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–present	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) NOx & SOx 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.

Faculty Sabbaticals Hosted

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

Funded Proposals (2001–present)

Hanson, PJ et al. 2015. *Science Plan for the Oak Ridge National Laboratory Terrestrial Ecosystem Science Scientific Focus Area.* U.S. Department of Energy, 2016 to 2018, $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, $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*, $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, ~ $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

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

Web of Science metrics, February 2018

WoS-All Data Bases = h-index = 54 with >10,760 citations for 144 publications, 31 Publications with more than 100 citations

Scopus metrics, February 2018

h-index = 52 with >10,390 citations for 141 publications

Google Scholar metrics, February 2018

h-index 63; i10-index 137; with >16,200 citations for over 285 items

Published works and data sets (1 book; 191 articles; 21 data sets)

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. Richardson AD, Hufkens K, Milliman T, Aubrecht DM, Furze ME, Krassovski MB, Latimer JM, Nettles WR, Warren JM, **Hanson PJ** (2017) Ecosystem

warming extends growing season but heightens cold 1 temperature vulnerability. *Nature* (submitted and in review).

2. 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 (2017) Guidelines and considerations for designing precipitation manipulation experiments in forest ecosystems. *Methods in Ecology and Evolution* (submitted).
3. Tfaily MM, Wilson RM, Cooper WT, Kostka J, **Hanson PJ**, Chanton JP (2017) Vertical stratification of peat pore water dissolved organic matter composition in a peat bog in Northern Minnesota. *Journal of Geophyscial Research – Biogeosciences* (accepted manuscript online), doi: 10.1002/2017JG004007
4. 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* (accepted).
5. 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* (accepted).
6. Iversen CM, Childs C, Norby RJ, Ontl TA, Kolka RK, Brice DJ, McFarlane KJ, **Hanson PJ** (2017) Fine-root growth in a forested bog is seasonally dynamic, but shallowly distributed in a nutrient-poor peat. *Plant and Soil* (early online), doi:10.1007s11104-017-3231-z.
7. 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
8. 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
9. 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 CO_2 and warming. *Journal of Geophysical Research – Biogeosciences* 122: 2841-2861, doi: 10.1002/2017JG003932
10. 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 Geophyscial Research – Biogeosciences* 122: 2046-2063, doi:10.1002/2016JG003725
11. 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 CO_2:CH_4 production ratios during anaerobic decomposition. *Organic Geochemistry* 112:22-32, doi: 10.1016/j.orggeochem.2017.06.011

12. 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
13. Walker AP, Carter KR, Gu L, **Hanson PJ**, Malhotra A, Norby RJ, Sebestyen SD, Wullschleger 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
14. 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.
15. **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 CO_2 atmosphere. *Biogeosciences* 14: 861–883, doi: 10.5194/bg-14-861-2017
16. 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.
17. 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
18. **Hanson PJ**, Gill AL, Xu X, Phillips JR, Weston DJ, Kolka RK, Riggs JS, Hook LA (2016) Intermediate-scale community-level flux of CO_2 and CH_4 in a Minnesota peatland: Putting the SPRUCE project in a global context. *Biogeochemistry* 129: 255-272, doi: 10.1007/s10533-016-0230-8.
19. 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.
20. 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

21. Wenk ES, Callaham 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.
22. 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.
23. 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
24. 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.
25. D'Odoricoa P, Gonsamob A, Goughc CM, Bohrerd G, Morisone J, Wilkinsone M, **Hanson PJ**, Gianelleg D, Fuentesh JD, Buchmannaa 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
26. Torn MS, Chabbi A, Crill P, **Hanson PJ**, Janssens IA, Luo Y, Hicks Pries C, Rumpel C, Schmidt MWI, Six J, Schrumpf M, Zhu B (2015) A call for international soil experiment networks for studying, predicting, and managing global change impacts. *Soil* 1:575-582.
27. 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*,*
28. 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
29. 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
30. 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.

31. 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 CO_2 enrichment sites. *New Phytologist* 203:883-899, doi: 10.1111/nph.12847
32. 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 CO_2 enrichment experiments: Model performance at ambient CO_2 concentration. *Journal of Geophyscial Research - Biogeosciences* 119: 937-964, doi:10.1002/2013JG002553
33. 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.
34. 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
35. 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 CO_2 Enrichment studies. *New Phytologist* 202:803–822, doi:10.1111/nph.12697
36. Ryan MG, Vose JM, **Hanson PJ**, Iverson LR, Miniat 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.
37. 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.
38. 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 CO_2: a model-data intercomparison at two contrasting temperate forest FACE sites. *Global Change Biology* 19:1759-1779, doi:10.1111/gcb.12164.

39. 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.
40. McFarlane KJ, Torn MS, **Hanson PJ**, Porras RC, Swanston CW, Callaham 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
41. 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.
42. 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.
43. 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
44. 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 ^{14}C. *Biogeochemistry* 108:91-107, doi 10.1007/s10533-011-9575-1.
45. 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.
46. 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.
47. 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
48. 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 CO_2 efflux: reconciling lags and observations. *New Phytologist* 191:1006-1017, doi:10.1111/j.1469-8137.2011.03771.x
49. 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
50. **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.
51. 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
52. 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.
53. 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.
54. 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.
55. 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.
56. 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.
57. **Hanson PJ**, Gunderson CA (2009) Root carbon flux: measurements versus mechanisms. *New Phytologist* 184:4-6.
58. 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.
59. Fröberg M, **Hanson PJ**, Trumbore SE, Swanston CW, Todd DE (2009) Flux of carbon from ^{14}C-enriched leaf litter throughout a forest soil mesocosm. *Geoderma* 149:181-188.
60. 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.

61. 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.
62. 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.
63. **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 CO_2 Experiments in Terrestrial Ecosytems. 14–18 April 2008, Arlington, Virginia, http://science.energy.gov/~/media/ber/pdf/Ecosystem_experiments.pdf
64. 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 [CO_2] on ecosystem carbon and water dynamics in different climatic zones. *Global Change Biology* 14:1986-1999.
65. 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.
66. 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.
67. Gu L, **Hanson PJ**, Post WM, Kaiser DP, Yang B, Nemani R, Pallardy SG, Meyers T (2008) The April 2007 freeze in the eastern United States: its damage to vegetation and implication for terrestrial ecosystem structure and functioning in a warming climate. *Bioscience* 58:253-262.
68. 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, Hutyra 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) CO_2 balance of boreal, temperate, and tropical forests derived from a global database. *Global Change Biology* 13:2509-2537.
69. Yang B, **Hanson PJ**, Riggs JS, Pallardy SG, Heuer M, Hosman KP, Meyers TP, Wullschleger SD, Gu L (2007) Biases of CO_2 storage in eddy flux measurements in a forest pertinent to vertical configurations of a profile system and CO_2 density averaging. Journal of Geophysical Research 112; D20123, doi:10.1029/2006JD008243.

70. **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.
71. Garten CT Jr, **Hanson PJ**, Todd DE Jr, Lu BW, Brice DJ (2007) Natural ^{15}N and ^{13}C 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.
72. **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.
73. 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.
74. 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.
75. 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.
76. 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.
77. 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
78. Garten CT Jr., **Hanson PJ** (2006) Measured forest soil C stocks and estimated turnover times along an elevation gradient. *Geoderma* 136:342-352.
79. 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.

80. 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
81. 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 ^{14}C-labeled hardwood forest. *New Phytologist* 172:523-535.
82. 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 CO_2 and energy exchange in temperate and boreal deciduous forests. *Ecological Modelling* 196:289-312.
83. 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.
84. 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.
85. Norby RJ, Wullschleger SD, **Hanson PJ**, Gunderson CA, Tschaplinski TJ, Jastrow JD. 2006. CO_2 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 CO_2: Case Studies, Processes, and Perspectives* Ecological Studies, Vol. 187. Springer, Berlin, pp. 231-251.
86. Cisneros-Dozal LM, Trumbore SE, **Hanson PJ** (2005) Partitioning sources of soil-respired CO_2 and their seasonal variation using a unique radiocarbon tracer. *Global Change Biology* 12:194–204.
87. **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
88. **Hanson PJ,** Wullschleger SD, Norby RJ, Tschaplinski TJ, Gunderson CA (2005) Importance of changing CO_2, 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.
89. 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.
90. **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.
91. King JS, **Hanson PJ**, Bernhardt E, DeAngelis P, Norby RJ, Pregitzer KS (2004) A multiyear synthesis of soil respiration responses to elevated atmospheric CO_2 from four forest FACE experiments. *Global Change Biology* 10:1027-1042.
92. Pendall E, Bridgham S, **Hanson PJ**, Hungate B, Kicklighter DW, Johnson DW, Law BE, Luo Y, Megonigal JP, Olsrud M, Ryan MG, Thornton P, Wan S (2004) Below-ground process responses to elevated CO_2 and temperature: a

discussion of observations, measurement methods, and models. *New Phytologist* 162:311-322.
93. **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.
94. **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.
95. 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.
96. 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.
97. 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.
98. 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.
99. **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.
100. 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.
101. **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.
102. **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.
103. 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.

104. **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.
105. 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.
106. **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.
107. 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 CO_2-enriched deciduous forest and the implications for carbon storage. *Ecological Applications* 12:1261-1266.
108. 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.
109. 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.
110. **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.
111. Wullschleger SD, Gunderson CA, **Hanson PJ**, Wilson KB, Norby RJ (2002) Sensitivity of stomatal and canopy conductance to elevated CO_2 concentration – Interacting variables and perspectives of scale. *New Phytologist* 153:485-496.
112. 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 CO_2 enrichment. *Plant Cell and Environment* 25:379-393.
113. Ehman JL, Schmid HP, Grimmond 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.
114. 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.

115. Trumbore S, Gaudinski JB, **Hanson PJ**, Southon JR (2002) Quantifying Ecosystem-Atmosphere Carbon Exchange with a ^{14}C Label. *EOS* 83:265,267-268.
116. 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) Forest disturbances and climate change. *BioScience* 51:723-734.
117. **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.
118. 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.
119. 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.
120. 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.
121. 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.
122. **Hanson PJ**, Weltzin JF (2000) Drought disturbance from climate change: response of United States forests. *Science of the Total Environment* 262:205-220.
123. Ehman J, Schmid HP, Grimmond 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.
124. Grimmond 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.
125. 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.
126. Joslin JD, Wolfe MH, **Hanson PJ** (2000) Effects of shifting water regimes on forest root systems. *New Phytologist* 147:117-129.
127. **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.

128. Wullschleger 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.
129. 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.
130. 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.
131. 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.
132. **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.
133. 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.
134. 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.
135. 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.
136. **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.
137. 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.
138. Luxmoore RJ, **Hanson PJ**, Beauchamp JJ, Joslin JD (1998) Passive nighttime warming facility for forest ecosystem research. *Tree Physiology* 18:615-623.
139. 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.
140. 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.
141. **Hanson PJ**, Tabberer TA, Lindberg SE (1997) Emissions of mercury vapor from tree bark. *Atmospheric Environment* 31:777-780.
142. 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.
143. 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.
144. 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.
145. Edwards NT, **Hanson PJ** (1996) Stem respiration in a closed-canopy upland oak forest. *Tree Physiology* 16:433-439.
146. 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.
147. **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.
148. **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.
149. Wullschleger SD, Norby RJ, **Hanson PJ** (1995) Growth and maintenance respiration in stems of *Quercus alba* after four years of CO_2 enrichment. *Physiologia Plantarum* 93:47-54.
150. Tschaplinski TJ, Stewart DB, **Hanson PJ**, Norby RJ (1995) Interactions between drought and elevated CO_2 on growth and gas exchange of seedlings of three deciduous tree species. *New Phytologist* 129:63-71.
151. **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.
152. **Hanson PJ**, Hoffman WA (1994) Emissions of non-CH_4 organic compounds and CO_2 from forest floor cores. *Soil Science Society of America Journal* 58:552-555.
153. 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.
154. **Hanson PJ**, Wullschleger SD, Bohlman SA, Todd DE (1993) Seasonal and topographic patterns of forest floor CO_2 efflux from an upland oak forest. *Tree Physiology* 13:1-15.
155. Luxmoore RJ, Wullschleger SD, **Hanson PJ** (1993) Forest responses to CO_2 enrichment and climate warming. *Water Air and Soil Pollution* 70:309-323.
156. 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.
157. 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.
158. **Hanson PJ**, Garten CT Jr. (1992) Deposition of $H^{15}NO_3$ to white oak, red maple, and loblolly pine foliage: experimental observations and a generalized model. *New Phytologist* 122:329-337.
159. 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.
160. 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.
161. 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.
162. **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.
163. Pier PA, Thornton FC, McDuffie C Jr., **Hanson PJ** (1992) CO_2 exchange rates of red spruce during the second season of exposure to ozone and acidic cloud deposition. *Environmental and Experimental Botany* 32:115-124.
164. **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.
165. **Hanson PJ**, Lindberg SE (1991) Dry deposition of reactive nitrogen compounds: a summary of leaf canopy and nonfoliar measurements. *Atmospheric Environment* 25A:1615-1634.
166. 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.
167. 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.
168. **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.

169. Garten CT, **Hanson PJ** (1990) Foliar retention of ^{15}N-nitrate and ^{15}N-ammonium by red maple (*Acer rubrum*) and white oak (*Quercus alba*) leaves from simulated acid rain. *Environmental and Experimental Botany* 30:333-342.
170. **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.
171. **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.
172. **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.
173. 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.
174. **Hanson PJ**, Rott K, Taylor GE Jr., Lindberg SE, Gunderson CA, Ross-Todd BM (1989) NO_2 deposition to elements of a forest landscape. *Atmospheric Environment* 23:1783-1794.
175. **Hanson PJ**, McLaughlin SB (1989) Growth, photosynthesis, and chlorophyll concentrations of red spruce seedlings treated with mist containing H_2O_2. *Journal of Environmental Quality* 18:499-503.
176. 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.
177. Norby RJ, Weerasuriya Y, **Hanson PJ** (1989) Induction of nitrate reductase activity in red spruce needles by NO_2 and HNO_3 vapor. *Canadian Journal of Forest Research* 19:889-896.
178. **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.
179. **Hanson PJ**, McLaughlin SB, Edwards NT (1988) Net CO_2 exchange of *Pinus taeda* shoots exposed to variable ozone levels and precipitation chemistries in field and laboratory settings. *Physiologia Plantarum* 74:635-642.
180. **Hanson PJ**, Isebrands JG, Dickson RE, Dixon RK (1988) Ontogenetic patterns of CO_2 exchange of *Quercus rubra* L. leaves during three flushes of shoot growth I. Median flush leaves. *Forest Science* 34:55-68.

181. **Hanson PJ**, Isebrands JG, Dickson RE, Dixon RK (1988) Ontogenetic patterns of CO_2 exchange of *Quercus rubra* L. leaves during three flushes of shoot growth II. Insertion gradients of leaf photosynthesis. *Forest Science* 34:69-76.
182. 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.
183. **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.
184. **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.
185. **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.
186. **Hanson PJ**, McRoberts RE, Isebrands JG, Dixon RK (1987) An optimal sampling strategy for determining CO_2 exchange rate as a function of photosynthetic photon flux density. *Photosynthetica* 21:98-101.
187. **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.
188. **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.
189. **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.
190. **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.
191. **Hanson PJ**, Dixon RK (1985) Allelopathic inhibition of northern red oak by interrupted fern and goldenrod. In P*roc. 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. Walker AP, Carter KR, **Hanson PJ**, Nettles WR, Philips JR, Sebestyen SD, and Weston DJ (2017) **SPRUCE S1 Bog Sphagnum CO_2 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
2. 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
3. **Hanson PJ**, Phillips JR, Riggs JS, Nettles WR (2017) **SPRUCE Large-Collar In Situ CO_2 and CH_4 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
4. 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
5. **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
6. 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
7. 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

8. 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
9. 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
10. **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. (Includes recent additions of annual data files.)
11. **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
12. **Hanson PJ** (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
13. 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
14. **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.
15. **Hanson PJ**, Phillips JR, Riggs JS, Nettles WR, Todd DE (2014) SPRUCE **Large-Collar In Situ CO_2 and CH_4 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
16. 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.
17. **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.

18. **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.
19. 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.
20. **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
21. **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.

Abstracts and Presentations (2010–present)

Hanson PJ, Phillips JR, Nettles WR, Heiderman R (2017) Recent carbon cycle dynamics in an ombrotrophic peatland: implications from warming and eCO_2 treatments and the role of vegetation layers in the flux of CO_2 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 CO_2 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 CO_2 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 CO_2 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, Wullscheger S, Villanueva RB, Hanson PJ (2017) Ecophysiology at SPRUCE: Impacts of whole ecosystem warming and elevated CO_2 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, Hopple 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 CO_2: Early CO_2 and CH_4 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 CO_2 in a boreal peatland forest. ESA Annual Meeting, Portland, Oregon, 5–10 August 2017.
Hanson PJ, Griffiths N, Sebestyen S, Ricciuto D (2017) Whole-ecosystem-warming and elevated-CO_2 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.

Hopple A, Brunik K, Pfeifer-Meister L, Keller J, Woerndle 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, Woerndle 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 CO_2: 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 CO_2: 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 CO_2 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 CO_2 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.

Hanson PJ, Ricciuto DM, Iversen CM, Griffiths N, Sebestyen S, Jensen A, Warren J, Norby, Shi X, Xu X, McFarlane KJ (2014) The S1-Bog Carbon Cycle and Projected Warming Responses for the SPRUCE Experiment. Presentation given at the Joint TES/SBR Principal Investigator Meeting, May 5–7, 2014, Bolger Center, Maryland.

Hanson PJ, Ricciuto DM, Thornton PE, Project Participants (2014) ORNL's Terrestrial Ecosystem Science Scientific Focus Area -2014. Poster presentation given at the Joint TES/SBR Principal Investigator Meeting, May 5–7, 2014, Bolger Center, Maryland.

Hook L, Devarakonda R, Riggs JS, Krassovski MB, Hanson PJ, Boden TA (2014) ORNL's TES SFA Data and Model Management and Archiving Facilitate Data Sharing and Model-Data Integration.Poster presentation given at the Joint TES/SBR Principal Investigator Meeting, May 5–7, 2014, Bolger Center, Maryland.

Jastrow J, Matamala R, McFarlane K, Fan Z, Porras R, Torn M, Guilderson T, Hanson P, (2014) Climatic and edaphic effects on root- and leaf-litter carbon inputs to temperate forest soils. Poster presentation given at the Joint TES/SBR Principal Investigator Meeting, May 5–7, 2014, Bolger Center, Maryland.

Ricciuto D, Thornton P, Shi X, Mao J, Hanson P, Sebestyen S, Griffiths N (2014) Modeling the Hydrological dynamics of the SPRUCE S1 Bog.Poster presentation given at the Joint TES/SBR Principal Investigator Meeting, May 5–7, 2014, Bolger Center, Maryland.

Schadt C, Hanson PJ, Steinweg M, Robeson MS, Zamin K, Kostka J (2014) Scoping potential microbial responses to warming and drying in the SPRUCE peatland ecosystem. Poster presentation given at the Joint TES/SBR Principal Investigator Meeting, May 5–7, 2014, Bolger Center, Maryland.

Xu X, Hanson PJ, Ricciuto D, Phillips JR, Shi X, Riggs JS, Iversen CM, Weston DJ, Hook LA, Thornton PE (2014) Integrating In-situ Data with a Model for Examining Community-level CO_2 and CH4 flux in a Carbon-rich Peatland in Northern Minnesota. Poster presentation given at the Joint TES/SBR Principal Investigator Meeting, May 5–7, 2014, Bolger Center, Maryland.

Hanson PJ, Chanton JP, Iversen CM, McFarlane KJ, Tfaily MM, Xu X (2013) Past and Future Stability of Deep Peatland Carbon Stocks: Assessing the Nature and Fate of Carbon in a Northern Minnesota Ombrotrophic Peatland, B11J-07, AGU Fall Meeting, San Francisco, California, 9–13 December.

Phillips JA, Hanson PJ, Riggs JS (2013) CO_2 and CH_4 Net Carbon Flux from a high-carbon peatland in Northern Minnesota: Plot scale observations of the Shrub, forb, *Sphagnum* and microbial community. GC51A-0942, AGU Fall Meeting, San Francisco, California, 9–13 December.

Chanton J, Tfaily MM, Kostka JE, Schadt CW, Hanson PJ, Cooper WT, Chanton P (2013) Humification and vertical stratification of organic matter transformations in the peat column at the SPRUCE site. Marcell Experimental Forest. B13H-0607, AGU Fall Meeting, San Francisco, California, 9–13 December.

Tfaily MM, Lin X, Chanton PR, Steinweg J, Esson K, Kostka J, Cooper T, Schadt CW, Hanson PJ, Chanton J (2013) Dissolved organic carbon cycling and transformation dynamics in a northern forested peatland. B13H-0608, AGU Fall Meeting, San Francisco, California, 9–13 December.

Krassovski M, Hanson PJ, Boden T, Riggs J, Nettles WR, Hook LA (2013) SPRUCE experiment data infrastructure, IN41C-1615, AGU Fall Meeting, San Francisco, California, 9–13 December.

Walker AP, Zaehle S, DeKauwe MG, Medlyn BE, Dietze M, Hickler T, Iversen CM, Jain AK, McCarthy HR, Parton WJ, Prentice C, Thornton PE, Wang S, Wang Y-P, Warlind D, Warren J, Weng E, Hanson PJ, Oren R, Norby RJ (2013) Model-experimental synthesis at two FACE sites in the southeastern US. Forest ecosystem responses to elevated CO_2. B13M-01, AGU Fall Meeting, San Francisco, California, 9–13 December.

Shi X, Thornton PE, Ricciuto DM, Hanson PJ, Mao J (2013) Development and testing the hydrological dynamics of vegetated wetland for CLM. H13N-07, AGU Fall Meeting, San Francisco, California, 9–13 December.

Jastrow J, Calderon FJ, McFarlane KJ, Porras RC, Torn MS, Guilderson TP, Hanson PJ (2013) Climatic and edaphic effects on the turnover and composition of mineral-associated soil organic matter in temperate deciduous forests. B24C-08, AGU Fall Meeting, San Francisco, California, 9–13 December.

Matamala R, Jastrow JD, McFarlane KJ, Guilderson TP, Hanson PJ (2013) Quantifying the amount of root-derived carbon retained in soil at 4 temperate deciduous forests. B31C-0420, AGU Fall Meeting, San Francisco, California, 9–13 December.

Hanson PJ, Barbier C, Riggs JS, Kolka RK, Sebestyen SE, Griffiths NA, Hook LA, Iversen CM, Warren JM, Weston DJ, Norby RJ (2013) Whole-ecosystem warming and CO_2 manipulation to assess ombrotrophic bog responses to hypothetical future environments. OOS 29-10, Annual meeting of the Ecological Society of America, Minneapolis, Minnesota, 4–9 August.

Kolka RK, Hanson PJ, Sebestyen SE (2013) Marcell Experimental Forest, USDA Forest Service peatland research past and present. OOS 29-1, Annual meeting of the Ecological Society of America, Minneapolis, Minnesota, 4–9 August.

Jensen AM, Warren JM, Hanson PJ, Childs J, Gunderson C, Weston DJ, Wullschleger SD (2013) Seasonal and spatial carbon assimilation patterns in black spruce; assessing temperature impacts at canopy level. COS 53-8, Annual meeting of the Ecological Society of America, Minneapolis, Minnesota, 4–9 August.

Tran HE, Weston DJ, Warren JM, Hanson PJ, Norby RJ, Childs J, Wullschleger SD (2013) Scaling Sphagnum photosynthesis from leaf to plot in an ecosystem level climate change experiment. PS 39-63, Annual meeting of the Ecological Society of America, Minneapolis, Minnesota, 4–9 August.

Steinweg MJ, Kostka JE, Hanson PJ, Schadt CW (2013) Spatial and temporal heterogeneity in bog enzymes and their temperature responses. COS 82-2, Annual meeting of the Ecological Society of America, Minneapolis, Minnesota, 4–9 August.

Hanson PJ, Kolka RK, Barbier C, Grant RF, Hook LA, Iversen CM, Miller PA, Norby RJ, Palik B, Schadt CW, Sebestyen SD, Shi Y, Thornton PE, Warren JM, Weston DJ

(2013) Spruce-Peatland Responses Under Climatic and Environmental Change An *In Situ* Warming by CO_2 Manipulation of a Characteristic High-Carbon Ecosystem. Invited talk for the Mer Bleue Carbon Meeting 2013, 4–5 March, Montreal, Canada.

Hanson PJ, Thornton PE, Miller PA, Grant RF, Kolka RK, Iversen CM, Norby RJ, Warren JM, Hook LA (2013) Evaluating high-carbon peatland responses to environmental change: a report on pre-treatment C stocks and fluxes for a characteristic ombrotrophic bog and projected response to warming by elevated CO_2 treatments. 4th NACP All-Investigators Meeting, 4–7 February, Albuquerque, New Mexico, http://www.nacarbon.org/cgi-bin/meeting_2013/mtg2013_ab_search.pl

Walker A, De Kauwe M, Dietze M, Hanson PJ, Hickler T, Jain AK, Luo Y, McCarthy H, Medlyn B, Norby RJ, Oren R, Parton WJ, Thornton PE, Wang S, Wang Y-P, Warland D, Weng E, Zaehle S (2013) A model-data synthesis of ecosystem responses to elevated CO_2 at two FACE sites in the south eastern U.S. 4th NACP All-Investigators Meeting, 4–7 February, Albuquerque, New Mexico, http://www.nacarbon.org/cgi-bin/meeting_2013/mtg2013_ab_search.pl

Pallardy SG, Gu L, Hanson PJ, Hosman KP, Riggs J (2013) Annual Variation in Functional Leaf Area and Photosynthetic Activity in a Drought-Prone Temperate Deciduous Forest 4th NACP All-Investigators Meeting, 4–7 February, Albuquerque, New Mexico, http://www.nacarbon.org/cgi-bin/meeting_2013/mtg2013_ab_search.pl

Matamala R, Jastrow JD, McFarlane K, Porras R, Torn M, Guilderson T, Hanson PJ (2013) Climatic and edaphic controls over root decomposition and labile components of mineral-associated soil organic matter 4th NACP All-Investigators Meeting, 4–7 February, Albuquerque, New Mexico, http://www.nacarbon.org/cgi-bin/meeting_2013/mtg2013_ab_search.pl

McFarlane K, Hanson PJ, Torn M, Matamala R, Jastrow JD, Porras RC, Guilderson T (2013) EBIS-AmeriFlux: Tracking Carbon Flux into Soil Sinks in Temperate Broadleaf Forests in the Eastern US with Radiocarbon. 4th NACP All-Investigators Meeting, 4–7 February, Albuquerque, New Mexico, http://www.nacarbon.org/cgi-bin/meeting_2013/mtg2013_ab_search.pl

Kolka RK, Hanson PJ (2013) Spruce-Peatland Responses Under Climatic and Environmental change: an *in situ* warming by carbon dioxide manipulation of a forest bog in northern Minnesota. Invited presentation to Symposium on Peatlands and Climate Change. Society of Wetland Science Annual Meeting, Duluth, Minnesota.

Hanson PJ, Kolka RK, Iversen C, Sebestyen SD, Norby RJ, Palik B, Thornton P, Warren J, Wullschleger SD, Hook L (2012) Spruce-Peatland Responses Under Climatic and Environmental Change An *In Situ* Warming by CO_2 Manipulation of a Characteristic High-Carbon Ecosystem. The 14th International Peat Congress Peatlands in Balance, 3–8 June 2012, Stockholm, Sweden, Abstract #109.

Iversen CM, Hanson PJ, Childs J, Norby RJ, Kolka RK, Barbier C, Bisht G, Griffiths NA, Hook LA, Palik B, Schadt CW, Sebestyen SD, Steinweg JM, Thomas WK, Thornton PE, Warren JM, Weston DJ, Wullschleger SD (2012) Spruce Peatland Responses Under Climatic and Environmental change: An *in situ* warming by

CO_2 manipulation of a peatland ecosystem. 9th INTECOL Wetlands Conference - Wetlands in a Complex World, 3–8 June 2012, Orlando, Florida.

Kolka RK, Hanson PJ, Iversen C, Sebestyen SD, Norby RJ, Palik B, Thornton P, Warren J, Wullschleger SD, Hook L (2012) Spruce-peatland responses under climatic and environmental Change (SPRUCE Experiment): An *in situ* warming by CO_2 manipulation of a characteristic high-carbon ecosystem. BIOGEOMON 2012: The 7th International Symposium on Ecosystem Behavior, 15–20 July 2012, Lincolnville, Maine.

Hanson PJ, Wullschleger SD, Norby RJ, Gunderson CA (2011) Impacts of Environmental and Atmospheric Changes on Carbon Storage and Exchange in Upland Deciduous Forests: Current Patterns and Future Projections. 96th Annual Meeting of the Ecological Society of America, 7–12 August 2001, Austin, Texas. [Invited Presentation OOS 11-2]

Hanson PJ, Kolka RK, Norby RJ, Wullshchleger SD, Garten Jr. CT, Sebestyen SD, Thornton PE, Bradford J, Mulholland PJ, Todd DE, Iversen C, Warren J, Hook L. (2011) Spruce Peatland Responses Under Climatic and Environmental Change: A Replicated In Situ Warming By CO_2 Manipulation of a Characteristic High-Carbon Ecosystem. 2011 AmeriFlux/NACP All Investigators Meeting, Poster Abstract G-156.

Hanson PJ, McFarlane K, Torn MS, Matamala R, Guilderson T, Jastrow JD, Callaham MA, Trumbore S, Parton Jr. WJ, and EBIS-Site Operators (2011) Multiyear Applications of ^{14}C-Enriched Leaf Litter at Temperate Deciduous Forests Across the Eastern United States: Application to Direct Observations of Soil Carbon Transport and Storage Dynamics in Organic and Mineral Soils. 2011 AmeriFlux/NACP All Investigators Meeting, Poster Abstract G-155.

Hanson PJ, Kolka RK, Norby RJ, Palik B, Wullschleger SD, Garten Jr. CT, Sebestyen SD, Thornton PE, Bradford J, Mulholland PJ, Todd DE, Iversen C, Warren J (2010) Evaluating spruce peatland responses under climatic and environmental change using a replicated in situ field manipulation. Abstract: B21A-0293 presented at 2010 Fall Meeting, AGU, San Francisco, California, 13–17 December.

Mulholland PJ, Sebestyen SD, Hanson PJ, Warren J, Kolka RK (2010) Water research within the spruce experiment, a large-scale study of climate change effects on a northern peatland. Abstract H41G-1178 presented at 2010 Fall Meeting, AGU, San Francisco, California, 13–17 December.

Vargas R, Baldocchi DD, Bahn M, Hanson PJ, Hosman K, Kulmala L, Pumpanen J, Yang, B (2010) On the temporal correlation between photosynthesis and soil respiration: reconciling lags and observations. Abstract B11D-0383 presented at 2010 Fall Meeting, AGU, San Francisco, California, 13–17 December.

Hanson PJ et al. (2010) Simultaneous Above- and Belowground Warming of Intact Ecosystem Plots to Achieve Hypothetical Future Climates. Invited talk presented at the Climate Change Experiments in High-Latitude Ecosystems meeting held in Fairbanks, Alaska, 14–15 October.

Hanson PJ, Wullschleger SD, Todd DE, Augé RM, Fröberg M, Johnson DW (2010) Oak forest responses to episodic-seasonal-drought, chronic multi-year precipitation change and acute drought manipulations in a region with deep soils and high

precipitation. Invited presentation for the European Geosciences Union General Assembly 2010, 2–7 May 2010, Vienna, Austria, Session BG2.6.

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