

EDWARD B. RASTETTER

Senior Scientist
The Ecosystems Center
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Education

Ph.D., University of Virginia, Department of Environmental Sciences, 1986. Dissertation: The Regulation of Ecosystem Processes within a Sealed Aquatic Microcosm
B.S., University of Hawaii, Zoology and Mathematics, 1976. Marine Options degree in Marine Environmental Management under the Sea Grant Program.

Professional Positions

February 1975 - March 1976: Biologist, Marine Options Program, University of Hawaii Sea Grant, on contract to the Naval Undersea Center, Hawaii Laboratory, Kaneohe, Hawaii
March 1976 - June 1979: Biologist, Research Corporation of the University of Hawaii, on contract to the Naval Ocean Systems Center, Hawaii Laboratory, Kaneohe, Hawaii.
January 1985 - August 1985: Research Assistant, University of Virginia, Department of Environmental Sciences. Development of a model of community succession on coastal barrier islands and in mangrove forests.
September 1985 - January 1986: Postdoctoral Research Associate, University of Virginia, Department of Environmental Sciences. Modeling the effects of acid rain on the soils of small forested catchments.
February 1986 - June 1987: Postdoctoral Research Associate, The Ecosystems Center, Marine Biological Laboratory. Modeling global carbon cycling.
June 1987 - February 1994: Assistant Scientist, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA.
February 1994 - November 2002: Associate Scientist, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA.
April-May 1996: Visiting Scientist, Swedish Agricultural University, Uppsala, Sweden
April 2004: Royal Society of Edinburgh visiting Scientist at the Macaulay Institute, Aberdeen Scotland
November 2002 - Present: Senior Scientist, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA.

Honors and Awards

1981-1984, Dean's Reserve Fellowship, University of Virginia

Service on National Committees and Institutional Boards

Full member of the Society of the Sigma Xi (1980)
U. S. Environmental Protection Agency Centers Panel, June 1991
Interagency (NSF/USDA/EPA/NASA) Terrestrial Ecology and Global Change Initiative (TECO) Panel June 1995.
National Atmospheric and Space Administration Panel, March 2001
National Science Foundation Biocomplexity Panel, May 2002
National Atmospheric and Space Administration Panel, June 2004

Service on MBL Committees

Hughes Library Planning Committee 1988-89
MBL Computer Services Committee, Chair since 1989
Housing, Food Services, and Child Care Committee, 2000-present
MBL Housing Study, fall 2000
Resident Science Task Force, Spring 2002
MBL Institutional Committee, 2012-present
MBL POM director search, 2013
MBL Science Council 2013-present

Editorial Boards

Ecosystems (1998- present)

Teaching

Designed and taught a short course entitled: A Review of Calculus and Linear Algebra for the Environmental Sciences (August 1983).

Teaching assistant in the following courses: Systems Analysis (Fall 1979, Spring 1981), Applied Hydrology (Spring 1980, Spring 1981), Terrestrial Ecology (Fall 1981).

Organized and lectured in a series of workshops for beginning graduate students on "Mathematical Modeling in Ecology," funded by the Clowes Fund (1989 - 1992).

Designed and taught an undergraduate course in Mathematical Modeling for the Semester in Environmental Sciences (1997 - present)

Mathematical modeling for non-programmers, Brown University (Spring 2006, 2012, 2014)

Funding (last 10 years)

NSF, *Collaborative Research on Carbon, Water, and Energy Balance of the Arctic Landscape at Flagship Observatories*

Principal Investigator, 09/01/2011 - 08/31/2014; Total Award: \$1,153,652

NSF, *Fire in Northern Alaska: Effect of a Changing Disturbance Regime on a Regional Macrosystem*

Principal Investigator, 05/01/2011 - 04/30/2015; Total Award: \$1,972,887

NSF, *Collaborative Research: Nutrient co-limitation in young and mature northern hardwood forests*

Principal Investigator; 07/01/2010 - 06/30/2013; Total Award: \$97,390

NSF-ARRA, *The Changing Seasonality of Tundra Nutrient Cycling: Implications for Ecosystem and Arctic System Functioning*

Principal Investigator; 09/01/2009 - 08/31/2012; Total Award: \$180,926

NSF, *Collaborative Research: Spatial and Temporal Influences of Thermokarst Features on Surface Processes in Arctic Landscapes*

Principal Investigator; 07/01/2008 - 06/30/2012; Total Award: \$116,158

EPA, *Integration of the software code for the MEL and GTHM models for simulating the dynamic interaction of biochemical and hydrologic process in terrestrial ecosystems*

Principal Investigator; 02/01/2008 - 03/31/2009; Total Award: \$46,633

NSF, *OPUS: Optimization of Resource Acquisition Strategies and its Effects on Ecosystem Function and Community Structure*

Principal Investigator; 09/01/2007 - 08/31/2010; Total Award: \$178,886

EPA, *Calibration of the Multiple Element Limitation (MEL) model for linked C, N, P, and water cycling in the Pacific Northwest*

Principal Investigator; 04/23/2007 - 04/22/2008; Total Award: \$50,000

NSF, *IPY: Collaborative Research on Carbon, Water, and Energy Balance of the Arctic Landscape at Flagship Observatories and in a PanArctic Network*

Co-Principal Investigator; 03/15/2007 - 02/28/2011; Total Award: \$1,398,347

NSF, *Loss and Retention of Nitrogen in an Arctic Landscape: Key Pathways and Process Regulation*

Co-Principal Investigator; 01/15/2005 - 12/31/2008; Total Award: \$924,000

NSF, *The Arctic LTER Project: Regional Variation in Ecosystem Processes and Landscape Linkages*

Co-Principal Investigator; 12/01/2004 - 11/30/2010; Total Award: \$4,194,000

NSF, *Land-Water Interactions at the Catchment Scale: Linking Biogeochemistry and Hydrology*

Co-Principal Investigator; 01/01/2004 - 08/31/2008; Total Award: \$79,989

NSF, *BE/CBC: Land Water Interactions at the Catchment Scale: Linking Biogeochemistry and Hydrology*

Co-Principal Investigator; 09/01/2002 - 08/31/2004; Total Award: \$59,978

NSF, *Turnover and Retention of Nitrogen in an arctic Watershed: Links to Organic Matter Accumulation and Response to Climate*

Co-Principal Investigator; 09/15/2001 - 08/31/2005; Total Award: \$1,110,892

NSF, *Species-, Community-, and Ecosystem-Level Consequences of the Interactions among Multiple Resources*

Principal Investigator; 06/01/2001 - 06/30/2005; Total Award: \$391,925

EPA, *GEM Enhancement of the General Ecosystem Model for Simulating Carbon and Nitrogen Isotope Dynamics*
Principal Investigator; 09/07/2000 – 06/30/2002; Total Award: \$80,000

EPA, *Update GEM Model*
Principal Investigator; 03/15/2000 – 09/30/2001; Total Award: \$79,745

NSF, *Developing Process-Level Understanding of Controls on Belowground Carbon and Nutrient Dynamics in Tundra Ecosystems*
Principal Investigator; 02/01/2000 – 01/31/2005; Total Award: \$1,653,896

Pending Grants

None

Training Record

Student Committees

Freddrick Wikström, Opponent for PhD defense, Swedish Agricultural University, Uppsala, Sweden
David Bryant, PhD committee, University of New Hampshire
Seeta Sistla, PhD committee, University of California at Santa Barbara
Chelsea Nagy, PhD committee, Brown University
Laura Garrison, PhD committee, Brown University

Tenure Review Committee

Riitta Hyvönen-Olsson, Faculty of Forestry, Swedish Agricultural University, Uppsala, Sweden

Post-Doctoral Fellows

Michael Ryan, 1988-1990
Robert McKane 1990-1994
David Fernandes 1994-1996
Mathew Williams 1994-1997
Darrell Herbert 1996-1999
Severine Le Dizès 2000-2001
Gabrielle Holmes 2008-2009
Adrian Rocha 2010-2012
Yueyang Jiang 2012-

Publications

- Rastetter, EB**, BL Kwiatkowski, DW Kicklighter, A Barker Plotkin, H Genet, J Nippert, K O'Keefe, SS Perakis, S Porder, SS Roley, RW Ruess, JR Thompson, WR Wieder, K Wilcox, RD Yanai. Submitted. Nitrogen and Phosphorus Constrain Carbon Gain in Terrestrial Ecosystems under Climate Change: the Roles of Nutrient Redistribution and Accumulation and of Changes in Plant and Soil Stoichiometry Ecological Applications
- Rastetter, EB**, MD Ohman, KJ Elliott, JS Rehage, VH Rivera-Monroy, RE Boucek, E Castañeda-Moya, TM Danielson, L Gough, PM Groffman, CR Jackson, CF Miniati, GR Shaver. In Press. Future trajectories for ecosystems of the US Long Term Ecological Research Network: The importance of time lags Ecosphere
- Rastetter, EB**, Griffin, KL, Rowe, RJ, Gough, L, McLaren, JR, Boelman, NT. In Press. Model Responses to CO₂ and Warming Are Underestimated without Explicit Representation of Arctic Small-Mammal Grazing, Ecological Applications
- Rastetter, EB**, GW Kling, GR Shaver, BC Crump, L Gough, and KL Griffin. 2021. Ecosystem Recovery from Disturbance Is Constrained by Element Cycle Openness, Vegetation-Soil Element Distribution, Form of Element Losses, and the Balance between Vegetation and Soil-Microbial Processes Ecosystems 24:667-685 <https://doi.org/10.1007/s10021-020-00542-3>
- Rastetter, EB**, and BL Kwiatkowski. 2020. An Approach to Modeling Resource Optimization for Substitutable and Interdependent Resources Ecological Modelling 425 109033 DOI: 10.1016/j.ecolmodel.2020.109033
- Liu, X-Y, K Koba, LAKoyama, SE Hobbie, MS Weiss, Y Inagaki, GR Shaver, AE Giblin, S Hobara, KJ Nadelhoffer, M Sommerkorn, **EB Rastetter**, GW Kling, JA Laundre, Y Yano, A Makabe, M Yano, and C-Q Liu. 2018. Nitrate is an important nitrogen source for arctic tundra plants Proc National Acad Sci 115:3398-3403
- Jiang, Y, **EB Rastetter**, GR Shaver, AV Rocha, Q Zhuang, and BL Kwiatkowski. 2017. Modeling long-term changes in tundra carbon balance following wildfire, climate change, and potential nutrient addition Ecological Applications 27:105-117 DOI: 10.1002/eap1413
- Nagy, RC, **EB Rastetter**, C Neill, and S Porder. 2017. Nutrient limitation in tropical secondary forests following different management practices Ecological Applications 27:734-755

- Hobbie, JE, GR Shaver, **EB Rastetter**, JE Cherry, SJ Goetz, KC Guay, WA Gould, and GW Kling. 2017. Ecosystem responses to climate change at a Low Arctic and a High Arctic long-term research site *Ambio* 46 (Suppl 1):S160-S173 DOI: 101007/s13280-016-0870-x
- Rastetter, EB**. 2017. Modeling for understanding v modeling for numbers *Ecosystems* 20:215-221
- Carey, JC, J Tang, PH Templer, KD Kroeger, TW Crowther, A Burton, JS Dukes, B Emmett, S Frey, M Heskell, L Jiang, M Machmuller, JE Mohan, AM Panetta, PB Reich, S Reinsch, X Wang, SD Allison, C Bamminger, SD Bridgham, SL Collins, G de Dato, WC Eddy, BJ Enquist, M Estiarte, J Harte, A Henderson, BR Johnson, KS Larsen, Y Luo, Sv Marhan, J Melillo, J Peñuelas, L Pfeifer-Meister, C Poll, **EB Rastetter**, A Reinmann, LL Reynolds, IK Schmidt, GR Shaver, AL Strong, V Suseela, and A Tietema. 2016. Temperature response of soil respiration largely unaltered with experimental warming *PNAS* 113: 13797–13802 doi: 101073/pnas1605365113
- Abbott, BW, JB Jones, EAG Schuur, FS Chapin III, WB Bowden, MS Bret-Harte, HE Epstein, MD Flannigan, TK Harms, TN Hollingsworth, MC Mack, AD McGuire, SM Natali, AV Rocha, SE Tank, MR Turetsky, JE Vonk, KP Wickland, GR Aiken, HD Alexander, RMW Amon, BW Benscoter, Y Bergeron, K Bishop, O Blarquez, B Bond-Lamberty, AL Breen, I Buffam, Y Cai, C Carcaillet, SK Carey, JM Chen, H Chen, TR Christensen, LW Cooper, JHC Cornelissen, W de Groot, TH DeLuca, E Dorrepaal, N Fetcher, JC Finlay, BC Forbes, NHF French, S Gauthier, MP Girardin, SJ Goetz, JG Goldammer, L Gough, P Grogan, L Guo, PE Higuera, L Hinzman, FS Hu, G Hugelius, EE Jafarov, R Jandt, JF Johnstone, J Karlsson, ES Kasischke, G Kattner, R Kelly, F Keuper, GW Kling, P Kortelainen, J Kouki, P Kuhry, H Laudon, I Laurion, RW Macdonald, PJ Mann, PJ Martikainen, JW McClelland, U Molau, SF Oberbauer, D Olefeldt, D Paré, M-A Parisien, S Payette, C Peng, OS Pokrovsky, **EB Rastetter**, PA Raymond, MK Reynolds, G Rein, JF Reynolds, M Robards, BM Rogers, C Schädel, K Schaefer, IK Schmidt, A Shvidenko, J Sky, RGM Spencer, G Starr, RG Striegl, SE Tank, R Teisserenc, LJ Tranvik, T Virtanen, JM Welker, S Zimov. 2016. Biomass offsets little or none of permafrost carbon release from soils, streams, and wildfire: An expert assessment *Environmental Research Letters* 11: 034014 doi:101088/1748-9326/11/3/034014
- Kranabetter, J, K McLaughlin, S Enders, J Fraterrigo, P Higuera, J Morris, **E Rastetter**, R Barnes, B Buma, D Gavin, L Gerhart, L Gillson, P Hietz, M Mack, B McNeil, and S Perakis. 2016. A framework to assess biogeochemical response to ecosystem disturbance using nutrient partitioning ratios *Ecosystems* 19:387-395
- Rastetter, EB**, and JJ Vallino. 2015. Ecosystem's 80th and the Reemergence of Emergence *Ecosystems* 18:735-739 DOI 101007/s10021-015-9893-6
- Jiang, Y, AV Rocha, **EB Rastetter**, GR Shaver, U Mishra, Q Zhuang, BL Kwiatkowski. 2016. C-N-P interactions control climate driven changes in regional patterns of C storage on the North Slope of Alaska *Landscape Ecol* 31: 195-213 DOI 101007/s10980-15-0266-5
- Jiang, Y, **EB Rastetter**, GR Shaver, AV Rocha, Q Zhuang, and BL Kwiatkowski. 2017. Modeling long-term changes in tundra carbon balance following wildfire, climate change, and potential nutrient addition *Ecological Applications* 27:105-117
- Jiang, Y, **EB Rastetter**, AV Rocha, AR Pearce, BL Kwiatkowski, GR Shaver. 2015. Modeling Carbon-Nutrient interactions during the early recovery of tundra after fire *Ecological Applications* 25:1640-1652
- Pearce, AR, **EB Rastetter**, WB Bowden, MC Mack, Y Jiang, and BL Kwiatkowski. 2015. Recovery of arctic tundra from thermal erosion disturbance is constrained by nutrient accumulation: a modeling analysis. *Ecological Applications* 25:1271-1289.
- McLaughlin, BC, C-Y Xu, **EB Rastetter**, KL Griffin. 2014. Predicting ecosystem carbon balance in a warming Arctic: the importance of long-term thermal acclimation potential and inhibitory effects of light on respiration. *Global Change Biology* 20: 1901-1912.
- Flombaum, P., O.E. Sala, and **E.B. Rastetter**. 2014. Interactions among resource partitioning, sampling effect, and facilitation on the biodiversity effect: A modeling approach. *Oecologia* 174:559-566.
- Sistla, S.A., **E.B. Rastetter**, and J.P. Schimel. 2014. Responses of a tundra system to warming using SCAMPS: A stoichiometrically coupled, acclimating microbe-plant-soil model. *Ecological Monographs* 84:151-170, <http://dx.doi.org/10.1890/12-2119.1>.
- Rastetter, E.B.**, R.D. Yanai, R.Q. Thomas, M.A. Vadeboncoeur, T.J. Fahey, M.C. Fisk, B.L. Kwiatkowski, and S.P. Hamburg. 2013. Recovery from disturbance requires resynchronization of ecosystem nutrient cycles. *Ecological Applications* 23:621-642.
- Shaver, G.R., **E.B. Rastetter**, V. Salmon, L.E. Street, M.J. van de Weg, A. Rocha, M.T. van Wijk, and M. Williams. 2013. Pan Arctic modelling of net ecosystem exchange of CO₂. *Philosophical Transactions of the Royal Society B* 368: 20120485 <http://dx.doi.org/10.1098/rstb.2012.0485>

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- Rocha, A.V., M.M. Loranty, P.E. Higuera, M.C. Mack, F.S. Hu, B.M. Jones, A.L. Breen, **E.B. Rastetter**, S.J. Goetz, and G.R. Shaver. 2012. The footprint of Alaskan tundra fires during the past half-century: implications for surface properties and radiative forcing. *Environmental Research Letters* 7(4) 044039.
- Loranty, M.M., S.J. Goetz, **E.B. Rastetter**, A.V. Rocha, G.R. Shaver, E.R. Humphreys, and P.M. Lafleur. 2011. Scaling an instantaneous model of tundra NEE to the Arctic landscape. *Ecosystems* 14:76-93.
- Luo, Y., J. Melillo, S. Niu, C. Beier, J.S. Clark, A.T. Classen, E. Davidson, J.S. Dukes, R.D. Evans, C.B. Field, C.I. Czimczik, M. Keller, B.A. Kimball, L.M. Kueppers, R.J. Norby, S.L. Pelini, E. Pendall, **E. Rastetter**, J. Six, M. Smith, M.G. Tjoelker, and M.S. Torn. 2011. Coordinated approaches to quantify long-term ecosystem dynamics in response to global change. *Global Change Biology* 17:843-854.
- Rastetter, E.B.** 2011. Modeling coupled biogeochemical cycles. *Frontiers in Ecology and the Environment* 9:68-73.
- Rastetter, E.B.** M. Williams, K.L. Griffin, B.L. Kwiatkowski, G. Tomasky, M.J. Potosnak, P.C. Stoy, G.R. Shaver, M. Stieglitz, G.W. Kling, and J.E. Hobbie. 2010. Application of the Ensemble Kalman Filter to Assimilate Eddy Covariance Flux data into a Model of Arctic Carbon Exchange. *Ecological Applications* 20:1285-1301.
- Yanai, R.D., J.J. Battles, A.D. Richardson, C.A. Blodgett, D.M. Wood, and **E.B. Rastetter**. 2010. Estimating uncertainty in ecosystem budget calculations. *Ecosystems* 11:239-248.
- Yano, Y., G.R. Shaver, A.E. Giblin, and **E.B. Rastetter**. 2010. Depleted ^{15}N in hydrolysable-N of arctic soils and its implication for mycorrhizal fungi-plant interaction. *Biogeochemistry* 97:183-194, doi:10.1007/s10533-009-9365-1.
- Yano, Y., G.R. Shaver, A.E. Giblin, **E.B. Rastetter**, and K.J. Nadelhoffer. 2010. Nitrogen dynamics in a small arctic watershed--Retention and downhill movement of ^{15}N . *Ecological Monographs* 80:331-351, <http://dx.doi.org/10.1890/08-0773.1>.
- Biesinger, Z., **E.B. Rastetter**, and B. Kwiatkowski. 2007. Hourly and daily models of active layer evolution in Arctic soils. *Ecological Modelling* 206:131-146.
- Shaver, G.R., L.E. Street, **E.B. Rastetter**, M.T. van Wijk, and M. Williams. 2007. Functional convergence in regulation of net CO_2 flux in heterogeneous tundra landscapes in Alaska and Sweden. *Journal of Ecology* 95:802-817.
- Chapin, F.S. III, G.M. Woodwell, J.T. Randerson, **E.B. Rastetter**, G.M. Lovett, 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, and E.-D. Schulze. 2006. Reconciling carbon-cycle concepts, terminology, and methods. *Ecosystems* 9:1041-1050.
- Claessens, L., C. Hopkinson, **E. Rastetter**, and J. Vallino. 2006. Effect of historical changes in land use and climate on the water budget of an urbanizing watershed. *Water Resources Research* 42, W03426, doi:10.1029/2005WR004131.
- Shaver, G.R., A.E. Giblin, K.J. Nadelhoffer, K.K. Thieler, M.R. Downs, J.A. Laundre, and **E.B. Rastetter**. 2006. Carbon turnover in Alaskan tundra soils: effects of organic matter quality, temperature, moisture and fertilizer. *Journal of Ecology* 94:740-753.
- Booth, M.S., J.M. Stark, and **E.B. Rastetter**. 2005. Controls on nitrogen cycling in terrestrial ecosystems: a synthetic analysis of literature data. *Ecological Monographs* 75: 139-157.
- Rastetter, E.B.**, B.L. Kwiatkowski, and R.B. McKane. 2005. A Stable Isotope Simulator that Can Be Coupled to Existing Mass-Balance Models. *Ecological Applications* 15:1772-1782.
- Rastetter, E.B.**, S.S. Perakis, G.R. Shaver, and G.I. Ågren. 2005. Carbon sequestration in terrestrial ecosystems under elevated CO_2 and temperature: Role of dissolved organic N loss. *Ecological Applications* 15:71-86.
- Williams, M., C. Hopkinson, **E. Rastetter**, J. Vallino, and L. Claessens. 2005. Relationships of land use and stream solute concentrations in the Ipswich River basin, northeastern Massachusetts. *Water, Air, and Soil Pollution* 161:55-74.
- Herbert, D.A., **E.B. Rastetter**, L. Gough, and G.R. Shaver. 2004. Species diversity across nutrient gradients: An analysis of resource competition in model ecosystems. *Ecosystems* 7:296-310.
- Rastetter, E.B.**, B.L. Kwiatkowski, S. Le Dizès, and J.E. Hobbie. 2004. The role of down-slope water and nutrient fluxes in the response of arctic hill slopes to climate change. *Biogeochemistry* 69:37-62.
- Williams, M., C. Hopkinson, **E. Rastetter**, and J. Vallino. 2004. N budgets and aquatic uptake in the Ipswich River basin, northeastern Massachusetts. *Water Resources Research* 40 W11201, doi:10.1029/2004WR003172.
- Rastetter, E.B.**, J.D. Aber, D.P.C. Peters, D.S. Ojima, and I. Burke. 2003. Using mechanistic models to scale ecological processes across space and time. *BioScience* 53:68-76.

- Rastetter, E.B.** 2003. The collision of hypotheses: What can be learned from comparisons of ecosystem models? In: C.D. Canham, J.J. Cole, and W.K. Lauenroth (eds.), *Models in Ecosystem Science*. Princeton (NJ): Princeton University Press, pp. 211-224.
- Herbert, D.A., M. Williams, and **E.B. Rastetter**. 2003. A modeled analysis of N and P limitation on carbon accumulation in an Amazonian forest site after alternate land-use abandonment. *Biogeochemistry* 65:121-150.
- Le Dizès, S., B.L. Kwiatkowski, **E.B. Rastetter**, A. Hope, J.E. Hobbie, D. Stow, and S. Daeschner. 2003. Modeling biogeochemical responses of tundra ecosystems to temporal and spatial variations in climate in the Kuparuk River Basin (Alaska). *Journal of Geophysical Research-Atmospheres* 108(D2), 8165, doi:10.1029/2001JD000960.
- McKane, R.B., L.C. Johnson, G.R. Shaver, K.J. Nadelhoffer, **E.B. Rastetter**, B. Fry, A.E. Giblin, K. Kieland, B.L. Kwiatkowski, J.A. Laundre, and G. Murray. 2002. Resource-based niche provide a basis for plant species diversity and dominance in arctic tundra. *Nature* 415:68-71.
- Pontius, R.G. Jr, L. Claessens, C. Hopkinson Jr, A. Marzouk, **E.B. Rastetter**, L.C. Schneider, and J. Vallino. 2002. Scenarios of land-use change and nitrogen release in the Ipswich watershed, Massachusetts, USA. GIS/EM4 No. 165 <http://www.colorado.edu/research/cires/banff/pubpapers/165/>.
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- Williams, M., Y. Shimabokuro, D.A. Herbert, S. Pardi-Lacruz, C. Renno, and E.B. Rastetter. 2002. Heterogeneity of soils and vegetation in eastern Amazonian rain forest: implications for scaling up biomass and production. *Ecosystems* 5:692-704.
- Williams, M., **E.B. Rastetter**, G.R. Shaver, J.E. Hobbie, E. Carpino, and B.L. Kwiatkowski. 2001. Primary production in an arctic watershed; an uncertainty analysis. *Ecological Applications* 11:1800-1816.
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- Chapin, S.F. III, A.D. McGuire, J. Randerson, R. Pielke, D. Baldocchi, S.E. Hobbie, N. Roulet, W. Eugster, E. Kasiskche, **E.B. Rastetter**, S.A. Zimov, and S.W. Running. 2000. Arctic and boreal ecosystems of western North America as components of the climate system. *Global Change Biology* 6(S1):211-223.
- Clein, J.S., B.L. Kwiatkowski, A.D. McGuire, J.E. Hobbie, **E.B. Rastetter**, J.M. Melillo, and D.W. Kicklighter. 2000. Modelling carbon responses of tundra ecosystems to historical and projected climate: A comparison of a plot- and a global-scale ecosystem model to identify process-based uncertainties. *Global Change Biology* 6(S1):127-140.
- Johnson, L.C., G.R. Shaver, D.H. Cades, **E. Rastetter**, K. Nadelhoffer, A. Giblin, J. Laundre, and A. Stanley. 2000. Plant carbon-nutrient interactions control ecosystem CO₂ exchange in Alaskan wet sedge tundra ecosystems. *Ecology* 81:453-469.
- Williams, M., W. Eugster, **E.B. Rastetter**, J.P. McFadden and F.S. Chapin III. 2000. The controls on net ecosystem productivity along an arctic transect: a model comparison with flux measurements. *Global Change Biology* 6(SI):116-126.
- Ågren, G.I., G.R. Shaver, and **E.B. Rastetter**. 1999. Nutrients: dynamics and limitations, pp. 333-345. In: Y. Luo and H.A. Mooney (eds.), *Carbon Dioxide and Environmental Stress*. Academic Press, San Diego.
- Herbert, D.A., **E.B. Rastetter**, G.R. Shaver, and G.I. Ågren. 1999. Effects of plant growth characteristics on biogeochemistry and community composition in a changing climate. *Ecosystems* 2:367-382.
- Moorhead, D.L., W.S. Currie, **E.B. Rastetter**, W.J. Parton, and M.E. Harmon. 1999. Climate and litter quality controls on decomposition: An analysis of modeling approaches. *Global Biogeochemical Cycles* 13:575-589.
- Rastetter, E.B.**, L. Gough, A.E. Hartley, D.A. Herbert, K.J. Nadelhoffer, and M. Williams. 1999. A revised assessment of species redundancy and ecosystem reliability. *Conservation Biology* 13:440-443.
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