

HANNAH M. HOROWITZ

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CURRENT APPOINTMENT

- Jan. 2020 - **Assistant Professor**, Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign, Urbana, IL
- Aug. 2020 - **Affiliate Professor**, Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign, Urbana, IL

EDUCATION

- 2017 **PhD**, Earth & Planetary Sciences, Harvard University, Cambridge, MA
Dissertation: “*The global biogeochemical cycle of mercury: Insights from modeling atmospheric chemistry and all-time emissions from human activity*”
- 2016 **M.S.**, Environmental Science & Engineering, Harvard John A. Paulson School of Engineering and Applied Sciences, Cambridge, MA
- 2011 **B.A.**, *magna cum laude*, Earth & Planetary Sciences (minor: French), Harvard College, Cambridge, MA
Thesis: “*Modeled and Observed Atmosphere-Terrestrial Exchange of Hg⁰ in a Temperate Hardwood Forest*”

HONORS, AWARDS, & FELLOWSHIPS

- 2019 15th Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS XV)
- 2019 Surface Ocean Lower Atmosphere Studies Early Career Scientist Day Presentation Award
- 2017-2019 NSF Atmospheric and Geospace Sciences Postdoctoral Research Fellowship
- 2017-2019 JISAO Postdoctoral Research Fellowship
- 2016 NOAA Climate & Global Change Postdoctoral Fellowship - Alternate
- 2016 CIRES Visiting Postdoctoral Fellowship - Declined
- 2015 Silver Award - Student Presentation, 12th International Conference on Mercury as a Global Pollutant
- 2015 Harvard Earth & Planetary Sciences (EPS) Departmental Conference Travel Grant
- 2014-2015 NSF GROW with USAID Research and Innovation Fellowship
- 2012-2015 National Science Foundation Graduate Research Fellowship
- 2013 Harvard University Certificate of Distinction in Teaching
- 2013 Best Student Presentation, 11th International Conference on Mercury as a Global Pollutant
- 2012 Student Presentation Award, AMS First Conference on Atmospheric Biogeosciences
- 2012 Harvard SEAS/SPH cross-school environmental research & education funding recipient
- 2010 Harvard University Center for the Environment Individual Grant Recipient
- 2010 Harvard College Research Program Grant Recipient

PEER-REVIEWED PUBLICATIONS

14. **H. M. Horowitz**, C. Holmes, A. Wright**, T. Sherwen, X. Wang, M. Evans, J. Huang, L. Jaeglé, Q. Chen, S. Zhai, and B. Alexander, Effects of sea salt aerosol emissions for Marine Cloud Brightening on atmospheric chemistry: Implications for radiative forcing, *Geophysical Research Letters*, **2020**, 47, e2019GL085838, DOI: 10.1029/2019GL085838. **undergraduate advisee
13. D.G. Streets, **H. M. Horowitz**, Z. Lu, L. Levin, C. P. Thackray, and E.M. Sunderland, Five hundred years of anthropogenic mercury: spatial and temporal release profiles, *Environmental Research Letters*, **2019**, 14, 084004, DOI: 10.1088/1748-9326/ab281f.
12. Y. Zhang, **H. M. Horowitz**, J. Wang, Z. Xie, J. Kuss, and A. Soerensen, An online coupled atmosphere-ocean model for air-sea exchange of mercury in the global ocean and its insights into wet deposition and atmospheric redox chemistry, *Environmental Science & Technology*, **2019**, 53 (9), 5052-5061, DOI: 10.1021/acs.est.8b06205.

11. D.G. Streets, **H. M. Horowitz**, Z. Lu, L. Levin, C. P. Thackray, and E.M. Sunderland, Global and regional trends in mercury emissions and concentrations, 2010-2015, *Atmospheric Environment*, **2019**, *201*, 417-427, DOI: 10.1016/j.atmosenv.2018.12.031.
10. **H. M. Horowitz**, R. M. Garland, M. Thatcher, W. A. Landman, Z. Dedekind, J. van der Merwe, and F. A. Engelbrecht, Evaluation of climate model aerosol seasonal and spatial variability over Africa using AERONET, *Atmospheric Chemistry & Physics*, **2017**, *17*, 13999-14023, DOI: 10.5194/acp-17-13999-2017.
9. **H. M. Horowitz**, D.J. Jacob, Y. Zhang, T.S. Dibble, F. Slemr, H.M. Amos, J.A. Schmidt, E.S. Corbitt, E.A. Marais, and E.M. Sunderland, A new mechanism for atmospheric mercury redox chemistry: implications for the global mercury budget, *Atmospheric Chemistry & Physics*, **2017**, *17*, 6353-6371, DOI: 10.5194/acp-17-6353-2017.
8. Streets, D.G., **H. M. Horowitz**, D.J. Jacob, Z. Lu, L. Levin, A. Ter Schure, and E.M. Sunderland, Total mercury released to the environment by human activities, *Environmental Science & Technology*, **2017**, *51* (11), DOI: 10.1021/acs.est.7b00451.
7. J. Schmidt, D. Jacob, **H. M. Horowitz**, L. Hu, T. Sherwen, M. Evans, Q. Liang, R. Suleiman, D. Oram, M. Le Breton, C. Parcival, S. Wang, B. Dix, and R. Volkamer, Modeling the observed tropospheric BrO background: Importance of multiphase chemistry and implications for ozone, OH, and mercury, *JGR-Atmospheres*, **2016**, *121*, 11819-11835, DOI: 10.1002/2015JD024229.
6. R. Sun, D. G. Streets, **H. M. Horowitz**, H. M. Amos, G. Liu, V. Perrot, J-P Toutain, H. Hintelmann, E. M. Sunderland, and J. E. Sonke, Historical (1850-2010) mercury stable isotope emissions from anthropogenic sources to the atmosphere, *ELEMENTA*, **2016**.
5. Y. Zhang, D. J. Jacob, **H. M. Horowitz**, L. Chen, H. M. Amos, D. P. Krabbenhoft, F. Slemr, V. St. Louis, and E. M. Sunderland, Observed decrease in atmospheric mercury explained by global decline in anthropogenic emissions, *PNAS*, **2016**, DOI: 10.1073/pnas.1516312113.
4. Chen, L., Y. Zhang, D. J. Jacob, A. Soerensen, J. Fisher, **H. M. Horowitz**, E. S. Corbitt, and X. Wang, Differences in decadal trends of atmospheric mercury between the Arctic and northern mid-latitudes suggest a decline in Arctic Ocean mercury, *Geophysical Research Letters*, **2015**, DOI: 10.1002/2015GL06405.
3. Amos, H. M., J. E. Sonke, D. Obrist, N. Robins, N. Hagan, **H. M. Horowitz**, R. P. Mason, M. Witt, I. Hedgecock, E. S. Corbitt, and E. M. Sunderland, Observational and modeling constraints on global anthropogenic enrichment of mercury: a critical review, *Environmental Science & Technology*, **2015** *49* (7), 4036-4047, DOI: 10.1021/es5058665.
2. **Horowitz, H. M.**, D. J. Jacob, H. M. Amos, D. G. Streets, and E. M. Sunderland, Historical mercury releases from commercial products: global environmental implications, *Environmental Science & Technology*, **2014** *48* (17), 10242-10250, DOI: 10.1021/es501337j.
1. Amos, H. M., D. J. Jacob, D. Kocman, **H. M. Horowitz**, Y. Zhang, S. Dutkiewicz, M. Horvat, E. S. Corbitt, D. P. Krabbenhoft, and E. M. Sunderland, Global biogeochemical implications of mercury discharges from rivers and sediment burial, *Environmental Science & Technology*, **2014** *48* (16), 9514-9522, DOI: 10.1021/es502134t.

INVITED TALKS & SEMINARS

14. Atmospheric Sciences Seminar, University of Illinois at Urbana-Champaign March 2020
Effects of sea salt aerosol emissions for Marine Cloud Brightening on atmospheric chemistry: Implications for radiative forcing
13. Seminar, IBS Center for Climate Physics, Pusan National University, Busan, South Korea April 2019
Impacts of anthropogenic change on pollution and climate
12. Civil & Environmental Engineering Seminar, University of Illinois at Urbana-Champaign April 2019
Impacts of anthropogenic change on pollution and climate
11. Earth and Environmental Science Seminar, University of Texas at Arlington Feb. 2019
Memoirs of a toxin: the lasting human impact on mercury in the environment

10. Atmospheric Physics & Chemistry Seminar, University of Washington Jan. 2019
Blowing snow sea salt aerosol in the Community Earth System Model
9. How to Get the Mentorship You Need Workshop Panelist, ESWN, AGU Fall Meeting Dec. 2018
8. Chemical Oceanography Seminar, University of Washington May 2018
Biogeochemical cycling of anthropogenic mercury in the global ocean
7. Atmospheric Physics & Chemistry Seminar, University of Washington April 2017
The global biogeochemical cycle of mercury: Insights from modeling atmospheric chemistry and all-time emissions from human activity
6. Earth & Planetary Sciences Graduate Student/Post-Doc Seminar series, Harvard University Nov. 2016
What can observations and modeling tell us about how atmospheric chemistry affects mercury deposition to ecosystems?
5. Beacon Hill Seminar (continuing adult education) - Science in the News series, Boston, MA Oct. 2015
Memoirs of a Toxin: The lasting human impact on mercury in the environment
4. Chemistry Department seminar, Trinity College, Hartford, CT October 2015
Understanding Hg in the global environment: anthropogenic impacts and atmospheric redox chemistry
3. Lake Michigan Air Directors Consortium, Mercury in the Midwest meeting, Indianapolis, IN Aug. 2015
Reconciling model results with observed trends in mercury: the importance of updated emissions inventories
2. Science in the News (SITN) Spring Public Lecture Series, Harvard University May 2015
Memoirs of a Toxin: The lasting human impact on mercury in the environment ([link to video](#))
1. Research Colloquium at the South African Weather Service, Irene, South Africa February 2015
Understanding the natural and human elements of the mercury cycle

CONFERENCE PRESENTATIONS

(with advised students as noted)*

21. Erin Emme* and **H. M. Horowitz**, Effects of sea salt aerosol emissions for Marine Cloud Brightening on atmospheric chemistry: Implications for radiative forcing, oral presentation at the *AGU Fall Meeting*, virtual, December 2020.
20. **H. M. Horowitz**, C. Holmes, A. Wright*, T. Sherwen, X. Wang, M. Evans, J. Huang, L. Jaeglé, Q. Chen, S. Zhai, and B. Alexander, Effects of sea salt aerosol emissions for Marine Cloud Brightening on atmospheric chemistry: Implications for radiative forcing, oral presentation at the *AMS 22nd Conference on Atmospheric Chemistry*, Boston, MA, January 2020. *Invited presentation*
19. **Horowitz, H. M.**, C. Holmes, A. Wright*, T. Sherwen, X. Wang, M. Evans, J. Huang, L. Jaeglé, Q. Chen, S. Zhai, and B. Alexander, Impacts of marine cloud brightening on atmospheric chemistry, poster presentation at the *Gordon Research Conference on Atmospheric Chemistry*, Sunday River, ME, August 2019.
18. **H. M. Horowitz**, *Memoirs of a toxin: the lasting human impact on mercury in the environment*, oral presentation at the *15th Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS XV)*, Brookhaven National Laboratory, NY, July 2019.
17. **Horowitz, H. M.**, A. Wright*, T. Sherwen, X. Wang, M. Evans, J. Huang, L. Jaegle, Q. Chen, C. Holmes, S. Zhai, and B. Alexander, Impacts of marine cloud brightening on atmospheric chemistry, poster presentation at the *9th International GEOS-Chem Users' Meeting*, Cambridge, MA, May 2019.
16. **Horowitz, H. M.**, S. Burrows, J. Huang, C. Bitz, L. Jaegle, P.-L. Ma, V. Nandan, and B. Alexander, Blowing snow sea salt aerosol emissions and radiative effects, poster presentation at the *Surface Ocean Lower Atmosphere Studies (SOLAS) Open Science Conference*, Sapporo, Japan, April 2019.

15. **Horowitz, H. M.**, H. L. Stern, D. Gergel, L. Dawson, E. Campbell, D. Cuomo, L. McCullough, L. G. Beckerman, A. Ismael, R. Scherrer, and K. Sturgeon, Polar Planetarium Show: a new program connecting local scientists, science center educators, and the public to the poles, oral presentation at the *AGU Fall Meeting*, Washington, DC, December 14, 2018.
14. **Horowitz, H. M.**, S. Burrows, J. Huang, L. Jaegle, C. Bitz, B. Alexander, Physical processes of blowing snow sea salt emissions: focus on snow salinity, oral presentation at the *AGU Fall Meeting*, Washington, DC, December 14, 2018.
13. A. Wright**, **H. M. Horowitz***, T. Sherwen, M. Evans, J. Huang, Q. Chen, L. Jaeglé, and B. Alexander, Impacts of Marine Cloud Brightening on Atmospheric Chemistry, poster presentation at the *AGU Fall Meeting*, Washington, DC, December 12, 2018. **undergraduate advisee; *presenting author
12. **Horowitz, H. M.**, B. Alexander, C. Bitz, L. Jaégle, J. Huang, and S. Burows, Present and future sea salt emissions from blowing snow on Arctic sea ice, oral presentation at the *AGU Fall Meeting*, New Orleans, LA, December 11, 2017.
11. **Horowitz, H. M.**, D. J. Jacob, Y. X. Zhang, T. S. Dibble, F. Slemr, H. M. Amos, J. A. Schmidt, E. S. Corbitt, E. A. Marais, and E. M. Sunderland, A new mechanism for atmospheric mercury redox chemistry: Implications for the global mercury budget, poster presentation at the *Gordon Research Conference on Atmospheric Chemistry*, Sunday River, ME, July 31-August 1, 2017.
10. **Horowitz, H. M.**, C. Thackray, D. J. Jacob, H. M. Amos, D. G. Streets, and E. M. Sunderland, All-time Enrichment of the Global Oceans with Anthropogenic Hg, oral presentation at the *13th International Conference on Mercury as a Global Pollutant*, Providence, RI, July 19, 2017.
9. **Horowitz, H. M.**, D. J. Jacob, H. M. Amos, Y. Zhang, T. S. Dibble, F. Slemr, and E. M. Sunderland, A state-of-the-science Hg redox mechanism for atmospheric models: constraints from observations and global implications, poster presentation at the *AGU Fall Meeting*, San Francisco, CA, December 18, 2015.
8. R. M. Garland, **H. M. Horowitz***, M. Thatcher, M. Naidoo, J. van der Merwe, W. A. Landman, and F.A. Engelbrecht, First Evaluation of the CCAM Aerosol Model over Africa: Implications for Regional Climate Modeling, poster presentation at the *AGU Fall Meeting*, San Francisco, CA, December 15, 2015. *presenting author
7. **Horowitz, H. M.**, R. M. Garland, W. A. Landman, J. van der Merwe, M. Thatcher, and F. A. Engelbrecht, First evaluation of the CCAM climate model aerosol simulation with AERONET measurements over Africa, poster presentation at the *9th Graduate Climate Conference (GCC)*, Woods Hole, MA, November 7, 2015.
6. **Horowitz, H. M.**, D. J. Jacob, H. M. Amos, T. S. Dibble, F. Slemr, J. A. Schmidt, D. A. Jaffe, S. Lyman, E. S. Corbitt, and E. M. Sunderland, Revisiting the GEOS-Chem atmospheric Hg simulation: chemistry and emissions, oral presentation at the *12th International Conference on Mercury as a Global Pollutant*, Jeju-do, South Korea, June 16, 2015.
5. **Horowitz, H. M.**, D. J. Jacob, H. M. Amos, T. S. Dibble, F. Slemr, J. A. Schmidt, D. A. Jaffe, S. Lyman, E. S. Corbitt, and E. M. Sunderland, Revisiting atmospheric Hg oxidation mechanisms in GEOS-Chem: constraints from observations, oral presentation at the *7th International GEOS-Chem Users' Meeting*, Cambridge, MA, May 6, 2015.
4. **Horowitz, H. M.**, D. J. Jacob, D. G. Streets, H. M. Amos, and E. M. Sunderland, Global environmental release of mercury from commercial products, oral presentation at the *11th International Conference on Mercury as a Global Pollutant*, Edinburgh, Scotland, July 29, 2013.
3. **Horowitz, H. M.**, D. J. Jacob, D. G. Streets, H. M. Amos, and E. M. Sunderland, Global source of environmental mercury from intentional uses and its biogeochemical cycling, poster presentation at the *6th International GEOS-Chem Users' Meeting*, Cambridge, MA, May 7, 2013.
2. **Horowitz, H. M.**, D. J. Jacob, D. G. Streets, M. K. Devane, H. M. Amos, and E. M. Sunderland, Global source of environmental mercury from commercial products, oral presentation at the *American Met. Soc. First Conference on Atmospheric Biogeosciences*, Boston, MA, June 1, 2012.

1. **Horowitz, H. M.**, E. S. Corbitt, R. W. Talbot, H. Mao, D. J. Jacob, H. M. Amos, and E. M. Sunderland, Modeled and Observed Atmosphere-Terrestrial Exchange of Hg(0) in a Temperate Hardwood Forest, poster presentation at the *10th International Conference on Mercury as a Global Pollutant*, Halifax, Nova Scotia, July 28, 2011.

ACADEMIC EXPERIENCE

- 2017 - 2019 NSF AGS Postdoctoral Research Fellow & JISAO Postdoctoral Fellow, JISAO & Dept. of Atmospheric Sciences; University of Washington, Seattle, WA
- 2011 - 2017 Graduate Research Assistant, Biogeochemistry of Global Contaminants & Atmospheric Chemistry Modeling Groups; Harvard University, Cambridge, MA
- Spring 2015 NSF GROW with USAID Research and Innovation Fellow; Climate Studies, Modelling and Environmental Health Research Group, Council for Scientific and Industrial Research, Pretoria, South Africa
- 2010 - 2011 Undergraduate Research Assistant, Atmospheric Chemistry Modeling Group; Harvard University, Cambridge, MA

RESEARCH ADVISING

Current PhD students

Tessa Clarizio, Civil and Environmental Engineering (EWES), Aug. 2020 - present

Current M.S. students

Hope Hunter, Civil and Environmental Engineering (EWES), Aug. 2020 - present

Current undergraduate research students

Erin Emme, Civil and Environmental Engineering; graduation: May 2021

Former undergraduate research students

Alicia Wright (University of Washington); B.S. Atmospheric Sciences, 2019

Ava Krahn (Beloit University), JISAO REU intern; B.S. Studio Art & Environmental Geology, 2019

Florence Chen (Harvard College); B.A. Earth & Planetary Sciences, 2015

TEACHING

- Fall 2020 Instructor, *CEE 330 Environmental Engineering*, University of Illinois at Urbana-Champaign
- 2020 - present Collins Scholar, Academy for Excellence in Engineering Education, University of Illinois at Urbana-Champaign
- May 2020 Participant, FSI Conference: Strengthening Student Experiences during COVID-19, Center for Innovation in Teaching & Learning, University of Illinois at Urbana-Champaign
- May 2020 Participant, "Moving Your Course Online", Center for Innovation in Teaching & Learning, University of Illinois at Urbana-Champaign
- Fall 2014 TA, *ESE 163: Pollution Control in Aquatic Ecosystems*, Environmental Sciences and Engineering, Harvard University
- Spring 2014 "Scientists Teaching Science" semester course (Dr. Philip Sadler), Harvard University
- Spring 2013 TA, *EPS/ESE 133: Atmospheric Chemistry*, Earth and Planetary Sciences/Environmental Sciences and Engineering, Harvard University
- 2010 - 2011 Peer Tutor, *Linear Algebra and Differential Equations, Mechanics, Electricity and Magnetism, Atmospheric Chemistry*, Bureau of Study Counsel, Harvard College

SERVICE AND LEADERSHIP

At the University of Illinois

- 2020 - onwards Coordinator, Womxn Exploring Graduate Opportunities in CEE ([WeGoCEE](#)) annual workshop for undergraduates across the US, Civil and Environmental Engineering Department
- 2020 - 2021 Seminar series coordinator, Energy-Water-Environment Sustainability (EWES) Interdisciplinary Program, Civil and Environmental Engineering Department
- April 2020 Speaker, Academic Careers Lunch Talk and Q&A, Graduate Society of Women Engineers (GradSWE)

Other Service and Leadership

- Dec. 2020 Session Co-Chair (oral) and Co-Convener, AGU Fall Meeting, “Aquatic Aerosols: From Microscale Processes to Impacts on Climate”
- Dec. 2020 Invited Speaker, Women in STEM Club at University High School, Urbana, IL
- 2020 Judge, Student Presentation Award, AMS Annual Meeting
- 2018 Judge, Outstanding Student Presentation Award (OSPA), AGU Fall Meeting
- 2018 - 2019 Science Communication Fellow - Polar Science, Pacific Science Center, Seattle, WA
- 2017 - 2019 Facilitator and participant, Diversity and Inclusion Group, Dept. of Atmospheric Sciences, University of Washington
- Sep. 2019 Participant, University of Washington Program on Climate Change Summer Institute: Climate Change Impacts on 21st Century Food and Water Security
- Feb 2019 Participant, CESM Joint Atmosphere Model, Chemistry-Climate, and Whole Atmosphere Working Group Meeting, National Center for Atmospheric Research
- Dec. 2018 Mentor, Mentoring365 Live for 3 undergraduate women mentees, American Geophysical Union (AGU) Fall Meeting
- Oct. 2018 Participant, Wildfire Smoke Risk Communication Stakeholder Synthesis Symposium, University of Washington
- May 2018 Participant, NSF-ATC and NCAR Atmospheric Chemistry Workshop, National Center for Atmospheric Research
- 2017 - 2018 Member, Colloquium Committee, Dept. of Atmospheric Sciences, University of Washington
- Dec. 2017 Participant, International Aerosol Modeling Algorithms (IAMA), Davis, CA
- Sep. 2017 Participant, University of Washington Program on Climate Change Summer Institute: Climate Change & Population Health
- 2014 - 2017 Mentor (Graduate student), Atmospheric Chemistry Modeling Group
- 2014 - 2016 Co-President, Harvard University GeoClub Co-President
- 2013, 2015 Volunteer, 6th & 7th International GEOS-Chem Users’ Meetings
- 2014 - 2015 Organizer and Facilitator, “Team Hg/POPs” research discussion meeting on mercury and persistent organic pollutants, Harvard University
- 2014 - 2015 Co-organizer and Moderator, Harvard Atmospheric Chemistry Journal Club
- 2014 Co-organizer and Leader, Earth and Planetary Sciences department-wide Graduate Student Field Trip to the Upper Peninsula of Michigan, Harvard University
- 2011 - 2014 Visiting K-12 Teacher, “There’s a Scientist in My Classroom!”/“Telling Your Story” Program
- 2013 - 2014 Mentor (Graduate student), Harvard Earth & Planetary Sciences Department mentor program
- 2011 - 2014 Mentor (Undergraduate women), Harvard College Women’s Center Women In STEM (WiSTEM) mentorship program
- Jan. 2014 Shaping Policy with Science, mini-course to develop and present policy memos, Harvard University
- Jan. 2014 Seminar speaker, Newington High School Science National Honors Society, Newington, CT
- Nov. 2013 Invited speaker and Participant, Scientist/Engineer-Teacher Partnerships Workshop, MIT
- June 2013 Participant, Women in Science and Engineering Software Carpentry Programming Boot Camp, Boston, MA
- 2012 - 2013 Co-organizer, Earth and Planetary Sciences Department Prospective Graduate Student Visits, Harvard University
- 2011 - 2012 Earth and Planetary Sciences Department Visiting Scholar Lecture Series Committee, Harvard University
- Jan. 2012 Guest lecturer and Q&A on my path to science, Wethersfield High School, Wethersfield, CT

Membership and Professional Affiliations

- since 2019 American Meteorological Society (AMS)
- since 2015 American Geophysical Union (AGU)
- since 2011 Earth Science Women’s Network (EWSN)
- 2018 - 2019 Women in Atmos, Dept. of Atmospheric Sciences, University of Washington
- 2014 - 2017 Harvard/MIT Women in Climate
- 2011 - 2017 Harvard Graduate Women in Science & Engineering (HGWISE)

Reviewing

Proposal Reviewer, National Science Foundation - Office of Polar Programs, Atmosphere and Geospace Sciences

Journal Reviewer, *PNAS*, *Atmos. Chem. Phys.*, *Environ. Sci. Technol.*, *STOTEN*, *JAMES*, *Atmosphere*, *Environ. Sci. Process. Impact*