate change - Progress in understanding and future opportunities for AerChemMIP, PDRMIP and RFMIP, *Geosci. Model Dev.*, 17, 2387–2417, <https://doi.org/10.5194/gmd-17-2387-2024>, 2024.

Akritidis, D., S. Pacer,...**V. Naik**,..., and P. Le Sager, Strong increase in mortality attributable to ozone pollution under a climate change and demographic scenario, *Environ. Res. Lett.* 19, <https://doi.org/10.1088/1748-9326/ad2162>, 2024.

Leung, L.R., A. Terando, R. Joseph, G. Tselioudis, L.M. Bruhwiler, B. Cook, C. Deser, A. Hall, B.D. Hamlington, A. Hoell, F.M. Hoffman, S. Klein, **V. Naik**, A.G. Pendergrass, C. Tebaldi, P.A. Ullrich, and M.F. Wehner, 2023: Ch. 3. Earth systems processes. In: Fifth U.S. National Climate Assessment. Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. U.S. Global Change Research Program, Washington, DC, USA. <https://doi.org/10.7930/NCA5.2023.CH3>.

Ahsan, H., H. Wang, ..., and **V. Naik**: The Emissions Model Intercomparison Project (Emissions-MIP): quantifying model sensitivity to emission characteristics, *Atmos. Chem. Phys.*, 23, 14779–14799, <https://doi.org/10.5194/acp-23-14779-2023>, 2023.

Zheng, Y., L. W. Horowitz, R. Menzel, D. J. Paynter, **V. Naik**, J. Li, and J. Mao, Anthropogenic amplification on production of biogenic secondary organic aerosols, *Atmos. Chem. Phys.*, 23, <https://doi.org/10.5194/acp-23-8993-2023>, 2023.

Forster, P. M., C. J. Smith, et al.,...**V. Naik**,...V. Masson-Delmotte, P. Zhai, Indicators of Global Climate Change 2022: Annual update of large scale indicators of the state of the climate system and the human influence, *ESSD*, 15, 2295–2327, <https://doi.org/10.5194/essd-15-2295-2023>, 2023.

Gao, C., **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, *JAMES*, 15, e2022MS003532. <https://doi.org/10.1029/2022MS003532>, 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.

Quaas, J., H Jia, ..., **V. Naik**,...G. Myhre, and M. Schulz, Robust evidence that the aerosol effective climate forcing trend turned sign, *Atmos. Chem. Phys.*, <https://doi.org/10.5194/acp-22-12221-2022>, 2022

Paulot, F, **V. Naik**, L. W. Horowitz, Reduction in near-surface wind speeds with increasing CO<sub>2</sub> may worsen winter air quality in the Indo-Gangetic Plain, *Geophys. Res. Lett.*, 49, e2022GL099039. <https://doi.org/10.1029/2022GL099039>, 2022

Zeng, G., N. L. Abraham, ..., **V. Naik**, ...J. Williams, and P. J. Young, Attribution of stratospheric and tropospheric ozone changes between 1850 and 2014 in CMIP6 models, *JGR-Atmospheres*, <https://doi.org/10.1029/2022JD036452>, 2022.

Delworth, T., W. Cooke, **V. Naik**, D. Paynter, and L. Zhang, A weakened AMOC may prolong greenhouse gas induced Mediterranean drying even with significant and rapid climate change mitigation, *PNAS*, <https://doi.org/10.1073/pnas.2116655119>, 2022.

Zanis, P., D. Akritidis, S. Turnock, **V. Naik**, S. Szopa, A. K. Georgoulas, et al., Climate change penalty and benefit on surface ozone: a global perspective based on CMIP6 earth system models, *Environ. Res. Lett.*, 17 (2), <https://doi.org/10.1088/1748-9326/ac4a34>, 2022.

IPCC, 2021: Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

Arias, P.A., N. Bellouin, ..., **V. Naik**, ..., X. Zhang, and K. Zickfeld, 2021: Technical Summary. In *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 33–144. doi: 10.1017/9781009157896.002.

Szopa, S., **V. Naik**, B. Adhikary, P. Artaxo, T. Berntsen, W.D. Collins, S. Fuzzi, L. Gallardo, A. Kiendler-Scharr, Z. Klimont, H. Liao, N. Unger, P. Zanis, et al., 2021: Short-Lived Climate Forcers. In *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 817–922, doi: 10.1017/9781009157896.008.

Canadell, J.G., P.M.S. Monteiro, ..., K. Zickfeld et al., 2021: Global Carbon and other Biogeochemical Cycles and Feedbacks. In *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 673–816, doi: 10.1017/9781009157896.007.

Murray, L. T., A. M. Fiore, D. T. Shindell, **V. Naik**, L. W. Horowitz, Large uncertainties in global hydroxyl projections tied to fate of reactive nitrogen and carbon, *PNAS*, 18 (43), e2115204118; 10.1073/pnas.2115204118, 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.

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, *Intl. J. Hydrogen Energy*, <https://doi.org/10.1016/j.ijhydene.2021.01.088>, 2021.

Griffiths P. T., L. T. Murray, G. Zeng, ..., **V. Naik**, ... 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.

Ming, Y., P. Lin, **V. Naik**, F. Paulot, L. W. Horowitz, P. A. Ginoux, V. Ramaswamy, N. G. Loeb, Z. Shen, C. E. Singer, R. X. Ward, Z. Zhang, and N. Bellouin, 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.

Allen, R. J., L. W. Horowitz, **V. Naik**, ..., S. Fujimori and W. J. Collins, Significant climate benefits from near-term climate forcer mitigation in spite of aerosol reductions, *Environ. Res. Lett.*, 16, 2021.

Thornhill, G., W. Collins, D. Olivie, ..., **V. Naik**, ..., S. Tilmes, 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, ..., **V. Naik**, ..., G. Zeng, and J. Zhang, Effective radiative forcing from emissions of reactive gases and aerosols—a multi-model comparison, *Atmos. Chem. Phys. Discuss.*, 21, 853–874, <https://doi.org/10.5194/acp-21-853-2021>, 2021.

Archibald, A., J. L. Neu, Y. Elshorbany, ..., **V. Naik**, ..., H. M. Worden and G. Zeng, Tropospheric Ozone Assessment Report (TOAR): A critical review of changes in the tropospheric ozone burden and budget from 1850–2100, *Elementa*, <https://doi.org/10.1525/elementa.2020.034>, 2020.

Stevenson, D. S., A. Zhao, **V. Naik**, F. O'Connor, S. Tilmes, G. Zeng, L. T. Murray, W. J. Collins, P. Griffiths, S. Shim, L. W. Horowitz, L. Sentman, L. Emmons, Trends in global tropospheric hydroxyl radical and methane lifetime since 1850 from AerChemMIP, *Atmos. Chem. Phys.*, 20, 12905–12920, <https://doi.org/10.5194/acp-20-12905-2020>, 2020

Turnock, S. T., R. J. Allen, M. Andrews, ..., **V. Naik**, ... , 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

Morgenstern, O., F. O'Connor, B. T. T. Johnson, ..., **V. Naik**, ..., D. T. Shindell, D. E. Kinnison, Reappraisal of the climate impacts of ozone-depleting substances, *Geophys. Res. Lett.*, 47, e2020GL088295. <https://doi.org/10.1029/2020GL088295>, 2020

R. J. Allen, S. Turnock, ..., **V. Naik**, ..., 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

Peters, D. R., J. L. Schnell, P. L. Kinney, **V. Naik** and D. E. Horton, Public Health and Climate Benefits and Tradeoffs of U.S. Vehicle Electrification, *GeoHealth*, <https://doi.org/10.1029/2020GH000275>, 2020

Saunio, M., A. R. Stavert, ..., **V. Naik**, ..., Q. Zhu, and Q. Zhuang, The Global Methane Budget 2000–2017, *Earth Syst. Sci. Data*, 12, 1561–1623, <https://doi.org/10.5194/essd-12-1561-2020>, 2020

L. W. Horowitz, **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, and M. Zhao, The GFDL Global Atmospheric Chemistry-Climate Model AM4. 1: Model Description and Simulation Characteristics, *JAMES*, <https://doi.org/10.1029/2019MS002032>, 2020

Dunne, J. P., L. W. Horowitz, ..., **V. Naik**, ... Y Zeng, and M. Zhao, The GFDL Earth System Model version 4.1 (GFDL-ESM 4.1): Overall coupled model description and simulation characteristics, *JAMES*, <https://doi.org/10.1029/2019MS002015>, 2020

Delworth, T. L., W. F. Cooke, ..., **V. Naik**, ..., L. Zhang, and M. Zhao, SPEAR: The Next Generation GFDL Modeling System for Seasonal to Multidecadal Prediction and Projection, *JAMES*, <https://doi.org/10.1029/2019MS0018952020>, 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

Pu, B., P. Ginoux, ..., **V. Naik**, ... E. Shevliakova, and M. Zhao, Retrieving the global distribution of the threshold of wind erosion from satellite data and implementing it into the Geophysical Fluid Dynamics Laboratory land–atmosphere model (GFDL AM4.0/LM4.0), *Atmos. Chem. Phys.*, 20, 55–81, <https://doi.org/10.5194/acp-20-55-2020>, 2020

Held, I. M., H. Guo, ..., **V. Naik**, ..., S. Underwood, and N. Zadeh, Structure and performance of GFDL's CM4.0 climate model, *JAMES*, 11, 3691–3727, 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.

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, 2019.

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Ocko, I., **V. Naik**, and D. Paynter, Rapid and reliable assessment of methane impacts on climate, *Atmos. Chem. Phys.*, 18, 15555–15568, 2018.

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, 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, *PNAS*, <https://doi.org/10.1073/pnas.1807532115>, 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.*, <https://doi.org/10.1016/j.atmosenv.2018.07.042>, 2018

Schnell, J., **V. Naik**, L. W. Horowitz, F. Paulot, J. Mao, P. Ginoux, M. Zhao, and K. Ram, Exploring the relationship between surface PM<sub>2.5</sub> and meteorology in Northern India, *Atmos. Chem. Phys.*, *18*, 10157-10175, 2018.

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Derwent, R. G., D. D. Parrish, I. E. Galbally, D. S. Stevenson, R. M. Doherty, **V. Naik**, P. J. Young, Uncertainties in models of tropospheric ozone based on Monte Carlo analysis: Tropospheric ozone burdens, atmospheric lifetimes and surface distributions, *Atmos Environ.*, 180, <https://doi.org/10.1016/j.atmosenv.2018.02.047>, 2018.

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M. Zhao, J.-C. Golaz, I. M. Held, ..., **V. Naik**, ..., A. T. Wittenberg, B. Wyman and B. Xiang, The GFDL Global Atmosphere and Land Model AM4.0/LM4.0: 1. Simulation Characteristics With Prescribed SSTs, *JAMES*, DOI:10.1002/2017MS001208, 2018.

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### **Presentations**

V. Naik, Air pollution and climate effects of Short-lived Climate Forcers (SLCFs) – Key findings from the IPCC AR6 WGI report, Colgate University, Sep 29, 2023 (virtual), Rochester University, Dec 1, 2023.

V. Naik, L. W. Horowitz, and D. Paynter, Emissions-based ERF: past, present and future, Gordon Research Conference on Radiation and Climate, Bates College, July 26, 2023.

Naik, L. Sentman, F. Paulot, L. W. Horowitz, and J. Dunne, Role of atmospheric chemistry-composition changes in future projections of climate change, Japan Geosciences Union Meeting, Chiba, May 23, 2023.

Naik, V., S. Smith, G. Correa, S. Elkins, A. Fiore, J. –F. Lamarque, R. Leung, H. Wang, M. Wu, L. Horowitz, J. Dunne, S. Bauer, and K. Tsigaridis, The World Avoided: air quality and climate effects of emission trajectories without the U.S. Clean Air Act, Ninth US Climate Modeling Summit, NOAA GFDL, April 25, 2023; CACTI Workshop, June 14, 2023

Naik, V., Keynote lecture - Atmospheric Chemistry-Climate interactions - what the future holds?, iCACGP-IGAC Joint Conference in Manchester, UK, September, 2022.

Naik, V., The role of Short-lived Climate Forcers (SLCFs) in the climate system – key findings from the IPCC AR6, Atmospheric & Environmental Chemistry Seminars (virtual), Harvard University, Dec 3, 2021; Center of Atmospheric Science Seminar Series (virtual), University of Cambridge, Dec 8, 2021, Department of Atmospheric Oceanic and Earth Sciences Seminar Series, George Mason University, Nov 16, 2022; iLEAPS Global Colloquium Series (virtual), Dec 20, 2022.

Naik, V., Short-lived Climate Forcers (SLCFs) including Methane in the IPCC 6th Assessment Report (AR6) of the Working Group I, Florence School of Regulation and the Environmental Defense Fund joint webinar "How to establish a right baseline for rigid methane mitigation policies", December 1, 2021.

Naik, V., Short-lived climate forcers in AR6 – key science advances and areas for further research, GFDL Informal Seminar (virtual), Nov 3, 2021.

Naik, V., Aerosol research findings and needs arising from IPCC AR6, 20<sup>th</sup> AeroCom Workshop (virtual), October 12, 2021.

Naik, V., Methane, Briefing for the Members of the House of Representatives Select Committee on the Climate Crisis, Sept 1, 2021.

Naik, V., Global Methane Assessment, NOAA's Office of Atmospheric Research, Senior Management Meeting, July 12, 2021.

Naik, V. and J. Rogelj, Aspects related to limiting climate change, including cumulative CO<sub>2</sub> emissions, remaining carbon budgets, and non-CO<sub>2</sub> emissions, Webinar in support of IPCC Summary for Policy Makers Final Government Draft, May 27, 2021.

Naik, V., Atmospheric Chemistry-Composition Prediction at GFDL, Air Quality Strategic Directions Workshop, National Weather Service Office of Science Technology and Integration, Nov 13, 2020.

Naik, V., Atmospheric Chemistry-Composition in GFDL Models, GFDL External Review, NOAA/GFDL, Princeton, NJ, October 29, 2019

Naik, V., Exploring Atmospheric Methane & OH Trends and Variability Using the GFDL Earth System Model (GFDL-AM4.1), Joint Atmospheric-Chemistry Seminar, Forschungszentrum Jülich, September 2, 2019

Naik, V., J. Schnell and F. Paulot, Connections between air pollution and climate in South Asia, 2018 American Geophysical Union Fall Meeting, Dec 10-14, Washington D.C., 2018.

Naik, V., Drivers of changes in global hydroxyl radical between 1980 and 2014, Tri-MIP-Athlon, University of Reading, Reading, UK, June 14, 2018.

Naik, V., Atmospheric Composition Changes relevant for Air Quality and Climate, Ocean and Climate Physics Seminar Series, Lamont-Doherty Earth Observatory, Palisades, NY, May 3, 2018.

Naik, V., L.W. Horowitz, S. A. Montzka, and F. Paulot, Drivers of changes in global hydroxyl radical between 1980 and 2014, Goldschmidt Conference, Paris, France, August 18, 2017.

Naik, V., Methane in Global Chemistry-Climate Models, Environmental Engineering Departmental Seminar, University of Iowa, Iowa City, IA, December 9, 2016.

Naik, V., Uncertainties in the Methane Budget, Nicholas School of Environment Seminar Series, Duke University, Durham, NC, November 4, 2016.

Naik, V. Chemistry-Climate Interactions, GFDL External Review, NOAA/GFDL, Princeton, NJ, May 20, 2014.

Naik, V et al., Impact of historical changes in well-mixed greenhouse gases on tropospheric composition, 2013 American Geophysical Union Fall Meeting, Dec 9-13, San Francisco, CA, 2013.

Naik, V. and the ACCMIP Team, Preindustrial to present-day changes in tropospheric hydroxyl from ACCMIP, Gordon Conference on Atmospheric Chemistry, Mt. Snow, VT, Jul 28 - Aug 2, 2013.

Naik, V, and the ACCMIP Team Preindustrial to present-day changes in tropospheric hydroxyl radical and methane lifetime from ACCMIP, GFDL Wednesday Seminar, July 17, 2013.

Naik, V., A. Voulgarakis, and the ACCMIP Team, Preindustrial to present-day changes in OH and methane lifetime – preliminary results, ACCMIP 2nd Meeting, Pasadena, CA, January, 2012.

Naik, V., L. Horowitz, A. Fiore, and Hiram Levy II, Impact of reducing short-lived air pollutants on atmospheric composition and climate, 2010 American Geophysical Union Fall Meeting, Dec 13-17, San Francisco, CA, 2010.

Naik, V., A. Fiore, L. Horowitz, H. B. Singh, C. Wiedinmyer, A. Guenther, J. A. de Gouw, D. B. Millet, H. Levy, and M. Oppenheimer, Observational constraints on the global budget of ethanol, 2007 American Geophysical Union Fall meeting, Dec 10-14, San Francisco, CA, 2007.

Naik, V., D. L. Mauzerall, L. W. Horowitz, D. Schwarzkopf, V. Ramaswamy, and M. Oppenheimer, The sensitivity of radiative forcing from biomass burning aerosols and ozone to emission location, 2006 American Geophysical Union Fall meeting, Dec 11-15, San Francisco, CA, 2006.

Naik, V., D. L. Mauzerall, L. W. Horowitz, D. Schwarzkopf, V. Ramaswamy, and M. Oppenheimer, Net radiative forcing due to changes in regional emissions of tropospheric ozone precursors, Mitigation of air pollution and climate change in China: A policy workshop on co-benefits and co-control, November 22-23, Beijing, China, 2005.

Naik, V., D. L. Mauzerall, L. W. Horowitz, D. Schwarzkopf, V. Ramaswamy, and M. Oppenheimer, Sensitivity of global tropospheric O<sub>3</sub> distribution and its radiative forcing to regional biomass burning emissions, 2005 Joint Assembly, May 23-27, New Orleans, LA, 2005.

Naik, V., D. L. Mauzerall, L. W. Horowitz, D. Schwarzkopf, V. Ramaswamy, and M. Oppenheimer, Attribution of regional radiative forcing due to tropospheric O<sub>3</sub>: A step towards climate credit for reductions in emissions of O<sub>3</sub> precursors, Air Pollution as a Climate Forcing: A Second Workshop, April 4-6, Honolulu, HI, 2005.

Naik, V., D. L. Mauzerall, L. W. Horowitz, D. Schwarzkopf, V. Ramaswamy, and M. Oppenheimer, Regional attribution of ozone production and associated radiative forcing: a step to crediting NO<sub>x</sub> emission reductions, American Geophysical Union Fall meeting, December 13-17, San Francisco, CA, 2004.

Naik, V., D. L. Mauzerall, L. W. Horowitz, D. Schwarzkopf, V. Ramaswamy, and M. Oppenheimer, Regional attribution of ozone production and associated radiative forcing: a step to crediting ozone reductions, 8<sup>th</sup> International Global Atmospheric Chemistry Conference, September 4-9, Christchurch, New Zealand, 2004.

Naik, V., Interactions of the Terrestrial Biosphere with Climate and Atmospheric Chemistry, Department of Atmospheric Sciences Seminar Series, University of Illinois at Urbana-Champaign, IL, 2003.

Naik, V., C. Delire, and D. J. Wuebbles, Modeling the climate variability of biogenic isoprene and monoterpenes, American Geophysical Union Fall meeting, December 6-10, San Francisco, CA, 2002.

Wuebbles, D. J., V. Naik, E. DeLucia, and J. A., Foley, Influence of geoengineered climate on the terrestrial biosphere, American Geophysical Union Fall meeting, December 10-14, San Francisco, CA, 2001.

Naik, V., Potential feedbacks and interactions between biogeochemical cycles and climate change with emphasis on methane, Workshop on Atmospheric Composition, Biogeochemical Cycles and Climate Change, Aspen Global Change Institute, Aspen 2000.

Naik, V., D. J. Wuebbles, K. O. Patten, and A. K. Jain, Effects of CFC and Halon Replacements on the Global Environment, American Geophysical Union Fall Meeting, San Francisco, CA, 1998.

Naik, V., Effects of CFC and Halon replacements on Global Environment, Department of Atmospheric Sciences Seminar Series, University of Illinois, 1998.

### **Other Activities**

- **Board Member**, GFDL Employees Association (GFDLEA), 2016
- **Treasurer**, GFDL Employees Association (GFDLEA), 2010-2011.
- **Student Representative**, Department of Atmospheric Sciences, UIUC, 2001-2002.
- **Student Member**, Department of Atmospheric Sciences, UIUC, Admissions/Recruitment Committee, 2001-2002.