

**Curriculum Vitae**  
**Pamela A. Matson**

Richard and Rhoda Goldman Professor of Environmental Studies, Emerita, Stanford  
Doerr School of Sustainability  
Dean Emerita, School of Earth, Energy and Environmental Sciences

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**Academic Appointments**

Goldman Professor, Emerita, Stanford Doerr School of Sustainability  
Senior Fellow, Emerita, Stanford Woods Institute for the Environment

**Administrative Appointments**

Faculty Director for the Sustainability, Science, and Practice Master's Program, Stanford University, 2017 - 2023  
Senior Fellow, Woods Institute for the Environment, 2005 - 2023  
Naramore Dean of the School of Earth, Energy and Environmental Sciences, Stanford University, 2002 - 2017  
Co-director Center for Environmental Science and Policy, Stanford University, 2000 - 2002  
Sant Director of the Earth Systems Program, Stanford University, 1999 - 2002  
Richard and Rhoda Goldman Professor of Environmental Sciences, Stanford University, 1997 - 2023  
Professor, University of California, 1993 - 1997  
Research Scientist, NASA-Ames Research Center, 1983 - 1993  
Post-doctoral Fellow, Department of Entomology, North Carolina State University, 1983

**Honors and Awards**

University of Wisconsin Eau Claire, Honorary Degree (2023)  
Excellence in Teaching Award, Stanford School of Earth (2022)  
Foundation Fellow, International Science Council (2022)  
Faculty Women's Forum Deborah Rhode Lifetime Achievement Award, Stanford University (2021)  
Tellus Mater Distinguished Fellow, Cambridge University (2019)  
Honorary Doctorate, McGill University (2017)

Honorary Doctorate, Princeton University (2017)  
 Fellow, California Academy of Sciences (2015)  
 Doctor of Science Honorary Degree, Arizona State University (2014)  
 Honorary Member, British Ecological Society (2013)  
 Sustainability Science Award, Ecological Society of America (2013)  
 Top 100 Women of Influence, Silicon Valley Business Journal (2013)  
 Fellow, Ecological Society of America (2012)  
 Einstein Visiting Professor, Chinese National Academy (2011)  
 Eminent Ecologist Award, Colorado State University (2009)  
 Major contributor to Nobel Peace prize awarded to Intergovernmental Panel on Climate Change, Norwegian Nobel Committee (2007)  
 The 2005 Richard W. Lyman Award, Stanford University (2005)  
 McMurty University Fellow for Undergraduate Education (2002)  
 National Associate, National Academy of Sciences (2002)  
 Leopold Leadership Fellow, Leopold Leadership Program (1999)  
 Richard and Rhoda Goldman Professorship, Stanford University (1999)  
 School of Public and Environmental Affairs Distinguished Alumni Award, Indiana University (1998)  
 Distinguished Alumni Award, Oregon State University (1998)  
 AAAS Fellow, American Academy of Arts and Sciences (1997)  
 Distinguished Alumni Award, University of Wisconsin-Eau Claire (1996)  
 MacArthur Fellowship (1995-2000)  
 Elected Member, National Academy of Sciences (1994)  
 Exceptional Service Medal, NASA (1993)  
 Elected Member, American Academy of Arts and Sciences (1992)  
 Fellow, Ames (NASA) Associate (1992)  
 Research Paper Award, Oregon State University (1984)

## **Education**

Ph.D. in Forest Ecology, Oregon State University, 1983  
 M.S. in Environmental Science, Indiana University, 1980  
 B.S. (magna cum laude) Biology and English, University of Wisconsin - Eau Claire, 1975

## **Boards, Advisory Committees, Professional Leadership**

### ***External To Stanford:***

Member, World Wildlife Fund National Council (2023 - Present)  
 Member, World Resources Institute Board (2023 - Present)  
 Ex-Officio, Board on International Scientific Organizations (2022 - Present)  
 Member, Flagship Institute of Sustainability, Tohoku University, Strategic Planning Committee (2022)  
 Member, ISC (International Science Council) Board Subcommittee for Science (2021 - Present)

Member, ISC (International Science Council) Governing Board (2021 - Present)  
 Chair, Gund Institute (University of Vermont) Advisory Board (2018 - Present)  
 Chair, World Wildlife Fund - US Board of Trustees (2018 - 2022)  
 Member, World Wildlife Fund – International Board of Directors (2018 - 2022)  
 Member, FutureEarth Advisory Council (2018 - 2020)  
 Member, Board of Directors, FFAR (Foundation for Food and Agriculture Research)  
 (2014 - 2015)  
 Vice Chair, Board of Trustees, World Wildlife Fund (2012 - 2018)  
 Member, ClimateWorks Board of Trustees (2011 - 2020)  
 Member, External Advisory Board for School of Global Environmental Sustainability,  
 Colorado State University (2010 - 2016)  
 Member, Advisory Board, National Park System (2010 - 2012)  
 Member, Advisory Board, Climate Central, Inc. (2009 - 2012)  
 Member, NAS Committee on America's Climate Choices and Chair of Advancing Climate  
 Science Subcommittee, National Academy of Science (2009 - 2012)  
 Member, NAS Committee on Climate, Energy and National Security, National Academy  
 of Science (2009 - 2011)  
 Member, NAS Science Ambassador Program Advisory Board, National Academy of  
 Science (2009 - 2010)  
 Member, NAS Certification Committee, National Academy of Science (2009)  
 Member, Board of Advisors, Global Institute of Sustainability, Arizona State University  
 (2007 - 2021)  
 Member, Advisory Board, Department of Ecology and Evolutionary Biology, Princeton  
 University, (2007 - 2019)  
 Member, Editorial Board, Proceedings of the National Academy of Sciences (2006 –  
 2015)  
 Member, Board of Trustees, World Wildlife Fund (2003 - 2022)  
 Founding Editor and Editorial Board Member, Annual Review of Environment and Resources  
 (2002 - 2015)  
 Founding Co-Chair, National Academy of Sciences Roundtable on Science and Technology for  
 Sustainability, National Academy of Sciences (2001 - 2009)  
 Founding Editor and Editorial Board Member - Annual Review of Energy and the Environment  
 (2001 - 2015)  
 Advisory Committee for Environmental Program, Luce Foundation (2001 - 2007)  
 Chair, Section on Ecology and Environmental Sciences, National Academy of Sciences  
 (2001 - 2004)  
 President, Ecological Society of America (2001 - 2003)  
 Member, Board of Trustees, National Park Conservation Association (2000 - 2007)  
 Member, National Academy of Sciences Temporary Nominating Group on Global and Human  
 Environmental Science, National Academy of Sciences (2000 - 2004)

Member, Coordinating Committee on the Sustainability Transition, National Academies of Science (2000 - 2002)

President Elect, Ecological Society of America (2000 - 2001)

Co-Chair, Section 27, National Academy of Sciences (1998 - 2001)

Lead Author, Working Group 1, Chapter 4, IPCC (Intergovernmental Panel on Climate Change) (1998 - 2001)

Liaison, Section 27, National Academy of Sciences (1998 - 2001)

Member, Science Advisory Committee, Organization of Tropical Studies (1998 - 2001)

Editorial Board, Annual Review of Energy and Environment (1998 - 2000)

Member, International SCOPE project on nitrogen transport and transformations, SCOPE (1998 - 2000)

Program Committee for the XVI International Botanical Congress (1998-1999)

Editorial Board, Ecosystems (1997 - 2002)

Member, vice chair and executive committee member, Scientific Advisory Committee, International Geosphere-Biosphere Program (1997 - 2001)

Member, Advisory Committee, Natural Resource Ecology Laboratory (1996-2000)

Member, U.S. National Committee, Scientific Committee on Problems of the Environment (SCOPE) (1996 - 1999)

Member, Board of Trustees, Institute of Ecosystem Studies (1995 - 2004)

Member, Board on Sustainable Development, National Academy of Sciences (1995 – 2000)

Chair, Sustainable Biosphere Initiative Steering Committee, Ecological Society of America (1994 - 2000)

Editorial Board, Ecological Applications (1994-2000)

Member, Boreal Ecosystem-Atmosphere Exchange Study Advisory Committee, NASA (1994 - 1998)

Member, Mission to Planet Earth Advisory Committee, NASA (1994 - 1997)

Editorial Board, Global Change Biology (1994 - 1997)

Member, Advisory Board, Aspen Global Change Institute (1992 - 2012)

Visiting committee or review committee member for multiple universities (MIT, Cornell, Princeton, Utah, Colorado State, Colorado, etc.)

***Stanford:***

Chair, Provost's Committee on Sustainability, Stanford University (2012 - 2017)

Member, Advisory Council, Woods Institute for the Environment (2006 - 2017)

Science Director, Leopold Leadership Program, Stanford University (2004 - 2017)

Stanford Environmental Initiative Leader, Stanford University (2004 - 2011)

Ex Officio member of Stanford University Academic Senate, Stanford University (2002 - 2017)

Member, Executive Committee of the Emmett Interdisciplinary Program in Environment

and Resources, Stanford University (2001 - 2006)  
 Sophomore Advisor, Stanford University (2001 - 2006)  
 Chair, Ad hoc Committee for an Interdisciplinary Environmental Studies Graduate Program, Stanford University (2000 - 2001)  
 Member, Provost's Task Force on University Needs, Stanford University (2000 - 2001)  
 Provost's Committee on Environment, Stanford University (1999 - 2004)  
 Provost's Committee to form Stanford Institute for the Environment, Stanford University (1999 - 2003)  
 Director, Earth Systems Program, Stanford University (1999 - 2002)  
 Dean of the School of Education Search Committee, Stanford University (1999 - 2000)  
 Institute for International Studies Search Committee, Stanford University (1998 - 2001)  
 Acting Director, Earth Systems Program, Stanford University (1998 - 1999)  
 Goldman Honors Program faculty member, Stanford University (1997 - 2002)  
 Sexual Harassment Advisor, School of Earth Sciences, Stanford University (1997 - 2001)

## **Publications**

Novy, J., B. Banerjee, and P.A. Matson. 2021. "A core curriculum for sustainability leadership." *Sustainability* 13 (19), 10557.

Hall, S.J., K.A. Lohse, and P.A. Matson. 2021. "Globalization of nitrogen deposition and ecosystem response: A 20-year perspective." This article belongs to *Ambio's* 50<sup>th</sup> Anniversary Collection, Theme: Eutrophication. *Ambio* 50: 750-752.

Hess, L.T., E.S. Hinckley, G. Robertson, and P.A. Matson. 2020. "Rainfall intensification increases nitrate leaching from tilled but not no-till cropping systems in the US Midwest." *Agriculture Ecosystems and Environment* 290 (106747): 1-10.

Anderson, C.M., R.S. DeFries, R. Litterman, P.A. Matson, D.C. Nepstad, S. Pacala, W.H. Schlesinger, M.R. Shaw, P. Smith, C. Weber, and C.B. Field. 2019. "Natural climate solutions are not enough." *Science* 363 (6430): 933-34.

Matson, P. 2019. *Interdisciplinary Teaching About Earth and the Environment for a Sustainable Future*. Foreword: vii-viii. Gosselin, D.C., Egger, A.E., and J.J. Taber (eds).

Hess, L.T., E.S. Hinckley, G. Robertson, S.K. Hamilton, and P.A. Matson. 2018. "Rainfall Intensification Enhances Deep Percolation and Soil Water Content in Tilled and No-Till Cropping Systems of the US Midwest." *Vadose Zone Journal* 17 (1).

Liu, X., P. Vitousek, Y. Chang, W. Zhang, P. Matson, F. Zhang. 2016. "Evidence for a historic change occurring in China." *Environmental Science and Technology* 50: 505-506.

Clark, W. C., N.M. Dickson, and P.A. Matson. 2016. "Knowledge Systems for Sustainable Development." *Proceeding of the National Academy of Sciences of the United States of America (Articles from the Arthur M. Sackler Colloquium Linking Knowledge with Action for Sustainable Development)* 113 (17): 4570-4622

Matson, P. A., W. Clark, and K. Andersson. 2016. *Pursuing Sustainability: A Guide to the Science and Practice*. Princeton University Press.

Becker, A., P. Matson, M. Fischer, and M. Mastrandrea. 2014. "Towards seaport resilience for climate change adaptation: Stakeholder perceptions of hurricane impacts in Gulfport (MS) and Providence (RI)." *Progress in Planning*.

Vitousek, P.M., and P.A. Matson. 2014. "Agricultural Nutrient Use and Its Environmental Consequences" pp. 269-285. In *The Evolving Sphere of Food Security*, Naylor, R.L. (ed). Oxford University Press: New York, NY.

Bierbaum, R.M., and P.A. Matson. 2013. "Energy in the Context of Sustainability." *Daedalus* 142(1): 146-161.

Matson, P.A. 2013. "From Global Environmental Change to Sustainability Science: Ecosystem Studies in the Yaqui Valley, Mexico" pp. 233-242. In *Fundamentals of Ecosystem Science*, Weathers, K.C., D.L. Strayer, and G.E. Likens (eds). Academic Press: Elsevier, Inc.

DeFries, R.S., E.C. Ellis, F.S. Chapin, P.A. Matson, B.L. Turner, A. Agrawal, P.J. Crutzen, C. Field, P. Gleick, P.M. Kareiva, E. Lambin, D. Liverman, E. Ostrom, P.A. Sanchez, and J. Syvitski. 2012. "Planetary opportunities: A social contract for global change science to contribute to a sustainable future." *BioScience* 62(6): 603-606.

Matson, P.A. (ed). 2012. *Seeds of Sustainability: Lessons from the Birthplace of the Green Revolution in Agriculture*. Washington, DC: Island Press.

Chapin III, F.S., P.A. Matson, and P. Vitousek. 2011. *Principles of Terrestrial Ecosystem Ecology*. New York: Springer.

Chen, Xin-Ping, Zhen-Ling Cui, P.M. Vitousek, K.G. Cassman, P.A. Matson, Jin-Shun Bai, Quin-Feng Meng et al. 2011. "Integrated soil-crop system management for food

security.” *Proceedings of the National Academy of Sciences* 108(16): 6399-6404.

Hinckley, E.S., and P.A. Matson. “Transformations, transport, and potential unintended consequences of high sulfur inputs to Napa Valley vineyards.” 2011. *Proceedings of the National Academy of Sciences* 108(34): 14005-14010, doi 10.1073/pnas.1110741108.

Hinckley, E.S., S. Fendorf, and P.A. Matson. 2011. “Short-term fates of high sulfur inputs in Northern California vineyard soils.” *Nutrient Cycling in Agroecosystems* 89(1): 135-142, doi: 10.1007/s10705-010-9383-3.

National Research Council of the National Academies Committee (Matson, co-chair). 2010. *America's Climate Choices: Advancing the Science of Climate Change*. Washington, DC: National Academy Press.

Ahrens, T.E., D.B Lobell, J.I. Ortiz-Monasterio, Y. Li, and P.A. Matson. 2010. "Narrowing the agronomic yield gap with improved nitrogen use efficiency: a modeling approach." *Ecological Applications* 20(1): 91-100.

K. Jacobs, L. Lebel, J. Buizer, L. Addams, P. Matson, E. McCullough, P. Garden, G. Saliba, and T. Finan. 2010. "Linking knowledge with action in the pursuit of sustainable water-resource management." *Proceedings of the National Academy of Sciences*, doi: 10.1073/pnas.0813125107.

Vitousek, P.M., R. Naylor, T. Crews, M.B. David, L.E. Drinkwater, E. Holland, P.J. Johnes, J. Katzenberger, L.A. Martinelli, P.A. Matson, G. Nziguheba, D. Ojima, C.A. Palm, G.P. Robertson, A. Sanchez, A.R. Townsend, and F. Zhang. 2009. "Nutrient Balances in Agricultural Development." *Science* 324(5934): 1519-1520.

Matson, P.A. 2009. "The Sustainability Transition." *Issues in Science and Technology* XXV(4): 39-42.

Vitousek, P.M., and P.A. Matson. 2009. "Nutrient cycling and biogeochemistry." In *Princeton Guide to Ecology*, S.A. Levin (ed). Princeton University Press.

Ahrens, T.D., J.M. Beman, J.A. Harrison, P.K. Jewett, and P.A. Matson. 2008. "A synthesis of nitrogen transformations and transfers from land to the sea in the Yaqui Valley agricultural region of northwest Mexico." *Water Resources Research* 44, W00A05, doi: 10.1029/2007WR006661.

Daily, G.C., and P.A. Matson. 2008. "Ecosystem services: From theory to

implementation." *Proceedings of the National Academy of Sciences* 105(28): 9455-9456.

Chapin, F.S., G.M. Woodwell, J.T. Randerson, G.M. Lovett, E.B. Rastetter, D.D. Baldocchi, D.A. Clark, M.E. Harmon, D.S. Schimel, R. Valentini, C. Wirth, J.D. Aber, J.J. Cole, M.L. Goulden, J.W. Harden, M. Heimann, R.W. Howarth, P.A. Matson, A.D. McGuire, J.M. Melillo, H.A. Mooney, J.C. Neff, R.A. Houghton, M.L. Pace, M.G. Ryan, S.W. Running, O.E. Sala, W.H. Schlesinger, E.D. Schulze. 2006. "Reconciling carbon cycle terminology: A search for consensus." *Ecosystems* 9(7): 1041-1050.

Carney, K.M., and P.A. Matson. 2006. "The influence of plant community composition and diversity on soil microbial communities." *Microbial Ecology* 52(2): 226-238.  
Matson, P.A., and P.M. Vitousek. 2006. "Agricultural intensification: Will land spared from farming be land spared for nature?" *Conservation Biology* 20(3): 709-710.

Holtgrieve, G.W., P.K. Jewett, P.A. Matson. 2006. "Variations in soil N cycling and trace gas emissions in wet tropical forests." *Oecologia* 146(4): 585-594.

Goldstein, J.H., G.C. Daily, J.B. Friday, P.A. Matson, R.A. Naylor, and P. Vitousek. 2006. "Business strategies for conservation on private lands: Koa forestry as a case study." *Proceedings of the National Academy of Sciences* 103(26): 10140-10145.

Luers, A.L., Naylor, R., and P.A. Matson. 2006. "A case study of land reform and coastal land transformation in Southern Sonora, Mexico." *Land Use Policy* 23(4): 436-447.

Matson, P., A. Luers, K. Seto, R. Naylor and I. Ortiz-Monasterio. 2005. "People, land use and environment in the Yaqui Valley, Sonora, Mexico." In *Population, Land Use, and Environment*, B. Entwistle and P. Stern, eds, 238-264. Washington, DC: National Research Council.

Carney, K.M., and P.A. Matson. 2005. "Plant diversity, soil microorganisms, and soil carbon cycling: does altering belowground communities matter to ecosystem functioning?" *Ecosystems* 8(8): 928-940.

Beman, J.M., K.R. Arrigo, and P.A. Matson. 2005. "Agricultural runoff fuels large phytoplankton blooms in vulnerable areas of the ocean." *Nature* 434: 211-214.

Lobell, D.B., J.I. Ortiz-Monasterio, G.P. Asner, P.A. Matson, R.L. Naylor, and W.P. Falcon. 2005. "Analysis of wheat yield and climatic trends in Mexico." *Field Crops*



Research 94: 250-256.

Lohse, K.A., and P.A. Matson. 2005. "Consequences of nitrogen additions for soil processes and solution losses from wet tropical forests." *Ecological Applications* 15(5): 1629-1648.

Carney, K. M., P.A. Matson, and B.J.M. Bohannan. 2004. "Diversity, composition, and function of tropical soil nitrifiers across a plant diversity gradient and among land use types." *Ecology Letters* 7: 684-694.

Steffen, W., A. Sanderson, P.D. Tyson, J. Jäger, P.A. Matson, B. Moore III, F. Oldfield, K. Richardson, H.J. Schellnhuber, B.L. Turner, and R.J. Wasson. 2004. *Global Change and the Earth System: A Planet Under Pressure*. New York: Springer-Verlag. ISBN 3-540-40800-2.

Osher, L.J., P.A. Matson, and R. Amundson. 2003. "Effect of land use change on soil carbon in Hawaii." *Biogeochemistry* 65(2): 213-232.

Hedin, L.O., P.M. Vitousek, and P.A. Matson. 2003. "Nutrient losses over four million years of tropical forest development." *Ecology* 84(9): 2231-2255.

Vitousek, P., O. Chadwick, P. Matson, S. Allison, L. Derry, L. Kettley, A. Luers, E. Mecking, V. Monastera, and S. Porder. 2003. "Erosion and the rejuvenation of weathering-derived nutrient supply in an old tropical landscape." *Ecosystems* 6(8): 762-772.

Hall, S.J., and P.A. Matson. 2003. "Nutrient status of tropical rain forests influences soil N dynamics after N additions." *Ecological Monographs* 73(1): 107-129.

Turner, B.L., R.E. Kasperson, P.A. Matson, J.J. McCarthy, R.W. Corell, L. Christensen, N. Eckley, J.X. Kasperson, A. Luers, M.L. Martello, C. Polsky, A. Pulsipher, and A. Schiller. 2003. "A framework for vulnerability analysis in sustainability sciences." *Proceedings of the National Academy of Sciences* 100(14): 8074-8079.

Turner, B.L., P.A. Matson, J.J. McCarthy, R.W. Corell, L. Christensen, N. Eckley, G.K. Hovelsrud-Broad, J.X. Kasperson, R.E. Kasperson, A. Luers, M.L. Martello, S. Mathiesen, R. Naylor, C. Polsky, A. Pulsipher, A. Schiller, H. Selin, and N. Tyler. 2003. "Illustrating the coupled human-environment system for vulnerability analysis: Three case studies." *Proceedings of the National Academy of Sciences* 100(14): 8080-8085.

Harrison, J., and P. Matson. 2003. "Patterns and controls of nitrous oxide emissions from waters draining a subtropical agricultural valley." *Global Biogeochemical Cycles* 17(3): 1080-1093.

Luers, A.L., D.B. Lobell, L.S. Sklar, C.L. Addams, and P.A. Matson. 2003. "A method for quantifying vulnerability, applied to the agricultural system of the Yaqui Valley, Mexico." *Global Environmental Change* 13: 255-267.

Matson, P.A., K. Lohse, and S. Hall. 2002. "The globalization of nitrogen deposition and consequences for terrestrial ecosystems." *Ambio* 31(2): 113-119.

Chapin, F.S., P.A. Matson, and H.A. Mooney. 2002. *Principles of Ecosystem Ecology*. New York: Springer Verlag.

Tilman, D., C.G. Cassman, P.A. Matson, R. Naylor, and S. Polasky. 2002. "Agricultural sustainability and intensive production practices." *Nature* 418: 671-677.

Hall, S.J., and P.A. Matson. 2002. "Environmental variables controlling trace gas emissions from forests: Acid Precipitation and Nitrogen Deposition." In *Trace Gas Exchange in Forest Ecosystems*, H. Papen, R. Gasche, and H. Rennenberg, eds, 279-306. Fundamental and Applied Tree Physiology, Book Series, Volume 3. The Netherlands: Kluwer Academic Publishers.

Matson, P.A. 2001. "Environmental challenges for the 21st century: Interacting challenges and integrative solutions." *Environmental Law Quarterly*, University of California, Berkeley. Vol 27(4): 1179-1190.

Schuur, E.A.G., and P.A. Matson. 2001. "Aboveground net primary productivity and nutrient cycling across a mesic to wet precipitation gradient in Hawaiian montane forest." *Oecologia* 128: 431-442.

Schuur, E.A.G., O.A. Chadwick, and P.A. Matson. 2001. "Carbon cycling and soil carbon storage in mesic to wet Hawaiian montane forests." *Ecology* 82(1): 3182-3196.

Riley, W.J., I. Ortiz-Monasterio, and P.A. Matson. 2001. "Nitrogen leaching and soil nitrate, nitrite, and ammonium levels under irrigated wheat in Northern Mexico." *Nutrient Cycling in Agroecosystems* 61: 223-236.

Prather, M., D. Ehhalt, F. Dentener, R. Derwent, E. Dlugokencky, E. Holland, I. Isaksen, J. Katima, V. Kirchhoff, P. Matson, P. Midgley, and M. Want. 2001.

"Atmospheric chemistry and greenhouse gases." In *Climate Change 2001: The Scientific Basis*. Houghton et al (eds) Intergovernmental Panel on Climate Change. Cambridge, UK: Cambridge University Press.

Steffen, W., P. Tyson, J. Jäger, P. Matson, B. Moore, F. Oldfield, K. Richardson, J. Schellnhuber, B. Turner, and R. Wasson. 2001. "Earth system science: An integrated approach." *Environment* 43(8): 21-27.

Asner G.P., A.R. Townsend, W.J. Riley, J.C. Neff, P.A. Matson, and C.C. Cleveland. 2001. "Physical and biogeochemical controls over terrestrial ecosystem responses to nitrogen deposition." *Biogeochemistry* 54(1): 1-39.

Mosier, A.R., M.A. Bleken, P. Chaiwanakupt, E.C. Ellis, J.R. Freney, R.B. Howarth, P.A. Matson, K. Minami, R. Naylor, K. Weeks, and Ahao-Liang Zhu. 2001. "Policy implications of human accelerated nitrogen cycling." *Biogeochemistry* 52(3): 281-320.

Perez, T., S.E. Trumbore, S.C. Tyler, P.A. Matson, I. Ortiz-Monasterio, T. Rahn, and D.W.T. Griffith. 2001. "Identifying the agricultural imprint on the global N<sub>2</sub>O budget using stable isotopes." *Journal of Geophysical Research-Atmospheres* 106(#D9): 9869-9878.

Kates, R.W., W.C. Clark, R. Corell, J.M. Hall, C.C. Jaeger, I. Lowe, J.J. McCarthy, H.J. Schellnhuber, B. Bolin, N.M. Dickson, S. Faucheux, G.C. Gallopin, A. Grubler, B. Huntley, J. Jäger, N.S. Jodha, R.E. Kaspersen, A. Mabogunje, P. Matson, H. Mooney, B. Moore, T. O'Riordan, and U. Svedin. 2001. "Environment and development: Sustainability science." *Science* 292(5517): 641-642.

Panek, J., P.A. Matson, I. Ortiz-Monasterio, and P. Brooks. 2000. "Distinguishing nitrification and denitrification sources of N<sub>2</sub>O in a Mexican wheat system using N as a tracer." *Ecological Applications* 10(2): 506-514.

Riley, W.J., and P.A. Matson. 2000. "NLOSS: A mechanistic model of denitrified N<sub>2</sub>O and N<sub>2</sub> evolution from soil." *Soil Science* 165(3): 237-249.

Schuur, E.A.G., and P.A. Matson. 2000. "Land use change: Global effects of local changes." In *Earth System Science: Patterns and Processes*, W.G. Ernst (ed). Cambridge, UK: Cambridge University Press.

Harrison, J., and P. Matson. 2000. "The atmosphere as global commons." In *The Commons Revisited: An American Perspective*, J. Burger, R. Norgaard, E. Ostrom, D.

Policansky, and B.D. Goldstein (eds). Washington, DC: Island Press.

Matson, P.A., and A. Goldstein. 2000. "Biogenic trace gas exchange." In *Methods in Ecosystem Science*, O. Sala, R. Jackson, H. Mooney, and R. Howarth, (eds). New York: Springer-Verlag.

Field, C.B., G.C. Daily, F.W. Davis, S. Gaines, P.A. Matson, J. Melack, and N.L. Miller. 1999. "Confronting climate change in California: Ecological impacts on the Golden State." Union of Concerned Scientists, Cambridge, MA and Ecological Society of America, Washington, DC.

Matson, P.A., W.D. McDowell, A. Townsend, and P. Vitousek. 1999. "The globalization of nitrogen deposition: ecosystem consequences in tropical environments." *Biogeochemistry* 46: 67-83.

National Research Council Board on Sustainable Development. 1999. *Our Common Journey: A transition toward sustainability*. Washington DC: National Academy Press.

Hall, S.J., and P.A. Matson. 1999. "Nitrogen oxide emissions following nitrogen additions in tropical forests." *Nature* 400: 152-155.

Vitousek, P.M., L.O. Hedin, P.A. Matson, J.H. Fownes, and J. Neff. 1998. "Within-system element cycles, input-output budgets, and nutrient limitation." In *Successes, Limitations, and the Future of Ecosystem Ecology*, M. Pace, and P. Groffman (eds). New York: Springer.

Matson, P.A., R.L. Naylor, and I. Ortiz Monasterio. 1998. "Integration of environmental, agronomic, and economic aspects of fertilizer management." *Science* 280: 112-115.

Field, C.B., J.G. Osborn, L.L. Hoffman, et al. 1998. "Mangrove biodiversity and ecosystem function." *Global Ecology and Biogeography Letters* 7: 3-14.

Vitousek, P.M., J. Aber, R. Howarth, G.E. Likens, P. Matson, D. Schindler, W. Schlesinger, and G.D. Tilman. 1997. "Human Alteration of the global nitrogen cycle: causes and consequences." *Ecological Applications* 7(3): 737-750.

Matson, P. 1997. "NO<sub>x</sub> emissions from soils and its consequences for the atmosphere and biosphere." *Nutrient Cycling in Agroecosystems* 48: 1-6.

- Matson, P.A., W.J. Parton, A.G. Power, and M. Swift. 1997. "Agricultural intensification and ecosystem properties." *Science* 277: 504-509.
- Matson, P.A., C. Billow, S. Hall, and J. Zachariesson. 1996. "Nitrogen trace gas responses to fertilization in sugar cane ecosystems." *Journal of Geophysical Research* 101(D13): 18533-18546.
- Hall, S.J., P.A. Matson, and P. Roth. 1996. "NO<sub>x</sub> emission from soil: implications for air quality modeling in agricultural regions." *Annual Review of Energy and Environment* 21: 311-46.
- Dungan, J.L., L.F. Johnson, C.R. Billow, P.A. Matson, J. Mazzurco, J. Moen, and V.C. Vanderbilt. 1996. "High spectral resolution reflectance of Douglas-fir grown under different fertilization treatments: experiment design and treatment effects." *Remote Sensing of Environment* 55: 217-228.
- Potter, C.S., P.A. Matson, P.M. Vitousek, and E.A. Davidson. 1996. "Process modeling of controls on nitrogen trace gas emissions from soils worldwide." *Journal of Geophysical Research-Atmospheres* 101(D1): 1361-1377.
- Matson, P.A., and P.M. Vitousek. 1996. "Trace gas emissions in a tropical deciduous forest ecosystem." In *Tropical Deciduous Forest Ecosystems*, H. Mooney, C. Medina, and R. Bullock (eds). New York: Springer-Verlag.
- Ortiz-Monasterio, J.I., P.A. Matson, J. Panek, and R.L. Naylor. 1995. "Nitrogen fertilizer management: consequences for N<sub>2</sub>O and NO emissions in Mexican irrigated wheat." 9th Nitrogen Workshop, Technische Universit, Braunschweig, Germany, 513-534.
- Lerdau, M. P. Matson, R. Fall, and R. Monson. 1995. "Ecological controls over monoterpene emissions from Douglas-fir (*Pseudotsuga Menziesii*)." *Ecology* 76(8): 2640-2647.
- DeFries, S.R., C.B. Potter, I. Fung, C.O. Justice, S. Los, P.A. Matson, E. Matthews, H.A. Mooney, C.S. Potter, K. Prentice, P.J. Sellers, J.R.G. Townshend, C.J. Tucker, S.L. Ustin, and P.M. Vitousek. 1995. "Mapping the land surface for global atmosphere-biosphere models: toward continuous distributions of vegetation's functional properties." *Journal of Geophysical Research-Atmospheres* 100(D10): 20867-20882.

Matson, P.A., and R.C. Harriss (eds). 1995. *Biogenic Trace gases: Measuring Emissions from Soil and Water*. Cambridge, UK: Blackwell Scientific Publishing.

Keller, M., and P.A. Matson. 1994. "Biosphere-atmosphere exchange of trace gases in the tropics: Evaluating the effects of land use change." In *Global Atmospheric-Biospheric Chemistry*, R. Prinn (ed). New York: Plenum Press.

Billow, C., P. Matson, and B. Yoder. 1994. "Seasonal biochemical changes in coniferous forest canopies and their response to fertilization." *Tree Physiology* 14: 564-574.

Matson, P.A., L. Johnson, C. Billow, J. Miller, and Ruilang Pu. 1994. "Seasonal changes in canopy chemistry across the Oregon Transect: patterns and spectral measurement with remote sensing." *Ecological Applications* 4(2): 280-298.

Potter, C.S., P.A. Matson, and P.M. Vitousek. 1994. "Evaluation of soil database attributes in a terrestrial carbon cycle model: implications for global change research." In *Environmental Information Systems Analysis*, W.K. Michener (ed). Taylor and Francis, UK.

Vitousek, P.M., L.R. Walker, L.D. Whiteaker, and P.A. Matson. 1993. "Nutrient limitation to plant growth during primary succession in Hawaii Volcanoes National Park." *Biogeochemistry* 23: 197-215.

Potter, C.S., J.T. Randerson, C.B. Field, P.A. Matson, P.M. Vitousek, H.A. Mooney, and S.A. Klooster. 1993. "Terrestrial ecosystem production: a process model based on global satellite and surface data." *Global Biogeochemical Cycles* 7(4): 811-842.

Matson, P.A., C. Potvin, and J. Travis. 1993. "Statistical methods: An upgrade for ecologists." (Special feature introduction) *Ecology* 74(6): 1615-1617.

Naylor, R., and P.A. Matson. 1993. "Food, conservation, and global environmental change: Is compromise possible?" *Eos* 74(15): 178-179.

Vitousek, P.M., and P.A. Matson. 1993. "Agriculture, the global nitrogen cycle and trace gas flux." In *Biogeochemistry of Global Change: Radiatively Active Trace Gases*, R. Oremland (ed), 193-208. New York: Chapman and Hall.

Davidson, E.A., P.A. Matson, P.M. Vitousek, R. Riley, K. Dunkin, G. Garcia-Mendez, and J.M. Maass. 1993. "Process regulation of soil emissions of NO and N<sub>2</sub>O in a

seasonally dry tropical forest." *Ecology* 74(1): 130-139.

Caldwell, M., P.A. Matson, C.A. Wessman, and J.A. Gamon. 1993. "Prospects for Scaling." In *Scaling Physiological Processes*, C. Field and J. Ehrlinger (eds), 223-229. New York: Academic Press.

Matson, P.A., S.T. Gower, C. Volkman, C. Billow, and C.C. Grier. 1992. "Soil nitrogen cycling and nitrous oxide fluxes in fertilized Rocky Mountain Douglas-fir forests." *Biogeochemistry* 18: 101-117.

Field, C.B., F.S. Chapin III, P.A. Matson, and H.A. Mooney. 1992. "Responses of terrestrial ecosystems to the changing atmosphere: A resource-based approach." *Annual Review of Ecology and Systematics* 23: 201-35.

Matson, P.A., and A. Berryman. 1992. "Ratio dependent predator-prey theory." (Special feature introduction) *Ecology* 73(5): 1529.

Matson, P.A. 1992. "Biogeochemistry and perspectives on change." (Book review) *Ecology* 73(2): 712-713.

Matson, P.A., and M.D. Hunter. 1992. "The relative contributions of top-down and bottom-up forces in population and community ecology." (Special feature introduction) *Ecology* 73(3): 723.

Vitousek, P.M., S.W. Andariese, P.A. Matson, L. Morris, and R.L. Sanford. 1992. "Management effects on soil nitrogen transformations in a young loblolly pine plantation." *Forest Ecology and Management* 49: 277-292.

Vitousek, P.M., and P.A. Matson. 1992. "Tropical forests and trace gases: potential interactions between tropical biology and the atmospheric sciences." *Biotropica* 24: 233-239.

Garcia, G., J.M. Maass, P.A. Matson, and P.M. Vitousek. 1992. "Nitrogen transformations and nitrous oxide flux in a drought-deciduous forest in Chamela, Jalisco, Mexico." *Oecologia* 88: 362-366.

Vitousek, P.M., and P.A. Matson. 1991. "A commentary on effects of tropical deforestation on global and regional atmospheric chemistry." *Climate Change* 19: 159-162.

- Matson, P.A., and S.L. Ustin. 1991. "The future of remote sensing in ecological studies." (Special feature introduction) *Ecology* 72(6): 1917.
- Roughgarden, J., S.W. Running, and P.A. Matson. 1991. "What does remote sensing do for ecology?" *Ecology* 72(6): 1918-1922.
- Vitousek, P.M., and P.A. Matson. 1991. "Gradient analysis of ecosystems." In *Comparative Analysis of Ecosystems*, J.J. Cole, G. Lovett, and S. Findley (eds), 287-298. New York: Springer-Verlag.
- Matson, P.A. 1991. "Trace gas emissions by plants: A summary." In *Trace Gas Emission by Plants*, T. Sharkey, E. Holland, H.A. Monney (eds), 341-343. San Diego, CA: Academic Press.
- Matson, P.A., C. Volkman, K. Coppinger, and W.A. Reiners. 1991. "Annual nitrous oxide flux and soil nitrogen characteristics in sagebrush steppe ecosystems." *Biogeochemistry* 1: 1-12.
- Davidson, E.A., P.M. Vitousek, P.A. Matson, R. Riley, G. Garcia, and J.M. Maass. 1991. "Soil emissions of nitric oxide in a seasonally dry tropical forest of Mexico." *Journal of Geophysical Research* 96(D8): 15439-15445.
- Gordon, D.M., and P.A. Matson. 1991. "Interactions of behavioral and evolutionary ecology in changing environments." (Special feature introduction) *Ecology* 72(4): 1179.
- Lubchenco, J., A. Olson, L. Brubaker, S. Carpenter, M. Holland, S. Hubbell, S. Levin, J. MacMahon, P. Matson, J. Melillo, H. Mooney, C. Peterson, H. Pulliam, L. Real, P. Regal, and P. Risser. 1991. "The sustainable biosphere initiative: An ecological research agenda." *Ecology* 72(2): 371-412.
- Matson, P.A., and P.M. Vitousek. 1990. "Ecosystem approach for the development of a global nitrous oxide budget." *Bioscience* 40(9): 667-672.
- Matson, P.A., and S. Carpenter. 1990. "Statistical analysis of ecological response to large-scale perturbation." (Special feature introduction) *Ecology* 71(6): 2037.
- Harris, R.C., M. Garstang, S.C. Wofsy, S.M. Beck, R.J. Bendura, J.R.B. Coelho, J.W. Drewry, J.M. Hoell, P.A. Matson, J.R. McNeal, L.C.B. Molion, R.L. Navarro, V. Rabine, and R.L. Snell. 1990. "The Amazon boundary layer experiment: Wet season 1987." *Journal of Geophysical Research* 95(D10): 16721-16736.



Vitousek, P.M., C.B. Field, and P.A. Matson. 1990. "Variation in foliar  $\delta^{13}\text{C}$  in Hawaiian *Metrosideros* polymorpha: A case of internal resistance?" *Oecologia* 84: 362-370.

Matson, P.A., P.M. Vitousek, G.P. Livingston, and N.A. Swanberg. 1990. "Sources of variation in nitrous oxide flux from Amazonian ecosystems." *Journal of Geophysical Research* 95(D10): 16789-16798.

Matson, P.A. 1990. "Plant-soil interactions during primary succession at Hawaii Volcanoes National Park." *Oecologia* 85: 241-246.

Matson, P.A. 1990. "The use of urban gradients in ecological studies." (Special feature introduction) *Ecology* 71(4): 1231.

Matson, P.A., and P.M. Vitousek. 1990. "Remote sensing and trace gas fluxes." In *Remote Sensing of Biosphere Functioning*, R. Hobbs, and H.A. Mooney (eds), 157-167. New York: Springer-Verlag.

Matson, P.A., and D.S. Ojima (eds). 1990. *Terrestrial Biosphere Exchange with Global Atmospheric Chemistry*. IGBP Report No. 13. Stockholm. 103 pp.

Woodward, S., P.M. Vitousek, and P. Matson. 1990. "Use of the exotic tree *Myrica faya* by native and exotic birds in Hawaii Volcanoes National Park." *Pacific Science* 44: 88-93.

Vitousek, P.M., P.A. Matson, C. Volkman, M. Maass, and G. Garcia. 1989. "Nitrous oxide fluxes from seasonally dry tropical forests." *Global Biogeochemical Cycles* 3(4): 375-382.

Luizao, F., P. Matson, G. Livingston, R. Luizao, and P. Vitousek. 1989. "Nitrous oxide flux following tropical land clearing." *Global Biogeochemical Cycles* 3: 281-285.

Reiners, W.A., L.L. Strong, P.A. Matson, I.C. Burke, and D.S. Ojima. 1989. "Estimating biogeochemical fluxes across sagebrush-steppe landscape with thematic mapper imagery." *Remote Sensing of Environment* 28: 121-129.

Myrold, D.D., P.A. Matson, and D.L. Peterson. 1989. "Relationships among soil microbial properties and above ground stand characteristics of conifer forests in

Oregon." *Biogeochemistry* 8: 265-281.

Vitousek, P.M., P.A. Matson, and K. Van Cleve. 1989. "Nitrogen availability and nitrification during succession: Primary, secondary and old-field series." *Plant and Soil* 115: 229-239.

Matson, P.A., P.M. Vitousek, and D.S. Schimel. 1989. "Regional extrapolation of trace gas flux based on soils and ecosystems." In *Exchange of Trace Gases Between Terrestrial Ecosystems and the Atmosphere*, M.D. Andreae, and D.S. Schimel (eds), 97-108. New York: Springer-Verlag.

Vitousek, P.M., P.A. Matson, and D.R. Turner. 1988. "Elevational and age gradients in Hawaiian montane rainforest: foliar and soil nutrients." *Oecologia* 77: 565-570.

Card, D.H., D.L. Peterson, P.A. Matson, and J.D. Aber. 1988. "Prediction of leaf chemistry by the use of visible and near infrared reflectance spectroscopy." *Remote Sensing of Environment* 26: 123-147.

Vitousek, P.M., and P.A. Matson. 1988. "Nitrogen transformation in tropical forest soils." *Soil Biology and Biochemistry* 20: 361-367.

Matson, P.A., and R.C. Harriss. 1988. "Aircraft-based measurements of biosphere-atmosphere gas exchange." *Ecology* 69(5): 1318-1325.

Peterson, D.L., J.D. Aber, P.A. Matson, D.J. Card, N. Swanberg, C. Wessman, M.A. Spanner, and C.A. Hlavka. 1988. "Remote sensing of forest canopy and leaf biochemical content." *Remote Sensing of the Environment* 24: 85-108.

Livingston, G.P., P.M. Vitousek, and P.A. Matson. 1988. "Nitrous oxide flux and nitrogen transformations across a landscape gradient in Amazonia." *Journal of Geophysical Research* 93(02): 1593-1599.

Swanberg, N.A., and P.A. Matson. 1987. "The use of airborne imaging spectrometer data to determine experimentally-induced variation in coniferous canopy chemistry." *Proceedings of Third Airborne Imaging Spectrometer Data Analysis Workshop, JPL Publication* 87-30, pp 70-74.

Matson, P.A., F.P. Hain, and W. Mawby. 1987. "Susceptibility indices in loblolly pine vary with silvicultural treatment." *Forest Ecology and Management* 22: 107-118.

Vitousek, P.M., L.R. Walker, L.D. Whitaker, D. Mueller-Dombois, and P.A. Matson. 1987. "Biological invasion by *Myrica faya* alters ecosystem development in Hawaii." *Science* 238: 802-804.

Matson, P.A., and P.M. Vitousek. 1987. "Cross-system comparisons of soil nitrogen transformations and nitrous oxide flux in tropical forest ecosystems." *Global Biogeochemical Cycles* 1: 163-170.

Mooney, H.A., P.M. Vitousek, and P.A. Matson. 1987. "Exchange of materials between the biosphere and atmosphere." *Science* 238: 926-932.

Burke, I.C., W.A. Reiners, D.L. Sturges, and P.A. Matson. 1987. "Herbicide treatment effects on properties of mountain big sagebrush soils after 14 years." *Soil Science Society of America Journal* 51: 1337-1343.

Waring, R.H., I. Cromack, Jr., P.A. Matson, R.D. Boone, and S.G. Stafford. 1987. "Ecosystem responses to forest dieback: Decomposition, nutrient availability, and tree vigor." *Forestry* 60: 219-227.

Matson, P.A., P.M. Vitousek, J.J. Ewel, M.J. Mazzarino, and G.P. Robertson. 1987. "Nitrogen transformations following tropical forest felling and burning on a volcanic soil." *Ecology* 68: 491-502.

Robertson, G.P., P.M. Vitousek, P.A. Matson, and J.M. Tiedje. 1987. "Dentrification in a clear-cut loblolly pine plantation in the Southeastern U.S.: Differences related to harvest intensity, site preparation, and silvicultural practice." *Plant and Soil* 97: 119-129.

Matson, P.A., L.L. Strong, and W.A. Reiners. 1987. "Biogeochemical Cycling in Sagebrush Ecosystems." Thematic Mapper Research in the Earth Sciences Workshop, Santa Barbara, CA, pp. 85-90.

Birk, E.M., and P.A. Matson. 1986. "Site fertility affects seasonal carbon reserves in loblolly pine." *Tree Physiology* 2: 17-27.

Vitousek, P.M., P.R. Ehrlich, A.J. Ehrlich, and P.A. Matson. 1986. "Human appropriation of the products of photosynthesis." *Bioscience* 36: 368-373.

Matson, P.A. 1986. "Biogeochemical processes in sagebrush ecosystems. Thematic Mapper Research in Earth Sciences Workshop, Goddard Space Flight Center,

Maryland, Sep 3-5. Goddard Space Flight Center Laboratory for Terrestrial Physics Publications, pp. 279-293.

Vitousek, P.M., and P.A. Matson. 1985. "Disturbance, nitrogen availability, and nitrogen losses: An experimental study in an intensively managed loblolly pine plantation." *Ecology* 66: 1360-1376.

Spanner, M.A., D.L. Peterson, W. Acevedo, and P.A. Matson. 1985. "High resolution spectrometry of leaf and canopy chemistry for biogeochemical cycling." *Proceedings of the Airborne Imaging Spectrometer Data Analysis Symposium*. NASA Jet Propulsion Laboratory, Pasadena, CA.

Vitousek, P.M., and P.A. Matson. 1985. "Intensive harvest and site preparation decrease nitrogen availability in young plantations." *The Southern Journal of Applied Forestry* 9: 120-125.

Vitousek, P.M., and P.A. Matson. 1985. "Nitrate losses from disturbed forests: Causes of delayed nitrate production in two Indiana forests." *Forest Science* 31: 122-131.

Matson, P.A., and F.P. Hain. 1985. "Host conifer defense strategies: A hypothesis." In *Proceedings First IUFRO Conference on the Role of Host-Pest Interaction in the Population Dynamics of Forest Insects*. September 1983. Banff, Alberta.

Hain, F.P., S.P. Cook, P.A. Matson, and K.G. Wilson. 1985. "Factors contributing to southern pine beetle host resistance." In *Integrated Pest Management Research Symposium*, S.J. Branham and R.C. Thatcher (eds). USDA-Forest Service General Technical Report SO-56.

Vitousek, P.M., and P.A. Matson. 1984. "Mechanisms of nitrogen retention in forest ecosystems: A field experiment." *Science* 225: 51-52.

Matson, P.A., and R.H. Waring. 1984. "Effects of nutrient and light limitation on mountain hemlock: Susceptibility to laminated root rot." *Ecology* 65: 1517-1524.

Matson, P.A., and R.D. Boone. 1984. "Nitrogen mineralization and natural disturbance: Wave-form dieback of mountain hemlock in the Oregon Cascades." *Ecology* 65: 1511-1516.

Vitousek, P.M., H.L. Allen, and P.A. Matson. 1983. "Impacts of management practices on soil nitrogen status." In *Maintaining Site Productivity in Pine Plantation Management*. Proceedings of Appalachian Society of American Foresters. Myrtle

Beach, S.C. pp. 25-39.

Binkley, D., and P.A. Matson. 1983. "An evaluation of an ion exchange resin bag method for assessing forest soil nitrogen availability." *Soil Science Society of America Journal* 47: 1050-1052.

Matson, P.A., and P.M. Vitousek. 1981. "Nitrogen mineralization and nitrification potentials following clearcutting in the Hoosier National Forest, Indiana." *Forest Science* 27: 781-791.