Curriculum Vitae

Drew T. Shindell

Nicholas School of the Environment &
Duke Global Health Initiative, Duke University
Grainger Hall, PO Box 90328, Durham, NC 27708
Email: drew.shindell@duke.edu
Webpage: https://nicholas.duke.edu/people/faculty/drew-shindell

EDUCATION

Ph.D. (Physics), State University of New York at Stony Brook, 1995
B.A. (Physics), University of California at Berkeley, 1988

EMPLOYMENT

2016-present: Nicholas Distinguished Professor of Earth Science, Duke University
2019-present: Professor by Special Appointment, Porter School of the Environment and Earth Sciences, Tel Aviv University
2015-present: Senior Scientist (Climate Sciences), UN Environment
2014-2016: Professor of Climate Sciences, Duke University
1997-2014: Physical Scientist, NASA Goddard Institute for Space Studies, NYC
1997-2010: Lecturer, Dept. of Earth and Environmental Sci., Columbia University
1995-1997: NASA EOS Postdoctoral Researcher, Columbia Univ. & NASA GISS

RESEARCH INTERESTS

Sensitivity of climate change to different drivers
Climate and air quality linkages and public policy
Interdisciplinary assessment of the impact of policy options on climate, public health, food and the economy
Atmospheric composition changes and solar power generation

PROFESSIONAL EXPERIENCE

Chair, Scientific Advisory Panel to the Climate and Clean Air Coalition (~60 nations plus various IGOs and NGOs), 2012-present
Coordinating Lead Author, "Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development" chapter, Intergovernmental Panel on Climate Change Special Report on 1.5°C, 2018
Contributing Author, "Strengthening and Implementing the Global Response", Intergovernmental Panel on Climate Change Special Report on 1.5°C, 2018
Scientific Advisor & Plenary Speaker, First WHO Global Conference on Air Pollution and Health: *Improving Air Quality, Combatting Climate Change – Saving Lives*, Geneva, Switzerland, 2018
AAAS Atmospheric and Hydrological Sciences Section Elected Member-at-large, 2016-2019

NCAR Atmospheric Composition, Observations and Modeling Laboratory Advisory Board Member, 2015-present

Technical Advisory Group to the International Standards Organization, US delegation member, 2017-present

Environment/Climate Advisory Committee, Global Alliance for Clean Cookstoves, 2015-present

Chapter co-lead, "Short-Lived Climate Pollutants", UNEP Emissions Gap Report, 2017

Foreign Expert, China Council for International Cooperation on Environment and Development, Special Policy Study: Coordinated Actions for Addressing Climate Change and Air Pollution, 2014-2015.

Review Panel, NOAA Office of Atmospheric Research, Laboratory Review, 2014

Coordinating Lead Author, Anthropogenic and Natural Radiative Forcing chapter, Intergovernmental Panel on Climate Change Fifth Assessment Report, 2011-2013

Contributing Author, 3 chapters (Long-term Climate Change: Projections, Commitments and Irreversibility; Detection and Attribution of Climate Change: from Global to Regional; and Evaluation of Climate Models), IPCC Fifth Assessment Report, 2013

Originator & Co-Lead, Atmospheric Chemistry and Climate Model Intercomparison Project, 2009-2013

Chair, Integrated Assessment of Black Carbon and Tropospheric Ozone, UN Environment Programme & World Meteorological Organization, 2009-2011

Member, National Academy of Sciences Assessment of the Effects of US Tax Policy on Greenhouse Gas Emissions, 2011-2013

Member, National Academy of Sciences Assessment of Himalayan Glaciers: Climate Change, Water Resources, and Water Security, 2011-2012

Co-Editor, Atmospheric Chemistry and Physics, 2009-2014

Co-Chair, US Climate Change Science Program Synthesis & Assessment Product 3.2: Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols, 2006-2008

Co-author, Arctic Climate Impacts Assessment, 2005

Co-author, UNEP/WMO Scientific Assessment of Ozone Depletion, 1998, 2002, 2006

AGU Atmospheric Physics and Climate Section Secretary, 2002-2004

Visiting Scientist, Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France, 2009; Max-Planck Institute for Meteorology, Hamburg, Germany, 2003; Imperial College, London, UK, 2000

PUBLIC OUTREACH/GOVERNMENT/MEDIA

Education: Co-creator of 'Climate Change Science' course offered by American Museum of Natural History (AMNH) to middle & high school teachers. Consultant on AMNH exhibits.

Government: Testimony delivered to both houses of the US Congress, US EPA, US National Academy, US State Dept., Arctic Council, UNFCCC, etc.

Media: Numerous outreach activities including interviews and appearances on NOVA, NPR, BBC, CBC, CNN, New York Times, Washington Post, etc.

AWARDS & HONORS

Clarivate Analytics "Highly Cited Researcher", 2010-present
AAAS Fellow, 2015
AGU Fellow, 2014
US EPA Scientific and Technological Achievement Award, 2013
MIT Henry Kendall Honorary Lecturer, 2013
NCAR Earth System Research Laboratory Distinguished Lecturer, 2013
AGU Atmospheric Science Charney Lecturer, Fall meeting, 2012
Ne'eman Distinguished Lecturer, Tel Aviv University, 2012
Scientific American 'Top 50' Scientists, 2004
NASA GISS 'Best Popular Science Article' peer award, 2002 and 2011
NASA GISS 'Publication of the Year' peer award, 1998, 1999 and 2012
National Science Foundation, Antarctic Service Medal, 1994

MENTORING

PhD: K. Seltzer, T. Tang, M. Ru, A. Hu

Postdoctoral: J. Lee Grenfell (now at Free U Berlin), Volker Grewe (now at DLR), Nadine Unger (now at U Exeter), Daven Henze (now at U Colorado), Apostolos Voulgarakis (now at Imperial), Pavan Racherla (now at NextClimate), Olga Pechony, Yunha Lee (now at U Washington), Melissa Scott (Duke Hospital)

Thesis committee: Mark Potosnak (Columbia), Sun Wong (Columbia), Jae Lee (Stony Brook), Ben Kravitz (Rutgers), Miriam Marlier (Columbia), Justin Wood (Murdoch), Michael Valerino (Duke – School of Engineering), Patrick Brown (Duke – School of the Environment), Linda Low (Duke – School of Public Policy), plus many Duke School of the Environment Masters' students

GRANTS

Funding as PI from NASA's Atmospheric Chemistry Modeling and Analysis Program (1998, 2003, 2006, 2010, 2017); NASA Applied Sciences program (2008); NASA Living with a Star (2009), NASA National Climate Assessment (2011, 2013), NASA Aura Science (2014); NASA SORCE (2015); NASA GISS (2015; 2019); NSF (2000, 2014); California Air Resources Board (2008); US EPA (2010); US DoT (2014); Pisces Foundation (2016), Rockefeller Foundation (2018 – co-I). Co-I on numerous NSF and NASA proposals.

PEER-REVIEWED PUBLICATIONS

253 Shindell, D., C. J. Smith, Climate and air-quality benefits of a realistic phase-out of fossil fuels, ***Nature***, doi: 10.1038/s41586-019-1554-z, 2019.

252 Tallis, H, et al, Aligning Evidence Generation and Use Across Health, Development, and Environment, ***Curr. Opinion Env. Sust.***, in press, 2019.

251 Hodenbrog, O, et al, Water vapor adjustments and responses differ between climate

drivers, ***Atmos. Chem. Phys***,, in press, 2019.
250 Shindell, D., G. Faluvegi, P. Kasibhatla, R. Van Dingenen, Spatial patterns of crop yield change by emitted pollutant, ***Earth's Future***, 7, 101-112, doi:10.1029/2018EF001030, 2019.
249 Tang, T., Shindell, D., et al., Comparison of Effective Radiative Forcing Calculations using Multiple Methods, Drivers, and Models, ***J. Geophys. Res.***, 124, 4382-4394, 2019.
248 Allen, R. J., A. Amiri-Farahani, J.-F. Lamarque, C. Smith, D. Shindell, T. Hassan, C. E. Chung, Observationally-constrained aerosol-cloud semi-direct effects, ***npj Climate Atm. Sci.***, 2, 16, doi:10.1038/s41612-019-0073-9, 2019.
247 Stjern, C., et al., Arctic amplification response to individual climate drivers, ***J. Geophys. Res.***, 124, 6698-6717, doi:10.1029/2018JD029726, 2019.
246 Aas, W., et al., Global and regional trends of atmospheric sulfur, ***Sci. Rep.***, 9, 953, 2019.
245 Richardson, T. B., et al., Drivers of precipitation change: An energetic understanding, ***J. Climate***, in press, 2019.
244 IPCC, Summary for Policymakers. In: Global warming of 1.5°C. An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, et al (eds.)]. World Meteorological Organisation, Geneva, Switzerland, 2018.
243 Rogelj, J., D. Shindell, J. Jiang, et al., Mitigation Pathways compatible with 1.5°C in the context of sustainable development, in Special Report on Global Warming of 1.5°C, Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2018.
242 UN Environment, Air Pollution in Asia and the Pacific: Science-based Solutions, Nairobi, Kenya, 58 pp., 2018.
241 Ru, M., D. Shindell, K. Seltzer, S. Tao, Q. Zhong, The long-term relationship between emissions and economic growth for SO_2, CO_2 and BC, ***Env. Res. Lett.***, 13, 124021, 2018.
240 Fiore, A., et al., 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, 2018.
239 Smith, C., et al., Understanding rapid adjustments to diverse forcing agents, ***Geophys. Res. Lett.***, 45, 12023-12031, doi:10.1029/2018GL079826, 2018.
238 Myhre, G., et al., Quantifying the importance of rapid adjustments for global precipitation changes, ***Geophys. Res. Lett.***, 45, 11,399-11,405, 2018.
237 Seltzer, K., D. Shindell, C. Malley, Measurement-based assessment of health burdens from long-term ozone exposure in the United States, Europe, and China, ***Env. Res. Lett.***, 13, 104018, 2018.
236 Shindell, D., G. Faluvegi, K. Seltzer, C. Shindell, Quantified, Localized Health Benefits of Accelerated Carbon Dioxide Emissions Reductions, ***Nature Climate Change***, 8, 291-295, 2018.
235 Jeuland, M., J.-S. T. Soo, and D. Shindell, The Need for Policies to Reduce the Costs of Cleaner Cooking in Low Income Settings: Implications from Systematic Analysis of Costs and Benefits, ***Energy Policy***, 121, 275-285, 2018.
234 Alvarado, M., E. Winijkul, R. Adams-Selin, E. Hunt, C. Brodowski, C. R. Lonsdale, D. T. Shindell, G. Faluvegi, G. Kleiman, T. M. Mosier, and R. Kumar, Sources of Black Carbon Deposition to the Himalayan Glaciers in Current and Future Climates, ***J. Geophys. Res.***, 123, 7482-7505, 2018.

233 Westervelt, D. M., A. J. Conley, A. M. Fiore, J.-F. Lamarque, D. T. Shindell, M. Previdi, N. R. Mascioli, G. Faluvegi, G. Correa, L. W. Horowitz, Connecting regional aerosol emissions reductions to local and remote precipitation responses, ***Atmos. Chem. Phys.***, 18, 12461-12475, 2018.

232 Tang, T., et al., Dynamical response of Mediterranean precipitation to greenhouse gases and aerosols, ***Atmos. Chem. Phys.***, 18, 8439–8452, 2018.

231 Integrated Assessment of Short-lived Climate Pollutants in Latin America and the Caribbean, Climate and Clean Air Coalition, Paris, pp. 101, 2018.

230 Myhre, G., et al., Sensible heat has significantly affected the global hydrological cycle over the historical period, ***Nature Comm.***, DOI:10.1038/s41467-018-04307-4, 2018.

229 Conley, A. J., Westervelt, D. M., Lamarque, J.-F., Fiore, A. M., Shindell, D., Correa, G., Faluvegi, G., and Horowitz, L. W., Multimodel surface temperature responses to removal of U.S. sulfur dioxide emissions, ***J. Geophys. Res.***, 123, 2773-2796, 2018.

228 Liu, L., et al., A PDRMIP multi-model study on the impacts of regional aerosol forcings on global and regional precipitation, ***J Climate***, 31, 4429-4447, 2018.

227 Richardson, T. B., et al., Carbon dioxide physiological forcing dominates projected Eastern Amazonian drying, ***Geophys. Res. Lett.***, 45, 2815–2825, 2018.

226 Fuglestvedt, J., Rogelj, J., Millar, R.J., Allen, M., Boucher, O., Cain, M., Forster, P.M., Kriegler, E., Shindell, D., Implications of possible interpretations of 'greenhouse gas balance' in the Paris Agreement, ***Phil. Trans. R. Soc. A***, 20160445, doi:10.1098/rsta.2016.0445, 2018.

225 Samset, B. H., G. Myhre, P. M. Forster, Ø. Hodnebrog, T. Andrews, O. Boucher, G. Faluvegi, D. Fläschner, M. Kasoar, V. Kharin, A. Kirkevåg, J.-F. Lamarque, D. Olivié, T. Richardson, D. Shindell, T. Takemura, A. Voulgarakis, Weak hydrological sensitivity to temperature change over land, independent of climate forcing, ***npj Climate and Atm. Sci***., 3, doi:10.1038/s41612-017-0005-5, 2018.

224 Shindell, D. T., N. Borgford-Parnell, M. Brauer, A. Haines, J. C. I. Kuylenstierna, S. A. Leonard, V. Ramanathan, A. Ravishankara, M. Amann, L. Srivastava, A climate policy pathway for near- and long-term benefits, ***Science***, 356, 493-494, 2017.

223 Seltzer, K., Shindell, D. T., Faluvegi, G., & Murray, L.T., Evaluating modeled impact metrics for human health, agriculture growth, and near-term climate, ***J. Geophys. Res.,*** 122, 13,506-13,524, https://doi.org/10.1002/2017JD026780, 2017.

222 Kumar, R., V. Mishra, J. Buzan, R. Kumar, D. Shindell, M. Huber, Dominant control of agriculture and irrigation on urban heat island in India, ***Scientific Reports,*** 7, 14054, doi:10.1038/s41598-017-14213-2, 2017.

221 Doherty, R. M., C. Orbe, G. Zeng, M. Prather, D. A. Plummer, M. Lin, D. Shindell, I. A. Mackenzie1, O. Wild, Multi-model Impacts of Climate Change on Pollution Transport from Global Emission Source Regions, ***Atmos. Chem. Phys.***, 17, 14219-14237, 2017.

220 Stjern, C. W., B. H. Samset, G. Myhre, P. M. Forster, Ø. Hodnebrog, T. Andrews, O. Boucher, G. Faluvegi, T. Iversen, M. Kasoar, V. Kharin, A. Kirkevåg, J.-F. Lamarque, D. Olivié, T. Richardson, D. Shawki, D. Shindell, C. J. Smith, T. Takemura, A. Voulgarakis, F. Zwiers, Rapid adjustments cause weak surface temperature response to increased black carbon concentrations, ***J. Geophys. Res.***, *122*, *11*,*462–11*,*481*, 2017.

219 Haines, A., M. Amann, N. Borgford-Parnell, S. Leonard, J. C. I. Kuylenstierna, D. Shindell, Short-lived climate pollutant mitigation and the sustainable development goals, ***Nature Climate Change***, 7, 863-869, 2017.

218 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, S. C. Wofsy, Global Atmospheric Chemistry – Which Air Matters, ***Atmos. Chem. Phys***., 19, 9081-9102, 2017.

217 Bergin, M., C. Ghoroi, D. Dixit, J. Schauer, D. Shindell, Large reductions in solar energy production due to dust and particulate air pollution, ***Env. Sci. Tech.***, 4, 339-344, 2017.

216 Campbell, B., D. Beare, E. Bennett, J. Hall-Spencer, J. Ingram, F. Jaramillo, R. Ortiz, N. Ramankutty, J. Sayer, D. Shindell, Agriculture production as a major driver of the Earth System exceeding planetary boundaries, ***Ecology & Society***, 22 (4), 8, doi:10.5751/ES-09595-220408, 2017.

215 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 change in air pollution attributable to climate change, ***Nature Climate Change***, 7, 647-651, 2017.

214 Shindell, D., J. S. Fuglestvedt, W. J. Collins, The Social Cost of Methane: Theory and Applications, ***Faraday Disc.,*** 200, 429-451, doi: 10.1039/C7FD00009J, 2017.

213 Gasser, T., G. P. Peters, J. S. Fuglestvedt, W. J. Collins, D. T. Shindell, and P. Ciais, Accounting for the climate-carbon feedback in emission metrics, ***Earth Syst. Dynam***., 8, 235-253, doi:10.5194/esd-2016-55, 2017.

212 Westervelt, D.M., A.J. Conley, A.M. Fiore, J.-F. Lamarque, D. Shindell, M. Previdi, G. Faluvegi, G. Correa, L.W. Horowitz, Multi-model precipitation responses to removal of U.S. sulfur dioxide emissions, ***J. Geophys. Res.***, 122, 5024–5038, 2017.

211 Myhre, G., Aas, W., Cherian, R., Collins, W., Faluvegi, G., Flanner, M., Forster, P., Hodnebrog, Ø., Klimont, Z., Lund, M. T., Mülmenstädt, J., Lund Myhre, C., Olivié, D., Prather, M., Quaas, J., Samset, B. H., Schnell, J. L., Schulz, M., Shindell, D., Skeie, R. B., Takemura, T., and Tsyro, S.: Multi-model simulations of aerosol and ozone radiative forcing due to anthropogenic emission changes during the period 1990–2015, ***Atmos. Chem. Phys***., 17, 2709-2720, 2017.

210 Collins, W. J., J.-F. Lamarque, M. Schulz, O. Boucher, V. Eyring, M. I. Hegglin, A. Maycock, G. Myhre, M. Prather, D. Shindell, S. J. Smith, AerChemMIP: Quantifying the effects of chemistry and aerosols in CMIP6, ***Geosci. Model. Dev.,*** 10, 585-607, 2017.

209 Myhre, G., P. M. Forster, B. H. Samset, Ø. Hodnebrog, J. Sillmann, T. Andrews, O. Boucher, G. Faluvegi, D. Fläschner, T. Iversen, M. Kasoar, V. Kharin, A. Kirkevåg, J.-F. Lamarque, D. Olivié, T. Richardson, D. Shindell, K. P. Shine, C. W. Stjern, T. Takemura, A. Voulgarakis, F. Zwiers, PDRMIP: A Precipitation Driver and Response Model Intercomparison Project, Protocol and preliminary results, ***Bull. Amer. Met. Soc.,*** 6, 1185-1198, 2017.

208 Shindell, D., Crop Yield Changes Induced by Emissions of Individual Climate-Altering Pollutants, ***Earth's Future***, 4, 373-380, doi:10.1002/2016EF000377, 2016.

207 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, 3509–3518, doi:10.1002/2016GL068060, 2016.

206 Gonsamo, A., J. M. Chen, D. T. Shindell, and G. P. Asner, Coherence among the Northern Hemisphere land, cryosphere, and ocean responses to natural variability and anthropogenic forcing during the satellite era, ***Earth Sys. Dyn.***, 7, 717–734, 2016.

205 Silva, R. A., West, J. J., Lamarque, J.-F., Shindell, D. T., Collins, W. J., Dalsoren, S., Faluvegi, G., Folberth, G., Horowitz, L. W., Nagashima, T., Naik, V., Rumbold, S. T., Sudo, K., Takemura, T., Bergmann, D., Cameron-Smith, P., Cionni, I., Doherty, R. M., Eyring, V., Josse, B., MacKenzie, I. A., Plummer, D., Righi, M., Stevenson, D. S., Strode, S., Szopa, S., and Zengast, G.: 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.

204 Kasoar, M., Voulgarakis, A., Lamarque, J.-F., Shindell, D. T., Bellouin, N., Collins, W. J., Faluvegi, G., and Tsigaridis, K.: Regional and global temperature response to anthropogenic SO_2 emissions from China in three climate models, ***Atmos. Chem. Phys.***, 16, 9785-9804, doi:10.5194/acp-16-9785-2016, 2016.

203 Liu, H., M. Fu, X. Jin, Y. Shang, D. Shindell, G. Faluvegi, C. Shindell, K. He**,** Health and climate impacts of ocean-going vessels in East Asia, ***Nature Climate Change***, doi:10.1038/nclimate3083, 2016.

202 Geller, M. A., T. Zhou, D. Shindell, R. Ruedy, I. Aleinov, L. Nazarenko, N.L. Tausnev, M. Kelley, S. Sun, Y. Cheng, R.D. Field, and G. Faluvegi, Modeling the QBO – Other Model Improvements Resulting from the Required Increased Vertical Resolution***, J. Adv. Model. Earth Syst.***, 8, 1092-1105, 2016.

201 Lee, Y., D. T. Shindell G. Faluvegi, and R. W. Pinder, Potential impact of a US climate policy and air quality regulations on future air quality and climate change, ***Atmos. Chem. Phys.***, 16, 5323-5342, 2016.

200 Shindell, D. T., Lee, Y., and Faluvegi, G., Climate and Health Impacts of US Emissions Reductions Consistent with 2°C, ***Nature Climate Change,*** 6, 503-507, doi:10.1038/nclimate2935, 2016.

199 Parrish, D. D., I.E. Galbally, J.-F. Lamarque, V. Naik, L. Horowitz, D.T. Shindell, S.J. Oltmans, R. Derwent, H. Tanimoto, E Brunke, M. Cupeiro, Seasonal cycles of O_3 in the marine boundary layer: Observation and model simulation comparisons, ***J. Geophys. Res.***, 121, 538-557, 2016.

198 Samset, B. H., G. Myhre, P. Forster, Ø. Hodnebrog, G. Faluvegi, D. Fläschner, M. Kasoar, S. Kharin, A. Kirkevåg, J.-F. Lamarque, D. Olivié, T. Richardson, D. Shindell, K. Shine, T. Takemura, A. Voulgarakis, Fast and slow precipitation responses to individual climate forcers: A PDRMIP multi-model study, ***Geophys. Res****. Lett.*, 43, doi:10.1002/2016GL068064, 2016.

197 Kristiansen, N. I., A. Stohl, D. J. L. Olivié, B. Croft, O. A. Søvde, H. Klein, T. Christoudias, D. Kunkel, S. J. Leadbetter, Y. H. Lee, K. Zhang, K. Tsigaridis, T. Bergman, N. Evangeliou, H. Wang, P.-L. Ma, R. C. Easter, P. J. Rasch, X. Liu, G. Pitari, G. Di Genova, S. Y. Zhao, Y. Balkanski, S. E. Bauer, G. S. Faluvegi, H. Kokkola, R. V. Martin, J. R. Pierce, M. Schulz, D. Shindell, H. Tost, and H. Zhang, Evaluation of observed and modelled aerosol lifetimes using radioactive tracers of opportunity and an ensemble of 19 global models, ***Atmos. Chem. Phys***., 16, 3525–3561, 2016.

196 Zhang, S., M. Wang, S. Ghan, A. Ding, H. Wang, K. Zhang, D. Neubauer, U. Lohmann, S. Ferrachat, T. Takeamura, A. Gettelman, H. Morrison, Y. Lee, D. Shindell, D. Partridge, P. Stier, Z. Kipling, and C. Fu, On the characteristics of aerosol indirect effect based on dynamic regimes in global climate models, ***Atmos. Chem. Phys.***, 16, 2765-2783, 2016.

195 Shindell, D. T., Faluvegi, G., Rotstayn, L., Milly, G., Spatial Patterns of Radiative Forcing and Surface Temperature Response, ***J. Geophys. Res.***, 120, 5385-5403, 2015.

194 Scovronick, N., C. Dora, E. Fletcher, A. Haines, and D. Shindell, Reduce short-lived climate pollutants to yield multiple benefits, ***The Lancet***, 386, 1-3, 2015.

193 Harmsen, M. J., D P van Vuuren, M van den Berg, A F Hof, C Hope, V Krey, J-F Lamarque, A Marcucci, D T Shindell & M Schaeffer, How well do integrated assessment models represent non-CO2 radiative forcing?, ***Clim. Chg.***, 133, 565–582, 2015.

192 Marvel, K., G.A. Schmidt, D. Shindell, C. Bonfils, A. N. LeGrande, L. Nazarenko, and K. Tsigaridis, Do responses to different anthropogenic forcings add linearly in climate models?, ***Environ. Res. Lett.,*** 10, 104010, 2015.

191 Rotstayn, L., M. Collier, D. Shindell, and O. Boucher, Why does aerosol forcing control historical global-mean surface temperature change in CMIP5 models?, ***J. Climate***, 28, 6608-6625, 2015.

190 Schnell, J., 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, 2015.

189 Hood, L., et al., Solar Signals in CMIP-5 Simulations: The Ozone Response, ***Q. J. Royal Met. Soc.***, 141, 2670-2689, 2015.

188 Mitchell, D., et al., Solar Signals in CMIP-5 Simulations: The Stratospheric Pathway, ***Q. J. Royal Met. Soc.***, 141, 2390-2403, 2015.

187 Voulgarakis, A., M. E. Marlier, G. Faluvegi, D. T. Shindell, K. Tsigaridis, and S. Mangeon, Interannual variability of tropospheric trace gases and aerosols: The role of biomass burning emissions, ***J. Geophys. Res.***, 120, 7157-7173, doi:10.1002/2014JD022926, 2015.

186 Nazarenko, L., et al., Future climate change under RCP emission scenarios with GISS ModelE2, ***J. Adv. Model. Earth Syst.***, 7, 244-267, 2015.

185 Shindell, D. T., The Social Cost of Atmospheric Release, ***Climatic Change,*** 130, 313-326, 2015.

184 Myhre, G., O. Boucher, F. Bréon, P. Forster, and D. Shindell, Declining uncertainty in transient climate response as CO2 dominates future climate change, ***Nature Geoscience***, 8, 181-185, doi:10.1038/NGEO2371, 2015.

183 Lee, Y., P. Adams, and D. T. Shindell, Evaluation of the global aerosol microphysical ModelE2-TOMAS model against satellite and ground-based observations, ***Geosci. Model Dev.***, 8, 631–667, 2015.

182 Gettelman, A., D. T. Shindell, and J. F. Lamarque, Impact of aerosol radiative effects on 2000–2010 surface temperatures, ***Climate Dyn.,*** 45, 2165-2179, 2015.

181 Shindell, D. T., Inhomogeneous forcing and transient climate sensitivity, ***Nature Climate Change,*** doi:10.1038/nclimate2136, 4, 274-277, 2014.

180 Schmale, J., D. Shindell, E. von Schneidemesser, I. Chabay, M. Lawrence, Clean up our skies, ***Nature,*** 515, 335-337, 2014.

179 Anenberg, S. C., et al., Impacts of intercontinental transport of anthropogenic fine particulate matter on human mortality, ***Air Qual. Atmos. Health***, 7, 369-379, 2014.

178 Manzini, E., et al., Northern winter climate change: Assessment of uncertainty in CMIP5 projections related to stratosphere-troposphere coupling, ***J. Geophys. Res. Atmos.***, 119, 7979–7998, doi:10.1002/2013JD021403, 2014.

177 Lee, Y.C., D.T. Shindell, G. Faluvegi, M. Wenig, Y.F. Lam, Z. Ning, S. Hao, C.S. Lai, Increase of ozone concentrations, its temperature sensitivity and the precursor factor in South China, ***Tellus B***, 66, 23455, doi:10.3402/tellusb.v66.23455, 2014.

176 Schmidt, G.A., et al., Configuration and assessment of the GISS ModelE2 contributions to the CMIP5 archive, ***J. Adv. Model. Earth Syst.***, 6, 141-184, 2014.

175 Miller, R. L., et al., CMIP5 Historical Simulations (1850-2012) with GISS ModelE2, ***J. Adv. Model. Earth Syst.***, 6, 441-477, 2014.

174 Cooper, O. R., et al., Global distribution and trends of tropospheric ozone: An observation-based review, ***Elementa Sci. Anth.***, 2, doi:10.12952/journal.elementa.000029, 2014.

173 Parrish, D. D., et al., Long-term changes in lower tropospheric baseline ozone concentrations: Comparing chemistry-climate models and observations at northern midlatitudes, ***J. Geophys. Res.***, 119, 5719-5736, doi:10.1002/2013JD021435, 2014.

172 Marlier, M. E., A. Voulgarakis, D. T. Shindell, G. Faluvegi, C. Henry, and J. T.

Randerson, The role of temporal evolution in modeling atmospheric emissions from tropical fires, ***Atmos. Env.***, 89, 158-168, 2014.

171 Schmidt, G.A., D. T. Shindell, and K. Tsigaridis, Reconciling warming trends, ***Nature Geoscience***, 7, 158-160, 2014.

170 Rogelj, J., M. Schaeffer, M. Meinshausen, D. T. Shindell, W. Hare, Z. Klimont, G. J. M.Velders, M. Amann, and H. J. Schellnhuber, Disentangling the effects of CO_2 and short-lived climate forcer mitigation, ***Proc. Natl. Acad. Sci.***, doi:10.1073/pnas.1415631111, 2014.

169 Tsigaridis, K., et. al., The AeroCom evaluation and intercomparison of organic aerosol in global models, ***Atmos. Chem. Phys.***, 14, 10845–10895, 2014.

168 Nolte, C., T. Otte, R. Pinder, J. Bowden, J. Herwehe, G. Faluvegi, D. Shindell, Influences of Regional Climate Change on Air Quality Across the Continental U.S. Projected from Downscaling IPCC AR5 Simulations, in Air Pollution Modeling and its Application XXII, NATO Science for Peace and Security Series C: Environmental Security, D. G. Steyn, P. J. H. Builtjes, and R. M. A. Timmermans, Eds., Springer Netherlands, 2014.

167 IPCC, Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T. F., et al., (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2013.

166 Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestvedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T. F., et. al., (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2013.

165 Kirschke, S., et al., Three decades of global methane sources and sinks, ***Nature Geoscience***, 6, 813-823, 2013.

164 Streets, D. G., D. T. Shindell, Z. Lu, and G. Faluvegi, Radiative forcing due to major aerosol emitting sectors in China and India, ***Geophys. Res. Lett.***, 40, 4409–4414, doi:10.1002/grl.50805, 2013.

163 Silva, R. A., et al., Global premature mortality due to anthropogenic outdoor air pollution and the contribution of past climate change, ***Environ. Res. Lett.***, 8, doi:10.1088/1748-9326/8/3/034005, 2013.

162 Hsu, A., A. Reuben, D. Shindell, A. de Sherbinin, M. Levy, Toward the next generation of air quality monitoring indicators, ***Atmos. Env.***, 80, 561-570, 2013.

161 Pechony, O., D. T. Shindell, and G. Faluvegi, Direct top-down estimates of biomass burning CO emissions using TES and MOPITT versus bottom-up GFED inventory, ***J. Geophys. Res.***, 118, 8054–8066, doi:10.1002/jgrd.50624, 2013.

160 Naik, V., et al., 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, 2013.

159 Charlton-Perez, A. J., et al., Mean Climate and Variability of the Stratosphere in the CMIP5 models, ***J. Geophys. Res.***, 118, 2494-2505, 2013.

158 Lamarque, J.F., et al., Multi-model mean nitrogen and sulfur deposition from the Atmospheric Chemistry and Climate Model Intercomparison Project (ACCMIP): evaluation of historical and projected future changes, ***Atmos. Chem. Phys.***, 13, 7997–8018, 2013.

157 Eyring, V. et al., Long-term changes in tropospheric and stratospheric ozone and associated climate impacts in CMIP5 simulations, ***J. Geophys. Res.***,

doi:10.1002/jgrd.50316, 2013.
156 Doherty, R. M., Wild, O., Shindell, D. T., Zeng, G., Collins, W. J., MacKenzie, I. A., Fiore, A. M., Stevenson, D. S., Dentener, F. J., Schultz, M. G., Hess, P., Derwent, R. G. and Keating, T. J., Impacts of climate change on surface ozone and intercontinental ozone pollution: A multi-model study, ***J. Geophys. Res.***, 118, 3744-3763, 2013.
155 Nabat, P. et al., 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, 2013.
154 Shindell, D. T. et al., Radiative forcing in the ACCMIP historical and future climate simulations, ***Atmos. Chem. Phys.***, 13, 2939–2974, 2013.
153 Stevenson, D. S. et al., Tropospheric ozone changes, radiative forcing and attribution to emissions in the Atmospheric Chemistry and Climate Model Intercomparison Project (ACCMIP), ***Atmos. Chem. Phys.***, 13, 3063–3085, 2013.
152 Bowman, K. W. et al., Evaluation of ACCMIP outgoing longwave radiation from tropospheric ozone using TES satellite observations, ***Atmos. Chem. Phys.***, 13, 4057–4072, 2013.
151 Bond, T., et al., Bounding the role of black carbon in the climate system: A scientific assessment, ***J. Geophys. Res.***, 118, 5380–5552,doi:10.1002/jgrd.50171, 2013.
150 Shindell, D., G. Faluvegi, L. Nazarenko, K. Bowman, J.-F. Lamarque, A. Voulgarakis, G. A. Schmidt, O. Pechony, R. Ruedy, Attribution of historical whole-atmosphere ozone forcing to emissions, ***Nature Climate Change***, 3, 567-570, doi:10.1038/nclimate1835, 2013.
149 Marlier, M. E., R. S. DeFries, A. Voulgarakis, P. L. Kinney, J. T. Randerson, D. T. Shindell, Y. Chen, and G. Faluvegi, El Niño and health risks from landscape fire emissions in Southeast Asia, ***Nature Climate Change***, 3, 131–136, 2013.
148 Nordhaus, W.D., M.L. Cropper, F. de la Chesnaye, N. Diffenbaugh, D.G. Hawkins, R.F. Mann, B.C. Murray, J.M. Reilly, D. Shindell, E. Toder, R.C. Williams, III, and C. Wolfram, Effects of U.S. Tax Policy on Greenhouse Gas Emissions. W.D. Nordhaus, S.A. Merrill, and P.T. Beaton, Eds. National Academies Press, 2013.
147 Yu, H., Chin, M., West, J., Atherton, C. S., Bellouin, N., Bergmann, D., Bey, I., Bian, H., Diehl, T., Forberth, G., Hess, P., Shindell, D., Takemura, T., Tan, Q., A multi-model assessment of the influence of regional anthropogenic emission reductions on aerosol direct radiative forcing and the role of intercontinental transport, ***J. Geophys. Res.***, 118, 700–720, 2013.
146 Shindell, D. T., Pechony, O., Voulgarakis, A., Faluvegi, G., Nazarenko, L., Lamarque, J.-F., Bowman, K., Milly, G., Kovari, B., Ruedy, R. and Schmidt, G. A., Interactive ozone and methane chemistry in GISS-E2 historical and future climate simulations, ***Atmos. Chem. Phys.***, 13, 2653–2689, 2013.
145 Collins, W. J., Fry, M. M., Yu, H., Fuglestvedt, J. S., Shindell, D. T. and West, J. J., Global and regional temperature-change potentials for near-term climate forcers, ***Atmos. Chem. Phys.***, 13, 2471–2485, 2013.
144 Kobashi, T., Shindell, D. T., Kodera, K., Box, J. E., Nakaegawa, T. and Kawamura, K., On the origin of multidecadal to centennial Greenland temperature anomalies over the past 800 yr, ***Clim. Past***, 9, 583–596, 2013.
143 Lee, Y. H. et al., 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, 2013.
142 Voulgarakis, A. et al., Analysis of present day and future OH and methane lifetime in the ACCMIP simulations, ***Atmos. Chem. Phys.***, 13, 2563–2587, 2013.
141 Young, P. J. et al., 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, 2013.

140 Lamarque, J.-F., D. T. Shindell, et al., The Atmospheric Chemistry and Climate Model Intercomparison Project (ACCMIP): overview and description of models, simulations and climate diagnostics, ***Geosci. Model Dev.***, 6, 179-206, 2013.

139 Otto, A., F.E.L. Otto, O. Boucher, J. Church, G. Hegerl, P.M. Forster, N.P. Gillett, J. Gregory, G.C. Johnson, R. Knutti, N. Lewis, U. Lohmann, J. Marotzke, G. Myhre, D. Shindell, B. Stevens, and M.R. Allen, Energy budget constraints on climate response, ***Nature Geosci.***, 6, 415-416, doi:10.1038/ngeo1836, 2013.

138 Voulgarakis, A., Shindell, D. T., and Faluvegi, G.: Linkages between ozone-depleting substances, tropospheric oxidation and aerosols, ***Atmos. Chem. Phys.***, 13, 4907-4916, doi:10.5194/acp-13-4907-2013, 2013.

137 Shindell, D., J. C. I. Kuylenstierna, E. Vignati, R. Dingenen, M. Amann, Z. Klimont, S. C. Anenberg, N. Muller, G. Janssens-Maenhout, F. Raes, J. Schwartz, G. Faluvegi, L. Pozzoli, K. Kupiainen, L. Höglund-Isaksson, L. Emberson, D. Streets, V. Ramanathan, K. Hicks, K. Oanh, G. Milly, M. Williams, V. Demkine, and D. Fowler, Simultaneously mitigating near-term climate change and improving human health and food security, ***Science***, 335, 183-189, 2012.

136 Racherla, P. N., D. T. Shindell, and G. Faluvegi, The added value to global model projections of climate change by dynamical downscaling: A case study over the continental US using the GISS-ModelE2 and WRF models, ***J. Geophys. Res.***, 117, D20118, doi:10.1029/2012JD018091, 2012.

135 Himalayan Glaciers: Climate Change, Water Resources, and Water Security, Vaux, H. J, D. Balk, E. R. Cook, P. Gleick, W. Lau, M. Levy, E. L. Malone, R. McDonald, D. Shindell, L. G. Thompson, J. L. Wescoat, Jr., M. W. Williams, ISBN 978-0-309-26098-5, 218 pages, National Academies Press, 2012.

134 Shindell, D. T., Evaluation of the Absolute Regional Temperature Potential, ***Atmos. Chem. Phys.***, 12, 7955-7960, 2012.

133 Goosse, H., Crespin, E., Dubinkina, S., Loutre, M.-F., Mann, M. E., Renssen, H., Sallaz-Damaz, Y., Shindell, D., The role of forcing and internal dynamics in explaining the ‘‘Medieval Climate Anomaly’’**, *Clim. Dyn***., 39:2847–2866, DOI 10.1007/s00382-012-1297-0, 2012.

132 Henze, D. K., D. T. Shindell, F. Akhtar, R. J. D. Spurr, R. W. Pinder, D. Loughlin, M. Kopacz, K. Singh, and C. Shim, Spatially Refined Aerosol Direct Radiative Forcing Efficiencies, ***Environ. Sci. Tech.***, 46, 9511−9518, 2012.

131 Fiore, A. M., Naik, V., Spracklen, D. V., Steiner, A., Unger, N., Prather, M., Bergmann, D., Cameron-Smith, P. J., Cionni, I., Collins, W. J., Dalsøren, S., Eyring, V., Folberth, G. A., Ginoux, P., Horowitz, L. W., Josse, B., Lamarque, J.-F., MacKenzie, I. A., Nagashima, T., O'Connor, F. M., Righi, M., Rumbold, S., Shindell, D. T., Skeie, R. B., Sudo, K., Szopa, S., Takemura, T., Zeng, G., Global Air Quality and Climate, ***Chem. Soc. Rev***., 41, 6663-6683, 2012.

130 Shindell, D. T., A. Voulgarakis, G. Faluvegi, and G. Milly, Precipitation response to regional radiative forcing. ***Atmos. Chem. Phys.***, 12, 6969-6982, 2012.

129 Dou, T., C. Xiao, D. T. Shindell, J. Liu, K. Eleftheriadis, J. Ming, and D. Qin, The distribution of snow black carbon observed in the Arctic and compared to the GISS-PUCCINI model, ***Atmos. Chem. Phys.***, 12, 7995–8007, 2012.

128 Anenberg, S.C., J. Schwartz, D. Shindell, M. Amann, G. Faluvegi, Z. Klimont, G. Janssens-Maenhout, L. Pozzoli, R. Van Dingenen, E. Vignati, L. Emberson, N.Z. Muller, J.J. West, M. Williams, V. Demkine, W.K. Hicks, J. Kuylenstierna, F. Raes, and V. Ramanathan, Global air quality and health co-benefits of mitigating near-term climate change through methane and black carbon emission controls, ***Environ. Health***

Perspect., 120, 831-839, doi:10.1289/ehp.1104301, 2012.

127 Fry, M.M., V. Naik, J.J. West, M.D. Schwarzkopf, A.M. Fiore, W.J. Collins, F.J. Dentener, D.T. Shindell, C. Atherton, D. Bergmann, B.N. Duncan, P. Hess, I.A. MacKenzie, E. Marmer, M.G. Schultz, S. Szopa, O. Wild, and G. Zeng, The influence of ozone precursor emissions from four world regions on tropospheric composition and radiative climate forcing, ***J. Geophys. Res.***, 117, D07306, doi:10.1029/2011JD017134, 2012.

126 Kravitz, B., A. Robock, D.T. Shindell, and M.A. Miller, Sensitivity of stratospheric geoengineering with black carbon to aerosol size and altitude of injection. ***J. Geophys. Res.***, 117, D09203, doi:10.1029/2011JD017341, 2012.

125 Wild, O., Fiore, A. M., Shindell, D. T., Doherty, R. M., Collins, W. J., Dentener, F. J., Schultz, M. G., Gong, S., MacKenzie, I. A., Zeng, G., Hess, P., Duncan, B. N., Bergmann, D. J., Szopa, S., Jonson, J. E., Keating, T. J., and Zuber, A., Modelling future changes in surface ozone: a parameterized approach, ***Atmos. Chem. Phys***., 12, 2037-2054, 2012.

124 United Nations Environment Programme and World Meteorological Organization, Integrated Assessment of Black Carbon and Tropospheric Ozone (Chair), Nairobi, Kenya, 288pp, 2011.

123 Near-term Climate Protection and Clean Air Benefits: Actions for Controlling Short-Lived Climate Forcers, United Nations Environment Programme (Lead-author), Nairobi, Kenya, 78pp, 2011.

122 Callaghan, T. V., Johansson, M., Brown, R. D., et al., The Changing Face of Arctic Snow Cover: A Synthesis of Observed and Projected Changes, ***AMBIO***, 40, 17–31, 2011.

121 Shindell, D., G. Faluvegi, M. Walsh, S. C. Anenberg, R. Van Dingenen, N. Z. Muller, J. Austin, D. Koch, and G. Milly, Climate, health, agricultural and economic impacts of tighter vehicle-emission standards, ***Nature Climate Change***, *1*, 59-66, 2011.

120 Aghedo, A. M., K. W. Bowman, D. T. Shindell, G. Faluvegi, The impact of orbital sampling, monthly averaging and vertical resolution on climate chemistry model evaluation with satellite observations, ***Atmos. Chem. Phys.***, 11, 6493–6514, 2011.

119 Lamarque, J. F., J. R. McConnell, D. T. Shindell, J. J. Orlando and G. S. Tyndall, Understanding the drivers for the 20th century change of hydrogen peroxide in Antarctic ice-cores, ***Geophys. Res. Lett***, 38, L04810, doi:10.1029/2010GL045992, 2011.

118 Voulgarakis, A., P. J. Telford, A. M. Aghedo, P. Braesicke, G. Faluvegi, N. L. Abraham, K. W. Bowman, J. A. Pyle, and D. T. Shindell, Global multi-year O3-CO correlation patterns from models and TES satellite observations, ***Atmos. Chem. Phys.***, 11, 5819-5838, 2011.

117 Koch, D., S. Bauer, A. Del Genio, G. Faluvegi, J.R. McConnell, S. Menon, R.L. Miller, D. Rind, R. Ruedy, G.A. Schmidt, and D. Shindell, Coupled aerosol-chemistry-climate twentieth century transient model investigation: Trends in short-lived species and climate responses. ***J. Climate***, 24, 2693-2714, 2011.

116 Aghedo, A. M., K. W. Bowman, H. M. Worden, S. S. Kulawik, D. T. Shindell, J. F. Lamarque, G. Faluvegi, M. Parrington, D. B. A. Jones, and S. Rast, The vertical distribution of ozone instantaneous radiative forcing from satellite and chemistry climate models, ***J. Geophys. Res.***, 116, D01305, doi:10.1029/2010JD014243, 2011.

115 Cionni, I., Eyring, V., Lamarque, J. F., Randel, W. J., Stevenson, D. S., Wu, F., Bodeker, G. E., Shepherd, T. G., Shindell, D. T., and Waugh, D. W.: Ozone database in support of CMIP5 simulations: results and corresponding radiative forcing, ***Atmos. Chem. Phys.***, 11, 11267-11292, 2011.

114 Schmidt, G. A., Jungclaus, J. H., Ammann, C. M., Bard, E., Braconnot, P., Crowley, T.

J., Delaygue, G., Joos, F., Krivova, N. A., Muscheler, R., Otto-Bliesner, B. L., Pongratz, J., Shindell, D. T., Solanki, S. K., Steinhilber, F., and Vieira, L. E. A.: Climate forcing reconstructions for use in PMIP simulations of the last millennium (v1.0), ***Geosci. Model Dev***., 4, 33-45, 2011.

113 Pechony, O. and D. T. Shindell, The driving forces of global wildfires over the past millennium and the forthcoming century. ***Proc. Natl. Acad. Sci***., 107, 19167-19170, 2010.

112 Voulgarakis, A. and D.T. Shindell, Constraining the sensitivity of regional climate with the use of historical observations, ***J. Climate***, 23, 6068-6073, 2010.

111 Shindell, D. T., M. Schulz, Y. Ming, T. Takemura, G. Faluvegi, and V. Ramaswamy, Spatial scales of climate response to inhomogeneous radiative forcing, ***J. Geophys. Res.***, 115, D19110, doi:10.1029/2010JD014108, 2010.

110 Gray, L. J., J. Beer, M. Geller, JD. Haigh, M. Lockwood, K. Matthes, U. Cubasch, D. Fleitmann, G. Harrison, L. Hood, J. Luterbacher, G. A. Meehl, D. Shindell, B. van Geel, W. White, Solar Influences on Climate, ***Rev. Geophys.***, 48, RG4001, doi:10.1029/2009RG000282, 2010.

109 Shindell, D. T., and G. Faluvegi, The net climate impact of coal-fired power plant emissions, ***Atmos. Chem. Phys.***, 10, 3247-3260, 2010.

108 Lamarque, J.-F., Bond, T. C., Eyring, V., Granier, C., Heil, A., Klimont, Z., Lee, D., Liousse, C., Mieville, A., Owen, B., Schultz, M. G., Shindell, D., Smith, S. J., Stehfest, E., Van Aardenne, J., Cooper, O. R., Kainuma, M., Mahowald, N., McConnell, J. R., Naik, V., Riahi, K., and van Vuuren, D. P.: Historical (1850–2000) gridded anthropogenic and biomass burning emissions of reactive gases and aerosols: methodology and application, ***Atmos. Chem. Phys.,*** 10, 7017-7039, 2010.

107 Unger, N., T. C. Bond, J. S. Wang, D. M. Koch, S. Menon, D. T. Shindell, and S. Bauer, Attribution of climate forcing to economic sectors, ***Proc. Natl. Acad. Sci.,*** 107, 3382-3387, 2010.

106 Shindell, D. T., Faluvegi, G., Koch, D. M., Schmidt, G. A., Unger, N., Bauer, S., Improved attribution of climate forcing to emissions, ***Science***, 326, 716-718, 2009.

105 Mann, M. E., Z. Zhang, S. Rutherford, R. Bradley, M. K. Hughes, D. Shindell, C. Ammann, G. Faluvegi, F. Ni, Global Signatures of the Little Ice Age and Medieval Climate Anomaly and Plausible Dynamical Origins, ***Science***, 326, 1256-1260, 2009.

104 Anenberg, S.C., J.J. West, A.M. Fiore, D.A. Jaffe, M.J. Prather, D. Bergmann, K. Cuvelier, F.J. Dentener, B.N. Duncan, M. Gauss, P. Hess, J.E. Jonson, A. Lupu, I.A. MacKenzie, E. Marmer, R.J. Park, M.G. Sanderson, M. Schultz, D.T. Shindell, S. Szopa, M.G. Vivanco, Wild O., and Zang G., Intercontinental impacts of ozone pollution on human mortality. ***Environ. Sci. Technol.***, 43, 6482-6487, 2009.

103 Isaksen, I. S. A., et al., Atmospheric composition change: Climate-Chemistry interactions, ***Atm. Env.***, 43, 5138-5192, 2009.

102 Henze, D. K., Seinfeld, J. H., and Shindell, D. T, Inverse modeling and mapping US air quality influences of inorganic PM2.5 precursor emissions using the adjoint of GEOS-Chem, ***Atmos. Chem. Phys.***, 9, 5877-5903, 2009.

101 Lee, J. N., D. T. Shindell, and S. Hameed, The influence of solar forcing on tropical circulation, ***J. Climate***, 22, 5870-5885, 2009.

100 Reidmiller, D. R., A. M. Fiore, D. A. Jaffe, D. Bergmann, C. Cuvelier, F. J. Dentener, B. N. Duncan, G. Folberth, M. Gauss, S. Gong, P. Hess, J. E. Jonson, T. Keating, A. Lupu, E. Marmer, R. Park, M. G. Schultz, D. T. Shindell, S. Szopa, M. G. Vivanco, O. Wild, and A. Zuber, The influence of foreign vs. North American emissions on surface ozone in the US, ***Atmos. Chem. Phys.***, 9, 5027-5042, 2009.

99 Unger, N., S. Menon, D. M. Koch, and D. T. Shindell, Impacts of aerosol-cloud interactions on past and future changes in tropospheric composition, ***Atmos. Chem.***

Phys., 9, 4115-4129, 2009.

98 Shindell, D.T., Faluvegi, G., Climate response to regional radiative forcing during the twentieth century, ***Nature Geoscience***, 2, 294-300, 2009.

97 Pechony, O., and D. T. Shindell, Fire parameterization on a global scale, ***J. Geophys. Res.***, 114, D16115, doi:10.1029/2009JD011927, 2009.

96 Robock, A., Ammann, C. M., Oman, L., Shindell, D., Levis, S., and Stenchikov, G., Did the Toba Volcanic Eruption of ~74k BP Produce Widespread Glaciation?, ***J. Geophys. Res.***, 114, D10107, doi:10.1029/2008JD011652, 2009.

95 Unger, N., Shindell, D. T., and Wang, J. S., Climate forcing by the on-road transportation and power generation sectors, ***Atm. Env.***, 43, 3077-3085, 2009.

94 Fiore, A. M., et al., Multimodel estimates of intercontinental source-receptor relationships for ozone pollution, ***J. Geophys. Res.***, 114, D04301, doi:10.1029/2008JD010816, 2009.

93 Steig, E.J., D.P. Schneider, S.D. Rutherford, M.E. Mann, J.C. Comiso, and D.T. Shindell, Warming of the Antarctic ice-sheet surface since the 1957 International Geophysical Year, ***Nature***, 457, 459-462, 2009.

92 Field, C. V., G. A. Schmidt, and D. T. Shindell, Interpreting ^{10}Be changes during the Maunder Minimum, ***J. Geophys. Res.***, 114, D02113, doi:10.1029/2008JD010578, 2009.

91 Shindell, D.T., Lamarque, J.-F., Unger, N., Koch, D., Faluvegi, G., Bauer, S., Ammann, M., Cofala, J., Teich, H., Climate forcing and air quality change due to regional emissions reductions by economic sector, ***Atmos. Chem. Phys.***, 8, 7101–7113, 2008.

90 Shindell, D.T., et al., A multi-model assessment of pollution transport to the Arctic, ***Atmos. Chem. Phys.***, 8, 5353–5372, 2008.

89 Sanderson, M. G., et al., A multi-model study of the hemispheric transport and deposition of oxidised nitrogen, ***Geophys. Res. Lett.***, 35, L17815, doi:10.1029/2008GL035389, 2008.

88 Shindell, D.T., H. Levy II, M. D. Schwarzkopf, L. W. Horowitz, J.-F. Lamarque, 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.

87 Fischer, A. M., D. T. Shindell, B. Winter, M. S. Bourqui, G. Faluvegi, E. Rozanov, M. Schraner, and S. Brönnimann, Stratospheric winter climate response to ENSO in three chemistry-climate models, ***Geophys. Res. Lett.***, 35, L13819, doi:10.1029/2008GL034289, 2008.

86 Menon, S., N. Unger, D. Koch, J. Francis, T. Garrett, I. Sednev, D. Shindell, and D. Streets, Aerosol climate effects and air quality impacts from 1980 to 2030, ***Environ. Res. Lett.***, **3**, 024004, doi:10.1088/1748-9326/3/2/024004, 2008.

85 Quinn, P. K., T.S. Bates, E. Baum, N. Doubleday, A.M. Fiore, M. Flanner, A. Fridlind, T.J. Garrett, D. Koch, S. Menon, D. Shindell, A. Stohl, and S.G. Warren, Short-Lived Pollutants in the Arctic: Their Climate Impact and Possible Mitigation Strategies, ***Atmos. Chem. Phys.***, 8, 1723–1735, 2008.

84 Lee, J. N., S. Hameed, and D. T. Shindell, The northern annular mode in summer and its relation to solar activity variations in the GISS ModelE, ***J. Atm. Solar Terr. Phys.***, 70, 730-741, 2008.

83 Unger, N., D. T. Shindell, D. M. Koch, and D. G. Streets, Air pollution radiative forcing from specific emissions sectors at 2030, ***J. Geophys. Res***., 113, D02306, doi:10.1029/2007JD008683, 2008.

82 Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols, Levy, H. L., D. Shindell, A. Gilliland, L. W. Horowitz, and M. D. Schwarzkopf (eds), U.S. Climate Change Science Program,

Synthesis and Assessment Product 3.2, Washington DC, 2008.
81 Hansen, J., et al., Climate simulations for 1880-2003 with GISS modelE, ***Clim. Dyn.***, 29, 661-696, 2007.
80 Shindell, D.T., G. Faluvegi, S. E. Bauer, D. M. Koch, N. Unger, S. Menon, R.L. Miller, G.A. Schmidt, D. G. Streets, Climate response to projected changes in short-lived species under the A1B scenario from 2000-2050 in the GISS climate model, ***J. Geophys. Res.***, 112, D20103, doi:10.1029/2007JD008753, 2007.
79 Bauer, S. E., D. Koch, N. Unger, S. M. Metzger, D. T. Shindell, and D. G. Streets, Nitrate aerosols today and in 2030: a global simulation including aerosols and tropospheric ozone, ***Atmos. Chem. Phys.***, 7, 5043-5059, 2007.
78 Shindell, D.T., Local and remote contributions to Arctic warming, ***Geophys. Res. Lett.***, 34, L14704, doi:10.1029/2007GL030221, 2007.
77 Hansen, J., et al., Dangerous human-made interference with climate: A GISS modelE study, ***Atm. Chem. Phys.***, 7. 2287-2312, 2007.
76 Shindell, D.T., Estimating the potential for twenty-first century sudden climate change, ***Phil. Trans. R. Soc. A***, 365, 2675–2694, 2007.
75 Harder, S. L., D. T. Shindell, G. A. Schmidt, and E. J. Brook, A global climate model study of CH_4 emissions during the Holocene and glacial-interglacial transitions constrained by ice core data, ***Global Biogeochem. Cycles***, 21, GB1011, doi:10.1029/2005GB002680, 2007.
74 Shindell, D.T., G. Faluvegi, R.L. Miller, G.A. Schmidt, J.E. Hansen, and S. Sun 2006. Solar and anthropogenic forcing of tropical hydrology, ***Geophys. Res. Lett.***, 33, L24706, doi:10.1029/2006GL027468, 2006.
73 Dentener, F., et al., Nitrogen and Sulphur Deposition on regional and global scales: a multi-model evaluation, ***Global Biogeochem. Cycles***, 20, GB4003, doi:10.1029/2005GB002672, 2006.
72 Shindell, D. T., et al., Multi-model simulations of carbon monoxide: Comparison with observations and projected near-future changes, ***J. Geophys. Res.***, 111, D19306, doi:10.1029/2006JD007100, 2006.
71 Butchart, N., et al. A multi-model study of climate change in the Brewer-Dobson circulation, ***Clim. Dyn.***, 10.1007/s00382-006-0162-4, 2006.
70 Miller, R. L., G. A. Schmidt, and D. T. Shindell, Forced variations of annular modes in the 20th century Intergovernmental Panel on Climate Change Fourth Assessment Report models, ***J. Geophys. Res.***, 111, D18101, doi:10.1029/2005JD006323, 2006.
69 Oman, L., A. Robock, G. Stenchikov, T. Thordarson, D. Koch, D., Shindell, and C. Gao, Modeling the Distribution of the Volcanic Aerosol Cloud from the 1783 Laki Eruption, ***J. Geophys. Res.***, 111, D12209, doi:10.1029/2005JD006899, 2006.
68 Unger, N., D.T. Shindell, D.M. Koch, M. Amann, J. Cofala, and D.G. Streets. Influences of man-made emissions and climate changes on tropospheric ozone, methane and sulfate at 2030 from a broad range of possible futures, ***J. Geophys. Res.***, 111, D12313, doi:10.1029/2005JD006518, 2006.
67 Shindell, D. T., G. Faluvegi, N. Unger, E. Aguilar, G. A. Schmidt, D. M. Koch, S. E. Bauer, and R. L. Miller, Simulations of preindustrial, present-day, and 2100 conditions in the NASA GISS composition and climate model G-PUCCINI, ***Atm. Chem. Phys.***, 6, 4427-4459, 2006.
66 Dentener, F., et al., The global atmospheric environment for the next generation, ***Env. Sci. & Tech.***, 40, 3586-3594, 2006.
65 Shindell, D., G. Faluvegi, A. Lacis, J. Hansen, R. Ruedy, and E. Aguilar, The role of tropospheric ozone increases in 20th century climate change, ***J. Geophys. Res.***, 111, D08302, doi:10.1029/2005JD006348, 2006.
64 Stevenson, D. S., et al (co-author), Multi-model ensemble simulations of present-day

and near-future tropospheric ozone, ***J. Geophys. Res.***, *111*, D08301, doi:10.1029/2005JD006338, 2006.

63 Shindell, D. T., Decadal-scale modulation of the NAO/AO by external forcing: Current state of understanding, ***Nuovo Cimento***, 29, 137-145, 2006.

62 Unger, N., D. T. Shindell, D. M. Koch, and D. Streets, Cross influences of ozone and sulfate precursor emissions changes on air quality and climate, ***Proc. Natl. Acad. Sci.,*** 103, 4377-4380, 2006.

61 LeGrande, A.N., G.A. Schmidt, D.T. Shindell, C.V. Field, R.L. Miller, D.M. Koch, G. Faluvegi, and G. Hoffmann, Consistent simulations of multiple proxy responses to an abrupt climate change event. ***Proc. Natl. Acad. Sci.,*** 103, 837-842, doi:10.1073pnas.0510095103, 2006.

60 Schmidt, G.A., et al. (co-author), Present day atmospheric simulations using GISS ModelE: Comparison to in-situ, satellite and reanalysis data, ***J. Clim.***, 19, 153-192, 2006.

59 Shindell, D. T., G. Faluvegi, and L. K. Emmons, Inferring carbon-monoxide pollution changes from space-based observations, ***J. Geophys. Res.***, 110, D23303, doi:10.1029/2005JD006132, 2005.

58 Lamarque, J.-F., et al (co-author), 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.

57 Schmidt, G.A., G. Hoffmann, D. T. Shindell, and Y. Hu, Modeling atmospheric stable water isotopes and the potential for constraining cloud processes and stratosphere-troposphere water exchange, ***J. Geophys. Res.***, 110, D21314, doi:10.1029/2005JD005790, 2005.

56 Hansen, J., et al (co-author), Efficacy of climate forcings, ***J. Geophys. Res.***, 110, D18104, doi:10.1029/2005JD005776, 2005.

55 Bell, N., D. Koch, and D. T. Shindell, Impacts of chemistry-aerosol coupling on tropospheric ozone and sulfate simulations in a general circulation model, ***J. Geophys. Res.***, 110, D14305, doi:10.1029/2004JD005538, 2005.

54 Shindell, D. T., G. Faluvegi, N. Bell, and G. A. Schmidt, An emissions-based view of climate forcing by methane and tropospheric ozone, ***Geophys. Res. Lett.***, 32, L04803, doi:10.1029/2004GL021900, 2005.

53 Schmidt, G.A., D. T. Shindell, and S. Harder, Reply to comment by W. F. Ruddiman on "A note on the relationship between ice core methane concentrations and insolation", ***Geophys. Res. Lett.***, 32, L15704, doi:10.1029/2005GL022982, 2005.

52 Shindell, D. T., B. P. Walter, and G. Faluvegi, Impacts of climate change on methane emissions from wetlands, ***Geophys. Res. Lett.***, 31, L21202, doi:10.1029/2004GL021009, 2004.

51 Schmidt, G.A., D. T. Shindell, and S. Harder, A note on the relationship between ice core methane concentrations and insolation, ***Geophys. Res. Lett.***, 31, L23206, doi:10.1029/2004GL021083, 2004.

50 Shindell, D. T., and G. A. Schmidt, Southern Hemisphere climate response to ozone changes and greenhouse gas increases, ***Geophys. Res. Lett.***, 31, L18209, doi:10.1029/2004GL020724, 2004.

49 Grewe, V., D.T. Shindell, and V. Eyring, The impact of horizontal transport on the chemical composition in the tropopause region: Lightning NOx and streamers. ***Adv. Space. Res***. 33, 1058-1061, doi:10.1016/S0273-1177(03)00589, 2004.

48 Schmidt, G. A., D. T. Shindell, R. L. Miller, M. E. Mann, and D. Rind, General circulation modeling of Holocene climate variability, ***Quat. Sci. Rev.***, 23, 2167-2181, doi:10.1016/j.quascirev.2004.08.005. 2004.

47 Shindell, D. T., G. A. Schmidt, M. E. Mann, and G. Faluvegi, Dynamic winter climate

response to large tropical volcanic eruptions since 1600, ***J. Geophys. Res***., 109, D05104, doi:10.1029/2003JD004151, 2004.

46 Rind, D., D. Shindell, J. Perlwitz, J. Lerner, P. Lonergan, J. Lean, and C. McLinden, The relative importance of solar and anthropogenic forcing of climate change between the Maunder Minimum and the present, ***J. Climate***, 17, 906-929, 2004.

45 Shindell, D. T., G. A. Schmidt, R. L. Miller, and M. E. Mann, Volcanic and solar forcing of climate change during the preindustrial era, ***J. Climate***, 16, 4094-4107, 2003.

44 Matthes, K., K. Kodera, J. D. Haigh, D. T. Shindell, K. Shibata, U. Langematz, E. Rozanov, and Y. Kuroda, GRIPS solar experiments intercomparison project: initial results, ***Papers Meteorol. Geophys.***, 54, 380-395, 2003.

43 Shindell, D. T., G. Faluvegi, and N. Bell, Preindustrial-to-present-day radiative forcing by tropospheric ozone from improved simulations with the GISS chemistry-climate GCM, ***Atm. Chem. Phys.***, 3, 1675-1702, 2003.

42 Grenfell, J. L., D. T. Shindell, and V. Grewe, Sensitivity studies of oxidative changes in the troposphere in 2100 using the GISS GCM, ***Atmos. Chem. Phys.***, 3, 1267-1283, 2003.

41 Shine, K. P., et al., (co-author), A comparison of model-simulated trends in stratospheric temperatures, ***Q. J. R. Meteorol. Soc.***, 129, 1565-1588, 2003.

40 Shindell, D. T., Whither Arctic Climate?, ***Science***, 299, 215-216, 2003.

39 Schmidt, G. A., and D. T. Shindell, Atmospheric composition, radiative forcing and climate change as a consequence of a massive methane release from gas hydrates, ***Paleoceanography***, 18, 1004, doi:10.1029/2002PA000757, 2003.

38 Austin, J., D. Shindell, et al., Uncertainties and assessments of chemistry-climate models of the stratosphere, ***Atmos. Chem. Phys.***, 3, 1-27, 2003.

37 Newman, P. A., et al, (co-author), Polar Stratospheric Ozone: Past and Future, Chapter 3, ***Scientific assessment of ozone depletion: 2002***, World Meteorological Organization, Report #47, Geneva, 2003.

36 Shindell, D. T., and G. Faluvegi, An exploration of ozone changes and their radiative forcing prior to the chlorofluorocarbon era, ***Atmos. Chem. Phys.***, 2, 363-374, 2002.

35 Rind, D., D. Shindell, N. K. Balachandran, and P. Lonergan, 2xCO2 and solar variability influences on the troposphere through wave-mean flow interactions, ***J. Met. Soc. Japan***, 80, 863-876, 2002.

34 Hansen, J., et al., (co-author), Climate forcings in Goddard Institute for Space Studies SI2000 simulations, ***J. Geophys. Res.***, 107 (D18), 4347, doi:10.1029/2001JD001143, 2002.

33 Shindell, D. T., and V. Grewe, Separating the influence of halogen and climate changes on ozone recovery in the upper stratosphere, ***J. Geophys. Res***., 107 (D12), 4144, doi: 10.1029/2001JD000420, 2002.

32 Grewe, V., C. Reithmeier, and D. Shindell, Dynamic-chemical coupling of the upper troposphere and lower stratosphere region, ***Chemosphere***, 47/8, 55-65, 2002.

31 Pitari, G., E. Mancini, V. Rizi, and D. T. Shindell, Impact of future climate and emission changes on stratospheric aerosols and ozone, ***J. Atmos. Sci.,*** 59, 414-440, 2002.

30 Gillett, N. P., M. R. Allen, R. E. McDonald, C. A. Senior, D. T. Shindell, and G. A. Schmidt, How linear is the Arctic Oscillation response to greenhouse gases?, ***J. Geophys. Res.***, 107 (D3), 4022, doi 10.1029/2001JD000589, 2002.

29 Shindell, D. T., G. A. Schmidt, M. E. Mann, D. Rind, and A. Waple, Solar forcing of regional climate change during the Maunder Minimum, ***Science***, 294, 2149-2152, 2001.

28 Grenfell, J. L., D. T. Shindell, D. Koch, and D. Rind, Chemistry-climate interactions in

the Goddard Institute for Space Studies general circulation model 2. New insights into modeling the preindustrial atmosphere, ***J. Geophys. Res.***, 106, 33,435-33,452, 2001.

27 Rosenzweig, C., et al., (co-author), Climate change and a global city: The potential consequences of climate variability and change - Metro East Coast. Report for the U.S. Global Change Research Program, National Assessment of the potential consequences of climate variability and change for the United States, Columbia Earth Institute, New York, 224 pp, 2001.

26 Oinas, V., A. A. Lacis, D. Rind, D. T. Shindell, and J. E. Hansen, Radiative cooling by stratospheric water vapor: Big differences in GCM results, ***Geophys. Res. Lett.***, *28*, 2791-2794, 2001.

25 Shindell, D. T., J. L. Grenfell, D. Rind, C. Price, and V. Grewe, Chemistry-climate interactions in the Goddard Institute for Space Studies general circulation model 1. Tropospheric chemistry model description and evaluation, ***J. Geophys. Res.***, 106, 8047-8076, 2001.

24 Shindell, D. T., G. A. Schmidt, R. L. Miller, & D. Rind, Northern Hemisphere winter climate response to greenhouse gas, volcanic, ozone and solar forcing, ***J. Geophys. Res.***, 106, 7193-7210, 2001.

23 Grewe, V., D. Brunner, M. Dameris, J. L. Grenfell, R. Hein, D. Shindell, and J. Staehelin, Origin and variability of upper tropospheric nitrogen oxides and ozone at northern mid-latitudes, ***Atmospheric Environment***, *35*, 3421-3433, 2001.

22 Shindell, D. T., Climate and ozone response to increased stratospheric water vapor, ***Geophys. Res. Lett.***, 28, 1551-1554, 2001.

21 Taalas, P., J. Kaurola, A. Kylling, D. Shindell, J. Austin, R. Sausen, M. Dameris, V. Grewe, J. Herman, and B. Steil, The impact of greenhouse gases and halogenated species on future solar UV radiation doses, ***Geophys. Res. Lett.***, 27, 1127-1130, 2000.

20 Shindell, D., R. L. Miller, G. A. Schmidt, & L. Pandolfo, Simulation of Recent Northern Winter Climate Trends By Greenhouse Gas Forcing, ***Nature***, 399, 452-455, 1999.

19 Shindell, D., D. Rind, N. Balachandran, J. Lean, & P. Lonergan, Solar Cycle Variability, Ozone, and Climate, ***Science***, 284, 305-308, 1999.

18 Balachandran, N. K., D. Rind, P. Lonergan, & D. Shindell, Effects of solar cycle variability on the lower stratosphere and the troposphere, ***J. Geophys. Res.***, 104, 27321-27339, 1999.

17 Hofmann, D., J. Pyle, J. Austin, N. Butchart, C. Jackman, D. Kinnison, F. Lefevre, G. Pitari, D. Shindell, R. Toumi & P. von der Gaathen, Predicting Future Ozone Changes and Detection of Recovery, Chapter 12, *Scientific assessment of ozone depletion: 1998*, World Meteorological Organization, Report #44, Geneva, 1999.

16 Shindell, D. T., D. Rind & N. Balachandran, Interannual variability of the Antarctic ozone hole in a GCM. Part 2: A comparison of unforced and QBO induced variability, ***J. Atmos. Sci.***, 56, 1873-1884, 1999.

15 Shindell, D. T., D. Rind & P. Lonergan, Increased Polar Stratospheric Ozone Losses and Delayed Eventual Recovery due to Increasing Greenhouse Gas Concentrations, ***Nature***, 392, 589-592, 1998.

14 Rind, D., D. T. Shindell, P. Lonergan & N. K. Balachandran, Climate Change and the Middle Atmosphere. Part III: The Doubled CO2 Climate Revisited, ***J. Climate***, *11*, 876-894, 1998.

13 Shindell, D. T., D. Rind & P. Lonergan, Climate Change and the Middle Atmosphere. Part IV: Ozone Photochemical response to doubled CO2, ***J. Climate***, *11*, 895-918, 1998.

12 Shindell, D. T., S. Wong & D. Rind, Interannual variability of the Antarctic ozone hole in a GCM. Part 1: The influence of tropospheric wave variability, ***J. Atmos. Sci.***, *54*, 2308-2319, 1997.

11 Shindell, D. T., The potential influence of ClO O2 on stratospheric ozone depletion chemistry, ***J. Atmos. Chem.***, *26*, 323-335, 1997.

10 Shindell, D. T. & R. L. de Zafra, Limits on heterogeneous processing in the Antarctic spring vortex from a comparison of measured and modeled chlorine, ***J. Geophys. Res.***, *102*, 1441-1449, 1997.

9 Waters, J. W., et al. (Co-author), Validation of UARS MLS ClO measurements, ***J. Geophys. Res.***, *101*, 10,091-10,127, 1996.

8 Shindell, D. T. & R. L. de Zafra, Chlorine monoxide in the Antarctic spring vortex 2. A comparison of measured and modeled diurnal cycling over McMurdo Station, 1993, ***J. Geophys. Res.***, *101*, 1475–1487, 1996.

7 Shindell, D. T. & R. L. de Zafra, The chlorine budget of the lower polar stratosphere: Upper limits on ClO, and implications of new Cl2O2 photolysis cross sections, ***Geophys. Res. Lett.***, *22*, 3215-3218, 1995.

6 de Zafra, R. L., J. M. Reeves & D. T. Shindell, Chlorine monoxide in the Antarctic spring vortex 1. Evolution of midday vertical profiles over McMurdo Station, 1993, ***J. Geophys. Res.***, *100*, 13,999-14,008, 1995.

5 Emmons, L. K. , D. T. Shindell, J. M. Reeves & R. L. de Zafra, Stratospheric ClO profiles from McMurdo Station, Antarctica, spring 1992, ***J. Geophys. Res.***, *100*, 3049-3055, 1995.

4 Shindell, D. T., J. M. Reeves, L. K. Emmons & R. L. de Zafra, Arctic chlorine monoxide observations during spring 1993 over Thule, Greenland, and implications for ozone depletion, ***J. Geophys. Res.***, 99, 25,697-25,704, 1994.

3 Emmons, L. K., J. M. Reeves, D. T. Shindell & R. L. de Zafra, N2O as an indicator of Arctic vortex dynamics: Correlations with O3 over Thule, Greenland, in February and March, 1992, ***Geophys. Res. Lett.***, *21*, 1275-1278, 1994.

2 de Zafra, R. L., L. K. Emmons, J. M. Reeves & D. T. Shindell, An overview of millimeter-wave spectroscopic measurements of chlorine monoxide at Thule, Greenland, February-March, 1992: Vertical profiles, diurnal variation, and longer-term trends, ***Geophys. Res. Lett.***, 21, 1271-1274,1994.

1 de Zafra, R. L., C. Trimble & D. T. Shindell, Measurement of stratospheric trace gases by millmeter-wave spectoscopy for an annual cycle at the South Pole, ***Antarctic Journal of the United States***, *29*, 253-256, 1994.

OTHER EDITED/REVIEWED CONTRIBUTIONS

Shindell, D. T., Not just CO_2, in "Climate 2020: A UNA-UK publication providing analysis and recommendations on fulfilling the Paris Agreement on climate change", p 70-71, 2018.

Shindell, D. T., Climate Change Mitigation during the Millennium Development Goals Period (2000-2015), background paper for the World Economic and Social Survey, UN Department of Economic and Social Affairs, 2015.

Climate Change: Breaking the Stalemate, Milken Institute Review: A Journal of Economic Policy, 15, 35-45, 2013.

Kuylenstierna, J.C.I., et al., Atmosphere. In *Global Environment Outlook 5: Environment for the Future We Want*. United Nations Environment Programme, 31-64, 2012.

Health and Food Security Benefits from Climate Change Mitigation, UN Chronicle, 44, 50-53, 2012.

Shindell, D., The Clean Air Dividend, *New Scientist*, **214**, 2860, 22-23, 2012.

The UNEP/WMO Assessment of Measures to Limit Near-Term Climate Change and Improve Air Quality, *Energy Management*, pp. 14-18, April, 2011.

Protecting the environment can boost the economy, *Nature*, 459, p 321, doi:10.1038/459321b, 2009.

Climate Change and the Cryosphere: Snow, Water, Ice, and Permafrost in the Arctic (co-author), a report of the Atmospheric Monitoring and Assessment Program to the Arctic Council, 2011.

Atmospheric Chemistry and Climate, in *Encyclopedia of Climate and Weather*, S. Schneider, editor, Oxford University Press, 2009.

Mediterranean Climate Variability over the Last Centuries: A review, J. Lutebacher et al., Elsevier, 2006.

Volcanic and Solar Forcing, in *Encyclopedia of Quaternary Science*, C. Mock, editor, Elsevier, Oxford, 2006.

Arctic Climate Impact Assessment (contributing author), Cambridge University Press, 2005.

Little Ice Age, and Maunder Minimum, in *Encyclopedia of Paleoclimatology and Ancient Environments*, V. Gornitz, editor, Kluwer Academic Publishers, Dordrecht, 2003.

Global warming and atmospheric ozone, in *McGraw Hill Yearbook of Science and Technology*, M. Schlesinger, editor, McGraw Hill, New York, 2003.

Arctic Oscillation, in *Encyclopedia of Global Environmental Change*. T. Munn, editor, John Wiley and Sons Publishers, London, 2001.