

Paul J. Hanson

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Environmental Sciences Division
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Research Expertise

Influence of climatic change on eco-physiological processes and ecosystems
Process-level physiological modeling
Deposition of trace gases to landscape surfaces
Physiology of woody plants
Air pollution stress physiology

Education

Ph.D.	University of Minnesota	Tree Physiology	1986
M.S.	University of Minnesota	Plant Physiology	1983
B.A.	St. Cloud State University	Biology (summa cum laude)	1981

Professional Experience

2012–present Corporate Fellow, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee

2006–2020 Group Leader, Ecosystem Sciences Group, Environmental Sciences Division, Oak Ridge National Laboratory

2005–2012 Distinguished R&D Staff Member, Environmental Sciences Division, Oak Ridge National Laboratory.

2004–2009 Chief Scientist, Program for Ecosystem Research, U.S. Department of Energy

2001–2004 Senior R&D Staff Member, Environmental Sciences Division, Oak Ridge National Laboratory.

1996–2001 Research Staff Member II, Environmental Sciences Division, Oak Ridge National Laboratory.

1994–1998 Adjunct Associate Professor, Department of Ecology, University of Tennessee, Knoxville.

1992–1995 Research Staff Member I, Environmental Sciences Division, Oak Ridge National Laboratory.

1989–1992 Research Associate, Physiological Ecology Group, Environmental Sciences Division, Oak Ridge National Laboratory.

1988–1989 Scientist, Automated Sciences Group, Oak Ridge, Tennessee

1986–1988 Postdoctoral Research Associate, Environmental Sciences Division, Oak Ridge National Laboratory

Professional Activities

- 2005–present Subject Editor, *Global Change Biology*
- 2018–present Member, U.S. Department of Energy’s (DOE) Environmental Systems Science Data Infrastructure for a Virtual Ecosystem (ESS–DIVE) Archive Partnership Board (APB)
- 2009–2014 Member, North American Carbon Program, Carbon Cycle Science Steering Group (Two 3-year terms)
- 2013–2014 U.S. Global Changes Research Program Invited Reviewer, Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5), Working Group I and Synthesis reports
- 2007–2012 Member, National Aeronautics and Space Administration’s Oak Ridge National Laboratory Distributed Active Archive Center (DAAC) User Working Group
- 2007–2011 Member of U.S. Environmental Protection Agency’s (EPA) Clean Air Science Advisory Committee (CASAC) NO_x & SO_x Secondary Review Panel
- 2009 Invited Congressional Testimony, 9 June 2009, Energy and Environment Subcommittee of the House Science and Technology Committee
- 2005–2008 Member of EPA’s Clean Air Science Advisory Committee (CASAC) Ozone Review Panel
- 2002–2004 Member, National Institute for Global Environmental Change (NIGEC) National Technical Advisory Committee (NTAC)
- 2003 Panel member, U.S. Department of Agriculture’s (USDA) Cooperative State Research, Education, and Extension Service (CSREES) Competitive Grants Program
- 1994–2004 Editorial Review Board, *Tree Physiology* (not 1999)
- 1995–2000 Associate Editor, *Journal of Environmental Quality* (two 3-year terms)
- 1998 Ad hoc member of an EPA Technical Qualifications Board
- 1996–1998 Advisory Board Southeast Regional Center of the National Institute for Global Environmental Change
- 1994–1995 Panel Member, DOE’s Southeast Regional Center – National Institute for Global Environmental Change
- 1994–1996 Contributing Author, EPA, contributing to the revised Air Quality Criteria Document for Particulate Matter
- 1992,1994 Panel Member, USDA's National Research Initiative Competitive Grants Program
- 1992 Grand Awards Judge, 43rd International Science and Engineering Fair.
- 1988–1990 Contributing Author, EPA, Air Quality Criteria Document for Oxides of Nitrogen

Awards and Honors

- 2015 Significant Event Award for SPRUCE (Spruce and Peatland Responses Under Changing Environments), Oak Ridge National Laboratory
- 2008 Fellow, American Association for the Advancement of Science (AAAS), Section on Biological Sciences, elected November 2008

- 2004 Award for excellence in presentation of a paper, Soil Science Society of America, Division S-7, Annual meeting, October 31 – November 4, 2004, Seattle, Washington
- 2003 Award of Merit for a Book, Society for Technical Communication
- 2002 Award for excellence in presentation of a paper, Soil Science Society of America, Division S-7, Annual meeting, November 10–14, 2002, Indianapolis, Indiana
- 1995 Distinguished Scientific Achievement Award, Environmental Sciences Division Oak Ridge National Laboratory
- 1994 Award of Merit in Scholarly Articles, Society for Technical Communication
- 1988 Sigma Xi, elected to full membership
- 1986–1988 Postdoctoral Fellowship, Oak Ridge Associated Universities
- 1985 Graduate School Fellowship, University of Minnesota
- 1980 Phi Kappa Phi

Active Society Memberships

- American Association for the Advancement of Science (AAAS)
- American Geophysical Union (AGU)
- Ecological Society of America (ESA)
- Soil Science Society of America (SSSA)

Students/Teachers Advised

Keith Rott 1987, Kelly Maas 1989, D. Susanne Ramer 1990, Cindy S. Fuhrer 1990, Stephanie Bohlman 1991–1992, Todd Tabberer 1993–94, Kristin Harter 1994–1995, James ‘Ben’ Stringfellow 1995, James Arnett 1995–1997, Tracy Misek 1996–1997, Jennifer Croker 1995–1997, M. Lala S. Chambers 1994–1997, T. Brendon Johnson 1996–1997, Morgan Castner 1997–1998, Mark Scannell 1999, Karen Voiles 1999, Philip Allen 2000–2001, Bridgette M. Boudreaux 2001&2005, Jason C. Fults 2001, Craig Wayson 2003–2005, Rebekah Wagner 2006–2007, Mats Fröberg 2006–2008, Jake Graham 2017-2020.

Faculty Sabbaticals Hosted

Yuling Fu, Chinese Academy of Science, 2009–2010; H.-J. Segschneider, Institut für Radioagronomie, Jülich, FRG, 1991; W. Hoffman, Denison University, Danville, Ohio, 1991–1992

Funded Proposals (2001–present)

- Hanson, PJ et al. 2019. Third triennial *Science Plan and Progress Report for the Terrestrial Ecosystem Science Scientific Focus Area (TES SFA)*. U.S. Department of Energy, 2019 to 2022, Funded at \$8.3M per year.
- Hanson, PJ et al. 2015. Second triennial *Science Plan for the Oak Ridge National Laboratory Terrestrial Ecosystem Science Scientific Focus Area*. U.S. Department of Energy, 2016 to 2018, Funded at \$8.255M per year

Hanson, PJ et al. 2012. *Extended Science Plan for the Oak Ridge National Laboratory Terrestrial Ecosystem Science Scientific Focus Area*. U.S. Department of Energy, 2013 to 2015, Funded at \$8M per year

Hanson, PJ et al. *Science Plan for the Terrestrial Ecosystem Science Scientific Focus Area*. U.S. Department of Energy, 2010 to 2012, Funded at \$7 to 8M per year

Hanson, PJ et al. *Science Plan for the Climate Change Response Science Focus Area*. U.S. Department of Energy, 2010 to 2013, Funded at \$5M per year

Hanson, PJ et al. *Task 3 Component of the Science Plan for the Climate Change Forcing Science Focus*, U.S. Department of Energy, 2010 to 2013, ~\$400K per year

Hanson PJ *Climate Change Response Science Focus Area*. 2007–2009, ~\$2.5M per year

Hanson PJ *Program for Ecosystem Research Chief Scientist*. 2004–2009, ~\$200,000 per year

Gu L, Hanson PJ, Pallardy SG, Wullschleger SD, Edwards NT. *Regulation of carbon sequestration and water use in an Ozark Forest: Proposing a new strategically located Ameriflux tower site in Missouri*. U.S. Department of Energy, 2003–2005, ~\$1.397M over three years.

Hanson PJ, Tschaplinski TJ, Wullschleger SD, Augé RM. *Identifying Critical Thresholds for Plant/Ecosystem Response to Moisture Stress*. U.S. Department of Energy, 2002–2004, ~\$900,000 over three years.

Hanson PJ, Trumbore SE, Gaudinski J, Southon J, Torn M, Jastrow J. *Enriched Background Isotope Study (EBIS)*, U.S. Department of Energy, 2002–2004, ~\$2.7M over three years.

Hanson PJ. *Mechanisms of forest ecosystem adjustments to altered precipitation-the Walker Branch Throughfall Displacement Experiment (TDE)*. Renewal proposal 2002–2006, \$2.2M over five years.

Hanson PJ and others. *Mechanisms of Forest Ecosystem Adjustment to Altered Precipitation - The Walker Branch Throughfall Displacement Experiment (TDE)*. Renewal proposal 1999–2001, \$2.6M over three years.

Publications

ORCID ID: <http://orcid.org/0000-0001-7293-3561>; **ResearcherID:** D-8069-2011

Web of Science metrics (All Data Bases, September 2020)

h-index = 61 with >14,000 citations for 166 indexed publications

Scopus metrics, September 2020

h-index = 59 with >13,588 citations for 162 indexed publications

Google Scholar metrics, September 2020

h-index 71; i10-index 161; with 21,314 citations for over 300 items

Published works and data sets (1 book; 214 articles; 32 data sets)

38 Publications with more than 100 citations

Book:

Hanson PJ, Wullschleger SD, Editors (2003) *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, 421 p.

Articles, Book Chapters, and Key Reports:

1. Wilson RM, Tfaily MM, Zalman CM, Kolton MM, Johnston E, Petro C, **Hanson PJ**, Heyman HM, Kyle J, Hoyt DW, Eder EK, Purvine SO, Kolka RK, Sebestyen SD, Griffiths NA, Schadt CW, Keller JK, Bridgham SD, Chanton JP, Kostka JE (2020) Soil metabolome response to whole ecosystem warming at the Spruce and Peatland Responses Under Changing Environments experiment. *Proceedings of the National Academy of Sciences* (being revised for final review).
2. Poyatos R, Granda V, Flo V, Mencuccini M, Steppe K, Martínez-Vilalta J, SAPFLUXNET contributors [**Hanson PJ**, Norby RJ Wullschleger SD] (2020) Global transpiration data from sap flow measurements: the SAPFLUXNET database. *Earth System Science Data* ??
3. Graham JD, **Hanson PJ**, Phillips JR, Warren JM, Wullschleger SD, Glenn NF (2020) *Picea mariana* and *Larix laricina* growth responses to elevated temperature and CO₂: a four-year synthesis from the SPRUCE experiment. *Global Change Biology* (Submitted).
4. Shi X, Ricciuto DM, Thornton PE, Xu X, Yuan F, Norby RJ, Walker AP, Warren J, Mao J, **Hanson PJ**, Meng L, Weston D, Griffiths NA (2020) Modeling the hydrology and physiology of *Sphagnum* moss in a northern temperate bog. *Biogeosciences Discussion* <https://doi.org/10.5194/bg-2020-90>
5. McPartland MY, Montgomery RA, **Hanson PJ**, Phillips JR, Kolka RK, Palik B (2020) Vascular plant species response to warming and elevated carbon dioxide in a boreal peatland. *Environmental Research Letters* (Submitted).
6. Yuan F, Wang Y, Ricciuto DM, Shi X, Yuan F, **Hanson PJ**, Thornton PE, Xu X (2020) An Integrative Model for Soil Biogeochemistry and Methane Processes: II. Warming and Elevated CO₂ Effects on Peatland CH₄ Emission. *Journal of Geophysical Research - Biogeosciences* (Revisions made and returned).
7. Ricciuto DM, Xu X, Shi X, Wang Y, Song X, Schadt CW, Griffiths NA, Mao J, Warren JM, Thornton PE, Chanton J, Keller JK, Bridgham S, Gutknecht J, Stephen D. Sebestyen⁷, Adrien Finzi⁸, Randall Kolka⁷, and **Hanson PJ** (2019) An interactive model for soil biogeochemistry and methane processes: I. model structure and sensitivity analyses. *Journal of Geophysical Research - Biogeosciences* (accepted).
8. Malhotra A, Brice D, Childs J, Graham JD, Hobbie EA, Vander Stel H, Feron SC, **Hanson PJ**, Iversen CM (2020) Peatland warming strongly increases fine-root growth. *Proceedings of the National Academy of Sciences* doi: <https://doi.org/10.1073/pnas.2003361117>
9. **Hanson PJ**, Griffiths NA, Iversen CM, Norby RJ, Sebestyen SD, Phillips JR, Chanton JP, Kolka RK, Malhotra A, Oleheiser KC, Warren JM, Shi X, Yang X, Mao J, Ricciuto DM (2020) Rapid net carbon loss from a whole-ecosystem warmed peatland. *AGU Advances* 1, e2020AV000163. <https://doi.org/10.1029/2020AV000163>

10. Hoppel AM, Wilson, RM, Kolton, M, Zalman, CA, Chanton JP, Kostka J, **Hanson PJ**, Keller JK, Bridgham SD (2020) Massive peatland carbon banks vulnerable to rising temperatures. *Nature Communication* 11:2373 doi: 10.1038/s41467-020-16311-8
11. Graham JD, Glenn NF, Spaete LP, **Hanson PJ** (2020) Characterizing Peatland Microtopography Using Gradient and Microform-Based Approaches. *Ecosystems* <https://doi.org/10.1007/s10021-020-00481-z>
12. Paschalis A, Fatichi S, Zscheischler J, Ciais P, Bahn M, Boysen L, Chang J, De Kauwe M, Estiarte M, Goll D, **Hanson PJ**, Harper AB, Hou E, Kigel J, Knapp AK, Larsen KS, Li W, Lierert S, Luo Y, Meir P, Ogaya R, Parolari AJ, Peng C, Peñuelas J, Pongratz J, Rambal S, Schmidt IK, Shi H, Sternberg M, Tian H, Tschumi E, Ukkola A, Vicca S, Viogy N, Wang Y-P, Wang Z, Wu D, Zhu Q (2020) Rainfall-manipulation experiments as simulated by terrestrial biosphere models: where do we stand? *Global Change Biology* 26:3336-3355 <https://doi.org/10.1111/gcb.15024>.
13. Kluber LA, Johnston ER, Allen SA, Hendershot JN, **Hanson PJ**, Schadt CW (2020) Constraints on microbial communities, decomposition and methane production in deep peat deposits. *PLOS ONE* 15(2):e0223744. <https://doi.org/10.1371/journal.pone.0223744>.
14. **Hanson PJ**, Walker AP (2020) Invited Commentary: “Advancing global change biology through experimental manipulations: Where have we been and where might we go?” *Global Change Biology* 26:287-299, <https://doi.org/10.1111/gcb.14894>.
15. Norby RJ, Childs J, **Hanson PJ**, Warren JM (2019) Rapid loss of an ecosystem engineer: Sphagnum decline in an experimentally warmed bog. *Ecology and Evolution* 9:12571-12585. doi:10.1002/ece3.5722.
16. Ward EJ, Warren JM, McLennan DA, Dusenge ME, Way DA, Stan D, Wullschleger SD, **Hanson PJ** (2019) Photosynthetic and respiratory responses of two bog shrub species to whole ecosystem warming and elevated CO₂ at the boreal-temperate ecotone. *Frontiers in Forests and Global Change* 2:article 54, doi: 10.3389/ffgc.2019.00054.
17. Carrell AA, Kolton M, Glass JB, Pelletier DA, Warren MJ, Kostka JE, Iversen CM, **Hanson PJ**, Weston DJ (2019) Experimental warming alters the composition, diversity and N₂ fixation activity of the peat moss (*Sphagnum fallax*) microbiomes. *Global Change Biology* 25:2993-3004, <https://doi.org/10.1111/gcb.14715>
18. Jensen AM, Warren JM, King AW, Ricciuto DM, **Hanson PJ**, Wullschleger SD (2019) Simulated projections of boreal forest peatland ecosystem productivity are sensitive to observed seasonality in leaf physiology. *Tree Physiology* 39:556-572, doi:10.1093/treephys/tpy140.
19. Liang J, Wang G, Ricciuto DM, Gu L, **Hanson PJ**, Wood JD, Mayes MA (2019) Evaluating the E3SM Land Model at a temperate forest site using flux and soil water measurements, *Geoscientific Model Development* 12:1601-1612, <https://doi.org/10.5194/gmd-12-1601-2019>.
20. Huang Y, Stacy M, Jiang J, Sundi N, Ma S, Saruta V, Jung CG, Shi Z, Xia J, **Hanson PJ**, Ricciuto D, Luo Y (2019) Realized ecological forecast through an interactive ecological platform for assimilating data (EcoPAD, v 1.0) into models.

Geoscientific Model Development 12:1119–1137, <https://doi.org/10.5194/gmd-12-1119-2019>.

21. Asbjornsen H, Campbell JL, Jennings KA, Vadeboncoeur MA, McIntire C, Templer PH, Phillips RP, Bauerle TL, Dietze MC, Frey SD, Groffman PM, Guerrieri R, **Hanson PJ**, Kelsey EP, Knapp AK, McDowell NG, Meir P, Novick KA, Ollinger SV, Pockman WT, Schaberg G, Wullschleger SD, Smith MD, Rustad L (2018) Guidelines and considerations for designing precipitation manipulation experiments in forest ecosystems. *Methods in Ecology and Evolution* 9:2310-2325, doi: 10.1111/2041-210X.13094.
22. Krassovski MB, Lyon GE, Riggs JS, **Hanson PJ** (2018) Near real time environmental monitoring and large volume data collection over slow communication links. *Geoscientific Instrumentation, Geoscientific Instrumentation, Methods and Data Systems* 7:289-295, doi:10.5194/gi-7-289-2018.
23. Richardson AD, Hufkens K, Milliman T, Aubrecht DM, Furze ME, Seyednasrollah B, Krassovski MB, Latimer JM, Nettles WR, Heiderman RR, Warren JM, **Hanson PJ** (2018) Ecosystem warming extends vegetation activity but heightens cold temperature vulnerability. *Nature* 560:368-371, doi: 10.1038/s41586-018-0399-1.
24. Steinweg JM, Kostka JE, **Hanson PJ**, Schadt CW (2018) Temperature sensitivity of extracellular enzymes differs with peat depth but not with season in an ombrotrophic bog. *Soil Biology and Biochemistry* 125:244-250, <https://doi.org/10.1016/j.soilbio.2018.07.001>.
25. McFarlane KJ, **Hanson PJ**, Iversen CM, Phillips JR, Brice DJ (2018) Local spatial heterogeneity of Holocene carbon accumulation throughout the peat profile of an ombrotrophic Northern Minnesota bog. *Radiocarbon* 60:941-962, doi:10.1017/RDC.2018.37.
26. Jiang J, Huang Y, Ma S, Stacy M, Shi Z, Ricciuto DM, **Hanson PJ**, Luo Y (2018) Forecasting responses of a northern peatland carbon cycle to elevated CO₂ and a gradient of experimental warming. *Journal of Geophysical Research – Biogeosciences* 123: 1057-1071, <https://doi.org/10.1002/2017JG004040>.
27. Smith RJ, Nelson PR, Jovan S, **Hanson PJ**, McCune B (2018) Novel climates reverse carbon uptake of atmospherically-dependent epiphytes: climatic constraints on the iconic boreal forest lichen *Evernia mesomorpha*. *American Journal of Botany* 105: 266-274, doi: 10.1002/ajb2.1022
28. Tfaily MM, Wilson RM, Cooper WT, Kostka JE, **Hanson P**, Chanton JP (2018) Vertical stratification of peat pore water dissolved organic matter composition in a peat bog in Northern Minnesota. *Journal of Geophysical Research – Biogeosciences* 123:479-494. <https://doi.org/10.1002/2017JG004007>
29. Iversen CM, Childs C, Norby RJ, Ontl TA, Kolka RK, Brice DJ, McFarlane KJ, **Hanson PJ** (2018) Fine-root growth in a forested bog is seasonally dynamic, but shallowly distributed in a nutrient-poor peat. *Plant and Soil* 424: 123-143, doi:10.1007/s11104-017-3231-z.
30. Griffiths NA, **Hanson PJ**, Ricciuto DM, Iversen CM, Jensen AM, Malhotra A, McFarlane KJ, Norby RJ, Sargsyan K, Sebestyen SD, Shi X, Walker AP, Ward EJ, Warren JM, Weston DJ (2017) Temporal and spatial variation in peatland

- carbon cycling and implications for interpreting responses of an ecosystem-scale warming experiment. *Soil Science Society of America Journal* 81:1668-1688, doi:10.2136/sssaj2016.12.0422
31. Barba J, Cueva A, Bahn M, Barron-Gafford GA, Bond-Lamberty B, **Hanson PJ**, Jaimes A, Kulmala L, Pumpanen J, Scott RL, Wohlfahrt G, Vargas R (2018) Comparing ecosystem and soil respiration: a review of tower-based and soil measurements challenges. *Agricultural and Forest Meteorology* 249:434-443, doi: 10.1016/j.agrformet.2017.10.028
 32. Ma S, Jiang J, Huang Y, Shi Z, Wilson RM, Ricciuto D, **Hanson PJ**, Luo Y (2017) Data-constrained projections of methane fluxes in a northern Minnesota peatland in response to elevated CO₂ and warming. *Journal of Geophysical Research – Biogeosciences* 122: 2841-2861, doi: 10.1002/2017JG003932
 33. Huang Y, Jiang J, Ma S, Ricciuto DM, **Hanson PJ**, Luo Y (2017) Soil thermal dynamics, snow cover and frozen depth under five temperature treatments in an ombrotrophic bog: constrained forecast with data assimilation. *Journal of Geophysical Research – Biogeosciences* 122: 2046-2063, doi:10.1002/2016JG003725
 34. Wilson RM, Tfaily MM, Rich VI, Keller JK, Bridgham SD, Medvedeff C, Meredith L, **Hanson PJ**, Hines M, Pfeifer-Meister L, Saleska SR, Crill P, Cooper WT, Chanton JP, Kostka JE (2017) Hydrogenation of organic matter as a terminal electron sink sustains high CO₂:CH₄ production ratios during anaerobic decomposition. *Organic Geochemistry* 112:22-32, doi: 10.1016/j.orggeochem.2017.06.011
 35. Porras RC, Hicks Pries CE, McFarlane KJ, **Hanson PJ**, Torn MS (2017) Association with pedogenic iron and aluminum: effects on soil organic carbon storage and stability in four temperate forest soils. *Biogeochemistry* 133:333-345, doi:10.1007/s10533-017-0337-6
 36. Walker AP, Carter KR, Gu L, **Hanson PJ**, Malhotra A, Norby RJ, Sebestyen SD, Wullschlegel SD, Weston DJ (2017) Biophysical drivers of seasonal variability in *Sphagnum* gross primary production in a northern temperate bog. *Journal of Geophysical Research - Biogeosciences* 122:1078-1097, doi:10.1002/2016JG003711
 37. Hobbie EA, Chen J, **Hanson PJ**, Iversen CM, McFarlane KJ, Thorp NR, Hofmockel KS (2017) Long-term carbon and nitrogen dynamics at spruce revealed through stable isotopes in peat profiles. *Biogeosciences* 14:2481-2494, doi:10.5194/bg-14-2481-2017.
 38. **Hanson PJ**, Riggs JS, Nettles WR, Phillips JR, Krassovski MB, Hook LA, Gu L, Richardson AD, Aubrecht DM, Ricciuto DM, Warren JM, Barbier C (2017) Attaining whole-ecosystem warming using air and deep soil heating methods with an elevated CO₂ atmosphere. *Biogeosciences* 14: 861–883, doi: 10.5194/bg-14-861-2017
 39. Wilson RM, Hopple AH, Tfaily MM, Sebestyen S, Schadt CW, Pfeifer-Meister L, Medvedeff C, McFarlane K, Kostka JE, Kolton M, Kolka R, Kluber L, Keller J, Guilderson T, Griffiths N, Chanton JP, Bridgham S, **Hanson PJ** (2016) Stability of peatland carbon to rising temperatures. *Nature Communications* 7:13723, doi: 10.1038/NCOMMS13723.

40. Phillips RP, Ibanez I, D'Orangeville L, **Hanson PJ**, Ryan MG, McDowell N (2016) A belowground perspective on the drought sensitivity of forests: towards improved understanding and simulation. *Forest Ecology & Management* 380:309-320, <http://dx.doi.org/10.1016/j.foreco.2016.08.043>
41. **Hanson PJ**, Gill AL, Xu X, Phillips JR, Weston DJ, Kolka RK, Riggs JS, Hook LA (2016) Intermediate-scale community-level flux of CO₂ and CH₄ in a Minnesota peatland: Putting the SPRUCE project in a global context. *Biogeochemistry* 129: 255-272, doi: 10.1007/s10533-016-0230-8.
42. Xu X, Yuan F, **Hanson PJ**, Wullschleger SD, Thornton PE, Riley WJ, Song X, Graham DE, Song C, Tian H (2016) Reviews and syntheses: four decades of modeling methane cycling in terrestrial ecosystems. *Biogeosciences* 13:3735-3755, doi:10.5194/bg-13-3735-2016.
43. Estiarte M, Vicca S, Peñuelas J, Bahn M, Beier C, Emmett BA, Fay PA, **Hanson PJ**, Hasibeder R, Kigel J, Kröel-Dulay G, Larsen KS, Lellei-Kovács E, Limousin JM, Ogaya R, Ourcival JM, Reinsch S, Sala OE, Schmidt IK, Sternberg M, Tielbörger K, Tietema A, Janssens IA (2016) Few multi-year precipitation-reduction experiments find a shift in the productivity-precipitation relationship. *Global Change Biology* 22:2570–2581, doi: 10.1111/gcb.13269
44. Wenk ES, Callahan MA Jr., **Hanson PJ** (2016) Soil macro-invertebrate communities across a productivity gradient in deciduous forests of eastern North America. *Northeastern Naturalist* 23:25-44.
45. McDowell N, **Hanson PJ**, Ibanez I, Phillips RP, Ryan MG (2016) Physiological Responses of Forests to Drought. pp. 49-58. In Vose JM, Clark JS, Luce CH, Patel-Weynand T eds. *Effects of drought on forests and rangelands in the United States: a comprehensive science synthesis*. Gen. Tech. Rep. WO-93b. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office.
46. Krassovski MB, Riggs JS, Hook LA, Nettles WR, Boden TA, **Hanson PJ** (2015) A comprehensive data acquisition and management system for an ecosystem-scale peatland warming and elevated CO₂ experiment. *Geoscientific Instrumentation Methods and Data Systems* 4:203–213, doi:10.5194/gi-4-203-2015, Data at doi: 10.3334/CDIAC/spruce.013
47. Shi X, Thornton PE, Ricciuto DM, **Hanson PJ**, Mao J, Sebestyen SD, Griffiths NA, Bisht G (2015) Representing northern peatland microtopography and hydrology within the Community Land Model. *Biogeosciences* 12:6463-6477, doi:10.5194/bg-12-6463-2015.
48. D'Odorico P, Gonsamob A, Gough CM, Bohrer G, Morisone J, Wilkinsone M, **Hanson PJ**, Gianelle D, Fuentes JD, Buchmann N (2015) The match and mismatch between photosynthesis and land surface phenology of deciduous forests. *Agricultural and Forest Meteorology* 214:25-38, doi:10.1016/j.agrformet.2015.07.005
49. Torn MS, Chabbi A, Crill P, **Hanson PJ**, Janssens IA, Luo Y, Hicks Pries C, Rumpel C, Schmidt MWI, Six J, Schrumpp M, Zhu B (2015) A call for international soil experiment networks for studying, predicting, and managing global change impacts. *Soil* 1:575-582.

50. Jensen AM, Warren JM, **Hanson PJ**, Childs J, Wullschleger SD (2015) Needle age and season influence photosynthetic temperature response and total annual carbon uptake in mature *Picea mariana* trees. *Annals of Botany* 116: 821–832, doi:10.1093/aob/mcv115,
51. Medlyn BE, Zaehle S, De Kauwe MG, Walker AP, Dietze MC, **Hanson PJ**, Hickler T, Jain AK, Luo Y, Parton W, Prentice IC, Thornton PE, Wang S, Wang Y-P, Weng E, Iversen CM, McCarthy HR, Warren JM, Oren R, Norby RJ (2015) Using ecosystem experiments to improve vegetation models. *Nature Climate Change* 5:528-534, doi: 10.1038/NCLIMATE2621
52. Bailey V, **Hanson PJ**, Jastrow J, Torn M, Stover D (2014) *Data-model needs for belowground ecology. A summary report from the Terrestrial Ecosystem Science (TES) Mini-Workshop*, <http://science.energy.gov/~media/ber/pdf/workshop%20reports/Belowground-Workshop-Report-Nov2014.pdf>
53. Warren JM, **Hanson PJ**, Iversen CM, Kumar J, Walker AP, Wullschleger SD (2015) Root structural and functional dynamics in terrestrial biosphere models – evaluation and recommendations. *New Phytologist* 205:59-78, doi:10.1111/nph.13034.
54. De Kauwe MG, Medlyn BE, Zaehle S, Walker AP, Dietze M, Wang Y-P, Luo Y, Jain AK, El-Masri B, Hickler T, Wårlind D, Weng E, Parton WJ, Thornton PE, Wang S, Prentice IC, Asao S, Smith B, McCarthy HR, Iversen CM, **Hanson PJ**, Warren JM, Oren R, Norby RJ (2014) Where does the carbon go? A model-data intercomparison of carbon allocation at two temperate forest free-air CO₂ enrichment sites. *New Phytologist* 203:883-899, doi: 10.1111/nph.12847
55. Walker AP, **Hanson PJ**, De Kauwe MG, Medlyn BE, Zaehle S, Asao S, Dietze M, Hickler T, Huntingford C, Iversen CM, Jain A, Lomas M, Luo Y, McCarthy H, Parton W, Prentice IC, Thornton PE, Wang S, Wang Y-P, Warlind D, Weng E, Warren JM, Woodward FI, Oren R, Norby RJ (2014) Comprehensive ecosystem model-data synthesis using multiple data sets at two temperate forest free-air CO₂ enrichment experiments: Model performance at ambient CO₂ concentration. *Journal of Geophysical Research - Biogeosciences* 119: 937-964, doi:10.1002/2013JG002553
56. Tfaily MM, Cooper WT, Kostka J, Chanton PR, Schadt CW, **Hanson PJ**, Iversen CM, Chanton JP (2014) Organic matter transformation in the peat column at Marcell Experimental Forest: humification and vertical stratification. *Journal of Geophysical Research – Biogeosciences* 119:661-675, doi:10.1002/2013/JG002492.
57. Vicca S, Bahn M, Estiarte M, van Loon EE, Vargas R, Alberti G, Ambus P, Arain MA, Beier C, Bentley LP, Borken W, Buchmann N, Collins SL, de Dato G, Dukes JS, Escolar C, Fay P, Guidolotti G, **Hanson PJ**, Kahmen A, Kröel-Dulay G, Ladreiter-Knauss T, Larsen KS, Lellei-Kovacs E, Lebrija-Trejos E, Maestre FT, Marhan S, Marshall M, Meir P, Miao Y, Muhr J, Niklaus PA, Ogaya R, Peñuelas J, Poll C, Rustad LE, Savage K, Schindlbacher A, Schmidt IK, Smith AR, Sotta ED, Suseela V, Tietema A, van Gestel N, van Straaten O, Wan S, Weber U, Janssens IA (2014) Can current moisture responses predict soil

- respiration under altered precipitation regimes? A synthesis of manipulation experiments. *Biogeosciences* 11:2991-3013, doi:10.5194/bgd-11-853-2014
58. Zaehle S, Medlyn BE, De Kauwe MG, Walker AP, Dietze MC, Hickler T, Luo Y, Wang Y-P, El-Masri B, Thornton P, Jain A, Wang S, Wårlind D, Weng E, Parton W, Iversen CM, Gallet-Budynek A, Mccarthy H, Finzi A, **Hanson PJ**, Prentice IC, Oren R, Norby RJ (2014) Evaluation of 11 terrestrial carbon–nitrogen cycle models against observations from two temperate Free-Air CO₂ Enrichment studies. *New Phytologist* 202:803–822, doi:10.1111/nph.12697
 59. Ryan MG, Vose JM, **Hanson PJ**, Iversen LR, Miniati CF, Luce CH, Band LE, Klein SL, McKenzie D, Wear DN (2014) Chapter 3 Forest Processes, pp. 25-54, In Peterson DL, Vose JM, Patel-Weynand T, Eds., *Climate Change and United States Forests*, Springer Book Series: *Advances in Global Change Research* 57:25-54.
 60. Williams RS, Marbert BS, Fisk MC, **Hanson PJ** (2014) Ground-dwelling beetle responses to long-term precipitation alterations in a hardwood forest. *Southeastern Naturalist* 13:138-155.
 61. DeKauwe MG, Medlyn BE, Zaehle S, Walker AP, Dietze MC, Hickler T, Jain AK, Luo Y, Parton WJ, Prentice IC, Smith B, Thornton PE, Wang S, Wang Y-P, Warland D, Weng E, Crous KY, Ellsworth DS, **Hanson PJ**, Kim H-S, Warren JM, Oren R, Norby RJ (2013) Forest water use and water use efficiency at elevated CO₂: a model-data intercomparison at two contrasting temperate forest FACE sites. *Global Change Biology* 19:1759-1779, doi:10.1111/gcb.12164.
 62. Ryan MG, Vose JM, Ayres MP, Band LE, Ford CR, **Hanson PJ**, Hicke JA, Iversen BK, Kerns BK, Klein SL, Littell JS, Luce CH, McKenzie D, Wear DN, Weed AS (2013) Chapter 2 Effects of Climate Variability and Change, pp. 7-95 In: SL, Vose JM, Peterson DL, Patel-Weynand T, Eds. *Effects of Climate Variability and Change on Forest Ecosystems: A Comprehensive Science Synthesis for the U.S. Forest Sector*, Gen. Tech. Rep. PNW-GTR-870, Portland, Oregon.
 63. McFarlane KJ, Torn MS, **Hanson PJ**, Porras RC, Swanston CW, Callahan MA Jr., Guilderson TP (2013) Comparison of soil organic matter dynamics at five temperate deciduous forests with physical fractionation and radiocarbon measurements. *Biogeochemistry* 112:457-476, DOI:10.1007/s10533-0212-9740-1
 64. Barbier C, **Hanson PJ**, Todd DE Jr, Belcher D, Jekabson EW, Thomas WK, Riggs JS (2012) Air Flow and Heat Transfer in a Temperature Controlled Open Top Enclosure, ASME International Mechanical Engineering Congress and Exposition, 2012, Houston, TX, Paper #IMECE2012-86352.
 65. Parsekian AD, Slater L, Ntarlagiannis D, Nolan J, Sebestyen SD, Kolka RK, **Hanson PJ** (2012) Uncertainty in peat volume and soil carbon estimated using ground-penetrating radar and probing. *Soil Science Society of America Journal* 76:1911-1918, doi: 10.2136/sssaj2012.0040.
 66. Gunderson CA, Edwards NT, Walker AV, O’Hara KH, Campion CM, **Hanson PJ** (2012) Forest phenology and a warmer climate – growing season extension in relation to climatic provenance. *Global Change Biology* 18:2008-2025, doi: 10.1111/j.1365-2486.2011.02632.x

67. Tipping E, Chamberlain PM, Fröberg M, **Hanson PJ**, Jardine PM (2012) Simulation of carbon cycling, including dissolved organic carbon transport, in forest soil locally enriched with ¹⁴C. *Biogeochemistry* 108:91-107, doi 10.1007/s10533-011-9575-1.
68. Weston DJ, **Hanson PJ**, Norby RJ, Tuskan GA, Wullschleger SD (2012) From systems biology to photosynthesis and whole-plant physiology. *Plant Signaling and Behavior* 7:2, 260-262, doi: 10.4161/psb.18802.
69. Wagner RJ, Kay MW, Abrams MD, **Hanson PJ**, Martin M (2012) Tree-ring growth and wood chemistry response to manipulated precipitation variation for two temperate *Quercus* species. *Tree-Ring Research* 68:17-29 (See also front piece 68: 1), doi: 10.3959/2010-6.1.
70. Gu, L, Massman WJ, Leuning R, Pallardy SG, Meyers T, **Hanson PJ**, Riggs JS, Hosman KP, Yang B (2011) The fundamental equation of eddy covariance and its application in flux measurements. *Agricultural and Forest Meteorology* 152:135-148, doi: 10.1016/j.agrformet.2011.09.014
71. Vargas R, Baldocchi DD, Bahn M, **Hanson PJ**, Hosman KP, Kulmala L, Pumpanen J, Yang B (2011) On the multi-temporal correlation between photosynthesis and soil CO₂ efflux: reconciling lags and observations. *New Phytologist* 191:1006-1017, doi:10.1111/j.1469-8137.2011.03771.x
72. Wullschleger SD, Childs KW, King AW, **Hanson PJ** (2011) A model of heat transfer in sapwood and implications for sap flux density measurements using thermal dissipation probes. *Tree Physiology* 31:669-679, doi:10.1093/treephys/tpr051
73. **Hanson PJ**, Childs KW, Wullschleger SD, Riggs JS, Thomas WK, Todd DE, Warren JM (2011) A method for experimental heating of intact soil profiles for application to climate change experiments. *Global Change Biology* 17:1083–1096, doi: 10.1111/j.1365-2486.2010.02221.x.
74. Parton WJ, **Hanson PJ**, Swanston C, Torn M, Trumbore SE, Riley W, Kelly R (2010) ForCent model development and testing using the Enriched Background Isotope Study (EBIS) experiment. *JGR-Biogeosciences* 115:G04001, doi:10.1029/2009JG001193
75. Yang B, Pallardy SG, Meyers TP, Gu L-H, **Hanson PJ**, Wullschleger SD, Heuer M, Hosman KP, Riggs JS, Sluss DW (2010) Environmental controls on water use efficiency during severe drought in an Ozark Forest in Missouri, USA. *Global Change Biology* 16:2252-2271, doi:10.1111/j.1365-2486.2009.02138.x.
76. Kardol P, Todd DE, **Hanson PJ**, Mulholland PJ (2010) Long-term successional forest dynamics: species and community responses to climatic variability. *Journal of Vegetation Science* 21:627-642.
77. Kramer C, Trumbore S, Fröberg M, Cisneros-Dozal LM, Zhang D, Xu X, Santos G, **Hanson PJ** (2010) Recent (<4 year old) leaf litter is not a major source of microbial carbon in a temperate forest mineral soil. *Soil Biology and Biochemistry* 42:1028-1037.
78. Amthor JS, **Hanson PJ**, Norby RJ, Wullschleger SD (2010) A comment on “Appropriate experimental ecosystem warming methods by ecosystem, objective, and practicality” by Aronson and McNulty”. *Agricultural and Forest Meteorology* 150: 497-498.

79. Riley WJ, Gaudinski JB, Torn MS, Joslin JD, **Hanson PJ** (2009) Fine-root mortality rates in a temperate forest: estimates using radiocarbon data and numerical modeling. *New Phytologist* 184:387-398.
80. **Hanson PJ**, Gunderson CA (2009) Root carbon flux: measurements versus mechanisms. *New Phytologist* 184:4-6.
81. Gaudinski JB, Torn MS, Riley WJ, Swanston C, Trumbore SE, Joslin JD, Majdi H, Dawson TE, **Hanson PJ** (2009) Use of stored carbon reserves in growth of temperate tree roots and leaf buds: analyses using radiocarbon measurements and modeling. *Global Change Biology* 15:992-1014.
82. Fröberg M, **Hanson PJ**, Trumbore SE, Swanston CW, Todd DE (2009) Flux of carbon from ¹⁴C-enriched leaf litter throughout a forest soil mesocosm. *Geoderma* 149:181-188.
83. Bernier P, **Hanson PJ**, Curtis PS (2008) Measuring litterfall and branchfall. Chapter 7 In: Hoover CM Ed., *Field Measurements for Forest Carbon Monitoring*, Springer, New York, pp. 91-101.
84. Gu L, **Hanson PJ**, Post WM, Liu Q (2008) A novel approach for identifying the true temperature sensitivity from soil respiration measurements, *Global Biogeochemical Cycles* 22, GB4009, doi:10.1029/2007GB003164.
85. Gerten D, Luo Y, Le Maire G, Parton WJ, Keough C, Weng E, Beier C, Ciais P, Cramer W, Dukes JS, Sowerby A, **Hanson PJ**, Knapp AK, Linder S, Nepstad D, Rustad L, Sowerby A (2008) Modelled effects of precipitation on ecosystem carbon and water dynamics in different climatic zones. *Global Change Biology* 14:2365-2379.
86. **Hanson PJ** and others (2008) Ecosystem Experiments: Understanding Climate Change Impacts on Ecosystems and Feedbacks to the Physical Climate. Workshop Report on Exploring Science Needs for the Next Generation of Climate Change and Elevated CO₂ Experiments in Terrestrial Ecosystems. 14–18 April 2008, Arlington, Virginia, https://science.osti.gov/-/media/ber/pdf/Ecosystem_experiments.pdf
87. Luo Y, Gerten D, Le Marie G, Parton WJ, Weng E, Zhou X, Keough C, Beier C, Ciais P, Cramer W, Dukes JS, Emmett B, **Hanson PJ**, Knapp A, Linder S, Nepstad D, Rustad L (2008) Modeled interactive effects of precipitation, temperature, and [CO₂] on ecosystem carbon and water dynamics in different climatic zones. *Global Change Biology* 14:1986-1999.
88. Fröberg M, **Hanson PJ**, Todd DE, Johnson DW (2008) Evaluation of effects of sustained decadal precipitation manipulations on soil carbon stocks. *Biogeochemistry* 89:151-161.
89. Johnson DW, Todd DE Jr., **Hanson PJ** (2008) The effects of throughfall manipulation on soil nutrient status: results of 12 years of sustained wet and dry treatments. *Global Change Biology* 14:1661-1675.
90. Gu L, **Hanson PJ**, Post WM, Kaiser DP, Yang B, Nemani R, Pallardy SG, Meyers T (2008) The 2007 eastern US spring freezes: Increased cold damage in a warming world. *Bioscience* 58:253-262.
91. Luyssaert S, Inglima I, Jung M, Richardson AD, Reichstein M, Papale D, Piao S, Schulze E-D, Wingate L, Matteucci G, Aragao L, Aubinet M, Beer C, Bernhofer C, Black KG, Bonal D, Bonnefond JM, Chambers J, Ciais P, Cook B, Davis KJ,

- Dolman AJ, Gielen B, Goulden M, Grace J, Granier A, Grelle A, Griffis T, Grünwald T, Guidolotti G, **Hanson PJ**, Harding R, Hollinger D, Hutya LR, Kolari P, Kruijt B, Kutsch W, Lagergren F, Laurila T, Law B, LeMaire G, Lindroth A, Loustau D, Malhi Y, Mateus J, Migliavacca M, Mission L, Montagnani L, Moncrieff J, Moors E, Munger JW, Nikinmaa E, Ollinger SV, Pita G, Rebmann C, Roupsard O, Saigusa N, Sanz MJ, Seufert G, Sierra C, Smith ML, Tang J, Valentini R, Vesala T, Janssens IA. (2007) CO₂ balance of boreal, temperate, and tropical forests derived from a global database. *Global Change Biology* 13:2509-2537.
92. Yang B, **Hanson PJ**, Riggs JS, Pallardy SG, Heuer M, Hosman KP, Meyers TP, Wullschleger SD, Gu L (2007) Biases of CO₂ storage in eddy flux measurements in a forest pertinent to vertical configurations of a profile system and CO₂ density averaging. *Journal of Geophysical Research* 112; D20123, doi:10.1029/2006JD008243.
93. **Hanson PJ**, Kurz WA (2007) Commercial and project-based responses and associated research initiatives in the forest sector. In Freer-Smith PH, Broadmeadow MSJ, Lynch JM, Eds. *Forestry and Climate Change*, CAB International, pp. 226-232.
94. Garten CT Jr, **Hanson PJ**, Todd DE Jr, Lu BW, Brice DJ (2007) Natural ¹⁵N and ¹³C abundance as indicators of forest N status and soil C dynamics, pp. 61-82. IN (R.H. Michener and K. Lajtha, eds.) *Stable Isotopes in Ecology and Environmental Science* (second edition). Blackwell Science, Oxford.
95. **Hanson PJ**, Tschaplinski TJ, Wullschleger SD, Todd DE Jr., Augé RM (2007) The Resilience of Upland-Oak Forest Canopy Trees to Chronic and Acute Precipitation Manipulations. In: Buckley DS and Clatterbuck WK, Eds, *Proceedings 15th Central Hardwood Forest Conference, Knoxville, TN February 27–March 1, 2006*, e-General Technical Report SRS–101, United States Department of Agriculture, Forest Service Southern Research Station, pp. 3-12.
96. Pallardy SG, Gu L, **Hanson PJ**, Myers TP, Wullschleger SD, Yang B, Riggs JS, Hosman KP, Mark Heuer M (2007) Carbon Dioxide Fluxes in a Central Hardwoods Oak-hickory Forest Ecosystem. In: Buckley DS and Clatterbuck WK, Eds, *Proceedings 15th Central Hardwood Forest Conference, Knoxville, TN February 27–March 1, 2006*, e-General Technical Report SRS–101, United States Department of Agriculture, Forest Service Southern Research Station, pp. 13-20.
97. Mao J, Wang B, Dai Y, Woodward FI, **Hanson PJ**, Lomas MR (2007) Improvements of a dynamic global vegetation model and simulations of carbon and water at an upland-oak forest. *Advances in Atmospheric Sciences* 24:311-322.
98. Fröberg M, Jardine PM, **Hanson PJ**, Swanston CW, Todd DE, Tarver JR, Garten CT Jr. (2007) Low Dissolved Organic Carbon Input from Fresh Litter to Deep Mineral Soils. *Soil Science Society of America Journal* 71:347-354.
99. Cisneros-Dozal LM, Trumbore S, **Hanson PJ** (2007) Effect of moisture on leaf litter decomposition and its contribution to soil respiration in a temperate forest. *Journal of Geophysical Research* 112: G01013, doi:10.1029/2006JG000197.
100. Gu L, Meyers T, Pallardy SG, **Hanson PJ**, Yang B, Heuer M, Hosman KP, Liu Q, Riggs J, Sluss D, Wullschleger SD (2007) Influences of biomass heat and biochemical energy storages on the land surface fluxes and radiative

- temperature. *Journal of Geophysical Research* 112: D02107, doi:10.1029/2006JD007425
101. Garten CT Jr., **Hanson PJ** (2006) Measured forest soil C stocks and estimated turnover times along an elevation gradient. *Geoderma* 136:342-352.
 102. Gu LH, Meyers T, Pallardy SG, **Hanson PJ**, Yang B, Heuer M, Hosman KP, Riggs JS, Sluss D, Wullschleger SD (2006) Direct and indirect effects of atmospheric conditions and soil moisture on surface energy partitioning revealed by a prolonged drought at a temperate forest site. *Journal of Geophysical Research-Atmospheres* 111(D16): Art. No. D16102, doi:10.1029/2006JD007161.
 103. Wayson CA, Randolph JC, **Hanson PJ**, Schmid HP, Grimmond CSB (2006) Comparison of soil respiration methods in a mid-latitude deciduous forest. *Biogeochemistry* 80:173-189, doi: 10.1007/s10533-006-9016-8
 104. Joslin JD, Gaudinski JB, Torn MS, Riley WJ, **Hanson PJ** (2006) Fine root turnover patterns and their relationship to root diameter and soil depth in a ¹⁴C-labeled hardwood forest. *New Phytologist* 172:523-535.
 105. Grant RF, Zhang Y, Yuan F, Wang S, **Hanson PJ**, Gaumont-Guay D, Chen J, Black TA, Barr A, Baldocchi DD, Arain A (2006) Intercomparison of techniques to model water stress effects on CO₂ and energy exchange in temperate and boreal deciduous forests. *Ecological Modelling* 196:289-312.
 106. Jardine PM, Mayes MA, Mulholland PJ, **Hanson PJ**, Tarver J, Luxmoore RJ, McCarthy JF, Wilson GV (2006) Vadose zone flow and transport of dissolved organic carbon at multiple scales in humid regions. *Vadose Zone Journal* 5:140-152.
 107. Wullschleger SD, **Hanson PJ** (2006) Sensitivity of canopy transpiration to altered precipitation in an upland oak forest: evidence from a long-term field manipulation study. *Global Change Biology* 12:97-109.
 108. Norby RJ, Wullschleger SD, **Hanson PJ**, Gunderson CA, Tschaplinski TJ, Jastrow JD. 2006. CO₂ enrichment of a deciduous forest: The Oak Ridge FACE Experiment. In Nösberger J, Long SP, Norby RJ, Stitt M, Hendrey GR, Blum H, Eds. *Managed Ecosystems and CO₂: Case Studies, Processes, and Perspectives Ecological Studies*, Vol. 187. Springer, Berlin, pp. 231-251.
 109. Cisneros-Dozal LM, Trumbore SE, **Hanson PJ** (2005) Partitioning sources of soil-respired CO₂ and their seasonal variation using a unique radiocarbon tracer. *Global Change Biology* 12:194-204.
 110. **Hanson PJ**, Swanston CW, Garten CT Jr., Todd DE, Trumbore SE (2005) Reconciling Change in Oi-Horizon Carbon-14 With Mass Loss for an Oak Forest. *Soil Science Society of America Journal* 69:1492-1502
 111. **Hanson PJ**, Wullschleger SD, Norby RJ, Tschaplinski TJ, Gunderson CA (2005) Importance of changing CO₂, temperature, precipitation, and ozone on carbon and water cycles of an upland oak forest: incorporating experimental results into model simulations. *Global Change Biology* 11:1402-1423.
 112. Swanston CW, Torn MS, **Hanson PJ**, Southon JR, Garten CT, Hanlon EM, Ganio L (2005) Initial characterization of processes of soil carbon stabilization using forest stand-level radiocarbon enrichment. *Geoderma* 128:52-62.

113. **Hanson PJ**, Amthor JS, Wullschleger SD, Wilson KB, Grant RF, Hartley A, Hui D, Hunt ER Jr., Johnson DW, Kimball JS, King AW, Luo Y, McNulty SG, Sun G., Thornton PE, Wang S, Williams M, Baldocchi DD, Cushman RM (2004) Oak forest carbon and water simulations: model intercomparisons and evaluations against independent data. *Ecological Monographs* 74(3):443-489.
114. King JS, **Hanson PJ**, Bernhardt E, DeAngelis P, Norby RJ, Pregitzer KS (2004) A multiyear synthesis of soil respiration responses to elevated atmospheric CO₂ from four forest FACE experiments. *Global Change Biology* 10:1027-1042.
115. Pendall E, Bridgham S, **Hanson PJ**, Hungate B, Kicklighter DW, Johnson DW, Law BE, Luo Y, Magonigal JP, Olsrud M, Ryan MG, Thornton P, Wan S (2004) Below-ground process responses to elevated CO₂ and temperature: a discussion of observations, measurement methods, and models. *New Phytologist* 162:311-322.
116. **Hanson PJ**, O'Hara FM Jr (2003) Introduction. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 3-7.
117. **Hanson PJ**, Huston MA, Todd DE (2003) Walker Branch Throughfall Displacement Experiment (TDE) In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 8-31.
118. Wilson KB, **Hanson PJ** (2003) Deciduous Hardwood Photosynthesis: Species Differences, Temporal Patterns and Response to Soil Water Deficits. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 35-47.
119. Edwards NT, **Hanson PJ** (2003) Aboveground autotrophic respiration. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 48-66.
120. Tschaplinski TJ, **Hanson PJ** (2003) Dormant-season nonstructural carbohydrate storage. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 67-84.
121. Wullschleger SD, **Hanson PJ** (2003) Sensitivity of sapling and mature-tree water use to altered precipitation. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 87-99.
122. **Hanson PJ**, O'Neill EG, Chambers MLS, Riggs JS, Joslin JD, Wolfe MH (2003) Soil respiration and litter decomposition. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 163-189.
123. Todd DE, **Hanson PJ** (2003) Rates of coarse-wood decomposition. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 210-214.
124. **Hanson PJ**, Todd DE, West DC, Edwards NT, Tharp ML, Simpson WA Jr. (2003) Tree and sapling growth and mortality. In: Hanson PJ, Wullschleger

- SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 255-273.
125. **Hanson PJ**, Todd DE, Joslin JD (2003) Canopy production. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 303-315.
 126. Wullschleger SD, **Hanson PJ**, Todd DE (2003) Forest water use and the influence of precipitation change. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 363-377.
 127. **Hanson PJ**, Edwards NT, Tschaplinski TJ, Wullschleger SD, Joslin JD (2003) Estimating the net primary and net ecosystem production of a southeastern upland *Quercus* forest from an 8-year biometric record. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 378-395.
 128. Johnson DW, **Hanson PJ**, Todd DE (2003) Nutrient availability and cycling. In: Hanson PJ, Wullschleger SD, Eds, *North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes*. Springer, New York, pp. 396-414.
 129. **Hanson PJ**, Todd DE, Johnson DW, Joslin JD (2003) Responses of Eastern Deciduous Forests to Precipitation Change. Chapter 10 In: McPherson GR, Weltzin JF, Eds. *Changing Precipitation Regimes and Terrestrial Ecosystems*, The University of Arizona Press, Tucson, pp. 164-179.
 130. Norby RJ, **Hanson PJ**, O'Neill EG, Tschaplinski TJ, Weltzin JF, Hansen RT, Cheng W, Wullschleger SD, Gunderson CA, Edwards NT, Johnson DW (2002) Net primary productivity of a CO₂-enriched deciduous forest and the implications for carbon storage. *Ecological Applications* 12:1261-1266.
 131. Curtis PS, **Hanson PJ**, Bolstad P, Barford C, Randolph JC, Schmid HP, Wilson KB (2002) Biometric and eddy-covariance based estimates of annual carbon storage in five eastern North American deciduous forests. *Agriculture and Forest Meteorology* 113:3-19.
 132. Davidson EA, Savage K, Bolstad P, Clark DA, Curtis PS, Ellsworth DS, **Hanson PJ**, Law BE, Luo Y, Pregitzer KS, Randolph JC, Zak D (2002) Belowground carbon allocation in forests estimated from litterfall and IRGA-based soil respiration measurements. *Agriculture and Forest Meteorology* 113:39-51.
 133. **Hanson PJ**, one of 9 contributing authors. (2002) Chapter 4. Environmental Effects of Particulate Matter. In: *Third External Review Draft of Air Quality Criteria for Particulate Matter*, U.S. Environmental Protection Agency, Washington, D.C.
 134. Wullschleger SD, Gunderson CA, **Hanson PJ**, Wilson KB, Norby RJ (2002) Sensitivity of stomatal and canopy conductance to elevated CO₂ concentration – Interacting variables and perspectives of scale. *New Phytologist* 153:485-496.
 135. Gunderson CA, Sholtis JD, Wullschleger SD, Tissue DT, **Hanson PJ**, Norby RJ (2002) Environmental and stomatal control of photosynthetic enhancement in the canopy of a sweetgum (*Liquidambar styraciflua* L.)

- plantation during three years of CO₂ enrichment. *Plant Cell and Environment* 25:379-393.
136. Ehman JL, Schmid HP, Grimmerd CSB, Randolph JC, **Hanson PJ**, Wayson CA, Cropley FD (2002) An initial intercomparison of micrometeorological and ecological inventory estimates of carbon sequestration in a mid-latitude deciduous forest. *Global Change Biology* 8:575-589.
 137. Johnson DW, **Hanson PJ**, Todd DE (2002) The effects of throughfall manipulation on soil leaching in a deciduous forest. *Journal of Environmental Quality* 31:204-216.
 138. Trumbore S, Gaudinski JB, **Hanson PJ**, Southon JR (2002) Quantifying Ecosystem-Atmosphere Carbon Exchange with a ¹⁴C Label. *EOS* 83:265,267-268.
 139. Dale VH, Joyce LA, McNulty S, Neilson RP, Ayres MP, Flannigan MD, **Hanson PJ**, Irland LC, Lugo AE, Peterson, CJ, Simberloff D, Swanson FJ, Stocks BJ, Wotton BM (2001) Climate Change and Forest Disturbances *BioScience* 51:723-734. [https://doi.org/10.1641/0006-3568\(2001\)051\[0723:CCAFD\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2001)051[0723:CCAFD]2.0.CO;2)
 140. **Hanson PJ**, Todd DE, Amthor JS (2001) A six-year study of sapling and large-tree growth and mortality responses to natural and induced variability in precipitation and throughfall. *Tree Physiology* 21:345-358.
 141. Wilson KB, Baldocchi DD, **Hanson PJ** (2001) Leaf age affects the seasonal pattern of photosynthetic capacity and net ecosystem exchange of carbon in a deciduous forest. *Plant Cell and Environment* 24:571-583.
 142. Wullschleger SD, **Hanson PJ**, Todd DE (2001) Transpiration from a multi-species deciduous forest as estimated by xylem sap flow techniques. *Forest Ecology and Management* 143:205-213.
 143. Joslin JD, Wolfe MH, **Hanson PJ** (2001) Factors controlling the timing of root elongation intensity in a mature upland oak-hickory stand. *Plant and Soil* 228:201-212.
 144. Wilson KB, **Hanson PJ**, Mulholland PJ, Baldocchi DD, Wullschleger SD (2001) A comparison of methods for determining forest evapotranspiration and its components across scales: sap-flow, soil water budget, eddy covariance, and catchment water balance. *Agriculture and Forest Meteorology* 106:153-168.
 145. **Hanson PJ**, Weltzin JF (2000) Drought disturbance from climate change: response of United States forests. *Science of the Total Environment* 262:205-220.
 146. Ehman J, Schmid HP, Grimmerd CSB, **Hanson PJ**, Randolph JC, Cropley FD (2000) A preliminary intercomparison of micrometeorological and ecological estimates of carbon sequestration in a mid-latitude deciduous forest. In R.J. de Dear, J.D. Kalma, T.R. Oke and A. Auliciems (eds). *Biometeorology and Urban Climatology at the Turn of the Millenium*, World Meteorological Organization, pp. 235-240.
 147. Grimmerd CSB, **Hanson PJ**, Schmid HP, Wullschleger SD, Cropley F (2000) Evapotranspiration rates at the Morgan Monroe State Forest AmeriFlux Site: A comparison of results from eddy covariance turbulent flux measurements and sap flow techniques. *15th Conference on Hydrology*, January 9-14, 2000, American Meteorological Society Long Beach, CA. January 2000, pp 158-161.

148. Johnson DW, Susfalk RB, Gholz HL, **Hanson PJ** (2000) Simulated effects of temperature and precipitation change in several forest ecosystems. *Journal of Hydrology* 235:183-204.
149. Joslin JD, Wolfe MH, **Hanson PJ** (2000) Effects of altered water regimes on forest root systems. *New Phytologist* 147:117-129.
150. **Hanson PJ** (2000) Large-scale Water Manipulations. Chapter 23 in Sala OE, Jackson RB, Mooney HA, Howarth RW (Eds.) *Methods in Ecosystem Science*, Springer-Verlag, New York. pp. 341-352.
151. Wullschlegel SD, Wilson KB, **Hanson PJ** (2000) Environmental control of whole-plant transpiration, canopy conductance and estimates of the decoupling coefficient for large red maple trees. *Agriculture and Forest Meteorology* 104:157-168.
152. Wilson KB, Baldocchi DD, **Hanson PJ** (2000) Quantifying stomatal and non-stomatal limitations to carbon assimilation resulting from leaf aging and drought in mature deciduous tree species. *Tree Physiology* 20:787-797.
153. Wilson KB, **Hanson PJ**, Baldocchi DD (2000) Factors controlling evaporation and energy partitioning beneath a deciduous forest over an annual cycle. *Agriculture and Forest Meteorology* 102:83-103.
154. Wilson KB, Baldocchi DD, **Hanson PJ** (2000) Spatial and seasonal variability of photosynthetic parameters and their relationship to leaf nitrogen in a deciduous forest. *Tree Physiology* 20:565-578.
155. **Hanson PJ**, Edwards NT, Garten CT Jr., Andrews JA (2000) Separating root and soil microbial contributions to soil respiration: a review of methods and observations. *Biogeochemistry* 48:115-146.
156. Garten CT Jr., Cooper LW, Post WM III, **Hanson PJ** (2000) Climate controls on forest soil C isotope ratios in the southern Appalachian Mountains. *Ecology* 81:1108-1119.
157. Garten CT Jr., Post WM III, **Hanson PJ**, Cooper LW (1999) Forest soil carbon inventories and dynamics along an elevation gradient in the southern Appalachian Mountains. *Biogeochemistry* 45:115-145.
158. Peterson AG, Ball TJ, Luo Y, Field CB, Reich PB, Curtis PS, Griffin KL, Gunderson CA, Norby RJ, Tissue DT, Forstreuter M, Rey A, Vogel CS and CMEAL Participants (**Hanson PJ**) (1999) The photosynthesis-leaf nitrogen relationship at ambient and elevated atmospheric carbon dioxide: a meta-analysis. *Global Change Biology* 5:331-346.
159. **Hanson PJ**, Todd DE, Huston MA, Joslin JD, Croker J, Augé. RM (1998) *Description and field performance of the Walker Branch Throughfall Displacement Experiment: 1993-1996*, ORNL/TM-13586, Oak Ridge National Laboratory, Oak Ridge, Tennessee.
160. Johnson DW, **Hanson PJ**, Todd DE, Susfalk RB, Trettin C (1998) Precipitation Change and Soil Leaching: Field Results and Simulations from Walker Branch Watershed, Tennessee. *Water Air and Soil Pollution* 105:251-262.
161. Luxmoore RJ, **Hanson PJ**, Beauchamp JJ, Joslin JD (1998) Passive nighttime warming facility for forest ecosystem research. *Tree Physiology* 18:615-623.

162. Lindberg SE, **Hanson PJ**, Meyers TP, Kim KH (1998) Air/surface exchange of mercury vapor over forests: the need for a reassessment of continental biogenic emissions. *Atmospheric Environment* 32:895-908.
163. Wullschleger SD, **Hanson PJ**, Tschaplinski TJ (1998) Whole-plant water flux in understory red maple exposed to altered precipitation regimes. *Tree Physiology* 18:71-79.
164. **Hanson PJ**, Tabberer TA, Lindberg SE (1997) Emissions of mercury vapor from tree bark. *Atmospheric Environment* 31:777-780.
165. Kim K-H, **Hanson PJ**, Barnett MO, Lindberg SE (1997) Biogeochemistry of mercury in the air-soil-plant system. In H. Sigel and A. Sigel, eds. *Metal Ions in Biological Systems, Vol. 34: Mercury and Its Effects on Environment and Biology*. Basel, Hong Kong, pp. 185-212.
166. Wullschleger SD, **Hanson PJ**, Todd DE (1996) Measuring stem water content in four deciduous hardwoods with a time-domain reflectometer. *Tree Physiology* 16: 809-815.
167. Wullschleger SD, **Hanson PJ**, Edwards GS (1996) Growth and maintenance respiration in leaves of northern red oak seedlings and mature trees after three years of ozone exposure. *Plant Cell and Environment* 19:577-584.
168. Edwards NT, **Hanson PJ** (1996) Stem respiration in a closed-canopy upland oak forest. *Tree Physiology* 16:433-439.
169. Kelly JM, Samuelson L, Edwards G, **Hanson P**, Kelting D, Mays A, Wullschleger S (1995) Are seedlings reasonable surrogates for trees? an analysis of ozone impacts on *Quercus rubra*. *Water Air and Soil Pollution* 85:1317-1324.
170. **Hanson PJ**, Todd DE, Edwards NT, Huston MA (1995) Field performance of the Walker Branch Throughfall Displacement Experiment, In: A. Jenkins, R.C. Ferrier, and C. Kirby, eds., *Ecosystem Manipulation Experiments: scientific approaches, experimental design and relevant results*, Ecosystem Research Report #20, Commission of the European Communities, pp. 307-313.
171. **Hanson PJ**, Lindberg SE, Tabberer TA, Owens JG, Kim K-H (1995) Foliar Exchange of Mercury Vapor: Evidence for a Compensation Point. *Water Air and Soil Pollution* 80:373-382.
172. Wullschleger SD, Norby RJ, **Hanson PJ** (1995) Growth and maintenance respiration in stems of *Quercus alba* after four years of CO₂ enrichment. *Physiologia Plantarum* 93:47-54.
173. Tschaplinski TJ, Stewart DB, **Hanson PJ**, Norby RJ (1995) Interactions between drought and elevated CO₂ on growth and gas exchange of seedlings of three deciduous tree species. *New Phytologist* 129:63-71.
174. **Hanson PJ**, Samuelson LJ, Wullschleger SD, Tabberer TA, Edwards GS (1994) Seasonal patterns of light-saturated photosynthesis and leaf conductance for mature and seedling *Quercus rubra* L. Foliage: Differential sensitivity to ozone. *Tree Physiology* 14:1351-1366.
175. **Hanson PJ**, Hoffman WA (1994) Emissions of non-CH₄ organic compounds and CO₂ from forest floor cores. *Soil Science Society of America Journal* 58:552-555.
176. McLaughlin SB, Layton PA, Adams MB, Edwards NT, **Hanson PJ**, O'Neill EG, Roy WK (1994) Growth responses of 53 open-pollinated loblolly

- pine families to ozone and acid rain. *Journal of Environmental Quality* 23:247-257.
177. **Hanson PJ**, Wullschleger SD, Bohlman SA, Todd DE (1993) Seasonal and topographic patterns of forest floor CO₂ efflux from an upland oak forest. *Tree Physiology* 13:1-15.
 178. Luxmoore RJ, Wullschleger SD, **Hanson PJ** (1993) Forest responses to CO₂ enrichment and climate warming. *Water Air and Soil Pollution* 70:309-323.
 179. Kim K-H, Lindberg SE, **Hanson PJ**, Meyers TP, Owens J (1993) Applications of micrometeorological methods to measurements of mercury emissions over contaminated soils. In *Proc. Ninth International Conference on Heavy Metals in the Environment*, Toronto, Canada, Vol 1, pp. 328-331.
 180. Turner RS, **Hanson PJ**, Huston MA, Garten CT Jr., Mulholland PJ (1993) A large-scale throughfall manipulation experiment on Walker Branch Watershed. In: Rasmussen L, Brydges T, Mathy P (Eds), *Experimental Manipulations of Biota and Biogeochemical Cycling in Ecosystems: Approach - Methodologies - Findings*, Commission of the European Communities, Copenhagen, Denmark, pp. 96-105.
 181. **Hanson PJ**, Garten CT Jr. (1992) Deposition of H¹⁵NO₃ to white oak, red maple, and loblolly pine foliage: experimental observations and a generalized model. *New Phytologist* 122:329-337.
 182. Taylor GE Jr., **Hanson PJ** (1992) Forest trees and tropospheric ozone: role of canopy deposition and leaf uptake in developing exposure-response relationships. *Agriculture Ecosystems and Environment* 42:255-273.
 183. Wullschleger SD, **Hanson PJ**, Sage RF (1992) PHOTOBIO: Modeling the stomatal and biochemical control of plant gas exchange. *Journal of Natural Resources and Life Science Education* 21:141-145.
 184. Wullschleger SD, **Hanson PJ**, Gunderson CA (1992) Assessing the influence of exogenous ethylene on electron transport and fluorescence quenching in leaves of *Glycine max*. *Environmental and Experimental Botany* 32:449-455.
 185. **Hanson PJ**, Turner RS (1992) Nitrogen deposition to forest ecosystems: forms, regional inputs, and effects. Proceedings of the 1992 Air and Waste Management Association Annual Meeting, Kansas City, MO, paper No. 92 71.04.
 186. Pier PA, Thornton FC, McDuffie C Jr., **Hanson PJ** (1992) CO₂ exchange rates of red spruce during the second season of exposure to ozone and acidic cloud deposition. *Environmental and Experimental Botany* 32:115-124.
 187. **Hanson PJ**, Taylor GE Jr., Vose JM (1992) Measurements of reactive nitrogen gas deposition to forest landscape surfaces: biological and environmental controls. In: D.W. Johnson and S.E. Lindberg, eds. *Atmospheric Deposition and Nutrient Cycling in Forest Ecosystems*, Springer-Verlag, New York, pp. 166-177.
 188. **Hanson PJ**, Lindberg SE (1991) Dry deposition of reactive nitrogen compounds: a summary of leaf canopy and nonfoliar measurements. *Atmospheric Environment* 25A:1615-1634.
 189. McLaughlin SB, Anderson CP, **Hanson PJ**, Tjoelker MG, Roy WK (1991) Increased dark respiration and calcium deficiency of red spruce in relation to acidic deposition at high elevation Southern Appalachian Mountain Sites. *Canadian Journal of Forest Research* 21:1234-1244.

190. Wullschleger SD, Oosterhuis DM, Hurren RG, **Hanson PJ** (1991) Evidence for light-dependent recycling of respired carbon dioxide by the cotton fruit. *Plant Physiology* 97: 574-579.
191. **Hanson PJ** (one of 6 contributing authors) (1991) Chapter 10. The effects of nitrogen oxides on natural ecosystems and their composition. In: *Air Quality Criteria for Oxides of Nitrogen, Vol II.*, U.S. Environmental Protection Agency, Washington, D.C.
192. Garten CT, **Hanson PJ** (1990) Foliar retention of ¹⁵N-nitrate and ¹⁵N-ammonium by red maple (*Acer rubrum*) and white oak (*Quercus alba*) leaves from simulated acid rain. *Environmental and Experimental Botany* 30:333-342.
193. **Hanson PJ**, Taylor GE Jr. (1990) Modeling pollutant gas uptake by leaves: an approach based on physicochemical properties. In Dixon R et al. (Eds), *Process Modeling of Forest Growth Responses to Environmental Stress*, Timber Press, Portland, Oregon, pp. 351-356.
194. **Hanson PJ**, McLaughlin SB (1990) Continuous gas exchange measurements using individual fascicle cuvettes: the "tubule" system. In Payer HD, Pfirrmann T, Mathy P (Eds) *Environmental Research with Plants in Closed Chambers, Air Pollution Research Report No. 26*, Commission of the European Communities, pp. 143-147.
195. **Hanson PJ**, McLaughlin SB, Garten CT Jr. (1990) Application of artificial rain in experimental systems: Methods, results of case studies, and future needs. In Payer HD, Pfirrmann T, Mathy P (Eds) *Environmental Research with Plants in Closed Chambers, Air Pollution Research Report No. 26*, Commission of the European Communities, pp. 223-233.
196. Taylor GE Jr, **Hanson PJ**, Lindberg SE (1990) Deposition and emission of trace gases in controlled environments: A conceptual model, experimental methodologies, and application of results to the disciplines of physiological ecology and biogeochemistry. In Payer HD, Pfirrmann T, Mathy P (Eds) *Environmental Research with Plants in Closed Chambers, Air Pollution Research Report No. 26*, Commission of the European Communities, pp. 194-215.
197. **Hanson PJ**, Rott K, Taylor GE Jr., Lindberg SE, Gunderson CA, Ross-Todd BM (1989) NO₂ deposition to elements of a forest landscape. *Atmospheric Environment* 23:1783-1794.
198. **Hanson PJ**, McLaughlin SB (1989) Growth, photosynthesis, and chlorophyll concentrations of red spruce seedlings treated with mist containing H₂O₂. *Journal of Environmental Quality* 18:499-503.
199. Taylor G, Lindberg S, **Hanson P**, Garten C. (1989) Atmospheric-canopy exchange in forests. *Oak Ridge National Laboratory Review*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, pp. 90-96.
200. Norby RJ, Weerasuriya Y, **Hanson PJ** (1989) Induction of nitrate reductase activity in red spruce needles by NO₂ and HNO₃ vapor. *Canadian Journal of Forest Research* 19:889-896.
201. **Hanson PJ**, Taylor GE Jr, Lindberg SE, Lovett GM (1989) Deposition of reactive nitrogen gases to landscape surfaces. *1988 Annual Report of the Integrated Forest Study, ORNL/TM-11121*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, pp. 96-100.

202. **Hanson PJ**, McLaughlin SB, Edwards NT (1988) Net CO₂ exchange of *Pinus taeda* shoots exposed to variable ozone levels and precipitation chemistries in field and laboratory settings. *Physiologia Plantarum* 74:635-642.
203. **Hanson PJ**, Isebrands JG, Dickson RE, Dixon RK (1988) Ontogenetic patterns of CO₂ exchange of *Quercus rubra* L. leaves during three flushes of shoot growth I. Median flush leaves. *Forest Science* 34:55-68.
204. **Hanson PJ**, Isebrands JG, Dickson RE, Dixon RK (1988) Ontogenetic patterns of CO₂ exchange of *Quercus rubra* L. leaves during three flushes of shoot growth II. Insertion gradients of leaf photosynthesis. *Forest Science* 34:69-76.
205. Taylor GE Jr, **Hanson PJ**, Baldocchi DD (1988) Pollutant deposition to individual leaves and plant canopies: site of regulation and relationship to injury. In Heck WW, Taylor OC, Tingey DT (Eds) *Assessment of Crop Loss from Air Pollutants*, Elsevier Publishers, pp. 227-257.
206. **Hanson PJ**, McLaughlin SB (1988) Net carbon dioxide exchange characteristics of *Pinus taeda* L. shoots. In *Comparative Sensitivity, Mechanisms, and Whole Plant Physiological Implications of Responses of Loblolly Pine Genotypes To Ozone and Acid Deposition*, ORNL/TM-10777, Oak Ridge National Laboratory, Oak Ridge, Tennessee, pp. 96-123.
207. **Hanson PJ**, McLaughlin SB, Adams MB, Edwards NT (1988) Three techniques for measuring photosynthesis of loblolly pine shoots: comparisons between techniques and their relationship to seedling growth. In *Comparative Sensitivity, Mechanisms, and Whole Plant Physiological Implications of Responses of Loblolly Pine Genotypes to Ozone and Acid Deposition*, ORNL/TM-10777, Oak Ridge National Laboratory, Oak Ridge, Tennessee, pp. 241-254.
208. **Hanson PJ**, Dixon RK, Dickson RE (1987) Effect of container size and shape on the growth of northern red oak seedlings. *HortScience* 22:1293-1295.
209. **Hanson PJ**, McRoberts RE, Isebrands JG, Dixon RK (1987) An optimal sampling strategy for determining CO₂ exchange rate as a function of photosynthetic photon flux density. *Photosynthetica* 21:98-101.
210. **Hanson PJ**, Dixon RK (1987) Allelopathic effects of interrupted fern on northern red oak seedlings: amelioration by *Suillus luteus* L.:Fr. *Plant and Soil* 98:43-51.
211. **Hanson PJ**, Isebrands JG, Dickson RE (1987) Carbon budgets of *Quercus rubra* L. seedlings at selected stages of growth: Influence of light. In *Central Hardwood Forest Conference VI. Knoxville, Tennessee, Feb. 24-26*, pp. 269-276.
212. **Hanson PJ**, Dickson RE, Isebrands JG, Crow TR, Dixon RK (1986) A morphological index of *Quercus* seedling ontogeny for use in studies of physiology and growth. *Tree Physiology* 2:273-281.
213. **Hanson PJ**, Sucoff EI, Markhart AH III (1985) Quantifying apoplastic flux through red pine root systems using trisodium 3-hydroxy- 5,8,10-pyrenetrisulfonate. *Plant Physiology* 77:21-24.
214. **Hanson PJ**, Dixon RK (1985) Allelopathic inhibition of northern red oak by interrupted fern and goldenrod. In *Proc. Fifth Central Hardwood Forest Conference, University of Illinois, Urbana-Champaign, IL, April 15-17*, pp. 269-274.

Theses:

- Hanson PJ** (1986) *Studies of Quercus rubra L. seedling dry matter accumulation, morphological development, and carbon dioxide exchange under controlled conditions*. Ph.D. Thesis, University of Minnesota, St. Paul, Minnesota, 169 p.
- Hanson PJ** (1983) *Apoplastic water flux through root systems of Pinus resinosa Ait. Seedlings*. M.Sc. Thesis, University of Minnesota, St. Paul, Minnesota, 53 p.

Data Sets:

1. **Hanson PJ**, Todd DE Jr, Phillips JR, Garten CT Jr, Swanston CW, McFarlane KJ, LeMoine J (2020) Enriched Background Isotope Study (EBIS): Analysis of ¹⁴C-Enriched Carbon Cycle in Soils and Litter at Forested Oak Ridge and AmeriFlux Sites, 2000-2011. Oak Ridge National Laboratory, TES SFA, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <https://doi.org/10.25581/ornlsfa.020/1638590>
2. Krassovski MB, **Hanson PJ** (2020) SPRUCE Experimental Plot Top View Aerial Photographs beginning June 2019. Oak Ridge National Laboratory, TES SFA, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <https://doi.org/10.25581/spruce.076/1604061>
3. Schädel C, Nettles WR, Heiderman RR, Pearson KJ, Richardson AD, **Hanson PJ** (2019) SPRUCE Ground Observations of Phenology in Experimental Plots, 2018. Oak Ridge National Laboratory, TES SFA, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <https://doi.org/10.25581/spruce.073/1557731>
4. Schädel C, Richardson AD, Hufkens K, Milliman T, Seyednasrollah B, Nettles WR, Krassovski MB, **Hanson PJ** (2019) SPRUCE Vegetation Phenology in Experimental Plots from Phenocam Imagery, 2015-2018. Oak Ridge National Laboratory, TES SFA, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <https://doi.org/10.25581/spruce.071/1556082>
5. **Hanson PJ**, Phillips JR, Wullschleger SD, Nettles WR, Warren JM, Ward EJ (2018) SPRUCE Tree Growth Assessments of Picea and Larix in S1-Bog Plots and SPRUCE Experimental Plots beginning in 2011. Oak Ridge National Laboratory, TES SFA, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <https://doi.org/10.25581/spruce.051/1433836>
6. **Hanson PJ**, Phillips JR, Brice DJ, Hook LA (2018) SPRUCE Shrub-Layer Growth Assessments in S1-Bog Plots and SPRUCE Experimental Plots beginning in 2010. Oak Ridge National Laboratory, TES SFA, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <https://doi.org/10.25581/spruce.052/1433837>
7. **Hanson PJ**, Phillips JR, Brice DJ, Hook LA (2018) **SPRUCE Elevation Assessments for the Bog Surface**. Oak Ridge National Laboratory, TES SFA, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <https://doi.org/10.25581/spruce.055/1455014>
8. Heiderman RR, Nettles WR, Ontl TA, Latimer JM, Richardson AD, **Hanson PJ** (2018) **SPRUCE Manual Phenology Observations and Photographs 2010 to**

- Date.** Oak Ridge National Laboratory, TES SFA, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <https://doi.org/10.25581/spruce.054/1444106>
9. Richardson AD, Hufkens K, Milliman T, Aubrecht DM, Furze ME, Krassovski MB, **Hanson PJ** (2017) **SPRUCE Vegetation Phenology in Experimental Plots from Phenocam Imagery, 2015-2016.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <http://dx.doi.org/10.3334/CDIAC/spruce.045>
 10. Richardson AD, Latimer JM, Nettles WR, Warren JM, **Hanson PJ** (2017) **SPRUCE Ground Observations of Phenology in Experimental Plots, Spring 2016.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <http://dx.doi.org/10.3334/CDIAC/spruce.044>
 11. Walker AP, Carter KR, **Hanson PJ**, Nettles WR, Philips JR, Sebestyen SD, and Weston DJ (2017) **SPRUCE S1 Bog Sphagnum CO₂ Flux Measurements and Partitioning into Re and GPP.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <http://dx.doi.org/10.3334/CDIAC/spruce.039>
 12. Phillips JR, Brice DJ, **Hanson PJ**, Childs J, Iversen CM, Norby RJ, Warren JM (2017) **SPRUCE Pretreatment Plant Tissue Analyses, 2009 through 2013.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <http://dx.doi.org/10.3334/CDIAC/spruce.038>
 13. **Hanson PJ**, Phillips JR, Riggs JS, Nettles WR (2017) **SPRUCE Large-Collar In Situ CO₂ and CH₄ Flux Data for the SPRUCE Experimental Plots: Whole-Ecosystem-Warming.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <http://dx.doi.org/10.3334/CDIAC/spruce.034>
 14. Gutknecht J, Kluber LA, Hanson PJ, Schadt CW (2017) **SPRUCE Whole Ecosystem Warming (WEW) Peat Water Content and Temperature Profiles for Experimental Plot Cores Beginning June 2016.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <http://dx.doi.org/10.3334/CDIAC/spruce.041>
 15. **Hanson PJ**, Riggs JS, Nettles WR, Krassovski MB, Hook LA (2016) **SPRUCE Whole Ecosystems Warming (WEW) Environmental Data Beginning August 2015.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <http://dx.doi.org/10.3334/CDIAC/spruce.032>
 16. Wilson RM, Hopple AM, Tfaily MM, Sebestyen SD, Schadt CW, Pfeifer-Meister L, Medvedeff C, McFarlane KJ, Kostka JE, Kolton M, Kolka RK, Kluber LA, Keller JK, Guilderson TP, Griffiths NA, Chanton JP, Bridgham SD, **Hanson PJ**. (2016) **SPRUCE Stability of Peatland Carbon to Rising Temperatures: Supporting Data.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <http://dx.doi.org/10.3334/CDIAC/spruce.026>
 17. Kluber LA, Phillips JR, **Hanson PJ**, Schadt CW (2016) **SPRUCE Deep Peat Heating (DPH) Peat Water Content and Temperature Profiles for Experimental**

- Plot Cores, June 2014 through June 2015.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <http://dx.doi.org/10.3334/CDIAC/spruce.029>
18. Shi X, Thornton PE, Ricciuto DM, **Hanson PJ**, Mao J, Sebestyen SD, Griffiths NA, Bisht G (2016) **SPRUCE Representing Northern Peatland Microtopography and Hydrology within the Community Land Model: Modeling Archive.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. <http://dx.doi.org/10.3334/CDIAC/spruce.031>
 19. Griffiths NA, Hook LA, **Hanson PJ** (2016) **SPRUCE S1 Bog and SPRUCE Experiment Location Survey Results, 2015.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A, doi: [10.3334/CDIAC/spruce.015](https://doi.org/10.3334/CDIAC/spruce.015)
 20. **Hanson PJ**, Riggs JS, Dorrance C, Nettles WR, Hook LA (2015) **SPRUCE Environmental Monitoring Data: 2010-2014.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A, doi: [10.3334/CDIAC/spruce.001](https://doi.org/10.3334/CDIAC/spruce.001). (Includes recent additions of annual data files.)
 21. **Hanson PJ**, Riggs JS, Nettles WR, Krassovski MB, Hook LA (2015) **SPRUCE Deep Peat Heating (DPH) Environmental Data, February 2014 through July 2105.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A, doi: [10.3334/CDIAC/spruce.013](https://doi.org/10.3334/CDIAC/spruce.013)
 22. **Hanson PJ**, Krassovski MB, Hook LA (2015) **SPRUCE S1 Bog and SPRUCE Experiment Aerial Photographs.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A, doi: [10.3334/CDIAC/spruce.012](https://doi.org/10.3334/CDIAC/spruce.012)
 23. Jensen AM, Warren JM, **Hanson PJ**, Childs J, Wullschleger SD (2015) **SPRUCE S1 Bog Pretreatment Photosynthesis and Respiration for Black Spruce: 2010-2013.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A., doi: [10.3334/CDIAC/spruce.007](https://doi.org/10.3334/CDIAC/spruce.007)
 24. **Hanson PJ**, Riggs JS, Hook LA, Nettles WR, Dorrance C (2015) **SPRUCE S1-Bog Phenology Movies, 2010-2104.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A., doi: [10.3334/CDIAC/spruce.011](https://doi.org/10.3334/CDIAC/spruce.011).
 25. **Hanson PJ**, Phillips JR, Riggs JS, Nettles WR, Todd DE (2014) **SPRUCE Large-Collar In Situ CO₂ and CH₄ Flux Data for the SPRUCE Experimental Plots.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A., doi: [10.3334/CDIAC/spruce.006](https://doi.org/10.3334/CDIAC/spruce.006)
 26. Slater L, **Hanson PJ**, Hook LA (2012) **SPRUCE S1-Bog Peat Depth Determined by Push Probe and GPR: 2009-2010.** Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A., doi: [10.3334/CDIAC/spruce.002](https://doi.org/10.3334/CDIAC/spruce.002).

27. **Hanson, PJ**, U.S. Forest Service Staff, and SPRUCE Team (2012) **SPRUCE S1-Bog Vegetation Survey and Peat Depth Data: 2009**. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A., doi: [10.3334/CDIAC/spruce.003](https://doi.org/10.3334/CDIAC/spruce.003).
28. **Hanson PJ**, Brice D, Garten CT, Hook LA, Phillips J, Todd DE (2012) **SPRUCE S1-Bog Vegetation Allometric and Biomass Data: 2010-2011**. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A., doi: [10.3334/CDIAC/spruce.004](https://doi.org/10.3334/CDIAC/spruce.004).
29. Iversen CM, **Hanson PJ**, Brice DJ, Phillips JR, McFarlane KJ, Hobbie EA, Kolka RK (2014) **SPRUCE Peat Physical and Chemical Characteristics from Experimental Plot Cores, 2012**. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A., doi: [10.3334/CDIAC/spruce.005](https://doi.org/10.3334/CDIAC/spruce.005).
30. **Hanson PJ**, Riggs JS, Dorrance C, Hook LA (2011) **SPRUCE Environmental Monitoring Data: 2010-2011**. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, U.S.A. doi: [10.3334/CDIAC/spruce.001](https://doi.org/10.3334/CDIAC/spruce.001)
31. **Hanson PJ**, Todd DE, Riggs JS, Wolfe ME, O'Neill EG (2001) *Walker Branch Throughfall Displacement Experiment Data Report: Site characterization, system performance, weather, species composition and growth*. ORNL/CDIAC-134, NDP-078A. Carbon Dioxide Information Analysis Center, U.S. Department of Energy, Oak Ridge National Laboratory, Oak Ridge, Tennessee, U.S.A. 158 p.
32. Poyatos R, Granda V, Flo V, Molowny-Horas R, Steppe K, Mencuccini M, Martínez-Vilalta J Data Providers: **Hanson PJ, Wullschleger SD** (2020) SAPFLUXNET: A global database of sap flow measurements. (Version 0.1.4) [Data set]. Zenodo. <http://doi.org/10.5281/zenodo.3697807>

Abstracts and Presentations (2015–present)

- Hanson PJ and SPRUCE Project Participants (2020) Ombrotrophic Peatland Responses to Warming and Elevated CO₂: Implications for Ecosystem Carbon Exchange, Productivity and Greenhouse Gas Production After 3-Years of Manipulation. Invited Talk. Northern Arizona University, 31 January 2020.
- Hanson PJ, Norby RJ, Phillips JR, Warren JM, Griffiths NA, Iversen CM, Shi X, Ricciuto DM (2019) Ombrotrophic Peatland Responses to Warming and Elevated CO₂: Implications for Ecosystem Carbon Exchange, Productivity and Greenhouse Gas Production after 3-Years of Manipulation. AGU Fall Meeting, 9 to 13 December 2019, Abstract Number: B31C-03, Oral talk, Session: B31C.
- Hanson PJ, Phillips JR, Norby RJ, Warren JM, Griffiths NA, Ricciuto DM (2019) Peatland Responses to Warming and Elevated CO₂: CO₂ and CH₄ Flux Responses, the status of Vegetation Net Primary Production and Implications for Ecosystem Carbon Exchange After 3-Years of Manipulation. EGU Annual Meeting, 8 to 12 April 2019, EGU2019-11610 | Orals | Session BG2.15

- Hanson PJ (2018) Peatland ecosystem responses to warming and the implications for ecosystem carbon gain or loss: A SPRUCE project overview. 22 October 2018, Invited Presentation, Boise State University.
- Hanson PJ, Phillips JR, Nettles WR, Heiderman R (2017) Recent carbon cycle dynamics in an ombrotrophic peatland: implications from warming and eCO₂ treatments and the role of vegetation layers in the flux of CO₂ and CH₄, B42C-01. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Dusenge ME, Stinzianol JR, Warren JM, Ward EJ, Wullschleger SD, Hanson PJ, Way DA (2017) Thermal acclimation of photosynthesis and respiration differ across conifer species in a mature boreal peatland, B14A-04. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Graham J, Glenn NF, Spaete L, Hanson PJ (2017) Ecosystem structure and function in the SPRUCE chambers at fine resolution, B31D-2011. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Hopple A, Brunik K, Keller J, Pfeifer-Meister L, Woerndle G, Zalman C, Hanson P, Bridgham S (2017) How does whole ecosystem warming of a peatland affect methane production and consumption? B42C-02. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Krassovski M, Hanson PJ, Riggs JS, Nettles IV WR (2017) Near real time/low latency data collection for climate warming manipulations and an elevated CO₂ SPRUCE experiment, IN31C-0087. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Liang J, Ricciuto DM, Wang G, Gu L, Hanson PJ, Mayes MA (2017) A mechanistic diagnosis of the simulation of soil CO₂ efflux of the ACME Land Model, B41F-2034. AGU Fall Meeting, New Orleans, LA, 11-15 December.
- Luo Y, Huang Y, Jiang J, Shuang M, Saruta V, Liang G, Hanson PJ, Ricciuto DM, Milcu A, Roy J (2017) Integration of research infrastructures and ecosystem models toward development of predictive ecology (Invited), B31H-03. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Shi X, Ricciuto DM, Thornton PE, Hanson PJ, Xu X, Mao J, Warren J, Yuan F, Norby RJ, Sebestyen S, Griffiths N, Weston DJ, Walker A (2017) Representing Northern Peatland Hydrology and Biogeochemistry with ALM. B43G-2216. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Shuang MA, Huang Y, Jiang J, Ricciuto DM, Hanson PJ, Luo Y (2017) Acclimation of methane production weakens ecosystem response to climate warming in a northern peatland. B42C-04. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Shuang MA, Huang Y, Stacy M, Jiang J, Sundi M, Ricciuto DM, Hanson PJ, Luo Y, Saruta V (2017) EcoPAD - An interactive platform for near real-time ecological forecasting by assimilating data into model (Invited), B43I-01. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Steinweg JM, Kostka JE, Hanson PJ, Schadt CW (2017) Temperature sensitivity differences with depth and season between carbon, nitrogen, and phosphorus cycling enzyme activities in an ombrotrophic peatland system, B51D-1829. AGU Fall Meeting, New Orleans, LA, 11–15 December.

- Phillips JR, Hanson PJ, Warren J, Ward E, Brice D, Graham J (2017) Peatland Woody Plant Growth Responses to Warming and Elevated CO₂ in a Southern-boreal Raised Bog Ecosystem, B43G-2217. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Ward EJ, Dusenge ME, Warren J, Murphy BK, Way D, King AW, McLennan D, Montgomery R, Stefanski A, Reich PB, Aguilar MC, Wullschleger S, Villanueva RB, Hanson PJ (2017) Ecophysiology at SPRUCE: Impacts of whole ecosystem warming and elevated CO₂ on leaf-level photosynthesis and respiration of two ericaceous shrubs in a boreal peatland, B32B-04. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Warren J, Ward EJ, Wullschleger SD, Hanson PJ (2017) Increased transpiration and plant water stress in a black spruce bog exposed to whole ecosystem warming, B11K-04. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Wilson R, Tfaily M, Chanton J, Rich VI, Saleska SR, Holmes B, Langford L, Hanson PJ, Bridgham SD, Hoppole A, Keller J, Cory A, Kostka JE (2017) Controls on methanogenesis in organic-rich anaerobic environments, B42C-08. AGU Fall Meeting, New Orleans, LA, 11–15 December.
- Hanson PJ, Phillips JR, Graham J, Norby RJ, Warren JM, Wullschelger SD, Griffiths NA, Spaete L, Glenn N (2017) Peatland Responses to Warming and Elevated CO₂: Early CO₂ and CH₄ Flux Responses and the Status of Vegetation Net Primary Production, ESA Annual Meeting, Portland, Oregon, 5–10 August 2017.
- Ward EJ, Dusenge ME, Warren JM, Way DA, Wullschleger SD, Hanson PJ (2017) Ecophysiology at SPRUCE: Impacts of whole ecosystem warming and elevated CO₂ in a boreal peatland forest. ESA Annual Meeting, Portland, Oregon, 5–10 August 2017.
- Hanson PJ, Griffiths N, Sebestylen S, Ricciuto D (2017) Whole-ecosystem-warming and elevated-CO₂ Results through 1.5 years of manipulation. Invited Presentation #1185 in the session on Climate Change Effects on Northern Peatlands: Results of Manipulative Experiments I, Society of Wetland Scientists 2017 Annual Meeting, San Juan, Puerto Rico, 5–8 April 2017.
- Hoppole A, Brunik K, Pfeifer-Meister L, Keller J, Woerdle G, Medvedeff C, Hanson P, Bridgham S (2017) How does whole-ecosystem warming of a peatland affect methane production? Invited Presentation #1556 in the session on Climate Change Effects on Northern Peatlands: Results of Manipulative Experiments I, Society of Wetland Scientists 2017 Annual Meeting, San Juan, Puerto Rico, 5–8 April 2017.
- Rush J, Medvedeff C, Hanna E, Woerdle G, Bridgham S, Hanson P, Keller J (2017) Effects of Temperature on Humic Substance Reduction in a Northern Minnesota Peatland. Invited Presentation #1463 in the session on Climate Change Effects on Northern Peatlands: Results of Manipulative Experiments I, Society of Wetland Scientists 2017 Annual Meeting, San Juan, Puerto Rico, 5–8 April 2017.
- Shi X, Ricciuto D, Hanson P, Thornton P, Xu X, Mao J (2017) Representing northern peatland hydrology and biogeochemistry with ALM land surface model. Invited Presentation #1177 in the session on Climate Change Effects on Northern Peatlands: Results of Manipulative Experiments II, Society of Wetland Scientists 2017 Annual Meeting, San Juan, Puerto Rico, 5–8 April 2017.

- Hanson PJ, McFarlane KJ, Griffiths NA, Ricciuto DM, Iversen CM, Kolka RK (2017) Peatland Carbon Cycle Responses to Warming and Elevated CO₂: Early responses from the SPRUCE in situ manipulations. 2017 Joint NACP and AmeriFlux Principal Investigators Meeting, Bethesda, Maryland, 27–30 March 2017.
- Hanson PJ (2017) U.S. Eastern Forest Ecosystems and Drought Chronic and Acute Manipulation Insights (C-Nutrient Cycle Interactions). USDA Forest Service National Drought Meeting, San Antonio, Texas, 21–23 March 2017 (invited talk).
- Hanson PJ, Ricciuto DM, McFarlane KJ, Chanton P, Griffiths NA, Kolka RK, and additional Project Participants (2016) Peatland carbon impacts from warming and elevated CO₂: initial responses from the SPRUCE in situ manipulations. Conference Abstract, 2016 The 10th INTECOL International Wetlands Conference, 19–24 September 2016, Changshu, China, p. 185.
- Hopple A, Keller JA, Medvedeff CA, Hanson P, Pfeifer-Meister L, Bridgham SD (2016) How does deep warming of a peatland affects methane production? Conference Abstract, 2016 The 10th INTECOL International Wetlands Conference, 19–24 September 2016, Changshu, China, p. 190.
- Kluber LA, Hendershot JN, Allen S, Yip DZ, Yang Z, Hanson PJ, Schadt CW (2016) Microbial community responses and limitations to deep peat heating at the SPRUCE experiment in Northern Minnesota. COS 90-7, ESA Annual Meeting, Fort Lauderdale, Florida, 7–12 August 2016.
- Hanson PJ, Riggs JS, Nettles WR, Phillips JR, Krassovski M, Hook LA (2016) Field performance of the SPRUCE whole-ecosystem warming facility for tall stature peatland vegetation. PS 18-46, ESA Annual Meeting, Fort Lauderdale, Florida 7–12 August 2016.
- Kolka RK, Hanson PJ (2016) Spruce and Peatland Responses Under Climatic and Environmental Change (SPRUCE) Experiment. 15th International Peat Congress. Kuching, Malaysia, 15–19 August 2016.
- Chanton J, Wilson R, Tfaily MM, Sebestyen SD, Medvedeff C, McFarlane KJ, Kolka RK, Kostka JE, Keller J, Hanson PJ, Guilderson TP, de La Cruz F, Cooper WT, Bridgham SD, Barlaz M (2015) The Stability of Peatland Carbon Stores to Global Change: Evidence for Enhanced Methane and Carbon Dioxide Production. B44B-01: AGU Fall Meeting, San Francisco, California, 14–18 December 2015.
- Guilderson TP, McFarlane KJ, McNicol G, Hanson PJ, Chanton J, Wilson R, Bosworth R, Singleton MJ (2015) Sources of Below-Ground Respired Carbon in a Northern Minnesota Ombrotrophic Spruce Bog and the Influence of Heating Manipulations. B41C-0460: AGU Fall Meeting, San Francisco, California, 14–18 December 2015.
- Iversen CM, Norby RJ, Childs J, McCormack ML, Walker AP, Hanson PJ, Warren J, Sloan VL, Sullivan PF, Wullschleger S, Powell AS (2015) Linking Belowground Plant Traits With Ecosystem Processes: A Multi-Biome Perspective. B51K-03: AGU Fall Meeting, San Francisco, California, 14–18 December 2015.
- Matthews E, Varner RK, Peng C, Hanson PJ - Conveners (2015) Natural Wetlands and Open Waters in the Global Methane Cycle: Modeling, Observations, and Challenges I. B41C: AGU Fall Meeting, San Francisco, California, 14–18 December 2015.

- McFarlane KJ, Iversen CM, Phillips JR, Brice DJ, Hanson PJ (2015) Holocene Carbon Accumulation Rates in the SPRUCE Bog Prior to Warming and Elevated CO₂ Treatment. B11H-0540: AGU Fall Meeting, San Francisco, California, 14–18 December 2015.
- Shi X, Ricciuto DM, Xu X, Thornton PE, Hanson PJ, Mao J, Sebestyen S, Griffiths N (2015) Representing Northern Peatland Hydrology and Biogeochemistry within the Community Land Model. B41C-0431: AGU Fall Meeting, San Francisco, California, 14–18 December 2015.
- Xu X, Yuan F, Hanson PJ, Wullschleger SD, Thornton PE, Tian H, Riley WJ, Song X, Graham DE, Song C (2015) Four decades of modeling methane cycling in terrestrial ecosystems: Where we are heading? B41C-0429: AGU Fall Meeting, San Francisco, California, 14–18 December 2015.
- Hanson PJ, Norby RJ, King AW, Glenn Wilson G (2015) Robert J. (Bob) Luxmoore – Soil physicist, plant physiologist, forester, pioneer elevated CO₂ researcher, modeler, activist, mentor and colleague. Invited Talk, *Soil Science Society of American Annual Meeting*, Minneapolis, Minnesota, 17 November 2015, Session 181 Talk #1.
- Keller JK, Bridgham SD, Chanton J, Hanson PJ, Hopple A, Kostka JE, Medvedeff CA, Pfeifer-Meister L, Wilson R, McFarlane K, Guilderson TP, McNicol G (2015) Initial responses of methane cycling to deep peat heating in a bog ecosystem. *Soil Science Society of American Annual Meeting*, Minneapolis, Minnesota, 17 November 2015, Session 107 Talk #6.
- Estiarte M, Vicca S, Peñuelas J, Bahn M, Beier C, Emmett BA, Fay PA, Hanson PJ, Hasibeder R, Kigel J, Kröel-Dulay G, Larsen KL, Lellei-Kovács E, Limousin JM, Ogaya R, Ourcival JM, Sala OE, Smith AR, Schmidt IK, Sternberg M, Tielbörger K, Tietema A, Janssens I (2015) ANPP-precipitation relationships in multi-year drought experiments in natural ecosystems. *Ecological Society of America Annual Meeting*, August 9–14, 2015, OOS 58-8.
- Hanson PJ (2015) Chronic and acute precipitation manipulations in eastern deciduous forests: build wide, measure deep and be patient. *Ecological Society of America Annual Meeting*, August 9–14, 2015, OOS 58-7.

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