**Bibliography for Global Forest Carbon Database (ForC)**

The citations for the ForC database are managed in the ForC-db group on Mendeley (<https://www.mendeley.com/community/forc-db/>), which is a public repository.

DATA SOURCES 1

METHODOLOGY REFERENCES 57

ALLOMETRY REFERENCES 63

# DATA SOURCES

Adachi, M., Y. S. Bekku, W. Rashidah, T. Okuda, and H. Koizumi. 2006. Differences in soil respiration between different tropical ecosystems. Applied Soil Ecology 34:258–265.

Aide, T. M., J. K. Zimmerman, L. Herrera, M. Rosario, and M. Serrano. 1995. Forest recovery in abandoned tropical pastures in Puerto Rico. Forest Ecology and Management 77:77–86.

Alban, D. H., and D. A. Perala. 1992. Carbon storage in Lake States aspen ecosystems. Canadian Journal of Forest Research 22:1107–1110.

Alberti, G., A. Peressotti, P. Piussi, and G. Zerbi. 2008. Forest ecosystem carbon accumulation during a secondary succession in the Eastern Prealps of Italy. Forestry 81:1–11.

Albrektson, A. 1980. Biomass of Scots Pine (Pinus Sylvestris L.). Amount-Development-Methods for Mensuration. In Swedish. Technical Report.

Allard, V., J. M. Ourcival, S. Rambal, R. Joffre, and A. Rocheteau. 2008. Seasonal and annual variation of carbon exchange in an evergreen Mediterranean forest in southern France. Global Change Biology 14:714–725.

Allen, A. S., J. A. Andrews, A. C. Finzi, R. Matamala, D. D. Richter, and W. H. Schlesinger. 2000. Effects of free-air CO2 enrichment (FACE) on belowground processes in a Pinus taeda forest. Ecological Applications 10:437–448.

Allison, S. D., K. L. McGuire, and K. K. Treseder. 2010. Resistance of microbial and soil properties to warming treatment seven years after boreal fire. Soil Biology and Biochemistry 42:1872–1878.

Allison, S. D., and K. K. Treseder. 2008. Warming and drying suppress microbial activity and carbon cycling in boreal forest soils. Global Change Biology 14:2898–2909.

Alves, D., J. V. Soares, S. Amaral, E. Mello, S. Almeida, O. F. Da Silva, and A. Silveira. 1997. Biomass of primary and secondary vegetation in Rondonia, Western Brazilian Amazon. Global Change Biology 3:451–461.

Amiro, B. D., A. L. Orchansky, A. G. Barr, T. A. Black, S. D. Chambers, F. S. Chapin III, M. L. Goulden, M. Litvak, H. P. Liu, J. H. McCaughey, A. McMillan, and J. T. Randerson. 2006. The effect of post-fire stand age on the boreal forest energy balance. Agricultural and Forest Meteorology 140:41–50.

Amiro, B. 2010. Estimating annual carbon dioxide eddy fluxes using open-path analysers for cold forest sites. Agricultural and Forest Meteorology 150:1366–1372.

Anderson-Teixeira, K. J., J. P. Delong, A. M. Fox, D. A. Brese, and M. E. Litvak. 2011. Differential responses of production and respiration to temperature and moisture drive the carbon balance across a climatic gradient in New Mexico. Global Change Biology 17:410–424.

Anderson, K. J., A. P. Allen, J. F. Gillooly, and J. H. Brown. 2006. Temperature-dependence of biomass accumulation rates during secondary succession. Ecology Letters 9:673–682.

Anderson, K. J., A. P. Allen, J. F. Gillooly, and J. H. Brown. 2006. Temperature-dependence of biomass accumulation rates during secondary succession. Ecology Letters 9:673–682.

Andrews, J. A., K. G. Harrison, R. Matamala, and W. H. Schlesinger. 1999. Separation of Root Respiration from Total Soil Respiration Using Carbon-13 Labeling during Free-Air Carbon Dioxide Enrichment (FACE). Soil Science Society of America Journal 63:1429.

Anthoni, P. M., A. Knohl, C. Rebmann, A. Freibauer, M. Mund, W. Ziegler, O. Kolle, and E.-D. Schulze. 2004. Forest and agricultural land-use-dependent CO2 exchange in Thuringia, Germany. Global Change Biology 10:2005–2019.

Anthoni, P. M., B. E. Law, and M. H. Unsworth. 1999. Carbon and water vapor exchange of an open-canopied ponderosa pine ecosystem. Agricultural and Forest Meteorology 95:151–168.

Aragão, L. E. O. C., Y. Malhi, D. B. Metcalfe, J. E. Silva-Espejo, E. Jiménez, D. Navarrete, S. Almeida, A. C. L. Costa, N. Salinas, O. L. Phillips, L. O. . Anderson, T. R. Baker, P. H. Goncalvez, J. Huamán-Ovalle, M. Mamani-Solórzano, P. Meir, A. Monteagudo, M. C. Peñuela, A. Prieto, C. A. Quesada, A. Rozas-Dávila, A. Rudas, J. A. Silva Junior, and R. Vásquez. 2009. Above- and below-ground net primary productivity across ten Amazonian forests on contrasting soils.

Arain, M. A., and N. Restrepo-Coupe. 2005. Net ecosystem production in a temperate pine plantation in southeastern Canada. Agricultural and Forest Meteorology 128:223–241.

Araujo-Murakami, A., C. E. Doughty, D. B. Metcalfe, J. E. Silva-Espejo, L. Arroyo, J. P. Heredia, M. Flores, R. Sibler, L. M. Mendizabal, E. Pardo-Toledo, M. Vega, L. Moreno, V. D. Rojas-Landivar, K. Halladay, C. A. J. Girardin, T. J. Killeen, and Y. Malhi. 2014. The productivity, allocation and cycling of carbon in forests at the dry margin of the Amazon forest in Bolivia. Plant Ecology & Diversity 7:55–69.

Araújo, A. C. 2002. Comparative measurements of carbon dioxide fluxes from two nearby towers in a central Amazonian rainforest: The Manaus LBA site.

Archibald, S. A., A. Kirton, M. R. van der Merwe, R. J. Scholes, C. A. Williams, and N. Hanan. 2009. Drivers of inter-annual variability in Net Ecosystem Exchange in a semi-arid savanna ecosystem, South Africa. Biogeosciences 6:251–266.

Arneth, A., F. M. Kelliher, T. M. Mcseveny, and J. N. Byers. 1999. Assessment of annual carbon exchange in a water-stressed Pinus radiata plantation: an analysis based on eddy covariance measurements and an integrated biophysical model. Global Change Biology 5:531–545.

Arneth, A., F. M. Kelliher, T. M. McSeveny, and J. N. Byers. 1998. Net ecosystem productivity, net primary productivity and ecosystem carbon sequestration in a Pinus radiata plantation subject to soil water deficit. Tree Physiology 18:785–793.

Arthur, M. A., and T. J. Fahey. 1992. Biomass and nutrients in an Engelmann spruce–subalpine fir forest in north central Colorado: pools, annual production, and internal cycling. Canadian Journal of Forest Research 22:315–325.

Asensio, D., J. Penuelas, R. Ogaya, and J. Llusia. 2007. Seasonal soil and leaf CO2 exchange rates in a Mediterranean holm oak forest and their responses to drought conditions. Atmospheric Environment 41:2447–2455.

Aththorick, T. A., D. Setiadi, Y. Purwanto, and E. D. I. Guhardja. 2012. Vegetation stands structure and aboveground biomass after the shifting cultivation practices of Karo People in Leuser Ecosystem, North Sumatra. Biodiversitas 13:92–97.

Aubinet, M., B. Chermanne, M. Vandenhaute, B. Longdoz, M. Yernaux, and E. Laitat. 2001. Long term carbon dioxide exchange above a mixed forest in the Belgian Ardennes. Agricultural and Forest Meteorology 108:293–315.

Bader, M. K.-F., and C. Körner. 2010. No overall stimulation of soil respiration under mature deciduous forest trees after 7 years of CO2 enrichment. Global Change Biology 16:2830–2843.

Bader, M., E. Hiltbrunner, and C. Körner. 2009. Fine root responses of mature deciduous forest trees to free air carbon dioxide enrichment (FACE). Functional Ecology 23:913–921.

Baker, T. R., E. N. Honorio Coronado, O. L. Phillips, J. Martin, G. M. F. van der Heijden, M. Garcia, and J. Silva Espejo. 2007. Low stocks of coarse woody debris in a southwest Amazonian forest. Oecologia 152:495–504.

Baker, T. R., O. L. Phillips, Y. Malhi, S. Almeida, L. Arroyo, A. Di Fiore, T. Erwin, N. Higuchi, T. J. Killeen, S. G. Laurance, W. F. Laurance, S. L. Lewis, A. Monteagudo, D. A. Neill, P. Nunez Vargas, N. C. A. Pitman, J. N. M. Silva, and R. Vasquez Martinez. 2004. Increasing biomass in Amazonian forest plots. Philosophical Transactions of the Royal Society B: Biological Sciences 359:353–365.

Baldocchi, D. 2008. TURNER REVIEW No. 15. “Breathing” of the terrestrial biosphere: lessons learned from a global network of carbon dioxide flux measurement systems. Australian Journal of Botany 56:1–26.

Baldocchi, D. D., S. Ma, S. Rambal, L. Misson, J.-M. Ourcival, J.-M. Limousin, J. Pereira, and D. Papale. 2010. On the differential advantages of evergreenness and deciduousness in mediterranean oak woodlands: a flux perspective. Ecological Applications 20:1583–1597.

Baldocchi, D., J. Finnigan, K. Wilson, K. T. Paw U, and E. Falge. 2000. On Measuring Net Ecosystem Carbon Exchange Over Tall Vegetation on Complex Terrain. Boundary-Layer Meteorology 96:257–291.

Banfield, G. ., J. . Bhatti, H. Jiang, and M. . Apps. 2002. Variability in regional scale estimates of carbon stocks in boreal forest ecosystems: results from West-Central Alberta. Forest Ecology and Management 169:15–27.

Barford, C. C. 2001. Factors Controlling Long- and Short-Term Sequestration of Atmospheric CO2 in a Mid-latitude Forest. Science 294:1688–1691.

Bargali, S. S., S. P. Singh, and R. P. Singh. 1992. Structure and function of an age series of eucalypt plantations in Central Himalaya. I. Dry matter dynamics. Annals of Botany 69:405–411.

Barr, A. G., T. A. Black, E. H. Hogg, T. J. Griffis, K. Morgenstern, N. Kljun, A. Theede, and Z. Nesic. 2007. Climatic controls on the carbon and water balances of a boreal aspen forest, 1994?2003. Global Change Biology 13:561–576.

Barr, A. G., T. A. Black, E. H. Hogg, N. Kljun, K. Morgenstern, and Z. Nesic. 2004. Inter-annual variability in the leaf area index of a boreal aspen-hazelnut forest in relation to net ecosystem production. Agricultural and Forest Meteorology 126:237–255.

Barr, A. G., T. J. Griffis, T. A. Black, X. Lee, R. M. Staebler, J. D. Fuentes, Z. Chen, and K. Morgenstern. 2002. Comparing the carbon budgets of boreal and temperate deciduous forest stands. Canadian Journal of Forest Research 32:813–822.

Bartholomew, W. V, J. Meyer, and H. Laudelout. 1953. Mineral nutrient immobilization under forest and grass fallow in the Yangambi (Belgian Congo) region. Publications de L’Institut National Pour L’Etude Agronomique du Conge Belge Serie Scientifique 57:1–27.

Bascietto, M., M. T. Hajny, S. Linder, A. Masci, G. Matteucci, L. Montagnani, E. Moors, and M. Mund. 2003. Database of tree stands (Structure, age, biomass, LAI and NPP) of the FORCAST project.

Battles, J. J., J. J. Armesto, D. R. Vann, D. J. Zarin, J. C. Aravena, C. Pérez, and A. H. Johnson. 2002. Vegetation composition, structure, and biomass of two unpolluted watersheds in the Cordillera de Piuchué, Chiloé Island, Chile. Plant Ecology 158:5–19.

Becknell, J. M., and J. S. Powers. 2014. Stand age and soils as drivers of plant functional traits and aboveground biomass in secondary tropical dry forest. Canadian Journal of Forest Research 44:604–613.

Beets, P. N. 1980. Amount and distribution of dry matter in a mature beech/podocarp community. New Zealand Journal of Forestry Science 10:395–418.

Behera, N., S. K. Joshi, and D. P. Pati. 1990. Root contribution to total soil metabolism in a tropical forest soil from Orissa, India.

Berbigier, P., J.-M. Bonnefond, and P. Mellmann. 2001. CO2 and water vapour fluxes for 2 years above Euroflux forest site. Agricultural and Forest Meteorology 108:183–197.

Bergeron, O., H. A. Margolis, T. A. Black, C. Coursolle, A. L. Dunn, A. G. Barr, and S. C. Wofsy. 2007. Comparison of carbon dioxide fluxes over three boreal black spruce forests in Canada. Global Change Biology 13:89–107.

Bergeron, O., H. A. Margolis, C. Coursolle, and M.-A. Giasson. 2008. How does forest harvest influence carbon dioxide fluxes of black spruce ecosystems in eastern North America? Agricultural and Forest Meteorology 148:537–548.

Bergner, B., J. Johnstone, and K. K. Treseder. 2004. Experimental warming and burn severity alter soil CO2 flux and soil functional groups in a recently burned boreal forest. Global Change Biology 10:1996–2004.

Beringer, J., L. B. Hutley, N. J. Tapper, and L. A. Cernusak. 2007. Savanna fires and their impact on net ecosystem productivity in North Australia. Global Change Biology 13:990–1004.

Bernhofer, C., M. Aubinet, R. Clement, A. Grelle, T. Grünwald, A. Ibrom, P. Jarvis, C. Rebmann, E.-D. Schulze, and J. D. Tenhunen. 2003. Spruce Forests (Norway and Sitka Spruce, Including Douglas Fir): Carbon and Water Fluxes and Balances, Ecological and Ecophysiological Determinants. Pages 99–123Ecological Studies, 163: Fluxes of Carbon, Water and Energy of European Forests. Springer, Berlin Heidelberg.

Black, K., T. Bolger, P. Davis, M. Nieuwenhuis, B. Reidy, G. Saiz, B. Tobin, and B. Osborne. 2007. Inventory and eddy covariance-based estimates of annual carbon sequestration in a Sitka spruce (Picea sitchensis (Bong.) Carr.) forest ecosystem. European Journal of Forest Research 126:167–178.

Black, T. A., W. J. Chen, A. G. Barr, M. A. Arain, Z. Chen, Z. Nesic, E. H. Hogg, H. H. Neumann, and P. C. Yang. 2000. Increased carbon sequestration by a boreal deciduous forest in years with a warm spring. Geophysical Research Letters 27:1271–1274.

Black, T. A., G. Hartog, H. H. Neumann, P. D. Blanken, P. C. Yang, C. Russell, Z. Nesic, X. Lee, S. G. Chen, R. Staebler, and M. D. Novak. 1996. Annual cycles of water vapour and carbon dioxide fluxes in and above a boreal aspen forest. Global Change Biology 2:219–229.

Bolstad, P. V., K. J. Davis, J. Martin, B. D. Cook, and W. Wang. 2004. Component and whole-system respiration fluxes in northern deciduous forests. Tree Physiology 24:493–504.

Bond-Lamberty, B., C. Wang, and S. T. Gower. 2004. Contribution of root respiration to soil surface CO2 flux in a boreal black spruce chronosequence. Tree Physiology 24:1387–1395.

Bondarev, A. 1997. Age distribution patterns in open boreal Dahurican larch forests of Central Siberia. Forest Ecology and Management 93:205–214.

Bongers, F., D. Engelen, and H. Klinge. 1985. Phytomass structure of natural plant communities on spodosols in southern Venezuela: the Bana woodland. Vegetatio 63:13–34.

Boone, R. D., P. Sollins, and K. Cromack. 1988. Stand and Soil Changes Along A Mountain Hemlock Death and Regrowth Sequence. Ecology 69:714.

Bormann, F. H., and G. E. Likens. 1979. Pattern and Process in a Forested Ecosystem. Springer-Verlag New York, New York, NY.

Bowden, R. D., K. J. Nadelhoffer, R. D. Boone, J. M. Melillo, and J. B. Garrison. 1993. Contributions of aboveground litter, belowground litter, and root respiration to total soil respiration in a temperate mixed hardwood forest. Canadian Journal of Forest Research 23:1402–1407.

Broadbent, E. N., A. M. Almeyda Zambrano, G. P. Asner, M. Soriano, C. B. Field, H. R. de Souza, M. Peña-Claros, R. I. Adams, R. Dirzo, and L. Giles. 2014. Integrating Stand and Soil Properties to Understand Foliar Nutrient Dynamics during Forest Succession Following Slash-and-Burn Agriculture in the Bolivian Amazon. PLoS ONE 9:e86042.

Bronson, D. R., S. T. Gower, M. Tanner, S. Linder, and I. Van Herk. 2007. Response of soil surface CO2 flux in a boreal forest to ecosystem warming. Global Change Biology 14:856–867.

Brown, I. F., L. A. Martinelli, W. W. Thomas, M. Z. Moreira, C. A. Cid Ferreira, and R. A. Victoria. 1995. Uncertainty in the biomass of Amazonian forests: An example from Rondônia, Brazil. Forest Ecology and Management 75:175–189.

Buchmann, N. 2000. Biotic and abiotic factors controlling soil respiration rates in Picea abies stands. Soil Biology and Biochemistry 32:1625–1635.

Burton, A. J., K. S. Pregitzer, J. N. Crawford, G. P. Zogg, and D. R. Zak. 2004. Simulated chronic NO 3 − deposition reduces soil respiration in northern hardwood forests. Global Change Biology 10:1080–1091.

Busing, R. T., E. E. C. Clebsch, and P. S. White. 1993. Biomass and production of southern Appalachian cove forests reexamined. Canadian Journal of Forest Research 23:760–765.

Busing, R. T. 1998. Composition, structure and diversity of cove forest stands in the Great Smoky Mountains: a patch dynamics perspective. Journal of Vegetation Science 9:881–890.

Calfapietra, C., B. Gielen, A. N. J. Galema, M. Lukac, P. De Angelis, M. C. Moscatelli, R. Ceulemans, and G. Scarascia-Mugnozza. 2003. Free-air CO2 enrichment (FACE) enhances biomass production in a short-rotation poplar plantation. Tree Physiology 23:805–814.

Cannell, M. G. R. 1982. World forest biomass and primary production data. Academic Press, London.

CarboEurope-IP. 2006. CarboEurope-IP database. http://www.carboeurope.org/.

Carmona, M. R., J. J. Armesto, J. C. Aravena, and C. A. Pérez. 2002. Coarse woody debris biomass in successional and primary temperate forests in Chiloé Island, Chile. Forest Ecology and Management 164:265–275.

Carrara, A., A. S. Kowalski, J. Neirynck, I. A. Janssens, J. C. Yuste, and R. Ceulemans. 2003. Net ecosystem CO2 exchange of mixed forest in Belgium over 5 years. Agricultural and Forest Meteorology 119:209–227.

Carswell, F. E., A. L. Costa, M. Palheta, Y. Malhi, P. Meir, J. D. P. R. M. N. Costa, M. D. L. Ruivo, L. D. S. M. Leal, J. D. P. R. M. N. Costa, R. J. Clement, and J. Grace. 2002. Seasonality in CO2 and H2O flux at an eastern Amazonian rain forest. Journal of Geophysical Research D: Atmospheres 107.

Chambers, J. Q., N. Higuchi, J. P. Schimel, L. V. Ferreira, and J. M. Melack. 2000. Decomposition and carbon cycling of dead trees in tropical forests of the central Amazon. Oecologia 122:380–388.

Chambers, J. Q., J. dos Santos, R. J. Ribeiro, and N. Higuchi. 2001. Tree damage, allometric relationships, and above-ground net primary production in central Amazon forest. Forest Ecology and Management 152:73–84.

Chambers, J. Q., E. S. Tribuzy, L. C. Toledo, B. F. Crispim, N. Higuchi, J. Dos Santos, A. C. Araújo, B. Kruijt, A. D. Nobre, and S. E. Trumbore. 2004. Respiration from a tropical forest ecosystem: Partitioning of sources and low carbon use efficiency. Ecological Applications 14.

Chan, N., S. Takeda, R. Suzuki, and S. Yamamoto. 2013. Establishment of allometric models and estimation of biomass recovery of swidden cultivation fallows in mixed deciduous forests of the Bago Mountains, Myanmar. Forest Ecology and Management 304:427–436.

Chang, X., K. Che, C. Song, J. Wang, and B. Li. 1996. Biomass and nutrient element accumulation of Sabina prezewalskii forest community. Journal of Northwest Forestry College 12:23–28.

Chao, K.-J., O. L. Phillips, T. R. Baker, J. Peacock, G. Lopez-Gonzalez, R. Vásquez Martínez, A. Monteagudo, and A. Torres-Lezama. 2009. After trees die: quantities and determinants of necromass across Amazonia. Biogeosciences 6:1615–1626.

Chao, K.-J., O. L. Phillips, and T. R. Baker. 2008. Wood density and stocks of coarse woody debris in a northwestern Amazonian landscape. Canadian Journal of Forest Research 38:795–805.

Chave, J., D. Navarrete, S. Almeida, E. Álvarez, L. E. O. C. Aragão, D. Bonal, P. Châtelet, J. E. Silva-Espejo, J.-Y. Goret, P. von Hildebrand, E. Jiménez, S. Patiño, M. C. Peñuela, O. L. Phillips, P. Stevenson, and Y. Malhi. 2010. Regional and seasonal patterns of litterfall in tropical South America. Biogeosciences 7:43–55.

Chave, J., B. Riera, and M.-A. Dubois. 2001. Estimation of biomass in a neotropical forest of French Guiana: spatial and temporal variability. Journal of Tropical Ecology 17:S0266467401001055.

Chen, D. 2010. Dynamics and controls of carbon exchange of a tropical montane forest at Jianfengling, China. Chinese Academy of Forestry.

Chen, D., Y. Li, H. Liu, H. Xu, W. Xiao, T. Luo, Z. Zhou, and M. Lin. 2010. Biomass and carbon dynamics of a tropical mountain rain forest in China. Science China Life Sciences 53:798–810.

Chen, X., L. B. Hutley, and D. Eamus. 2003. Carbon balance of a tropical savanna of northern Australia. Oecologia 137:405–416.

Chen, Z., H. Zhang, B. Wang, and Z. Zhang. 1993. Studies on biomass and its allocation of the evergreen broad-leaved forest in Heishiding, Guangdong. Acta Phytoecologica et Geobotanica Sinica 17:289–298. [in Chinese].

China’s Forest Editorial Committee. 1999. China’s Forest (Volume 2): Coniferous Forest. China Forestry Publishing House, Beijing, China. In Chinese.

Cifuentes-Jara, M. 2008. Aboveground biomass and ecosystem carbon pools in tropical secondary forests growing in six life zones of Costa Rica. Oregon State University.

Clark, D. . D. ., and D. . D. . Clark. 2000. Landscape-scale variation in forest structure and biomass in a tropical rain forest. Forest Ecology and Management 137:185–198.

Clark, D. A. 2013. NPP Tropical Forest: La Selva, Costa Rica, 1975-1994, R1. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. doi:10.3334/ORNLDAAC/218.

Clark, D. A., S. Brown, D. W. Kicklighter, J. Q. Chambers, J. R. Thomlinson, J. Ni, and E. A. Holland. 2013. NPP Tropical Forest: Consistent Worldwide Site Estimates, 1967-1999, R1. Data set. Available on-line [http://daac.ornl.gov] from the Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. doi:10.3334/ORNLDAAC/616.

Clark, D. A., S. Brown, D. W. Kicklighter, J. Q. Chambers, J. R. Thomlinson, J. Ni, and E. A. Holland. 2001. Net primary production in tropical forests: An evaluation and synthesis of existing field data.

Clark, K. L., H. L. Gholz, and M. S. Castro. 2004. Carbon dynamics along a chronosequence of slash pine plantations in north Florida. Ecological Applications 14:1154–1171.

Clark, K. L., H. L. Gholz, J. B. Moncrieff, F. Cropley, and H. W. Loescher. 1999. Environmental Controls over Net Exchanges of Carbon Dioxide from Contrasting Florida Ecosystems. Ecological Applications 9:936.

Clark, K. L., N. Skowronski, and J. Hom. 2010. Invasive insects impact forest carbon dynamics. Global Change Biology 16:88–101.

Cleveland, C. C., and A. R. Townsend. 2006. Nutrient additions to a tropical rain forest drive substantial soil carbon dioxide losses to the atmosphere. Proceedings of the National Academy of Sciences of the United States of America 103:10316–10321.

Coles, J. R. P., and J. B. Yavitt. 2004. Linking Belowground Carbon Allocation to Anaerobic CH 4 and CO 2 Production in a Forested Peatland, New York State. Geomicrobiology Journal 21:445–455.

Comeau, P. G., and J. P. Kimmins. 1999. NPP Boreal Forest: Canal Flats, Canada, 1984. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. doi:10.3334/ORNLDAAC/465.

Comstedt, D., B. Boström, J. D. Marshall, A. Holm, M. Slaney, S. Linder, and A. Ekblad. 2006. Effects of Elevated Atmospheric Carbon Dioxide and Temperature on Soil Respiration in a Boreal Forest Using δ13C as a Labeling Tool. Ecosystems 9:1266–1277.

Cook, B. D., K. J. Davis, W. Wang, A. Desai, B. W. Berger, R. M. Teclaw, J. G. Martin, P. V. Bolstad, P. S. Bakwin, C. Yi, and W. Heilman. 2004. Carbon exchange and venting anomalies in an upland deciduous forest in northern Wisconsin, USA. Agricultural and Forest Meteorology 126:271–295.

Cromer, R. N., D. M. Cameron, S. J. Rance, P. A. Ryan, and M. Brown. 1993. Response to nutrients in Eucalyptus grandis. 1. Biomass accumulation. Forest Ecology and Management 62:211–230.

Cronan, C. S. 2003. Belowground biomass, production, and carbon cycling in mature Norway spruce, Maine, U.S.A. Canadian Journal of Forest Research 33:339–350.

Crow, T. R. 1978. Biomass and Production in Three Contiguous Forests in Northern Wisconsin. Ecology 59:265.

Crow, T. R. 1980. A Rainforest Chronicle: A 30-Year Record of Change in Structure and Composition at El Verde, Puerto Rico. Biotropica 12:42–55.

Crowell, M., and B. Freedman. 1994. Vegetation development in a hardwood-forest chronosequence in Nova Scotia. Canadian Journal of Forest Research 24:260–271.

Cummings, D. L., J. Boone Kauffman, D. A. Perry, and R. Flint Hughes. 2002. Aboveground biomass and structure of rainforests in the southwestern Brazilian Amazon. Forest Ecology and Management 163:293–307.

Curtis, P. S., C. S. Vogel, C. M. Gough, H. P. Schmid, H.-B. Su, and B. D. Bovard. 2005. Respiratory carbon losses and the carbon-use efficiency of a northern hardwood forest, 1999-2003. New Phytologist 167:437–456.

Curtis, P. S., P. J. Hanson, P. Bolstad, C. Barford, J. . Randolph, H. . Schmid, and K. B. Wilson. 2002. Biometric and eddy-covariance based estimates of annual carbon storage in five eastern North American deciduous forests. Agricultural and Forest Meteorology 113:3–19.

da Costa, A. C. L., D. B. Metcalfe, C. E. Doughty, A. A. R. de Oliveira, G. F. C. Neto, M. C. da Costa, J. de A. Silva Junior, L. E. O. C. Aragão, S. Almeida, D. R. Galbraith, L. M. Rowland, P. Meir, and Y. Malhi. 2014. Ecosystem respiration and net primary productivity after 8–10 years of experimental through-fall reduction in an eastern Amazon forest. Plant Ecology & Diversity 7:7–24.

Dang, C., and Z. Wu. 1992. Studies on the biomass for Castanopsis Echdnocarpa community of monsoon evergreen broad-leaved forest. Journal of Yunnan University (Natural Sciences) 14:95–107. [in Chinese].

Dang, C., Z. Wu, and Z. Zhang. 1994. Studies on the biomass of Cyclobalanopsis delavayi Community. Journal of Yunnan University (Natural Sciences) 16:205–209. [in Chinese].

Davidson, E. A., K. Savage, P. Bolstad, D. A. Clark, P. S. Curtis, D. S. Ellsworth, P. J. Hanson, B. E. Law, Y. Luo, K. S. Pregitzer, J. C. Randolph, and D. Zak. 2002. Belowground carbon allocation in forests estimated from litterfall and IRGA-based soil respiration measurements. Agricultural and Forest Meteorology 113:39–51.

Davidson, E. A., C. J. Reis de Carvalho, I. C. G. Vieira, R. de O. Figueiredo, P. Moutinho, F. Yoko Ishida, M. T. Primo dos Santos, J. Benito Guerrero, K. Kalif, and R. Tuma Sabá. 2004. Nitrogen and phosphorus limitation of biomass growth in a tropical secondary forest. Ecological Applications 14:150–163.

Davis, K. J., P. S. Bakwin, C. Yi, B. W. Berger, C. Zhao, R. M. Teclaw, and J. G. Isebrands. 2003. The annual cycles of CO2 and H2O exchange over a northern mixed forest as observed from a very tall tower. Global Change Biology 9:1278–1293.

Davis, M. R., R. B. Allen, and P. W. Clinton. 2003. Carbon storage along a stand development sequence in a New Zealand Nothofagus forest. Forest Ecology and Management 177:313–321.

Dean, C., S. Roxburgh, and B. Mackey. 2006. Growth modelling of Eucalyptus regnans for carbon accounting at the landscape scale. Pages 27–39Modelling forest systems. Workshop on the interface between reality, modelling and the parameter estimation processes, Sesimbra, Portugal, 2-5 June 2002. CABI, Wallingford.

DeAngelis, D. L., R. H. Gardner, and H. H. Shugart. 1981. Productivity of forest ecosystems studied during the IBP: the woodlands data set. Pages 567–672*in* D. E. Reichle, editor.Dynamic Properties of Forest Ecosystems. Cambridge University Press, Cambridge.

del Aguila-Pasquel, J., C. E. Doughty, D. B. Metcalfe, J. E. Silva-Espejo, C. A. J. Girardin, J. A. Chung Gutierrez, G. E. Navarro-Aguilar, C. A. Quesada, C. G. Hidalgo, J. M. Reyna Huaymacari, K. Halladay, D. del Castillo Torres, O. Phillips, and Y. Malhi. 2014. The seasonal cycle of productivity, metabolism and carbon dynamics in a wet aseasonal forest in north-west Amazonia (Iquitos, Peru). Plant Ecology & Diversity 7:71–83.

Delaney, M., S. Brown, A. E. Lugo, A. Torres-Lezama, and N. B. Quintero. 1997. The distribution of organic carbon in major components of forests located in five life zones of Venezuela. Journal of Tropical Ecology 13:697.

Delaney, M., S. Brown, A. E. Lugo, A. Torres-Lezama, and N. B. Quintero. 1998. The Quantity and Turnover of Dead Wood in Permanent Forest Plots in Six Life Zones of Venezuela1. Biotropica 30:2–11.

DeLucia, E. H. 1999. Net Primary Production of a Forest Ecosystem with Experimental CO2 Enrichment. Science 284:1177–1179.

Deng, S., L. Liao, S. Wang, H. Gao, and B. Lin. 2000. Bioproductivity of Castanopsis hysrix - Cyclobalanopsis glauca - Machilus pauhoi community in Huitong, Hunan. Chinese Journal of Applied Ecology 11:651–654. [in Chinese].

Desai, A. R., P. V. Bolstad, B. D. Cook, K. J. Davis, and E. V. Carey. 2005. Comparing net ecosystem exchange of carbon dioxide between an old-growth and mature forest in the upper Midwest, USA. Agricultural and Forest Meteorology 128:33–55.

Dolman, A. J., T. C. Maximov, E. J. Moors, A. P. Maximov, J. A. Elbers, A. V. Kononov, M. J. Waterloo, and M. K. van der Molen. 2004. Net ecosystem exchange of carbon dioxide and water of far eastern Siberian Larch (Larix cajanderii) on permafrost. Biogeosciences 1:133–146.

Dolman, A. J., E. J. Moors, and J. A. Elbers. 2002. The carbon uptake of a mid latitude pine forest growing on sandy soil. Agricultural and Forest Meteorology 111:157–170.

Dore, S., T. E. Kolb, M. Montes-Helu, S. E. Eckert, B. W. Sullivan, B. A. Hungate, J. P. Kaye, S. C. Hart, G. W. Koch, and A. Finkral. 2010. Carbon and water fluxes from ponderosa pine forests disturbed by wildfire and thinning. Ecological Applications 20:663–683.

Dorr, H., and K. O. Munnich. 1987. Annual variation in soil respiration in selected areas of the temperate zone. Tellus B 39B:114–121.

Doughty, C. E., D. B. Metcalfe, M. C. da Costa, A. A. R. de Oliveira, G. F. C. Neto, J. A. Silva, L. E. O. C. Aragão, S. S. Almeida, C. A. Quesada, C. A. J. Girardin, K. Halladay, A. C. L. da Costa, and Y. Malhi. 2014. The production, allocation and cycling of carbon in a forest on fertile terra preta soil in eastern Amazonia compared with a forest on adjacent infertile soil. Plant Ecology & Diversity 7:41–53.

Dragoni, D., H. P. Schmid, C. S. B. Grimmond, and H. W. Loescher. 2007. Uncertainty of annual net ecosystem productivity estimated using eddy covariance flux measurements. Journal of Geophysical Research 112:D17102.

Du, G., L. Hong, and G. Yao. 1987. Estimate and analysis the aboveground biomass of a secondary evergreen broad-leaved forest in Northwest of Zhejiang. Journal of Zhejiang Forestry Science and Technology 5:5–12. [in Chinese].

Dunn, A. L., C. C. Barford, S. C. Wofsy, M. L. Goulden, and B. C. Daube. 2007. A long-term record of carbon exchange in a boreal black spruce forest: means, responses to interannual variability, and decadal trends. Global Change Biology 13:577–590.

Edwards, N. T., and W. F. Harris. 1977. Carbon Cycling in a Mixed Deciduous Forest Floor. Ecology 58:431.

Edwards, N. T., and R. J. Norby. 1998. Below-ground respiratory responses of sugar maple and red maple saplings to atmospheric CO2 enrichment and elevated air temperature. Plant and Soil 206:85–97.

Edwards, P. J., and P. J. Grubb. 1977. Studies of Mineral Cycling in a Montane Rain Forest in New Guinea: I. The Distribution of Organic Matter in the Vegetation and Soil. The Journal of Ecology 65:943.

Egunjobi, J. K., and S. O. Bada. 1979. Biomass and Nutrient Distribution in Stands of Pinus caribea L. in the Dry Forest Zone of Nigeria. Biotropica 11:130.

Ehman, J. L., H. P. Schmid, C. S. B. Grimmond, J. C. Randolph, P. J. Hanson, C. A. Wayson, and F. D. Cropley. 2002. An initial intercomparison of micrometeorological and ecological inventory estimates of carbon exchange in a mid-latitude deciduous forest. Global Change Biology 8:575–589.

Epron, D., V. Le Dantec, E. Dufrene, and A. Granier. 2001. Seasonal dynamics of soil carbon dioxide efflux and simulated rhizosphere respiration in a beech forest. Tree Physiology 21:145–152.

Epron, D., L. Farque, É. Lucot, and P.-M. Badot. 1999. Soil CO 2 efflux in a beech forest: dependence on soil temperature and soil water content. Annals of Forest Science 56:221–226.

Epron, D., Y. Nouvellon, P. Deleporte, S. Ifo, G. Kazotti, A. Thongo M’Bou, W. Mouvondy, L. Saint Andre, O. Roupsard, C. Jourdan, and O. Hamel. 2006. Soil carbon balance in a clonal Eucalyptus plantation in Congo: Effects of logging on carbon inputs and soil CO2 efflux. Global Change Biology 12:1021–1031.

Esser, G., H. F. H. Lieth, J. M. O. Scurlock, and R. J. Olson. 1997. Worldwide Estimates and Bibliography of Net Primary Productivity derived from Pre-1982.

Ewel, J. J. 1971. Biomass changes in early tropical forest succession. Turrialba 21:110–112.

Ewel, K. C., W. P. Cropper.Jr., and H. L. Gholz. 1987. Soil CO 2 evolution in Florida slash pine plantations. II. Importance of root respiration. Canadian Journal of Forest Research 17:330–333.

Faber-Langendoen, D. 1992. Ecological constraints on rain forest management at Bajo Calima, western Colombia. Forest Ecology and Management 53:213–244.

Fahey, T. J., G. L. Tierney, R. D. Fitzhugh, G. F. Wilson, and T. G. Siccama. 2005. Soil respiration and soil carbon balance in a northern hardwood forest ecosystem. Canadian Journal of Forest Research 35:244–253.

Fahey, T. J., and J. W. Hughes. 1994. Fine Root Dynamics in a Northern Hardwood Forest Ecosystem, Hubbard Brook Experimental Forest, NH. The Journal of Ecology 82:533.

Falge, E., D. Baldocchi, J. Tenhunen, M. Aubinet, P. Bakwin, P. Berbigier, C. Bernhofer, G. Burba, R. Clement, K. J. Davis, J. A. Elbers, A. H. Goldstein, A. Grelle, A. Granier, J. Gumundsson, D. Hollinger, A. S. Kowalski, G. Katul, B. E. Law, Y. Malhi, T. Meyers, R. K. Monson, J. W. Munger, W. Oechel, K. T. Paw U, K. Pilegaard, Ü. Rannik, C. Rebmann, A. Suyker, R. Valentini, K. Wilson, and S. Wofsy. 2002. Seasonality of ecosystem respiration and gross primary production as derived from FLUXNET measurements. Agricultural and Forest Meteorology 113:53–74.

Falk, M., S. Wharton, M. Schroeder, S. Ustin, and K. T. P. U. 2008. Flux partitioning in an old-growth forest: seasonal and interannual dynamics. Tree Physiology 28:509–520.

Fang, Y., J. Mo, S. Peng, and D. Li. 2003. Role of forest succession on carbon sequestration of forest ecosystems in lower subtropical China. Acta Ecologica Sinica 23:1685–1694. [in Chinese].

Fehse, J., R. Hofstede, N. Aguirre, C. Paladines, A. Kooijman, and J. Sevink. 2002. High altitude tropical secondary forests: a competitive carbon sink? Forest Ecology and Management 163:9–25.

Feldpausch, T. R., M. A. Rondon, E. C. M. Fernandes, S. J. Riha, and E. Wandelli. 2004. Carbon and nutrient accumulation in secondary forests regenerating on pastures in central Amazonia. Ecological Applications 14:164–176.

Feng, Z. W., X. K. Wang, and G. Wu. 1999. Forest Biomass and Productivity in China. Science Press, Beijing, China (in Chinese).

Fenn, K., Y. Malhi, M. Morecroft, C. Lloyd, and M. Thomas. 2015. The Carbon Cycle of a Maritime Ancient Temperate Broadleaved Woodland at Seasonal and Annual Scales. Ecosystems 18:1–15.

Fenn, K., Y. Malhi, M. Morecroft, C. Lloyd, and M. Thomas. 2010. Comprehensive description of the carbon cycle of an ancient temperate broadleaved woodland. Biogeosciences Discussions 7:3735–3763.

Finér, L., H. Mannerkoski, S. Piirainen, and M. Starr. 2003. Carbon and nitrogen pools in an old-growth, Norway spruce mixed forest in eastern Finland and changes associated with clear-cutting. Forest Ecology and Management 174:51–63.

Flower-Ellis, J. G. K., and H. Persson. 1980. Investigation of Structural Properties and Dynamics of Scots Pine Stands. Pages 125–138*in* T. Persson, editor.Ecological Bulletins No. 32, Structure and Function of Northern Coniferous Forests - An Ecosystem Study. Oikos Editorial Office, Stockholm.

Folster, H., G. de las Salas, and P. Khanna. 1976. A tropical evergreen forest site with perched water table, Magdalena valley, Columbia Biomass and bioelement inventory of primary and secondary vegetation. Oecologia Plantarum 11:297–320.

Fonseca, W., J. M. Rey Benayas, and F. E. Alice. 2011. Carbon accumulation in the biomass and soil of different aged secondary forests in the humid tropics of Costa Rica. Forest Ecology and Management 262:1400–1408.

Forrester, D. I., J. Bauhus, and A. L. Cowie. 2006. Carbon allocation in a mixed-species plantation of Eucalyptus globulus and Acacia mearnsii. Forest Ecology and Management 233:275–284.

Frangi, J. L., and A. E. Lugo. 1985. Ecosystem Dynamics of a Subtropical Floodplain Forest. Ecological Monographs 55:351.

Fredeen, A. L., J. D. Waughtal, and T. G. Pypker. 2007. When do replanted sub-boreal clearcuts become net sinks for CO2? Forest Ecology and Management 239:210–216.

Fujimori, T., S. Kawanabe, H. Saito, C. C. Grier, and T. Shidei. 1976. Biomass and primary production in forests of three major vegetation zones of the northwestern United States. Journal of the Japanese Forestry Society 58:360–373.

Fukushima, M., M. Kanzaki, M. Hara, T. Ohkubo, P. Preechapanya, and C. Choocharoen. 2008. Secondary forest succession after the cessation of swidden cultivation in the montane forest area in Northern Thailand. Forest Ecology and Management 255:1994–2006.

Fukushima, M., M. Kanzaki, H. M. Thein, and Y. Minn. 2007. Recovery Process of Fallow Vegetation in the Traditional Karen Swidden Cultivation System in the Bago Mountain Range, Myanmar. Southeast Asian Studies 45:303–316.

Garbarino, M., P. J. Weisberg, and R. Motta. 2009. Interacting effects of physical environment and anthropogenic disturbances on the structure of European larch (Larix decidua Mill.) forests. Forest Ecology and Management 257:1794–1802.

Gaudinski, J. B., S. E. Trumbore, E. A. Davidson, and S. Zheng. 2000. Soil carbon cycling in a temperate forest: Radiocarbon-based estimates of residence times, sequestration rates and partitioning of fluxes. Biogeochemistry 51:33–69.

Gaumont-Guay, D., T. A. Black, T. J. Griffis, A. G. Barr, K. Morgenstern, R. S. Jassal, and Z. Nesic. 2006. Influence of temperature and drought on seasonal and interannual variations of soil, bole and ecosystem respiration in a boreal aspen stand. Agricultural and Forest Meteorology 140:203–219.

Gehring, C., M. Denich, M. Kanashiro, and P. L. G. Vlek. 1999. Response of secondary vegetation in Eastern Amazonia to relaxed nutrient availability constraints. Biogeochemistry 45:223–241.

Gehring, C., M. Denich, and P. L. G. Vlek. 2005. Resilience of secondary forest regrowth after slash-and-burn agriculture in central Amazonia. Journal of Tropical Ecology 21:519–527.

Geng, S. B. 2011. Study On The Carbon Flux Observation Over Poplar Plantation Ecosystem Of Xiping City In Henan Province Of China. Beijing Forestry University.

George, K., R. J. Norby, J. G. Hamilton, and E. H. DeLucia. 2003. Fine-root respiration in a loblolly pine and sweetgum forest growing in elevated CO2. New Phytologist 160:511–522.

Gerwing, J. J. 2002. Degradation of forests through logging and fire in the eastern Brazilian Amazon. Forest Ecology and Management 157:131–141.

Giardina, C. P., D. Binkley, M. G. Ryan, J. H. Fownes, and R. S. Senock. 2004. Belowground carbon cycling in a humid tropical forest decreases with fertilization. Oecologia 139:545–550.

Giardina, C. P., M. G. Ryan, D. Binkley, and J. H. Fownes. 2003. Primary production and carbon allocation in relation to nutrient supply in a tropical experimental forest. Global Change Biology 9:1438–1450.

Giasson, M.-A., C. Coursolle, and H. A. Margolis. 2006. Ecosystem-level CO2 fluxes from a boreal cutover in eastern Canada before and after scarification. Agricultural and Forest Meteorology 140:23–40.

Gielen, B., C. Calfapietra, M. Lukac, V. E. Wittig, P. De Angelis, I. A. Janssens, M. C. Moscatelli, S. Grego, M. F. Cotrufo, D. L. Godbold, M. R. Hoosbeek, S. P. Long, F. Miglietta, A. Polle, C. J. Bernacchi, P. A. Davey, R. Ceulemans, and G. E. Scarascia-Mugnozza. 2005. Net carbon storage in a poplar plantation (POPFACE) after three years of free-air CO2 enrichment. Tree Physiology 25:1399–1408.

Girardin, C. A. J., Y. Malhi, L. E. O. C. Aragão, M. Mamani, W. Huaraca Huasco, L. Durand, K. J. Feeley, J. Rapp, J. E. Silva-Espejo, M. Silman, N. Salinas, and R. J. Whittaker. 2010. Net primary productivity allocation and cycling of carbon along a tropical forest elevational transect in the Peruvian Andes. Global Change Biology 16:3176–3192.

Golley, F. B. 1975. Mineral Cycling in a Tropical Moist Forest Ecosystem. University of Georgia Press.

Gonzalez-Akre, E. B., V. Meakem, A. J. Tepley, N. A. Bourg, W. Mcshea, S. J. Davies, and K. J. Anderson‐Teixeira. 2016. Patterns of tree mortality in a temperate deciduous forest derived from a large forest dynamics plot. Ecosphere 7.

Gough, C. M., C. S. Vogel, H. P. Schmid, H.-B. Su, and P. S. Curtis. 2008. Multi-year convergence of biometric and meteorological estimates of forest carbon storage. Agricultural and Forest Meteorology 148:158–170.

Gough, C. M., C. S. Vogel, K. H. Harrold, K. George, and P. S. Curtis. 2007. The legacy of harvest and fire on ecosystem carbon storage in a north temperate forest. Global Change Biology 13:1935–1949.

Goulden, M. L. 1998. Sensitivity of Boreal Forest Carbon Balance to Soil Thaw. Science 279:214–217.

Goulden, M. L., A. M. S. McMillan, G. C. Winston, A. V. Rocha, K. L. Manies, J. W. Harden, and B. P. Bond-Lamberty. 2011. Patterns of NPP, GPP, respiration, and NEP during boreal forest succession. Global Change Biology 17:855–871.

Goulden, M. L., J. W. Munger, S.-M. Fan, B. C. Daube, and S. C. Wofsy. 1996. Exchange of Carbon Dioxide by a Deciduous Forest: Response to Interannual Climate Variability. Science 271:1576–1578.

Gower, S. T., O. Krankina, R. J. Olson, M. Apps, S. Linder, and C. Wang. 2001. Net Primary Production and Carbon Allocation Patterns of Boreal Forest Ecosystems. Ecological Applications 11:1395.

Gower, S. T., J. G. Vogel, J. M. Norman, C. J. Kucharik, S. J. Steele, and T. K. Stow. 1997. Carbon distribution and aboveground net primary production in aspen, jack pine, and black spruce stands in Saskatchewan and Manitoba, Canada. Journal of Geophysical Research 102:29029.

Granier, A., M. Aubinet, D. Epron, E. Falge, J. Gudmundsson, N. O. Jensen, B. Köstner, G. Matteucci, K. Pilegaard, M. Schmidt, and J. Tenhunen. 2003. Deciduous Forests: Carbon and Water Fluxes, Balances and Ecophysiological Determinants. Pages 55–70*in* R. Valentini, editor.Ecological Studies, 163: Fluxes of Carbon, Water and Energy of European Forests. Springer. Springer-Verlag, Berlin Heidelberg.

Granier, A., M. Reichstein, N. Bréda, I. A. Janssens, E. Falge, P. Ciais, T. Grünwald, M. Aubinet, P. Berbigier, C. Bernhofer, N. Buchmann, O. Facini, G. Grassi, B. Heinesch, H. Ilvesniemi, P. Keronen, A. Knohl, B. Köstner, F. Lagergren, A. Lindroth, B. Longdoz, D. Loustau, J. Mateus, L. Montagnani, C. Nys, E. Moors, D. Papale, M. Peiffer, K. Pilegaard, G. Pita, J. Pumpanen, S. Rambal, C. Rebmann, A. Rodrigues, G. Seufert, J. Tenhunen, T. Vesala, and Q. Wang. 2007. Evidence for soil water control on carbon and water dynamics in European forests during the extremely dry year: 2003. Agricultural and Forest Meteorology 143:123–145.

Granier, A., N. Bréda, B. Longdoz, P. Gross, and J. Ngao. 2008. Ten years of fluxes and stand growth in a young beech forest at Hesse, North-eastern France. Annals of Forest Science 65:704–704.

Greco, S., and D. D. Baldocchi. 1996. Seasonal variations of CO2 and water vapour exchange rates over a temperate deciduous forest. Global Change Biology 2:183–197.

Grier, C. C., and R. S. Logan. 1977. Old-Growth Pseudotsuga menziesii Communities of a Western Oregon Watershed: Biomass Distribution and Production Budgets. Ecological Monographs 47:373.

Grier, C. C., K. A. Vogt, M. R. Keyes, and R. L. Edmonds. 1981. Biomass distribution and above- and below-ground production in young and mature Abies amabilis zone ecosystems of the Washington Cascades. Canadian Journal of Forest Research 11:155–167.

Griffis, T. ., T. . Black, K. Morgenstern, A. . Barr, Z. Nesic, G. . Drewitt, D. Gaumont-Guay, and J. . McCaughey. 2003. Ecophysiological controls on the carbon balances of three southern boreal forests. Agricultural and Forest Meteorology 117:53–71.

Griffis, T. J., T. A. Black, D. Gaumont-Guay, G. B. Drewitt, Z. Nesic, A. G. Barr, K. Morgenstern, and N. Kljun. 2004. Seasonal variation and partitioning of ecosystem respiration in a southern boreal aspen forest. Agricultural and Forest Meteorology 125:207–223.

Grigal, D. F., C. G. Buttleman, and L. K. Kernik. 1985. Biomass and productivity of the woody strata of forested bogs in northern Minnesota. Canadian Journal of Botany 63:2416–2424.

Grimm, U., and H. W. Fassbender. 1999. NPP Tropical Forest: San Eusebio, Venezuela, 1970-1971. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/480. http://daac.ornl.gov.

Grunwald, T., and C. Bernhofer. 2007. A decade of carbon, water and energy flux measurements of an old spruce forest at the Anchor Station Tharandt. Tellus B 59:387–396.

Grunzweig, J. M., T. Lin, E. Rotenberg, A. Schwartz, and D. Yakir. 2003. Carbon sequestration in arid-land forest. Global Change Biology 9:791–799.

Grünzweig, J. M., D. W. Valentine, and F. S. Chapin. 2015. Successional Changes in Carbon Stocks After Logging and Deforestation for Agriculture in Interior Alaska: Implications for Boreal Climate Feedbacks. Ecosystems 18:132–145.

Guan, D.-X., J.-B. Wu, X.-S. Zhao, S.-J. Han, G.-R. Yu, X.-M. Sun, and C.-J. Jin. 2006. CO2 fluxes over an old, temperate mixed forest in northeastern China. Agricultural and Forest Meteorology 137:138–149.

Guimaraes, W. 1993. Liberacao de carbono e mudancas nos estoques dos nutrientes contidos na biomassa aerea e no solo resultante de queimadas de florestas secundarias em areas de pastagens abandonadas, em Altamira, Para. Instituto Nacional de Pesquisas da Amazonia/ Fundacao Universidade do Amazonas, Manaus.

Hadley, J. L., and J. L. Schedlbauer. 2002. Carbon exchange of an old-growth eastern hemlock (Tsuga canadensis) forest in central New England. Tree Physiology 22:1079–1092.

Hagedorn, F., M. Martin, C. Rixen, S. Rusch, P. Bebi, A. Zürcher, R. T. W. Siegwolf, S. Wipf, C. Escape, J. Roy, and S. Hättenschwiler. 2010. Short-term responses of ecosystem carbon fluxes to experimental soil warming at the Swiss alpine treeline. Biogeochemistry 97:7–19.

Hamilton, J., A. Finzi, E. DeLucia, K. George, S. Naidu, and W. Schlesinger. 2002. Forest carbon balance under elevated CO 2. Oecologia 131:250–260.

Hanson, P. J., N. T. Edwards, T. J. Tschaplinski, S. D. Wullschleger, and J. D. Joslin. 2003. Estimating the Net Primary and Net Ecosystem Production of a Southeastern Upland Quercus Forest from an 8-Year Biometric Record. Pages 378–395.

Harmand, J.-M., C. F. Njiti, F. Bernhard-Reversat, and H. Puig. 2004. Aboveground and belowground biomass, productivity and nutrient accumulation in tree improved fallows in the dry tropics of Cameroon. Forest Ecology and Management 188:249–265.

Harmon, M. E., K. Bible, M. G. Ryan, D. C. Shaw, H. Chen, J. Klopatek, and X. Li. 2004. Production, Respiration, and Overall Carbon Balance in an Old-growth Pseudotsuga-Tsuga Forest Ecosystem. Ecosystems.

Harmon, M. E., and C. Hua. 1991. Coarse Woody Debris Dynamics in Two Old-Growth Ecosystems. BioScience 41:604–610.

Hart, P. B. S., P. W. Clinton, R. B. Allen, A. H. Nordmeyer, and G. Evans. 2003. Biomass and macro-nutrients (above- and below-ground) in a New Zealand beech (Nothofagus) forest ecosystem: implications for carbon storage and sustainable forest management. Forest Ecology and Management 174:281–294.

Havas, P. 1999. NPP Boreal Forest: Kuusamo, Finland, 1967-1972. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA doi:10.3334/ORNLDAAC/466.

Havas, P. 1973. IBP Forests in Finland: report on a spruce forest ecosystem in the northern boreal zone. Pages 96–113*in* L. Kern, editor.Modelling Forest Ecosystems, Report EDFB-IBP-73-7. Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA.

Haynes, B. E., and S. T. Gower. 1995. Belowground carbon allocation in unfertilized and fertilized red pine plantations in northern Wisconsin. Tree Physiology 15:317–325.

Hegarty, E. E. 1991. Leaf litter production by lianes and trees in a sub-tropical Australian rain forest. Journal of Tropical Ecology 7:201.

Helmisaari, H.-S. 1995. Nutrient cycling in Pinus sylvestris stands in eastern Finland. Pages 327–336Nutrient Uptake and Cycling in Forest Ecosystems. Springer Netherlands, Dordrecht.

Hirano, T., R. Hirata, Y. Fujinuma, N. Saigusa, S. Yamamoto, Y. Harazono, M. Takada, K. Inukai, and G. Inoue. 2003. CO2 and water vapor exchange of a larch forest in northern Japan. Tellus B 55:244–257.

Hirano, T., J. Jauhiainen, T. Inoue, and H. Takahashi. 2009. Controls on the Carbon Balance of Tropical Peatlands. Ecosystems 12:873–887.

Hirano, T., H. Segah, T. Harada, S. Limin, T. JUNE, R. HIRATA, and M. OSAKI. 2007. Carbon dioxide balance of a tropical peat swamp forest in Kalimantan, Indonesia. Global Change Biology 13:412–425.

Hirata, R., T. Hirano, N. Saigusa, Y. Fujinuma, K. Inukai, Y. Kitamori, Y. Takahashi, and S. Yamamoto. 2007. Seasonal and interannual variations in carbon dioxide exchange of a temperate larch forest. Agricultural and Forest Meteorology 147:110–124.

Hirata, R., N. Saigusa, S. Yamamoto, Y. Ohtani, R. Ide, J. Asanuma, M. Gamo, T. Hirano, H. Kondo, Y. Kosugi, S.-G. Li, Y. Nakai, K. Takagi, M. Tani, and H. Wang. 2008. Spatial distribution of carbon balance in forest ecosystems across East Asia. Agricultural and Forest Meteorology 148:761–775.

Högberg, P., A. Nordgren, N. Buchmann, A. F. S. Taylor, A. Ekblad, M. N. Högberg, G. Nyberg, M. Ottosson-Löfvenius, and D. J. Read. 2001. Large-scale forest girdling shows that current photosynthesis drives soil respiration. Nature 411:789–792.

Hollinger, D. Y., J. Aber, B. Dail, E. A. Davidson, S. M. Goltz, H. Hughes, M. Y. Leclerc, J. T. Lee, A. D. Richardson, C. Rodrigues, N. A. Scott, D. Achuatavarier, and J. Walsh. 2004. Spatial and temporal variability in forest-atmosphere CO2 exchange. Global Change Biology 10:1689–1706.

Hollinger, D. Y., S. M. Goltz, E. A. Davidson, J. T. Lee, K. Tu, and H. T. Valentine. 1999. Seasonal patterns and environmental control of carbon dioxide and water vapour exchange in an ecotonal boreal forest. Global Change Biology 5:891–902.

Hooker, T. D., and J. E. Compton. 2003. Forest ecosystem carbon and nitrogen accumulation during the first century after agricultural abandonment. Ecological Applications 13:299–313.

Hoosbeek, M. R., M. Lukac, E. Velthorst, A. R. Smith, and D. L. Godbold. 2011. Free atmospheric CO2 enrichment increased above ground biomass but did not affect symbiotic N2-fixation and soil carbon dynamics in a mixed deciduous stand in Wales. Biogeosciences 8:353–364.

Hoshizaki, K., K. Niiyama, K. Kimura, T. Yamashita, Y. Bekku, T. Okuda, E. S. Quah, and N. S. M. Noor. 2004. Temporal and spatial variation of forest biomass in relation to stand dynamics in a mature, lowland tropical rainforest, Malaysia. Ecological Research 19:357–363.

Hozumi, K., K. Yoda, S. Kokawa, and T. Kira. (n.d.). Production ecology of tropical rain forests in southwestern Cambodia : I. Plant biomass.

Hudiburg, T., B. Law, D. P. Turner, J. Campbell, D. Donato, and M. Duane. 2009. Carbon dynamics of Oregon and Northern California forests and potential land-based carbon storage. Ecological Applications 19:163–180.

Hughes, R. F., J. B. Kauffman, and D. L. Cummings. 2002. Dynamics of Aboveground and Soil Carbon and Nitrogen Stocks and Cycling of Available Nitrogen along a Land-use Gradient in Rondônia, Brazil. Ecosystems 5:244–259.

Hughes, R. F., J. B. Kauffman, and V. J. Jaramillo. 1999. Biomass, carbon, and nutrient dynamics of secondary forests in a humid tropical region of Mexico. Ecology 80:1892–1907.

Hughes, R. F., J. B. Kauffman, and V. J. Jaramillo. 2000. Ecosystem-scale impacts of deforestation and land use in a humid tropical region of Mexico. Ecological Applications 10:515–527.

Humphreys, E. R., T. Andrew Black, K. Morgenstern, Z. Li, and Z. Nesic. 2005. Net ecosystem production of a Douglas-fir stand for 3 years following clearcut harvesting. Global Change Biology 11:450–464.

Humphreys, E. R., T. A. Black, K. Morgenstern, T. Cai, G. B. Drewitt, Z. Nesic, and J. A. Trofymow. 2006. Carbon dioxide fluxes in coastal Douglas-fir stands at different stages of development after clearcut harvesting. Agricultural and Forest Meteorology 140:6–22.

Hutley, L. B., R. Leuning, J. Beringer, and H. A. Cleugh. 2005. The utility of the eddy covariance techniques as a tool in carbon accounting: tropical savanna as a case study. Australian Journal of Botany 53:663.

Hutyra, L. R., J. W. Munger, S. R. Saleska, E. Gottlieb, B. C. Daube, A. L. Dunn, D. F. Amaral, P. B. de Camargo, and S. C. Wofsy. 2007. Seasonal controls on the exchange of carbon and water in an Amazonian rain forest. Journal of Geophysical Research 112:G03008.

Ilvesniemi, H., J. Levula, R. Ojansuu, P. Kolari, L. Kulmala, J. Pumpanen, S. Launiainen, T. Vesala, and E. Nikinmaa. 2009. Long-term measurements of the carbon balance of a boreal Scots pine dominated forest ecosystem. Boreal Environment Research 14:731–753.

IPCC. 2003. LUCF Sector Good Practice Guidance. Page *in* D. K. Jim Penman, Michael Gytarsky, Taka Hiraishi, Thelma Krug, T. N. Riitta Pipatti, Leandro Buendia, Kyoko Miwa, and K. T. and F. Wagner, editors. IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry. Institute for Global Environmental Strategies (IGES), Hayama, Japan.

IPCC. 2006. Agriculture, Forestry, and Other Land Use. Page *in* S. Eggleston, L. Buendia, K. Miwa, T. Ngara, and K. Tanabe, editors. 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Institute for Global Environmental Strategies, Hayama, Japan.

Irvine, J., and B. E. Law. 2002. Contrasting soil respiration in young and old-growth ponderosa pine forests. Global Change Biology 8:1183–1194.

Ito, A., and T. Oikawa. 2002. A simulation model of the carbon cycle in land ecosystems (Sim-CYCLE): a description based on dry-matter production theory and plot-scale validation. Ecological Modelling 151:143–176.

Ito, A., N. Saigusa, S. Murayama, and S. Yamamoto. 2005. Modeling of gross and net carbon dioxide exchange over a cool-temperate deciduous broad-leaved forest in Japan: Analysis of seasonal and interannual change. Agricultural and Forest Meteorology 134:122–134.

Jain, R. K., and B. Singh. 1998. Biomass production and soil amelioration in a high density Terminalia arjuna plantation on sodic soils. Biomass and Bioenergy 15:187–192.

Janisch, J. E., and M. E. Harmon. 2002. Successional changes in live and dead wood carbon stores: implications for net ecosystem productivity. Tree Physiology 22:77–89.

Janssens, I. A., M. Crookshanks, G. Taylor, and R. Ceulemans. 1998. Elevated atmospheric CO2 increases fine root production, respiration, rhizosphere respiration and soil CO2 efflux in Scots pine seedlings. Global Change Biology 4:871–878.

Jarosz, N., Y. Brunet, E. Lamaud, M. Irvine, J.-M. Bonnefond, and D. Loustau. 2008. Carbon dioxide and energy flux partitioning between the understorey and the overstorey of a maritime pine forest during a year with reduced soil water availability. Agricultural and Forest Meteorology 148:1508–1523.

Jassal, R. S., T. A. Black, T. Cai, G. Ethier, S. Pepin, C. Brümmer, Z. Nesic, D. L. Spittlehouse, and J. A. Trofymow. 2010. Impact of nitrogen fertilization on carbon and water balances in a chronosequence of three Douglas-fir stands in the Pacific Northwest. Agricultural and Forest Meteorology 150:208–218.

Jassal, R. S., T. A. Black, T. Cai, K. Morgenstern, Z. Li, D. Gaumont-Guay, and Z. Nesic. 2007. Components of ecosystem respiration and an estimate of net primary productivity of an intermediate-aged Douglas-fir stand. Agricultural and Forest Meteorology 144:44–57.

Jepsen, M. R. 2006. Above-ground carbon stocks in tropical fallows, Sarawak, Malaysia. Forest Ecology and Management 225:287–295.

Johnson, C. M., D. J. Zarin, and A. H. Johnson. 2000. Post-Disturbance Aboveground Biomass Accumulation in Global Secondary Forests. Ecology 81:1395.

Johnson, M. G., P. T. Rygiewicz, D. T. Tingey, and D. L. Phillips. 2006. Elevated CO2 and elevated temperature have no effect on Douglas-fir fine-root dynamics in nitrogen-poor soil. New Phytologist 170:345–356.

Jokela, E. J., and T. A. Martin. 2000. Effects of ontogeny and soil nutrient supply on production, allocation, and leaf area efficiency in loblolly and slash pine stands. Canadian Journal of Forest Research 30:1511–1524.

Jordan, C. F., E. Cuevas, and E. Medina. 1999. NPP Tropical Forest: San Carlos de Rio Negro, Venezuela, 1975-1984. http://daac.ornl.gov.

Juang, J.-Y., G. G. Katul, M. B. S. Siqueira, P. C. Stoy, S. Palmroth, H. R. McCarthy, H.-S. Kim, and R. Oren. 2006. Modeling nighttime ecosystem respiration from measured CO 2 concentration and air temperature profiles using inverse methods. Journal of Geophysical Research 111:D08S05.

Kadeba, O. 1991. Above-ground biomass production and nutrient accumulation in an age sequence of Pinus caribaea stands. Forest Ecology and Management 41:237–248.

Kajimoto, T., Y. Matsuura, M. A. Sofronov, A. V. Volokitina, S. Mori, A. Osawa, and A. P. Abaimov. 1999. Above- and belowground biomass and net primary productivity of a Larix gmelinii stand near Tura, central Siberia. Tree Physiology 19:815–822.

Kajimoto, T., Y. Matsuura, A. Osawa, A. P. Abaimov, O. A. Zyryanova, A. P. Isaev, D. P. Yefremov, S. Mori, and T. Koike. 2006. Size–mass allometry and biomass allocation of two larch species growing on the continuous permafrost region in Siberia. Forest Ecology and Management 222:314–325.

Kalyn, A. L., and K. C. J. Van Rees. 2006. Contribution of fine roots to ecosystem biomass and net primary production in black spruce, aspen, and jack pine forests in Saskatchewan. Agricultural and Forest Meteorology 140:236–243.

Karjalainen, T. 1996. The carbon sequestration potential of unmanaged forest stands in Finland under changing climatic conditions. Biomass and Bioenergy 10:313–329.

Kato, T., and Y. Tang. 2008. Spatial variability and major controlling factors of CO 2 sink strength in Asian terrestrial ecosystems: evidence from eddy covariance data. Global Change Biology 14:2333–2348.

Kauffman, J. B., C. Uhl, and D. L. Cummings. 1988. Fire in the Venezuelan Amazon 1: Fuel Biomass and Fire Chemistry in the Evergreen Rainforest of Venezuela. Oikos 53:167.

Keeton, W. S., M. Chernyavskyy, G. Gratzer, M. Main‐Knorn, M. Shpylchak, and Y. Bihun. 2010. Structural characteristics and aboveground biomass of old‐growth spruce–fir stands in the eastern Carpathian mountains, Ukraine. Plant Biosystems - An International Journal Dealing with all Aspects of Plant Biology 144:148–159.

Keith, H., R. Leuning, K. L. Jacobsen, H. A. Cleugh, E. van Gorsel, R. J. Raison, B. E. Medlyn, A. Winters, and C. Keitel. 2009. Multiple measurements constrain estimates of net carbon exchange by a Eucalyptus forest. Agricultural and Forest Meteorology 149:535–558.

Keith, H., R. J. Raison, and K. L. Jacobsen. 1997. Allocation of carbon in a mature eucalypt forest and some effects of soil phosphorus availability. Plant and Soil 196:81–99.

Keith, H., B. G. Mackey, and D. B. Lindenmayer. 2009. Re-evaluation of forest biomass carbon stocks and lessons from the world’s most carbon-dense forests. Proceedings of the National Academy of Sciences 106:11635–11640.

Keller, M., M. Palace, G. P. Asner, R. Pereira, and J. N. M. Silva. 2004. Coarse woody debris in undisturbed and logged forests in the eastern Brazilian Amazon. Global Change Biology 10:784–795.

Keller, M., M. Palace, and G. Hurtt. 2001. Biomass estimation in the Tapajos National Forest, Brazil examination of sampling and allometric uncertainties. Forest Ecology and Management 154:371–382.

Kenzo, T., T. Ichie, D. Hattori, J. J. Kendawang, K. Sakurai, and I. Ninomiya. 2010. Changes in above- and belowground biomass in early successional tropical secondary forests after shifting cultivation in Sarawak, Malaysia. Forest Ecology and Management 260:875–882.

Keyes, M. R., and C. C. Grier. 1981. Above- and below-ground net production in 40-year-old Douglas-fir stands on low and high productivity sites. Canadian Journal of Forest Research 11:599–605.

Khomik, M., M. A. Arain, and J. H. McCaughey. 2006. Temporal and spatial variability of soil respiration in a boreal mixedwood forest. Agricultural and Forest Meteorology 140:244–256.

Kimball, J. S., P. E. Thornton, M. A. White, and S. W. Running. 1997. Simulating forest productivity and surface-atmosphere carbon exchange in the BOREAS study region. Tree Physiology 17:589–599.

King, J. S., C. P. Giardina, K. S. Pregitzer, and A. L. Friend. 2007. Biomass partitioning in red pine ( Pinus resinosa ) along a chronosequence in the Upper Peninsula of Michigan. Canadian Journal of Forest Research 37:93–102.

King, J. S., P. J. Hanson, E. Bernhardt, P. DeAngelis, R. J. Norby, and K. S. Pregitzer. 2004. A multiyear synthesis of soil respiration responses to elevated atmospheric CO 2 from four forest FACE experiments. Global Change Biology 10:1027–1042.

King, J. S., M. E. Kubiske, K. S. Pregitzer, G. R. Hendrey, E. P. McDonald, C. P. Giardina, V. S. Quinn, and D. F. Karnosky. 2005. Tropospheric O3 compromises net primary production in young stands of trembling aspen, paper birch and sugar maple in response to elevated atmospheric CO2. New Phytologist 168:623–636.

King, J. S., R. B. Thomas, and B. R. Strain. 1996. Growth and carbon accumulation in root systems of Pinus taeda and Pinus ponderosa seedlings as affected by varying CO2, temperature and nitrogen. Tree Physiology 16:635–642.

Kira, T. 1998. NPP Tropical Forest: Khao Chong, Thailand, 1962-1965. http://daac.ornl.gov.

Klinge, H., and R. Herrera. 1983. Phytomass structure of natural plant communities on spodosols in southern Venezuela: The tall Amazon Caatinga forest. Vegetatio 53:65–84.

Klinge, H., W. A. Rodrigues, E. Brunig, and E. J. Fittkau. 1975. Biomass and Structure in a Central Amazonian Rain Forest. Pages 115–122*in* F. B. Golley and E. Medina, editors.Tropical Ecological Systems: Trends in Terrestrial and Aquatic Research. Springer-Verlag, Berlin, Heidelberg, New York.

Kljun, N., T. A. Black, T. J. Griffis, A. G. Barr, D. Gaumont-Guay, K. Morgenstern, J. H. McCaughey, and Z. Nesic. 2006. Response of Net Ecosystem Productivity of Three Boreal Forest Stands to Drought. Ecosystems 9:1128–1144.

Knohl, A., E.-D. Schulze, O. Kolle, and N. Buchmann. 2003. Large carbon uptake by an unmanaged 250-year-old deciduous forest in Central Germany. Agricultural and Forest Meteorology 118:151–167.

Kolari, P., J. Pumpanen, Ü. Rannik, H. Ilvesniemi, P. Hari, and F. Berninger. 2004. Carbon balance of different aged Scots pine forests in Southern Finland. Global Change Biology 10:1106–1119.

Kominami, Y., M. Jomura, M. Dannoura, Y. Goto, K. Tamai, T. Miyama, Y. Kanazawa, S. Kaneko, M. Okumura, N. Misawa, S. Hamada, T. Sasaki, H. Kimura, and Y. Ohtani. 2008. Biometric and eddy-covariance-based estimates of carbon balance for a warm-temperate mixed forest in Japan. Agricultural and Forest Meteorology 148:723–737.

Kosugi, Y., S. Takanashi, S. Ohkubo, N. Matsuo, M. Tani, T. Mitani, D. Tsutsumi, and A. R. Nik. 2008. CO2 exchange of a tropical rainforest at Pasoh in Peninsular Malaysia. Agricultural and Forest Meteorology 148:439–452.

Kosugi, Y., H. Tanaka, S. Takanashi, N. Matsuo, N. Ohte, S. Shibata, and M. Tani. 2005. Three years of carbon and energy fluxes from Japanese evergreen broad-leaved forest. Agricultural and Forest Meteorology 132:329–343.

Kowalski, A. S., D. Loustau, P. Berbigier, G. Manca, V. Tedeschi, M. Borghetti, R. Valentini, P. Kolari, F. Berninger, U. Rannik, P. Hari, M. Rayment, M. Mencuccini, J. Moncrieff, and J. Grace. 2004. Paired comparisons of carbon exchange between undisturbed and regenerating stands in four managed forests in Europe. Global Change Biology 10:1707–1723.

Kowalski, S., M. Sartore, R. Burlett, P. Berbigier, and D. Loustau. 2003. The annual carbon budget of a French pine forest (Pinus pinaster) following harvest. Global Change Biology 9:1051–1065.

Kraenzel, M., A. Castillo, T. Moore, and C. Potvin. 2003. Carbon storage of harvest-age teak (Tectona grandis) plantations, Panama. Forest Ecology and Management 173:213–225.

Krankina, O. N. 1999. NPP Boreal Forest: Siberian Scots Pine Forests, Russia, 1968-1974. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. doi:10.3334/ORNLDAAC/467.

Krishnan, P., T. A. Black, A. G. Barr, N. J. Grant, D. Gaumont-Guay, and Z. Nesic. 2008. Factors controlling the interannual variability in the carbon balance of a southern boreal black spruce forest. Journal of Geophysical Research 113:D09109.

Krishnan, P., T. A. Black, N. J. Grant, A. G. Barr, E. (Ted) H. Hogg, R. S. Jassal, and K. Morgenstern. 2006. Impact of changing soil moisture distribution on net ecosystem productivity of a boreal aspen forest during and following drought. Agricultural and Forest Meteorology 139:208–223.

Krishnan, P., T. A. Black, R. S. Jassal, B. Chen, and Z. Nesic. 2009. Interannual variability of the carbon balance of three different-aged Douglas-fir stands in the Pacific Northwest. Journal of Geophysical Research 114:G04011.

Kunstadter, P., E. C. Chapman, and S. Sabhasri. 1978. Farmers in the forest: economic development and marginal agriculture in Northern Thailand. Farmers in the forest: economic development and marginal agriculture in Northern Thailand.

Kutsch, W. L., C. Eschenbach, O. Dilly, U. Middelhoff, W. Steinborn, R. Vanselow, K. Weisheit, J. Wötzel, and L. Kappen. 2001. The Carbon Cycle of Contrasting Landscape Elements of the Bornhöved District. Pages 75–95*in* J. D. Tenhunen, R. Lenz, and R. Hantschel, editors.Ecosystem Approaches to Landscape Management in Central Europe. Ecological Studies, Vol. 147. Springer-Verlag, Berlin Heidelberg.

Kutsch, W. L., C. Liu, G. Hormann, and M. Herbst. 2005. Spatial heterogeneity of ecosystem carbon fluxes in a broadleaved forest in Northern Germany. Global Change Biology 11:70–88.

Kutsch, W. L., A. Staack, J. Wotzel, U. Middelhoff, and L. Kappen. 2001. Field measurements of root respiration and total soil respiration in an alder forest. New Phytologist 150:157–168.

Kwon, H., J. Kim, J. Hong, and J.-H. Lim. 2010. Influence of the Asian monsoon on net ecosystem carbon exchange in two major ecosystems in Korea. Biogeosciences 7:1493–1504.

Laclau, J.-P., J.-P. Bouillet, and J. Ranger. 2000. Dynamics of biomass and nutrient accumulation in a clonal plantation of Eucalyptus in Congo. Forest Ecology and Management 128:181–196.

Lagergren, F., L. Eklundh, A. Grelle, M. Lundblad, M. Molder, H. Lankreijer, and A. Lindroth. 2005. Net primary production and light use efficiency in a mixed coniferous forest in Sweden. Plant, Cell and Environment 28:412–423.

Lai, C.-T., G. Katul, J. Butnor, D. Ellsworth, and R. Oren. 2002. Modelling night-time ecosystem respiration by a constrained source optimization method. Global Change Biology 8:124–141.

Larigauderie, A., J. F. Reynolds, and B. R. Strain. 1994. Root response to CO2 enrichment and nitrogen supply in loblolly pine. Plant and Soil 165:21–32.

Lavigne, M. B., R. Boutin, R. J. Foster, G. Goodine, P. Y. Bernier, and G. Robitaille. 2003. Soil respiration responses to temperature are controlled more by roots than by decomposition in balsam fir ecosystems. Canadian Journal of Forest Research 33:1744–1753.

Law, B. E., . R. H. Waring, P. M. Anthoni, and J. D. Aber. 2000. Measurements of gross and net ecosystem productivity and water vapour exchange of a Pinus ponderosa ecosystem, and an evaluation of two generalized models. Global Change Biology 6:155–168.

Law, B. ., E. Falge, L. Gu, D. . Baldocchi, P. Bakwin, P. Berbigier, K. Davis, A. . Dolman, M. Falk, J. . Fuentes, A. Goldstein, A. Granier, A. Grelle, D. Hollinger, I. . Janssens, P. Jarvis, N. . Jensen, G. Katul, Y. Mahli, G. Matteucci, T. Meyers, R. Monson, W. Munger, W. Oechel, R. Olson, K. Pilegaard, K. . Paw U, H. Thorgeirsson, R. Valentini, S. Verma, T. Vesala, K. Wilson, and S. Wofsy. 2002. Environmental controls over carbon dioxide and water vapor exchange of terrestrial vegetation. Agricultural and Forest Meteorology 113:97–120.

Law, B. ., F. . Kelliher, D. . Baldocchi, P. . Anthoni, J. Irvine, D. Moore, and S. Van Tuyl. 2001. Spatial and temporal variation in respiration in a young ponderosa pine forest during a summer drought. Agricultural and Forest Meteorology 110:27–43.

Law, B. E., P. E. Thornton, J. Irvine, P. M. Anthoni, and S. Van Tuyl. 2001. Carbon storage and fluxes in ponderosa pine forests at different developmental stages. Global Change Biology 7:755–777.

Law, B. E., M. G. Ryan, and P. M. Anthoni. 1999. Seasonal and annual respiration of a ponderosa pine ecosystem. Global Change Biology 5:169–182.

Lawrence, D. 2005. Biomass accumulation after 10-200 years of shifting cultivation in Bornean rain forest. Ecology 86:26–33.

Le Goaster, S., E. Dambrine, and J. Ranger. 1991. Croissance et nutrition minerale d’un peuplement d’epicea sur sol pauvre. 1. Evolution de la biomasse et dynamique d’incorporation d’elements mineraux. Acta Oecologica 12:771–789.

Lee, M., K. Nakane, T. Nakatsubo, and H. Koizumi. 2003. Seasonal changes in the contribution of root respiration to total soil respiration in a cool-temperate deciduous forest. Plant and Soil 255:311–318.

Lee, M., K. Nakane, T. Nakatsubo, W. Mo, and H. Koizumi. 2002. Effects of rainfall events on soil CO2 flux in a cool temperate deciduous broad-leaved forest. Ecological Research 17:401–409.

Lee, X., J. D. Fuentes, R. M. Staebler, and H. H. Neumann. 1999. Long-term observation of the atmospheric exchange of CO 2 with a temperate deciduous forest in southern Ontario, Canada. Journal of Geophysical Research 104:15975.

Leighty, W. W., S. P. Hamburg, and J. Caouette. 2006. Effects of Management on Carbon Sequestration in Forest Biomass in Southeast Alaska. Ecosystems 9:1051–1065.

Lellei-Kovács, E., E. Kovács-Láng, T. Kalapos, Z. Botta-Dukát, S. Barabás, and C. Beier. 2008. Experimental warming does not enhance soil respiration in a semiarid temperate forest-steppe ecosystem. Community Ecology 9:29–37.

Letcher, S. G., and R. L. Chazdon. 2009. Rapid Recovery of Biomass, Species Richness, and Species Composition in a Forest Chronosequence in Northeastern Costa Rica. Biotropica 41:608–617.

Leuning, R., H. A. Cleugh, S. J. Zegelin, and D. Hughes. 2005. Carbon and water fluxes over a temperate Eucalyptus forest and a tropical wet/dry savanna in Australia: measurements and comparison with MODIS remote sensing estimates. Agricultural and Forest Meteorology 129:151–173.

Lewis, S. L., G. Lopez-Gonzalez, B. Sonké, K. Affum-Baffoe, T. R. T. R. Baker, L. O. L. O. Ojo, O. L. O. L. Phillips, J. M. J. M. Reitsma, L. White, J. A. J. A. Comiskey, M.-N. D. M.-N. D. K, C. E. N. C. E. N. Ewango, T. R. T. R. Feldpausch, A. C. A. C. Hamilton, M. Gloor, T. Hart, A. Hladik, J. Lloyd, J. C. J. C. Lovett, J.-R. J.-R. Makana, Y. Malhi, F. M. F. M. Mbago, H. J. H. J. Ndangalasi, J. Peacock, K. S. H. K. S.-H. Peh, D. Sheil, T. Sunderland, M. D. M. D. Swaine, J. Taplin, D. Taylor, S. C. S. C. Thomas, R. Votere, H. Wöll, B. Sonke, K. Affum-Baffoe, T. R. T. R. Baker, L. O. L. O. Ojo, O. L. O. L. Phillips, J. M. J. M. Reitsma, L. White, J. A. J. A. Comiskey, M.-N. D. M.-N. D. K, C. E. N. C. E. N. Ewango, T. R. T. R. Feldpausch, A. C. A. C. Hamilton, M. Gloor, T. Hart, A. Hladik, J. Lloyd, J. C. J. C. Lovett, J.-R. J.-R. Makana, Y. Malhi, F. M. F. M. Mbago, H. J. H. J. Ndangalasi, J. Peacock, K. S. H. K. S.-H. Peh, D. Sheil, T. Sunderland, M. D. M. D. Swaine, J. Taplin, D. Taylor, S. C. S. C. Thomas, R. Votere, and H. Woll. 2009. Increasing carbon storage in intact African tropical forests. Nature 457:1003–1006.

Li, H., S. Wang, L. Gao, and G. Yu. 2007. The carbon storage of the subtropical forest vegetation in central Jiangxi Province. Acta Ecologica Sinica 27:693–704. [in Chinese].

Li, S.-G. 2005. Year-round measurements of net ecosystem CO 2 flux over a montane larch forest in Mongolia. Journal of Geophysical Research 110:D09303.

Li, X., S. D. Wilson, and Y. Song. 1999. Secondary succession in two subtropical forests. Plant Ecology 143:13–21.

Li, X., R. Sun, Y. Li, X. Wang, D. Xie, X. Yan, and Q. Zhu. 2010. Carbon dioxide fluxes on green space in Haidian Park, Beijing. In Chinese. Acta Ecologica Sinica 30:6715–6725.

Li, Y., M. Xu, O. J. Sun, and W. Cui. 2004. Effects of root and litter exclusion on soil CO2 efflux and microbial biomass in wet tropical forests. Soil Biology and Biochemistry 36:2111–2114.

Lin, D., J. Lai, H. C. Muller-Landau, X. Mi, and K. Ma. 2012. Topographic Variation in Aboveground Biomass in a Subtropical Evergreen Broad-Leaved Forest in China. PLoS ONE 7:e48244.

Lin, G., J. R. Ehleringer, P. T. Rygiewicz, M. G. Johnson, and D. T. Tingey. 1999. Elevated CO2 and temperature impacts on different components of soil CO2 efflux in Douglas-fir terracosms. Global Change Biology 5:157–168.

Lin, G., P. T. Rygiewicz, J. R. Ehleringer, M. G. Johnson, and D. T. Tingey. 2001. Time-dependent responses of soil CO2 efflux components to elevated atmospheric [CO2] and temperature in experimental forest mesocosms. Plant and Soil 229:259–270.

Lin, Y., P. Lin, Z. Li, Z. Yang, C. Liu, and J. He. 1996. Biomass and Productivity of Castanopsis eyrei community in Wuyi Mountains. Acta Botanica Sinica 38:989–994. [in Chinese].

Linder, S. 1998. NPP Boreal Forest: Flakaliden, Sweden, 1986-1996. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA.

Linder, S., and G. I. Agren. 1998. NPP Boreal Forest: Jadraas, Sweden, 1973-1980. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. doi:10.3334/ORNLDAAC/202.

Linder, S., and B. Axelsson. 1982. Carbon uptake and allocation in subalpine ecosystems as a key to management. Pages 38–44*in* R. H. Waring, editor.I.U.F.R.O. Workshop P.I.07-00 Ecology of Subalpine Zones. Forest Research Laboratory, Oregon State University, Corvallis, Oregon, USA.

Litton, C. M., J. W. Raich, and M. G. Ryan. 2007. Carbon allocation in forest ecosystems. Global Change Biology 13:2089–2109.

Litton, C. M., M. G. Ryan, and D. H. Knight. 2004. Effects of tree density and stand age on carbon allocation patterns in postfire lodgepole pine. Ecological Applications 14:460–475.

Liu, W., J. E. D. Fox, and Z. Xu. 2002. Biomass and nutrient accumulation in montane evergreen broad-leaved forest (Lithocarpus xylocarpus type) in Ailao Mountains, SW China. Forest Ecology and Management 158:223–235.

Liu, Y., Wu, M., Guo, Z., Jiang, Y., Liu, S., Wang, Z., Liu, B., Zhu, X. 2001. Studies on biomass and net production of Quercus acutidentata forest in Baotianman Nature Reserve. Acta Ecologica Sinica 21:1451–1456. [in Chinese].

Liu, Y., M. Wu, Z. Guo, Y. Jiang, S. Liu, Z. Wang, B. Liu, and X. Zhu. 1998. Biomass and net productivity of Quercus variabilis forest in Baotianman Natural Reserve. Chinese Journal of Applied Ecology 9:569–574. [in Chinese].

Liu, Y., G. Yu, Q. Wang, and Y. Zhang. 2014. How temperature, precipitation and stand age control the biomass carbon density of global mature forests. Global Ecology and Biogeography 23:323–333.

Lloyd, J., O. Shibistova, D. Zolotoukhine, O. Kolle, A. Arneth, C. WIRTH, J. M. Styles, N. M. Tchebakova, and E.-D. Schulze. 2002. Seasonal and annual variations in the photosynthetic productivity and carbon balance of a central Siberian pine forest. Tellus B 54:590–610.

Lodhiyal, N., and L. . Lodhiyal. 2003. Biomass and net primary productivity of Bhabar Shisham forests in central Himalaya, India. Forest Ecology and Management 176:217–235.

Loescher, H. W., S. F. Oberbauer, H. L. Gholz, and D. B. Clark. 2003. Environmental controls on net ecosystem-level carbon exchange and productivity in a Central American tropical wet forest. Global Change Biology 9:396–412.

Lohila, A., T. Laurila, L. Aro, M. Aurela, J.-P. Tuovinen, J. Laine, P. Kolari, and K. Minkkinen. 2007. Carbon dioxide exchange above a 30-year-old Scots pine plantation established on organic-soil cropland. Boreal Environment Research 12:141–157.

Lucas, R. M., M. Honzák, I. Do Amaral, P. J. Curran, and G. M. Foody. 2002. Forest regeneration on abandoned clearances in central Amazonia. International Journal of Remote Sensing 23:965–988.

Lucas, R. M., M. Honzák, I. Do Amaral, P. J. Curran, and G. M. Foody. 1998. Avaliação da composição florística, biomassa e estrutura de floresta tropical em regeneração: a contribuição do sensoriamento remoto. Pages 61–82*in* C. Gascon and P. Moutinho, editors.Floresta Amazônica: dinâmica, regeneração e manejo. Ministério da Ciência e Tecnologia, Instituto Nacional de Pesquisa da Amazônia.

Lugo, A. E. 1992. Comparison of Tropical Tree Plantations with Secondary Forests of Similar Age. Ecological Monographs 62:1.

Lugo, A. E., D. Wang, and F. Herbert Bormann. 1990. A comparative analysis of biomass production in five tropical tree species. Forest Ecology and Management 31:153–166.

Lukac, M., C. Calfapietra, and D. L. Godbold. 2003. Production, turnover and mycorrhizal colonization of root systems of three Populus species grown under elevated CO2 (POPFACE). Global Change Biology 9:838–848.

Lund, M., P. M. Lafleur, N. T. Roulet, A. Lindroth, T. R. Christensen, M. Aurela, B. H. Chojnicki, L. B. Flanagan, E. R. Humphreys, T. Laurila, W. C. Oechel, J. Olejnik, J. Rinne, P. Schubert, and M. B. Nilsson. 2010. Variability in exchange of CO2 across 12 northern peatland and tundra sites. Global Change Biology:2436–2448.

Luo, H., W. C. Oechel, S. J. Hastings, R. Zulueta, Y. Qian, and H. Kwon. 2007. Mature semiarid chaparral ecosystems can be a significant sink for atmospheric carbon dioxide. Global Change Biology 13:386–396.

Luo, T.-X. 1996. Patterns of net primary productivity for Chinese major forest types and their mathematical models. Chinese Academy of Sciences, Beijing, China.

Luyssaert, S., I. Inglima, M. Jung, A. D. Richardson, M. REICHSTEIN, D. PAPALE, S. L. PIAO, E.-D. SCHULZE, L. WINGATE, G. MATTEUCCI, L. ARAGAO, M. AUBINET, C. BEER, C. BERNHOFER, K. G. BLACK, D. BONAL, J.-M. BONNEFOND, J. CHAMBERS, P. CIAIS, B. COOK, K. J. DAVIS, A. J. J. DOLMAN, B. GIELEN, M. GOULDEN, J. GRACE, A. GRANIER, A. GRELLE, T. GRIFFIS, T. GRÜNWALD, G. GUIDOLOTTI, P. J. J. HANSON, R. HARDING, D. Y. Y. HOLLINGER, L. R. HUTYRA, P. KOLARI, B. KRUIJT, W. KUTSCH, F. LAGERGREN, T. LAURILA, B. E. LAW, G. LE MAIRE, A. LINDROTH, D. LOUSTAU, Y. MALHI, J. MATEUS, M. MIGLIAVACCA, L. MISSON, L. MONTAGNANI, J. MONCRIEFF, E. MOORS, J. W. MUNGER, E. NIKINMAA, S. V. OLLINGER, G. PITA, C. REBMANN, O. ROUPSARD, N. SAIGUSA, M. J. SANZ, G. SEUFERT, C. SIERRA, M.-L. SMITH, J. TANG, R. VALENTINI, T. VESALA, and I. A. JANSSENS. 2007. CO 2 balance of boreal, temperate, and tropical forests derived from a global database. Global Change Biology 13:2509–2537.

Ma, S., D. D. Baldocchi, L. Xu, and T. Hehn. 2007. Inter-annual variability in carbon dioxide exchange of an oak/grass savanna and open grassland in California. Agricultural and Forest Meteorology 147:157–171.

Ma, Z., C. Peng, Q. Zhu, H. Chen, G. Yu, W. Li, X. Zhou, W. Wang, and W. Zhang. 2012. Regional drought-induced reduction in the biomass carbon sink of Canada’s boreal forests. Proceedings of the National Academy of Sciences 109:2423–2427.

Ma, Z., Q. Liu, H. Wang, X. Li, H. Zeng, and W. Xu. 2008. Observation and modeling of NPP for Pinus elliottii plantation in subtropical China. Science in China Series D: Earth Sciences 51:955–965.

Maass, M., and A. Martinez-Yrizar. 2001. NPP Tropical Forest: Chamela, Mexico, 1982-1995. http://daac.ornl.gov.

Mackowski, C. M. 1987. Wildlife hollows and timber management in Blackbutt forest. University of New England, Armidale, Australia.

MacLean, D. A., and R. W. Wein. 1976. Biomass of jack pine and mixed hardwood stands in northeastern New Brunswick. Canadian Journal of Forest Research 6:441–447.

Maier, C. A., T. J. Albaugh, H. L. Allen, and P. M. Dougherty. 2004. Respiratory carbon use and carbon storage in mid-rotation loblolly pine (Pinus taeda L.) plantations: the effect of site resources on the stand carbon balance. Global Change Biology 10:1335–1350.

Maier, C. A., and L. W. Kress. 2000. Soil CO 2 evolution and root respiration in 11 year-old loblolly pine ( Pinus taeda ) plantations as affected by moisture and nutrient availability. Canadian Journal of Forest Research 30:347–359.

Malhi, Y., C. Doughty, and D. Galbraith. 2011. The allocation of ecosystem net primary productivity in tropical forests. Philosophical Transactions of the Royal Society B: Biological Sciences 366:3225–3245.

Malhi, Y., T. R. Baker, O. L. Phillips, S. Almeida, E. Alvarez, L. Arroyo, J. Chave, C. I. Czimczik, A. Di Fiore, N. Higuchi, T. J. Killeen, S. G. Laurance, W. F. Laurance, S. L. Lewis, L. M. M. Montoya, A. Monteagudo, D. A. Neill, P. N. Vargas, S. Patino, N. C. A. Pitman, C. A. Quesada, R. Salomao, J. N. M. Silva, A. T. Lezama, R. V. Martinez, J. Terborgh, B. Vinceti, and J. Lloyd. 2004. The above-ground coarse wood productivity of 104 Neotropical forest plots. Global Change Biology 10:563–591.

Malhi, Y., D. Baldocchi, and P. G. Jarvis. 1999. The carbon balance of tropical, temperate and boreal forests. Plant, Cell and Environment 22:715–740.

Malhi, Y., C. E. Doughty, G. R. Goldsmith, D. B. Metcalfe, C. A. J. Girardin, T. R. Marthews, J. del Aguila-Pasquel, L. E. O. C. Aragão, A. Araujo-Murakami, P. Brando, A. C. L. da Costa, J. E. Silva-Espejo, F. Farfán Amézquita, D. R. Galbraith, C. A. Quesada, W. Rocha, N. Salinas-Revilla, D. Silvério, P. Meir, and O. L. Phillips. 2015. The linkages between photosynthesis, productivity, growth and biomass in lowland Amazonian forests. Global Change Biology 21:2283–2295.

Malhi, Y., F. Farfán Amézquita, C. E. Doughty, J. E. Silva-Espejo, C. A. J. Girardin, D. B. Metcalfe, L. E. O. C. Aragão, L. P. Huaraca-Quispe, I. Alzamora-Taype, L. Eguiluz-Mora, T. R. Marthews, K. Halladay, C. A. Quesada, A. L. Robertson, J. B. Fisher, J. Zaragoza-Castells, C. M. Rojas-Villagra, Y. Pelaez-Tapia, N. Salinas, P. Meir, and O. L. Phillips. 2014. The productivity, metabolism and carbon cycle of two lowland tropical forest plots in south-western Amazonia, Peru. Plant Ecology & Diversity 7:85–105.

Malhi, Y., A. D. Nobre, J. Grace, B. Kruijt, M. G. P. Pereira, A. Culf, and S. Scott. 1998. Carbon dioxide transfer over a Central Amazonian rain forest. Journal of Geophysical Research 103:31593.

Marín-Spiotta, E., W. L. Silver, and R. Ostertag. 2007. Long-term patterns in tropical reforestation: plant community composition and aboveground biomass accumulation. Ecological Applications 17:828–839.

Markkanen, T., U. Rannik, P. Keronen, T. Suni, and T. Vesala. 2001. Eddy covariance fluxes over a boreal Scots pine forest. Boreal Environment Research 6:65–78.

Marks, P. L., and F. H. Bormann. 1972. Revegetation following Forest Cutting: Mechanisms for Return to Steady-State Nutrient Cycling. Science 176:914–915.

Martin, J. G., and P. V. Bolstad. 2005. Annual soil respiration in broadleaf forests of northern Wisconsin: influence of moisture and site biological, chemical, and physical characteristics. Biogeochemistry 73:149–182.

Martius, C. 1997. Decomposition of Wood. Pages 267–276.

Martius, C., and A. G. Bandeira. 1998. Wood litter stocks in tropical moist forest in central Amazonia. Ecotropica 4:115–118.

Mascaro, J., G. P. Asner, D. H. Dent, S. J. DeWalt, and J. S. Denslow. 2012. Scale-dependence of aboveground carbon accumulation in secondary forests of Panama: A test of the intermediate peak hypothesis. Forest Ecology and Management 276:62–70.

Maseyk, K., J. M. Grunzweig, E. Rotenberg, and D. Yakir. 2008. Respiration acclimation contributes to high carbon-use efficiency in a seasonally dry pine forest. Global Change Biology 14:1553–1567.

Matamala, R., and W. H. Schlesinger. 2000. Effects of elevated atmospheric CO2 on fine root production and activity in an intact temperate forest ecosystem. Global Change Biology 6:967–979.

Mateus, J., G. Pita, A. Rodrigues, and H. Oliveira. 2006. Seasonal evolution of Evapotranspiration (regime) and carbon assimilation over a Eucalyptus Globulus plantation. Silva Lusitana 14:135–147.

McCarthy, H. R., R. Oren, K. H. Johnsen, A. Gallet-Budynek, S. G. Pritchard, C. W. Cook, S. L. LaDeau, R. B. Jackson, and A. C. Finzi. 2010. Re-assessment of plant carbon dynamics at the Duke free-air CO2 enrichment site: interactions of atmospheric [CO2] with nitrogen and water availability over stand development. New Phytologist 185:514–528.

McCaughey, J. H., M. R. Pejam, M. A. Arain, and D. A. Cameron. 2006. Carbon dioxide and energy fluxes from a boreal mixedwood forest ecosystem in Ontario, Canada. Agricultural and Forest Meteorology 140:79–96.

McDowell, N. G., N. J. Balster, and J. D. Marshall. 2001. Belowground carbon allocation of Rocky Mountain Douglas-fir. Canadian Journal of Forest Research 31:1425–1436.

McGarvey, J. C., J. R. Thompson, H. E. Epstein, and H. H. Shugart. 2015. Carbon storage in old-growth forests of the Mid-Atlantic: toward better understanding the eastern forest carbon sink. Ecology 96:311–317.

McHale, P. J., M. J. Mitchell, and F. P. Bowles. 1998. Soil warming in a northern hardwood forest: trace gas fluxes and leaf litter decomposition. Canadian Journal of Forest Research 28:1365–1372.

Meakem, V., A. J. Tepley, E. B. Gonzalez-Akre, V. Herrmann, H. C. Muller-Landau, S. J. Wright, S. P. Hubbell, R. Condit, and K. J. Anderson-Teixeira. 2017. Role of tree size in moist tropical forest carbon cycling and water deficit responses. New Phytologist.

Means, J. E., P. C. MacMillan, and K. Cromack Jr. 1992. Biomass and nutrient content of Douglas-fir logs and other detrital pools in an old-growth forest, Oregon, U.S.A. Canadian Journal of Forest Research 22:1536–1546.

Medlyn, B. E., P. Berbigier, R. Clement, A. Grelle, D. Loustau, S. Linder, L. Wingate, P. G. Jarvis, B. D. Sigurdsson, and R. E. McMurtrie. 2005. Carbon balance of coniferous forests growing in contrasting climates: Model-based analysis. Agricultural and Forest Meteorology 131:97–124.

Melillo, J. M. 2002. Soil Warming and Carbon-Cycle Feedbacks to the Climate System. Science 298:2173–2176.

Melillo, J. M., S. Butler, J. Johnson, J. Mohan, P. Steudler, H. Lux, E. Burrows, F. Bowles, R. Smith, L. Scott, C. Vario, T. Hill, A. Burton, Y.-M. Zhou, and J. Tang. 2011. Soil warming, carbon-nitrogen interactions, and forest carbon budgets. Proceedings of the National Academy of Sciences 108:9508–9512.

Mialet-Serra, I., A. Clement, N. Sonderegger, O. Roupsard, C. Jourdan, J.-P. LabouisseE, and M. Dingkuhn. 2005. Assimilate storage in vegetative organs of coconut (Cocos nucifera). Experimental Agriculture 41:161–174.

Miller, S. D., M. L. Goulden, M. C. Menton, H. R. da Rocha, H. C. de Freitas, A. M. e S. Figueira, and C. A. Dias de Sousa. 2004. Biometric and micrometeorological measurements of tropical forest carbon balance. Ecological Applications 14:114–126.

Milyukova, I. M., O. Kolle, A. V. Varlagin, N. N. Vygodskaya, E.-D. Schulze, and J. Lloyd. 2002. Carbon balance of a southern taiga spruce stand in European Russia. Tellus B 54:429–442.

Misson, L., J. Tang, M. Xu, M. McKay, and A. Goldstein. 2005. Influences of recovery from clear-cut, climate variability, and thinning on the carbon balance of a young ponderosa pine plantation. Agricultural and Forest Meteorology 130:207–222.

Mkhabela, M. S., B. D. Amiro, A. G. Barr, T. A. Black, I. Hawthorne, J. Kidston, J. H. McCaughey, A. L. Orchansky, Z. Nesic, A. Sass, A. Shashkov, and T. Zha. 2009. Comparison of carbon dynamics and water use efficiency following fire and harvesting in Canadian boreal forests. Agricultural and Forest Meteorology 149:783–794.

Mo, W., M.-S. Lee, M. Uchida, M. Inatomi, N. Saigusa, S. Mariko, and H. Koizumi. 2005. Seasonal and annual variations in soil respiration in a cool-temperate deciduous broad-leaved forest in Japan. Agricultural and Forest Meteorology 134:81–94.

Mollicone, D., G. Matteucci, R. Köble, A. Masci, M. Chiesi, and P. C. Smits. 2003. A Model-Based Approach for the Estimation of Carbon Sinks in European Forests. Pages 179–206.

Moncrieff, J. B., and C. Fang. 1999. A model for soil CO2 production and transport 2: Application to a florida Pinus elliotte plantation. Agricultural and Forest Meteorology 95:237–256.

Monson, R. K., A. A. Turnipseed, J. P. Sparks, P. C. Harley, L. E. Scott-Denton, K. Sparks, and T. E. Huxman. 2002. Carbon sequestration in a high-elevation, subalpine forest. Global Change Biology 8:459–478.

Montagnini, F. 2000. Accumulation in above-ground biomass and soil storage of mineral nutrients in pure and mixed plantations in a humid tropical lowland. Forest Ecology and Management 134:257–270.

Morgenstern, K., T. Andrew Black, E. R. Humphreys, T. J. Griffis, G. B. Drewitt, T. Cai, Z. Nesic, D. L. Spittlehouse, and N. J. Livingston. 2004. Sensitivity and uncertainty of the carbon balance of a Pacific Northwest Douglas-fir forest during an El Niño/La Niña cycle. Agricultural and Forest Meteorology 123:201–219.

Morrison, I. K. 1973. Distribution of Elements in Aerial Components of Several Natural Jack Pine Stands in Northern Ontario. Canadian Journal of Forest Research 3:170–179.

Moser, G., C. Leuschner, D. Hertel, S. Graefe, N. Soethe, and S. Iost. 2011. Elevation effects on the carbon budget of tropical mountain forests (S Ecuador): the role of the belowground compartment. Global Change Biology 17:2211–2226.

Mou, P., T. J. Fahey, and J. W. Hughes. 1993. Effects of Soil Disturbance on Vegetation Recovery and Nutrient Accumulation Following Whole-Tree Harvest of a Northern Hardwood Ecosystem. The Journal of Applied Ecology 30:661.

Muller, R. N. 1982. Vegetation Patterns in the Mixed Mesophytic Forest of Eastern Kentucky. Ecology 63:1901.

Mund, M., E. Kummetz, M. Hein, G. . Bauer, and E.-D. Schulze. 2002. Growth and carbon stocks of a spruce forest chronosequence in central Europe. Forest Ecology and Management 171:275–296.

Murty, D., R. E. McMurtrie, and M. G. Ryan. 1996. Declining forest productivity in aging forest stands: a modeling analysis of alternative hypotheses. Tree Physiology 16:187–200.

Nagy, M. T., I. A. Janssens, J. Curiel Yuste, A. Carrara, and R. Ceulemans. 2006. Footprint-adjusted net ecosystem CO2 exchange and carbon balance components of a temperate forest. Agricultural and Forest Meteorology 139:344–360.

Nakai, Y., K. Kitamura, S. Suzuki, and S. Abe. 2003. Year-long carbon dioxide exchange above a broadleaf deciduous forest in Sapporo, Northern Japan. Tellus B 55:305–312.

Nakai, Y., Y. Matsuura, T. Kajimoto, A. P. Abaimov, S. Yamamoto, and O. A. Zyryanova. 2008. Eddy covariance CO2 flux above a Gmelin larch forest on continuous permafrost in Central Siberia during a growing season. Theoretical and Applied Climatology 93:133–147.

Nakane, K. 1980. Comparative studies of cycling of soil organic carbon in three primeval moist forests. Japanese Journal of Ecology 30:155–172.

Nakane, K. 1995. Soil carbon cycling in a Japanese cedar (Cryptomeria japonica) plantation. Forest Ecology and Management 72:185–197.

Nakane, K., H. Tsubota, and M. Yamamoto. 1984. Cycling of soil carbon in a Japanese red pine forest I. Before a clear-felling. The Botanical Magazine Tokyo 97:39–60.

Nakane, K., H. Tsubota, and M. Yamamoto. 1986. Cycling of soil carbon in a Japanese red pine forest II. Changes occurring in the first year after a clear-felling. Ecological Research 1:47–58.

Nakane, K., M. Yamamoto, and H. Tsubota. 1983. Estimation of root respiration rate in a mature forest ecosystem. Japanese Journal of Ecology 33:397–408.

Nascimento, H. E. M., and W. F. Laurance. 2002. Total aboveground biomass in central Amazonian rainforests: a landscape-scale study. Forest Ecology and Management 168:311–321.

Naughton-Treves, L., and C. A. Chapman. 2001. Fuelwood Resources and Forest Regeneration on Fallow Land in Uganda. Journal of Sustainable Forestry 14:19–32.

Navarro, M. N. V, C. Jourdan, T. Sileye, S. Braconnier, I. Mialet-Serra, L. Saint-Andre, J. Dauzat, Y. Nouvellon, D. Epron, J. M. Bonnefond, P. Berbigier, A. Rouziere, J. P. Bouillet, and O. Roupsard. 2008. Fruit development, not GPP, drives seasonal variation in NPP in a tropical palm plantation. Tree physiology 28:1661–1674.

Niinistö, S. M., J. Silvola, and S. Kellomäki. 2004. Soil CO 2 efflux in a boreal pine forest under atmospheric CO 2 enrichment and air warming. Global Change Biology 10:1363–1376.

Noormets, A., M. J. Gavazzi, S. G. McNulty, J.-C. Domec, G. Sun, J. S. King, and J. Chen. 2010. Response of carbon fluxes to drought in a coastal plain loblolly pine forest. Global Change Biology 16:272–287.

Noormets, A., S. G. McNulty, J. L. DeForest, G. Sun, Q. Li, and J. Chen. 2008. Drought during canopy development has lasting effect on annual carbon balance in a deciduous temperate forest. New Phytologist 179:818–828.

Norby, R. J., E. H. DeLucia, B. Gielen, C. Calfapietra, C. P. Giardina, J. S. King, J. Ledford, H. R. McCarthy, D. J. P. Moore, R. Ceulemans, P. De Angelis, A. C. Finzi, D. F. Karnosky, M. E. Kubiske, M. Lukac, K. S. Pregitzer, G. E. Scarascia-Mugnozza, W. H. Schlesinger, and R. Oren. 2005. Forest response to elevated CO2 is conserved across a broad range of productivity. Proceedings of the National Academy of Sciences 102:18052–18056.

Norby, R. J., J. M. Warren, C. M. Iversen, B. E. Medlyn, and R. E. McMurtrie. 2010. CO2 enhancement of forest productivity constrained by limited nitrogen availability. Proceedings of the National Academy of Sciences 107:19368–19373.

Norby, R. J., P. J. Hanson, E. G. O’Neill, T. J. Tschaplinski, J. F. Weltzin, R. A. Hansen, W. Cheng, S. D. Wullschleger, C. A. Gunderson, N. T. Edwards, and D. W. Johnson. 2002. Net primary productivity of a CO2-enriched deciduous forest and the implications for carbon storage. Ecological Applications 12:1261–1266.

Norby, R. J., T. M. Long, J. S. Hartz-Rubin, and E. G. O’Neill. 2000. Nitrogen resorption in senescing tree leaves in a warmer , CO2 -enriched atmosphere. Plant and Soil 224:15–29.

Novick, K. A., P. C. Stoy, G. G. Katul, D. S. Ellsworth, M. B. S. Siqueira, J. Juang, and R. Oren. 2004. Carbon dioxide and water vapor exchange in a warm temperate grassland. Oecologia 138:259–274.

Nye, P. H., and D. J. Greenland. 1998. NPP Tropical Forest: Kade, Ghana, 1957-1972. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. doi:10.3334/ORNLDAAC/216. http://daac.ornl.gov.

Nygård, R., L. Sawadogo, and B. Elfving. 2004. Wood-fuel yields in short-rotation coppice growth in the north Sudan savanna in Burkina Faso. Forest Ecology and Management 189:77–85.

Nykvist, N. 1996. Regrowth of secondary vegetation after the “Borneo fire” of 1982–1983. Journal of Tropical Ecology 12:307.

O’Connell, K. E. B., S. T. Gower, and J. M. Norman. 2003. Net Ecosystem Production of Two Contrasting Boreal Black Spruce Forest Communities. Ecosystems 6:248–260.

Oechel, W. C., and K. Van Cleve. 1986. The Role of Bryophytes in Nutrient Cycling in the Taiga. Pages 121–137Forest Ecosystems in the Alaskan Taiga. Ecological Studies: 57. Springer, New York, USA.

Ogawa, H., K. Yoda, K. Ogino, and T. Kira. 1965. Comparative ecological studies on three main types of forest vegetation in Thailand. II. Plant biomass. Pages 49–80*in* T. Kira and K. Iwata, editors.Nature and Life in Southeast Asia Vol. I. Fauna and Flora Research Society, Kyoto.

Ohashi, M., K. Gyokusen, and A. Saito. 2000. Contribution of root respiration to total soil respiration in a Japanese cedar (Cryptomeria japonica D. Don) artificial forest. Ecological Research 15:323–333.

Ohkubo, S., Y. Kosugi, S. Takanashi, T. Mitani, and M. Tani. 2007. Comparison of the eddy covariance and automated closed chamber methods for evaluating nocturnal CO2 exchange in a Japanese cypress forest. Agricultural and Forest Meteorology 142:50–65.

Ohmann, L. F., and D. F. Grigal. 1979. Early Revegetation and Nutrient Dynamics Following the 1971 Little Sioux Forest Fire in Northeastern Minnesota. Forest Science 21:a0001-z0001.

Ohtsuka, T., T. Akiyama, Y. Hashimoto, M. Inatomi, T. Sakai, S. Jia, W. Mo, S. Tsuda, and H. Koizumi. 2005. Biometric based estimates of net primary production (NPP) in a cool-temperate deciduous forest stand beneath a flux tower. Agricultural and Forest Meteorology 134:27–38.

Ollinger, S. V., and M.-L. Smith. 2005. Net Primary Production and Canopy Nitrogen in a Temperate Forest Landscape: An Analysis Using Imaging Spectroscopy, Modeling and Field Data. Ecosystems 8:760–778.

Olson, R. J., J. M. O. Scurlock, S. D. Prince, D. L. Zheng, and K. R. Johnson. 2001. NPP Multi-Biome: Global Primary Production Data Initiative Products. Data set. Available on-line [http://daac.ornl.gov] from the Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/617. http://daac.ornl.gov.

Olszyk, D. M., M. G. Johnson, D. T. Tingey, P. T. Rygiewicz, C. Wise, E. VanEss, A. Benson, M. J. Storm, and R. King. 2003. Whole-seedling biomass allocation, leaf area, and tissue chemistry for Douglas-fir exposed to elevated CO 2 and temperature for 4 years. Canadian Journal of Forest Research 33:269–278.

Onyekwelu, J. 2007. Growth, biomass yield and biomass functions for plantation-grown Nauclea diderrichii (de wild) in the humid tropical rainforest zone of south-western Nigeria. Bioresource Technology 98:2679–2687.

Onyekwelu, J. C. 2004. Above-ground biomass production and biomass equations for even-aged Gmelina arborea (ROXB) plantations in south-western Nigeria. Biomass and Bioenergy 26:39–46.

Oren, R., C.-I. Hsieh, P. Stoy, J. Albertson, H. R. McCarthy, P. Harrell, and G. G. Katul. 2006. Estimating the uncertainty in annual net ecosystem carbon exchange: spatial variation in turbulent fluxes and sampling errors in eddy-covariance measurements. Global Change Biology 12:883–896.

Orihuela-Belmonte, D. E., B. H. J. de Jong, J. Mendoza-Vega, J. Van der Wal, F. Paz-Pellat, L. Soto-Pinto, and A. Flamenco-Sandoval. 2013. Carbon stocks and accumulation rates in tropical secondary forests at the scale of community, landscape and forest type. Agriculture, Ecosystems & Environment 171:72–84.

Ostertag, R. 2001. Effects of nitrogen and phosphorus availability on fine-root fynamics in Hawaiian montane forests. Ecology 82:485–499.

Overman, J. P. M., H. J. L. Witte, and J. G. Saldarriaga. 1994. Evaluation of regression models for above-ground biomass determination in Amazon rainforest. Journal of Tropical Ecology 10:207.

Ovington, J. D., and H. A. I. Madgwick. 1959. The growth and composition of natural stands of birch. Plant and Soil 10:389–400.

Pajari, B. 1995. Soil respiration in a poor upland site of Scots pine stand subjected to elevated temperatures and atmospheric carbon concentration. Plant and Soil 168–169:563–570.

Palace, M., M. Keller, G. P. Asner, J. N. M. Silva, and C. Passos. 2007. Necromass in undisturbed and logged forests in the Brazilian Amazon. Forest Ecology and Management 238:309–318.

Pare, D., and Y. Bergeron. 1995. Above-Ground Biomass Accumulation along a 230-Year Chronosequence in the Southern Portion of the Canadian Boreal Forest. The Journal of Ecology 83:1001.

Parrotta, J. A. 1999. Productivity, nutrient cycling, and succession in single- and mixed-species plantations of Casuarina equisetifolia, Eucalyptus robusta, and Leucaena leucocephala in Puerto Rico. Forest Ecology and Management 124:45–77.

Paw U, K., M. Falk, T. Suchanek, S. Ustin, J. Chen, Y.-S. Park, W. Winner, S. Thomas, T. Hsiao, R. Shaw, T. King, R. D. Pyles, M. Schroeder, and A. Matista. 2004. Carbon Dioxide Exchange Between an Old-growth Forest and the Atmosphere. Ecosystems 7.

Peichl, M., and M. A. Arain. 2006. Above- and belowground ecosystem biomass and carbon pools in an age-sequence of temperate pine plantation forests. Agricultural and Forest Meteorology 140:51–63.

Peichl, M., J. J. Brodeur, M. Khomik, and M. A. Arain. 2010. Biometric and eddy-covariance based estimates of carbon fluxes in an age-sequence of temperate pine forests. Agricultural and Forest Meteorology 150:952–965.

Peng, S., and Z. Zhang. 1994. Biomass, productivity and efficiency of radiation utilization of a typical vegetation in Dinghushan. Science In China (Series B) / Scientia Sinica Chimica 24:497–502. [in Chinese].

Pereira, J. S., J. A. Mateus, L. M. Aires, G. Pita, C. Pio, J. S. David, V. Andrade, J. Banza, T. S. David, T. A. Paço, and A. Rodrigues. 2007. Net ecosystem carbon exchange in three contrasting Mediterranean ecosystems &amp;ndash; the effect of drought. Biogeosciences 4:791–802.

Pereira, J. S., G. Pita, J. Silva, A. Fabiao, M. Carneiro, C. Nogueira, A. Rodrigues, M. Madeira, and E. Ribeiro. 2003. Full Carbon Balance in an Eucalypt Plantation in Portugal. Page S177Comparative Biochemistry and Physiology Part A 134.

Pilegaard, K., P. Hummelshøj, N. . Jensen, and Z. Chen. 2001. Two years of continuous CO2 eddy-flux measurements over a Danish beech forest. Agricultural and Forest Meteorology 107:29–41.

Pinard, M. A., and F. E. Putz. 1996. Retaining Forest Biomass by Reducing Logging Damage. Biotropica 28:278–295.

Poorter, L., M. T. van der Sande, J. Thompson, E. J. M. M. Arets, A. Alarcón, J. Álvarez-Sánchez, N. Ascarrunz, P. Balvanera, G. Barajas-Guzmán, A. Boit, F. Bongers, F. A. Carvalho, F. Casanoves, G. Cornejo-Tenorio, F. R. C. Costa, C. V. de Castilho, J. F. Duivenvoorden, L. P. Dutrieux, B. J. Enquist, F. Fernández-Méndez, B. Finegan, L. H. L. Gormley, J. R. Healey, M. R. Hoosbeek, G. Ibarra-Manríquez, A. B. Junqueira, C. Levis, J. C. Licona, L. S. Lisboa, W. E. Magnusson, M. Martínez-Ramos, A. Martínez-Yrizar, L. G. Martorano, L. C. Maskell, L. Mazzei, J. A. Meave, F. Mora, R. Muñoz, C. Nytch, M. P. Pansonato, T. W. Parr, H. Paz, E. A. Pérez-García, L. Y. Rentería, J. Rodríguez-Velazquez, D. M. A. Rozendaal, A. R. Ruschel, B. Sakschewski, B. Salgado-Negret, J. Schietti, M. Simões, F. L. Sinclair, P. F. Souza, F. C. Souza, J. Stropp, H. ter Steege, N. G. Swenson, K. Thonicke, M. Toledo, M. Uriarte, P. van der Hout, P. Walker, N. Zamora, and M. Peña-Claros. 2015. Diversity enhances carbon storage in tropical forests. Global Ecology and Biogeography 24:1314–1328.

Post, L. J. 1970. Dry-Matter Production of Mountain Maple and Balsam Fir in Northwestern New Brunswick. Ecology 51:548.

Powell, T. L., R. Bracho, J. Li, S. Dore, C. R. Hinkle, and B. G. Drake. 2006. Environmental controls over net ecosystem carbon exchange of scrub oak in central Florida. Agricultural and Forest Meteorology 141:19–34.

Powers, M. D., R. K. Kolka, J. B. Bradford, B. J. Palik, S. Fraver, and M. F. Jurgensen. 2012. Carbon stocks across a chronosequence of thinned and unmanaged red pine ( Pinus resinosa ) stands. Ecological Applications 22:1297–1307.

Proctor, J. 2013. NPP Tropical Forest: Gunung Mulu, Malaysia, 1977-1978, R1. Data set. Available on-line [http://www.daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/474.

Ramachandran, A., and M. Byrappa Gowdu Viswanathan. 2009. A new species of Gymnema (Asclepiadaceae) from the Kollihills in Peninsular India. Adansonia 31:407–411.

Read, L., and D. Lawrence. 2003. Recovery of biomass following shifting cultivation in dry tropical forests of the Yucatan. Ecological Applications 13:85–97.

Reiners, W. A. 1992. Twenty Years of Ecosystem Reorganization Following Experimental Deforestation and Regrowth Suppression. Ecological Monographs 62:503.

Ricciuto, D. M., M. P. Butler, K. J. Davis, B. D. Cook, P. S. Bakwin, A. Andrews, and R. M. Teclaw. 2008. Causes of interannual variability in ecosystem–atmosphere CO2 exchange in a northern Wisconsin forest using a Bayesian model calibration. Agricultural and Forest Meteorology 148:309–327.

Rice, A. H., E. H. Pyle, S. R. Saleska, L. Hutyra, M. Palace, M. Keller, P. B. de Camargo, K. Portilho, D. F. Marques, and S. C. Wofsy. 2004. Carbon balance and vegetation dynamics in an old-growth Amazonian forest. Ecological Applications 14:55–71.

Richardson, A. D., D. Y. Hollinger, J. D. Aber, S. V. Ollinger, and B. H. Braswell. 2007. Environmental variation is directly responsible for short- but not long-term variation in forest-atmosphere carbon exchange. Global Change Biology 13:788–803.

Rocha, W., D. B. Metcalfe, C. E. Doughty, P. Brando, D. Silvério, K. Halladay, D. C. Nepstad, J. K. Balch, and Y. Malhi. 2014. Ecosystem productivity and carbon cycling in intact and annually burnt forest at the dry southern limit of the Amazon rainforest (Mato Grosso, Brazil). Plant Ecology & Diversity 7:25–40.

Rodeghiero, M., and A. Cescatti. 2006. Indirect partitioning of soil respiration in a series of evergreen forest ecosystems. Plant and Soil 284:7–22.

Rodin, L. E., N. I. Bazilevich, and G. E. Fogg. 1968. Production and mineral cycling in terrestrial vegetation. Oliver & Boyd, Edinburgh; London.

Rodrigues, A., G. Pita, J. Mateus, C. Kurz-Besson, M. Casquilho, S. Cerasoli, A. Gomes, and J. Pereira. 2011. Eight years of continuous carbon fluxes measurements in a Portuguese eucalypt stand under two main events: Drought and felling. Agricultural and Forest Meteorology 151:493–507.

Romero, P., E. Neira, and A. Lara. 2007. Forest cover and carbon changes in coastal temperate rainforest, Chile.

Roser, C., L. Montagnani, E.-D. Schulze, D. Mollicone, O. Kolle, Mi. Meroni, D. Papale, L. B. Marchesini, S. Federici, and R. Valentini. 2002. Net CO2 exchange rates in three different successional stages of the “Dark Taiga” of central Siberia. Tellus B 54:642–654.

Rothstein, D. E., Z. Yermakov, and A. L. Buell. 2004. Loss and recovery of ecosystem carbon pools following stand-replacing wildfire in Michigan jack pine forests. Canadian Journal of Forest Research 34:1908–1918.

Roupsard, O., J.-M. Bonnefond, M. Irvine, P. Berbigier, Y. Nouvellon, J. Dauzat, S. Taga, O. Hamel, C. Jourdan, L. Saint-André, I. Mialet-Serra, J.-P. Labouisse, D. Epron, R. Joffre, S. Braconnier, A. Rouzière, M. Navarro, and J.-P. Bouillet. 2006. Partitioning energy and evapo-transpiration above and below a tropical palm canopy. Agricultural and Forest Meteorology 139:252–268.

Ruark, G. A., and J. G. Bockheim. 1988. Biomass, net primary production, and nutrient distribution for an age sequence of Populus tremuloides ecosystems. Canadian Journal of Forest Research 18:435–443.

Ruess, R. W., K. Van Cleve, J. Yarie, and L. A. Viereck. 1996. Contributions of fine root production and turnover to the carbon and nitrogen cycling in taiga forests of the Alaskan interior. Canadian Journal of Forest Research 26:1326–1336.

Ruess, R. W., R. L. Hendrick, A. J. Burton, K. S. Pregitzer, B. Sveinbjornssön, M. F. Allen, and G. E. Maurer. 2003. Coupling fine root dynamics with ecosystem carbon cycling in black spruce forests of interior Alaska. Ecological Monographs 73:643–662.

Runyon, J., R. H. Waring, S. N. Goward, and J. M. Welles. 1994. Environmental Limits on Net Primary Production and Light-Use Efficiency Across the Oregon Transect. Ecological Applications 4:226.

Ruppert, J., M. Mauder, C. Thomas, and J. Lüers. 2006. Innovative gap-filling strategy for annual sums of CO2 net ecosystem exchange. Agricultural and Forest Meteorology 138:5–18.

Rustad, Li. E., and I. J. Fernandez. 1998. Experimental soil warming effects on CO2 and CH4 flux from a low elevation spruce-fir forest soil in Maine, USA. Global Change Biology 4:597–605.

Ryan, M. G. 1991. A simple method for estimating gross carbon budgets for vegetation in forest ecosystems. Tree Physiology 9:255–266.

Ryan, M. G., D. Binkley, J. H. Fownes, C. P. Giardina, and R. S. Senock. 2004. An experimental test of the causes of forest growth decline with stand age. Ecological Monographs 74:393–414.

Ryan, M. G., R. M. Hubbard, S. Pongracic, R. J. Raison, and R. E. McMurtrie. 1996. Foliage, fine-root, woody-tissue and stand respiration in Pinus radiata in relation to nitrogen status. Tree Physiology 16:333–343.

Ryan, M. G., M. B. Lavigne, and S. T. Gower. 1997. Annual carbon cost of autotrophic respiration in boreal forest ecosystems in relation to species and climate. Journal of Geophysical Research 102:28871.

Ryan, M. G., and R. H. Waring. 1992. Maintenance Respiration and Stand Development in a Subalpine Lodgepole Pine Forest. Ecology 73:2100.

Saigusa, N., S. Yamamoto, S. Murayama, and H. Kondo. 2005. Inter-annual variability of carbon budget components in an AsiaFlux forest site estimated by long-term flux measurements. Agricultural and Forest Meteorology 134:4–16.

Saigusa, N., S. Yamamoto, S. Murayama, H. Kondo, and N. Nishimura. 2002. Gross primary production and net ecosystem exchange of a cool-temperate deciduous forest estimated by the eddy covariance method. Agricultural and Forest Meteorology 112:203–215.

Saiz, G., K. A. Byrne, K. Butterbach-Bahl, R. Kiese, V. Blujdea, and E. P. Farrell. 2006. Stand age-related effects on soil respiration in a first rotation Sitka spruce chronosequence in central Ireland. Global Change Biology 12:1007–1020.

Saiz, G., C. Green, K. Butterbach-Bahl, R. Kiese, V. Avitabile, and E. P. Farrell. 2006. Seasonal and spatial variability of soil respiration in four Sitka spruce stands. Plant and Soil 287:161–176.

Saldarriaga, J. G., D. C. West, M. L. Tharp, and C. Uhl. 1988. Long-Term Chronosequence of Forest Succession in the Upper Rio Negro of Colombia and Venezuela. The Journal of Ecology 76:938.

Saleska, S. R. 2003. Carbon in Amazon Forests: Unexpected Seasonal Fluxes and Disturbance-Induced Losses. Science 302:1554–1557.

Salomão, R. de P. 1994. Estimativas de biomassa e avaliação do estoque de carbono da vegetação de florestas primárias e secundárias de diversas idades (capoeiras) na Amazônia Oriental, município de Peixe-boi, Pará. Universidade Federal do Pará / Museu Paraense Emilio Goeldi, Belém.

Santos, A. J. B., G. T. D. A. Silva, H. S. Miranda, A. C. Miranda, and J. Lloyd. 2003. Effects of fire on surface carbon, energy and water vapour fluxes over campo sujo savanna in central Brazil. Functional Ecology 17:711–719.

Schindlbacher, A., S. Wunderlich, W. Borken, B. Kitzler, S. Zechmeister-Boltenstern, and R. Jandl. 2012. Soil respiration under climate change: prolonged summer drought offsets soil warming effects. Global Change Biology 18:2270–2279.

Schindlbacher, A., S. Zechmeister-Boltenstern, and R. Jandl. 2009. Carbon losses due to soil warming: Do autotrophic and heterotrophic soil respiration respond equally? Global Change Biology 15:901–913.

Schindler, D., M. Türk, and H. Mayer. 2006. CO2 fluxes of a Scots pine forest growing in the warm and dry southern upper Rhine plain, SW Germany. European Journal of Forest Research 125:201–212.

Schlegel, B. C., and P. J. Donoso. 2008. Effects of forest type and stand structure on coarse woody debris in old-growth rainforests in the Valdivian Andes, south-central Chile. Forest Ecology and Management 255:1906–1914.

Schmelz, D. V., and A. A. Lindsey. 1965. Size-class Structure of Old-growth Forests in Indiana. Forest Science 11:258–264(7).

Schmid, H. 2000. Measurements of CO2 and energy fluxes over a mixed hardwood forest in the mid-western United States. Agricultural and Forest Meteorology 103:357–374.

Schmid, H. P. 2003. Ecosystem-atmosphere exchange of carbon dioxide over a mixed hardwood forest in northern lower Michigan. Journal of Geophysical Research 108:4417.

Schöngart, J., and F. Wittmann. 2010. Biomass and Net Primary Production of Central Amazonian Floodplain Forests. Pages 347–388.

Schulze, E.-D., J. Lloyd, F. M. Kelliher, C. Wirth, C. Rebmann, B. Luhker, M. Mund, A. Knohl, I. M. Milyukova, W. Schulze, W. Ziegler, A. beta. Varlagin, A. F. Sogachev, R. Valentini, S. Dore, S. Grigoriev, O. Kolle, M. I. Panfyorov, N. Tchebakova, and N. Vygodskaya. 1999. Productivity of forests in the Eurosiberian boreal region and their potential to act as a carbon sink -- a synthesis. Global Change Biology 5:703–722.

Schulze, E.-D. 2000. The Carbon and Nitrogen Cycle of Forest Ecosystems. Pages 3–13.

Schulze, E.-D., W. Schulze, H. Koch, A. Arneth, G. Bauer, F. M. Kelliher, D. Y. Hollinger, N. N. Vygodskaya, W. A. Kusnetsova, A. Sogatchev, W. Ziegler, K. I. Kobak, and A. Issajev. 1995. Aboveground biomass and nitrogen nutrition in a chronosequence of pristine Dahurian Larix stands in eastern Siberia. Canadian Journal of Forest Research 25:943–960.

Schuur, E. A. G. 2005. NPP Tropical Forest: Maui, Hawaii, U.S.A., 1996-1997. http://daac.ornl.gov.

Schwalm, C. R., T. A. Black, K. Morgenstern, and E. R. Humphreys. 2007. A method for deriving net primary productivity and component respiratory fluxes from tower-based eddy covariance data: a case study using a 17-year data record from a Douglas-fir chronosequence. Global Change Biology 13:370–385.

Scott, D. A., J. Proctor, and J. Thompson. 1992. Ecological Studies on a Lowland Evergreen Rain Forest on Maraca Island, Roraima, Brazil. II. Litter and Nutrient Cycling. The Journal of Ecology 80:705.

Scott, G. 1977. The importance of old-field succession biomass increments to shifting cultivation. lains- Rocky Mountain Geographical Journal 6:318–327.

SCOTT, R. L., T. E. HUXMAN, D. G. WILLIAMS, and D. C. GOODRICH. 2006. Ecohydrological impacts of woody-plant encroachment: seasonal patterns of water and carbon dioxide exchange within a semiarid riparian environment. Global Change Biology 12:311–324.

Scott, R. L., G. D. Jenerette, D. L. Potts, and T. E. Huxman. 2009. Effects of seasonal drought on net carbon dioxide exchange from a woody-plant-encroached semiarid grassland. Journal of Geophysical Research 114:G04004.

Sharma, C. M., N. P. Baduni, S. Gairola, S. K. Ghildiyal, and S. Suyal. 2010. Tree diversity and carbon stocks of some major forest types of Garhwal Himalaya, India. Forest Ecology and Management 260:2170–2179.

Shaw, C. H., J. S. Bhatti, and K. J. Sabourin. 2005. An Ecosystem Carbon Database for Canadian Forests. Information Report NOR-X-403.

Shibata, H., T. Hiura, Y. Tanaka, K. Takagi, and T. Koike. 2005. Carbon cycling and budget in a forested basin of southwestern Hokkaido, northern Japan. Pages 89–95Forest Ecosystems and Environments. Springer-Verlag, Tokyo.

Sierra, C. A., J. I. del Valle, and H. I. Restrepo. 2012. Total carbon accumulation in a tropical forest landscape. Carbon Balance and Management 7:12.

Sierra, C. A., J. I. del Valle, S. A. Orrego, F. H. Moreno, M. E. Harmon, M. Zapata, G. J. Colorado, M. A. Herrera, W. Lara, D. E. Restrepo, L. M. Berrouet, L. M. Loaiza, and J. F. Benjumea. 2007. Total carbon stocks in a tropical forest landscape of the Porce region, Colombia. Forest Ecology and Management 243:299–309.

Sierra, C. A., M. E. Harmon, F. H. Moreno, S. A. Orrego, and J. I. . del Valle. 2007. Spatial and temporal variability of net ecosystem production in a tropical forest: testing the hypothesis of a significant carbon sink. Global Change Biology 13:838–853.

Silberstein, R., A. Held, T. Hatton, N. Viney, and M. Sivapalan. 2001. Energy balance of a natural jarrah (Eucalyptus marginata) forest in Western Australia: measurements during the spring and summer. Agricultural and Forest Meteorology 109:79–104.

Silver, W. L., L. M. Kueppers, A. E. Lugo, R. Ostertag, and V. Matzek. 2004. Carbon sequestration and plant community dynamics following reforestation of tropical pasture. Ecological Applications 14:1115–1127.

Silvester, W. B., and T. A. Orchard. 1999. The biology of kauri ( Agathis australis ) in New Zealand. Production, biomass, carbon storage, and litter fall in four forest remnants. New Zealand Journal of Botany 37:553–571.

Singh, B., A. Nordgren, M. Ottosson Lofvenius, M. N. Hogberg, P.-E. Mellander, and P. Hogberg. 2003. Tree root and soil heterotrophic respiration as revealed by girdling of boreal Scots pine forest: extending observations beyond the first year. Plant, Cell and Environment 26:1287–1296.

Smith, A. R., M. Lukac, M. Bambrick, F. Miglietta, and D. L. Godbold. 2013. Tree species diversity interacts with elevated CO 2 to induce a greater root system response. Global Change Biology 19:217–228.

Smithwick, E. A. H., M. E. Harmon, S. M. Remillard, S. A. Acker, and J. F. Franklin. 2002. Potential upper bounds of carbon stores in forests of the Pacific Northwest. Ecological Applications 12:1303–1317.

Snedaker, S. C. 1970. Ecological Studies on Tropical Moist Forest Succession in Eastern Lowland Guatemala. University of Florida, Gainesville.

Sorrensen, C. L. 2000. Linking smallholder land use and fire activity: examining biomass burning in the Brazilian Lower Amazon. Forest Ecology and Management 128:11–25.

Sprugel, D. G. 1984. Density, Biomass, Productivity, and Nutrient-Cycling Changes During Stand Development in Wave-Regenerated Balsam Fir Forests. Ecological Monographs 54:165.

Srivastava, A. K. 1995. Biomass and energy production in Casuarina equisetifolia plantation stands in the degraded dry tropics of the Vindhyan plateau, India. Biomass and Bioenergy 9:465–471.

Stape, J. ., D. Binkley, and M. G. Ryan. 2004. Eucalyptus production and the supply, use and efficiency of use of water, light and nitrogen across a geographic gradient in Brazil. Forest Ecology and Management 193:17–31.

Steele, S. J., S. T. Gower, J. G. Vogel, and J. M. Norman. 1997. Root mass, net primary production and turnover in aspen, jack pine and black spruce forests in Saskatchewan and Manitoba, Canada. Tree Physiology 17:577–587.

Steininger, M. K. 2000. Secondary forest structure and biomass following short and extended land-use in central and southern Amazonia.

Stocker, G. C. 2013. NPP Tropical Forest: Atherton, Australia, 1974-1985, R1. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. doi:10.3334/ORNLDAAC/577. http://daac.ornl.gov.

Stoy, P. C., G. G. Katul, M. B. S. Siqueira, J.-Y. Juang, K. A. Novick, J. M. Uebelherr, and R. Oren. 2006. An evaluation of models for partitioning eddy covariance-measured net ecosystem exchange into photosynthesis and respiration. Agricultural and Forest Meteorology 141:2–18.

Subke, J.-A. 2002. Forest floor CO2 fluxes in temperate forest ecosystems. An investigation of spatial and temporal patterns and abiotic controls. Bayreuther Institut für Terrestrische Ökosystemforschung (BITÖK): Bayreuther Forum Ökologie, Selbstverlag 96:1–119.

Subke, J.-A., V. Hahn, G. Battipaglia, S. Linder, N. Buchmann, and M. F. Cotrufo. 2004. Feedback interactions between needle litter decomposition and rhizosphere activity. Oecologia 139:551–559.

Sulzman, E. W., J. B. Brant, R. D. Bowden, and K. Lajtha. 2005. Contribution of aboveground litter, belowground litter, and rhizosphere respiration to total soil CO2 efflux in an old growth coniferous forest. Biogeochemistry 73:231–256.

Suni, T., J. Rinne, A. Reissell, N. Altimir, P. Keronen, Ü. Rannik, M. Dal Maso, M. Kulmala, and T. Vesala. 2003. Long-term measurements of surface fluxes above a Scots pine forest in Hyytiälä, southern Finland, 1996–2001. Boreal Environment Research 8:287–301.

Suni, T. 2003. Interannual variability and timing of growing-season CO 2 exchange in a boreal forest. Journal of Geophysical Research 108:4265.

Swamy, S. L., S. K. Kushwaha, and S. Puri. 2004. Tree growth, biomass, allometry and nutrient distribution in Gmelina arborea stands grown in red lateritic soils of Central India. Biomass and Bioenergy 26:305–317.

Szott, L. T., C. A. Palm, and C. B. Davey. 1994. Biomass and litter accumulation under managed and natural tropical fallows. Forest Ecology and Management 67:177–190.

Tagesson, T., and A. Lindroth. 2007. High soil carbon efflux rates in several ecosystems in southern Sweden. Boreal Environment Research 12:65–80.

Takagi, K., K. Fukuzawa, N. Liang, M. Kayama, M. Nomura, H. Shibata, K. Sasa, Y. Fujinuma, Y. Akibayashi, T. Koike, M. Mizuno, and T. Murayama. 2007. Contribution of the soil respiration during a series of forestry activities in northernmost Japan. Page 51AsiaFlux Workshop. Taoyuan, Taiwan.

Takanashi, S., Y. Kosugi, Y. Tanaka, M. Yano, T. Katayama, H. Tanaka, and M. Tani. 2005. CO2 exchange in a temperate Japanese cypress forest compared with that in a cool-temperate deciduous broad-leaved forest. Ecological Research 20:313–324.

Tan, Z.-H., Y.-P. Zhang, D. Schaefer, G.-R. Yu, N. Liang, and Q.-H. Song. 2011. An old-growth subtropical Asian evergreen forest as a large carbon sink. Atmospheric Environment 45:1548–1554.

Tang, J., D. D. Baldocchi, and L. Xu. 2005. Tree photosynthesis modulates soil respiration on a diurnal time scale. Global Change Biology 11:1298–1304.

Tanner, E. V. J. 1980. Studies on the Biomass and Productivity in a Series of Montane Rain Forests in Jamaica. The Journal of Ecology 68:573–588.

Tate, K. R., D. J. Ross, B. J. O’Brien, and F. M. Kelliher. 1993. Carbon storage and turnover, and respiratory activity, in the litter and soil of an old-growth southern beech (nothofagus) forest. Soil Biology and Biochemistry 25:1601–1612.

Teklemariam, T., R. M. Staebler, and A. G. Barr. 2009. Eight years of carbon dioxide exchange above a mixed forest at Borden, Ontario. Agricultural and Forest Meteorology 149:2040–2053.

Tepley, A. J., J. R. Thompson, H. E. Epstein, and K. J. Anderson-Teixeira. 2017. Vulnerability to forest loss through altered postfire recovery dynamics in a warming climate in the Klamath Mountains. Global Change Biology:1–16.

Terakunpisut, J., N. Gajaseni, and N. Ruankawe. 2007. Carbon sequestration potential in aboveground biomass of Thong Pha Phum National Forest, Thailand. Applied Ecology and Environmental Research 5:93–102.

Thierron, V., and H. Laudelout. 1996. Contribution of root respiration to total CO 2 efflux from the soil of a deciduous forest. Canadian Journal of Forest Research 26:1142–1148.

Thomas, C. K., B. E. Law, J. Irvine, J. G. Martin, J. C. Pettijohn, and K. J. Davis. 2009. Seasonal hydrology explains interannual and seasonal variation in carbon and water exchange in a semiarid mature ponderosa pine forest in central Oregon. Journal of Geophysical Research 114:G04006.

Thuille, A., N. Buchmann, and E.-D. Schulze. 2000. Carbon stocks and soil respiration rates during deforestation, grassland use and subsequent Norway spruce afforestation in the Southern Alps, Italy. Tree Physiology 20:849–857.

Tingey, D. T., E. H. Lee, D. L. Phillips, P. T. Rygiewicz, R. S. Waschmann, M. G. Johnson, and D. M. Olszyk. 2007. Elevated CO 2 and temperature alter net ecosystem C exchange in a young Douglas fir mesocosm experiment. Plant, Cell & Environment 30:1400–1410.

Tirone, G., S. Dore, G. Matteucci, S. Greco, and R. Valentini. 2003. Evergreen Mediterranean Forests. Carbon and Water Fluxes, Balances, Ecological and Ecophysiological Determinants. Pages 125–149Ecological Studies, 163: Fluxes of Carbon, Water and Energy of European Forests. Springer, Berlin Heidelberg.

Toky, O. P., and P. S. Ramakrishnan. 1983. Secondary Succession Following Slash and Burn Agriculture in North-Eastern India: I. Biomass, Litterfall and Productivity. The Journal of Ecology 71:735.

Tong, X., P. Meng, J. Zhang, J. Li, N. Zheng, and H. Huang. 2012. Ecosystem carbon exchange over a warm-temperate mixed plantation in the lithoid hilly area of the North China. Atmospheric Environment 49:257–267.

Trumbore, S., E. S. Da Costa, D. C. Nepstad, P. Barbosa De Camargo, L. A. Martinelli, D. Ray, T. Restom, and W. Silver. 2006. Dynamics of fine root carbon in Amazonian tropical ecosystems and the contribution of roots to soil respiration. Global Change Biology 12:217–229.

Turner, J. 1981. Nutrient Cycling in an Age Sequence of Western Washington Douglas-fir Stands. Annals of Botany 48:159–170.

Turner, J., and M. J. Lambert. 1986. Effects of forest harvesting nutrient removals on soil nutrient reserves. Oecologia 70:140–148.

Turner, J., M. J. Lambert, and G. Holmes. 1992. Nutrient cycling in forested catchments in southeastern New South Wales. 1. Biomass accumulation. Forest Ecology and Management 55:135–148.

Ueyama, M., Y. Harazono, E. Ohtaki, and A. Miyata. 2006. Controlling factors on the interannual CO 2 budget at a subarctic black spruce forest in interior Alaska. Tellus B 58:491–501.

Uhl, C., R. Buschbacher, and E. A. S. Serrao. 1988. Abandoned Pastures in Eastern Amazonia. I. Patterns of Plant Succession. The Journal of Ecology 76:663.

Uhl, C. 1987. Factors Controlling Succession Following Slash-and-Burn Agriculture in Amazonia. The Journal of Ecology 75:377.

Uhl, C., and C. F. Jordan. 1984. Succession and Nutrient Dynamics Following Forest Cutting and Burning in Amazonia. Ecology 65:1476.

Uhl, C., and J. B. Kauffman. 1990. Deforestation, Fire Susceptibility, and Potential Tree Responses to Fire in the Eastern Amazon. Ecology 71:437.

Urbanski, S., C. Barford, S. Wofsy, C. Kucharik, E. Pyle, J. Budney, K. McKain, D. Fitzjarrald, M. Czikowsky, and J. W. Munger. 2007. Factors controlling CO 2 exchange on timescales from hourly to decadal at Harvard Forest. Journal of Geophysical Research 112:G02020.

Uri, V., M. Varik, J. Aosaar, A. Kanal, M. Kukumägi, and K. Lõhmus. 2012. Biomass production and carbon sequestration in a fertile silver birch (Betula pendula Roth) forest chronosequence. Forest Ecology and Management 267:117–126.

Usoltsev, V. A., and J. K. Vanclay. 1995. Stand biomass dynamics of pine plantations and natural forests on dry steppe in Kazakhstan. Scandinavian Journal of Forest Research 10:305–312.

Valentini, R., P. De Angelis, G. Matteuci, R. Monaco, S. Dore, and G. E. Scarascia Mucnozza. 1996. Seasonal net carbon dioxide exchange of a beech forest with the atmosphere. Global Change Biology 2:199–207.

Valentini, R., G. Matteucci, A. J. Dolman, E.-D. Schulze, C. Rebmann, E. J. Moors, A. Granier, P. Gross, N. O. Jensen, K. Pilegaard, A. Lindroth, A. Grelle, C. Bernhofer, T. Grünwald, M. Aubinet, R. Ceulemans, A. S. Kowalski, T. Vesala, Ü. Rannik, P. Berbigier, D. Loustau, J. Guðmundsson, H. Thorgeirsson, A. Ibrom, K. Morgenstern, R. Clement, J. Moncrieff, L. Montagnani, S. Minerbi, and P. G. Jarvis. 2000. Respiration as the main determinant of carbon balance in European forests. Nature 404:861–865.

Van Do, T., A. Osawa, and N. T. Thang. 2010. Recovery process of a mountain forest after shifting cultivation in Northwestern Vietnam. Forest Ecology and Management 259:1650–1659.

Van Pelt, R., S. C. Sillett, and N. M. Nadkarni. 2004. Quantifying and Visualizing Canopy Structure in Tall Forests: Methods and a Case Study. Pages 49–72*in* M. Lowman and H. B. Rinker, editors.Forest Canopies. Elsevier.

Vann, D. R., A. Joshi, C. Pérez, A. H. Johnson, J. Frizano, D. J. Zarin, and J. J. Armesto. 2002. Distribution and cycling of C, N, Ca, Mg, K and P in three pristine, old-growth forests in the Cordillera de Piuchué, Chile. Biogeochemistry 60:25–47.

Vargas, R., M. F. Allen, and E. B. Allen. 2008. Biomass and carbon accumulation in a fire chronosequence of a seasonally dry tropical forest. Global Change Biology 14:109–124.

Veenendaal, E. M., O. Kolle, and J. Lloyd. 2004. Seasonal variation in energy fluxes and carbon dioxide exchange for a broad-leaved semi-arid savanna (Mopane woodland) in Southern Africa. Global Change Biology 10:318–328.

Vermetten, A. W. M., L. Ganzeveld, A. Jeuken, P. Hofschreuder, and G. M. J. Mohren. 1994. CO2 uptake by a stand of Douglas fir: flux measurements compared with model calculations. Agricultural and Forest Meteorology 72:57–80.

Vieira, S., S. Trumbore, P. B. Camargo, D. Selhorst, J. Q. Chambers, N. Higuchi, and L. A. Martinelli. 2005. Slow growth rates of Amazonian trees: Consequences for carbon cycling. Proceedings of the National Academy of Sciences 102:18502–18507.

Vogel, J. G., D. W. Valentine, and R. W. Ruess. 2005. Soil and root respiration in mature Alaskan black spruce forests that vary in soil organic matter decomposition rates. Canadian Journal of Forest Research 35:161–174.

Vogt, K. A., R. L. Edmonds, C. C. Grier, and S. R. Piper. 1980. Seasonal changes in mycorrhizal and fibrous-textured root biomass in 23- and 180-year-old Pacific silver fir stands in western Washington. Canadian Journal of Forest Research 10:523–529.

Vourlitis, G. L., N. Priante Filho, M. M. S. Hayashi, J. de S. Nogueira, F. Raiter, W. Hoegel, and J. H. Campelo, Jr. 2004. Effects of meteorological variations on the CO2 exchange of a Brazilian transitional tropical forest. Ecological Applications 14:89–100.

Vucetich, J. ., D. . Reed, A. Breymeyer, M. Degórski, G. . Mroz, J. Solon, E. Roo-Zielinska, and R. Noble. 2000. Carbon pools and ecosystem properties along a latitudinal gradient in northern Scots pine (Pinus sylvestris) forests. Forest Ecology and Management 136:135–145.

Wan, S., R. J. Norby, K. S. Pregitzer, J. Ledford, and E. G. O’Neill. 2004. CO2 enrichment and warming of the atmosphere enhance both productivity and mortality of maple tree fine roots. New Phytologist 162:437–446.

Wang, C., B. Bond-Lamberty, and S. T. Gower. 2003. Carbon distribution of a well- and poorly-drained black spruce fire chronosequence. Global Change Biology 9:1066–1079.

Wang, C., S. T. Gower, Y. Wang, H. Zhao, P. Yan, and B. P. Bond-Lamberty. 2001. The influence of fire on carbon distribution and net primary production of boreal Larix gmelinii forests in north-eastern China. Global Change Biology 7:719–730.

Wang, C., and J. Yang. 2007. Rhizospheric and heterotrophic components of soil respiration in six Chinese temperate forests. Global Change Biology 13:123–131.

Wang, H., N. Saigusa, Y. Zu, W. Wang, S. Yamamoto, and H. Kondo. 2008. Carbon fluxes and their response to environmental variables in a Dahurian larch forest ecosystem in northeast China. Journal of Forestry Research 19:1–10.

Wang, H., N. Saigusa, S. Yamamoto, H. Kondo, T. Hirano, A. Toriyama, and Y. Fujinuma. 2004. Net ecosystem CO2 exchange over a larch forest in Hokkaido, Japan. Atmospheric Environment 38:7021–7032.

Wang, J. R., A. L. Zhong, P. Comeau, M. Tsze, and J. P. Kimmins. 1995. Aboveground biomass and nutrient accumulation in an age sequence of aspen (Populus tremuloides) stands in the Boreal White and Black Spruce Zone, British Columbia. Forest Ecology and Management 78:127–138.

Wang, K.-Y., S. Kellomaki, T. S. Zha, and H. Peltola. 2004. Component carbon fluxes and their contribution to ecosystem carbon exchange in a pine forest: an assessment based on eddy covariance measurements and an integrated model. Tree Physiology 24:19–34.

Wang, Y., R. Amundson, and X.-F. Niu. 2000. Seasonal and altitudinal variation in decomposition of soil organic matter inferred from radiocarbon measurements of soil CO 2 flux. Global Biogeochemical Cycles 14:199–211.

Wang, Y., G. S. Zhou, B. R. Jia, S. Li, and S. H. Wang. 2010. Comparisons of carbon flux and its controls between broad-leaved Korean pine forest and Dahurian larch forest in northeast China. Acta Ecologica Sinica 30:4376–4388.

Weaver, G. T., and W. C. Ashby. 1971. Composition and Structure of an Old-Growth Forest Remnant in Unglaciated Southwestern Illinois. American Midland Naturalist 86:46.

Weaver, P. L. 2001. NPP Tropical Forest: Cinnamon Bay, U.S. Virgin Islands, 1982-1993, R1. Data set. Available on-line [http://www.daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/473.

Webb, E. L., and S. Fa’aumu. 1999. Diversity and structure of tropical rain forest of Tutuila, American Samoa: effects of site age and substrate. Plant Ecology 144:257–274.

Wen, D., Wei, P., Kong, G., Zhang, Q., Huang, Z. 1997. Biomass study of the community of Castanopsis chinensis, Cryptocarya concinna, Schima superb in a southern China Reserve. Acta Ecologica Sinica 17:497–504. [in Chinese].

Wen, D., Wei, P., Zhang, Q., Kong, G. 1999. Studies on biomass of the lower subtropical evergreen broad-leaved forests in a MAB Reserve of south China. Acta Phytoecologica Sinica 23:11–21. [in Chinese].

Wen, X.-F., H.-M. Wang, J.-L. Wang, G.-R. Yu, and X.-M. Sun. 2010. Ecosystem carbon exchanges of a subtropical evergreen coniferous plantation subjected to seasonal drought, 2003–2007. Biogeosciences 7:357–369.

White, L. L., D. R. Zak, and B. V. Barnes. 2004. Biomass accumulation and soil nitrogen availability in an 87-year-old Populus grandidentata chronosequence. Forest Ecology and Management 191:121–127.

Williams-Linera, G. 1983. Biomass and Nutrient Content in Two Successional Stages of Tropical Wet Forest in Uxpanapa, Mexico. Biotropica 15:275.

Williams, M., E. B. Rastetter, D. N. Fernandes, M. L. Goulden, G. R. Shaver, and L. C. Johnson. 1997. Predicting Gross Primary Productivity in Terrestrial Ecosystems. Ecological Applications 7:882.

Williams, M., P. A. Schwarz, B. E. Law, J. Irvine, and M. R. Kurpius. 2005. An improved analysis of forest carbon dynamics using data assimilation. Global Change Biology 11:89–105.

Wilson, K. B., and D. D. Baldocchi. 2001. Comparing independent estimates of carbon dioxide exchange over 5 years at a deciduous forest in the southeastern United States. Journal of Geophysical Research 106:34167.

Wirth, C., E.-D. Schulze, B. Lühker, S. Grigoriev, M. Siry, G. Hardes, W. Ziegler, M. Backor, G. Bauer, and N. N. Vygodskaya. 2002. Fire and site type effects on the long-term carbon and nitrogen balance in pristine Siberian Scots pine forests. Plant and Soil 242:41–63.

Wirth, C., E.-D. Schulze, W. Schulze, D. von St&#x000FC;nzner-Karbe, W. Ziegler, I. M. Miljukova, A. Sogatchev, A. B. Varlagin, M. Panvyorov, S. Grigoriev, W. Kusnetzova, M. Siry, G. Hardes, R. Zimmermann, and N. N. Vygodskaya. 1999. Above-ground biomass and structure of pristine Siberian Scots pine forests as controlled by competition and fire. Oecologia 121:66–80.

Wirth, C., C. I. Czimczik, and E.-D. Schulze. 2002. Beyond annual budgets: carbon flux at different temporal scales in fire-prone Siberian Scots pine forests. Tellus B 54:611–630.

Wofsy, S. C., M. L. Goulden, J. W. Munger, S.-M. Fan, P. S. Bakwin, B. C. Daube, S. L. Bassow, and F. A. Bazzaz. 1993. Net Exchange of CO2 in a Mid-Latitude Forest. Science 260:1314–1317.

Woldendorp, G. 2000. Estimating carbon in Mature Eucalypt Forests. Australian National University, Canberra.

Wu, J., D. Guan, M. Wang, T. Pei, S. Han, and C. Jin. 2006. Year-round soil and ecosystem respiration in a temperate broad-leaved Korean Pine forest. Forest Ecology and Management 223:35–44.

Xu, C.-Y., M. H. Turnbull, D. T. Tissue, J. D. Lewis, R. Carson, W. S. F. Schuster, D. Whitehead, A. S. Walcroft, J. Li, and K. L. Griffin. 2012. Age-related decline of stand biomass accumulation is primarily due to mortality and not to reduction in NPP associated with individual tree physiology, tree growth or stand structure in a Quercus-dominated forest. Journal of Ecology 100:428–440.

Xu, L., and D. D. Baldocchi. 2004. Seasonal variation in carbon dioxide exchange over a Mediterranean annual grassland in California. Agricultural and Forest Meteorology 123:79–96.

Xu, Z., C. Wan, P. Xiong, Z. Tang, R. Hu, G. Cao, and Q. Liu. 2010. Initial responses of soil CO2 efflux and C, N pools to experimental warming in two contrasting forest ecosystems, Eastern Tibetan Plateau, China. Plant and Soil 336:183–195.

Xu, Z., H. Yin, P. Xiong, C. Wan, and Q. Liu. 2012. Short-term responses of Picea asperata seedlings of different ages grown in two contrasting forest ecosystems to experimental warming. Environmental and Experimental Botany 77:1–11.

Yamakura, T., A. Hagihara, S. Sukardjo, and H. Ogawa. 1986. Aboveground biomass of tropical rain forest stands in Indonesian Borneo. Vegetatio 68:71–82.

Yamakura, T., A. Hagihara, S. Sukardjo, and H. Ogawa. 1986. Tree size in a mature dipterocarp forest stand in Sebulu, East Kalimantan, Indonesia. Southeast Asian Studies 23:452–478.

Yamamoto, S., S. Murayama, N. Saigusa, and H. Kondo. 1999. Seasonal and inter-annual variation of CO2 flux between a temperate forest and the atmosphere in Japan. Tellus B 51:402–413.

Yan, J., Y. Wang, G. Zhou, and D. Zhang. 2006. Estimates of soil respiration and net primary production of three forests at different succession stages in South China. Global Change Biology 12:810–821.

Yanai, R. D., B. B. Park, and S. P. Hamburg. 2006. The vertical and horizontal distribution of roots in northern hardwood stands of varying age. Canadian Journal of Forest Research 36:450–459.

Yang, T., K. Song, L. Da, X. Li, and J. Wu. 2010. The biomass and aboveground net primary productivity of Schima superba-Castanopsis carlesii forests in east China. Science China Life Sciences 53:811–821.

Yang, Y.-S., G.-S. Chen, J.-F. Guo, J.-S. Xie, and X.-G. Wang. 2007. Soil respiration and carbon balance in a subtropical native forest and two managed plantations. Plant Ecology 193:71–84.

Yi, W., Zhang, Z., Ding, M., Wang, B. 2000. Biomass and efficiency of radiation untilization in Erythrophleum fordii community. Acta Ecologica Sinica 20:397–403. [in Chinese].

Yin, H., T. Lai, X. Cheng, X. Jiang, and Q. Liu. 2009. Warming effect on growth and physiology of seedlings of Betula albo-sinensis and Abies faxoniana under two contrasting light conditions in subalpine coniferous forests of western Sichuan, China. Frontiers of Forestry in China 4:432–442.

Yin, H., Q. Liu, and T. Lai. 2008. Warming effects on growth and physiology in the seedlings of the two conifers Picea asperata and Abies faxoniana under two contrasting light conditions. Ecological Research 23:459–469.

Yu, C. L., and D. Liu. 2011. Analysis on CO2 Flux during growth season of natural broadleaved mixed forest in Xiaoxinganling mountains. In Chinese. China Journal of Agrometeorology 32:525–529.

Yu, G.-R., X.-J. Zhu, Y.-L. Fu, H.-L. He, Q.-F. Wang, X.-F. Wen, X.-R. Li, L. L.-M. Zhang, L. L.-M. Zhang, W. Su, S.-G. Li, X.-M. Sun, Y.-P. Zhang, J.-H. Zhang, J.-H. Yan, H.-M. Wang, G.-S. Zhou, B.-R. Jia, W.-H. Xiang, Y.-N. Li, L. Zhao, Y.-Y. Y.-F. Wang, P.-L. Shi, S.-P. Chen, X.-P. Xin, F.-H. Zhao, Y.-Y. Y.-F. Wang, and C.-L. Tong. 2013. Spatial patterns and climate drivers of carbon fluxes in terrestrial ecosystems of China. Global Change Biology 19:798–810.

Yu, G., Z. Chen, S. Piao, C. Peng, P. Ciais, Q. Wang, X. Li, and X. Zhu. 2014. High carbon dioxide uptake by subtropical forest ecosystems in the East Asian monsoon region. Proceedings of the National Academy of Sciences 111:4910–4915.

Yu, M. 1999. Dynamics of an evergreen broad-leaved forest dominated by Cyclobalanopsis glauca in southeast China. Scientia Silvae Sinicae 35:42–51. [in Chinese].

Yuste, J. C., B. Konopka, I. A. Janssens, K. Coenen, C. W. Xiao, and R. Ceulemans. 2005. Contrasting net primary productivity and carbon distribution between neighboring stands of Quercus robur and Pinus sylvestris. Tree Physiology 25:701–712.

Zarin, D. J., M. J. Ducey, J. M. Tucker, and W. A. Salas. 2001. Potential Biomass Accumulation in Amazonian Regrowth Forests. Ecosystems 4:658–668.

Zha, T., Z. Xing, K.-Y. Wang, S. Kellomaki, and A. G. Barr. 2006. Total and Component Carbon Fluxes of a Scots Pine Ecosystem from Chamber Measurements and Eddy Covariance. Annals of Botany 99:345–353.

Zhang, G. B., S. R. Liu, Y. D. Zhang, N. Miao, and H. Wang. 2008. Dynamics of aboveground biomass of sub-alpine old-growth forest in the upper Minjiang River (UMR). Acta Ecologica Sinica 28:3176–3184.

Zhang, J.-H., S.-J. Han, and G.-R. Yu. 2006. Seasonal variation in carbon dioxide exchange over a 200-year-old Chinese broad-leaved Korean pine mixed forest. Agricultural and Forest Meteorology 137:150–165.

Zhang, L. P. 2010. Characteristics of CO2 flux in a Chinese Fir plantations ecosystem in Huitong County, Hunan Province. Central South University of Forestry & Technology.

Zhang, Y., Z. Tan, Q. Song, G. Yu, and X. Sun. 2010. Respiration controls the unexpected seasonal pattern of carbon flux in an Asian tropical rain forest. Atmospheric Environment 44:3886–3893.

Zhang, Z., and M. Ding. 1996. Biomass and efficiency of radiation utilization in monsoon evergreen broadleaved forest in Dinghushan Biosphere Reserve. Acta Ecologica Sinica 16:525–534. [in Chinese].

Zhao, C., and Q. Liu. 2009. Growth and photosynthetic responses of two coniferous species to experimental warming and nitrogen fertilization. Canadian Journal of Forest Research 39:1–11.

Zhou, G., Y. Wang, Y. Jiang, and Z. Yang. 2002. Estimating biomass and net primary production from forest inventory data: a case study of China’s Larix forests. Forest Ecology and Management 169:149–157.

Zhou, J., Z. Zhang, G. Sun, X. Fang, T. Zha, S. McNulty, J. Chen, Y. Jin, and A. Noormets. 2013. Response of ecosystem carbon fluxes to drought events in a poplar plantation in Northern China. Forest Ecology and Management 300:33–42.

Zhu, J. J., D. H. Zeng, H. Z. Kang, X. Y. Wu, and Z. P. Fan. 2005. Decline of Pinus sylvestris var. mongolica Plantations on Sandy Land. China Forestry Publishing House, Beijing, China. In Chinese.

# METHODOLOGY REFERENCES

Adachi, M., Y. S. Bekku, W. Rashidah, T. Okuda, and H. Koizumi. 2006. Differences in soil respiration between different tropical ecosystems. Applied Soil Ecology 34:258–265.

Aide, T. M., J. K. Zimmerman, L. Herrera, M. Rosario, and M. Serrano. 1995. Forest recovery in abandoned tropical pastures in Puerto Rico. Forest Ecology and Management 77:77–86.

Alves, D., J. V. Soares, S. Amaral, E. Mello, S. Almeida, O. F. Da Silva, and A. Silveira. 1997. Biomass of primary and secondary vegetation in Rondonia, Western Brazilian Amazon. Global Change Biology 3:451–461.

Aragão, L. E. O. C., Y. Malhi, D. B. Metcalfe, J. E. Silva-Espejo, E. Jiménez, D. Navarrete, S. Almeida, A. C. L. Costa, N. Salinas, O. L. Phillips, L. O. . Anderson, T. R. Baker, P. H. Goncalvez, J. Huamán-Ovalle, M. Mamani-Solórzano, P. Meir, A. Monteagudo, M. C. Peñuela, A. Prieto, C. A. Quesada, A. Rozas-Dávila, A. Rudas, J. A. Silva Junior, and R. Vásquez. 2009. Above- and below-ground net primary productivity across ten Amazonian forests on contrasting soils.

Araujo-Murakami, A., C. E. Doughty, D. B. Metcalfe, J. E. Silva-Espejo, L. Arroyo, J. P. Heredia, M. Flores, R. Sibler, L. M. Mendizabal, E. Pardo-Toledo, M. Vega, L. Moreno, V. D. Rojas-Landivar, K. Halladay, C. A. J. Girardin, T. J. Killeen, and Y. Malhi. 2014. The productivity, allocation and cycling of carbon in forests at the dry margin of the Amazon forest in Bolivia. Plant Ecology & Diversity 7:55–69.

Baker, T. R., O. L. Phillips, Y. Malhi, S. Almeida, L. Arroyo, A. Di Fiore, T. Erwin, N. Higuchi, T. J. Killeen, S. G. Laurance, W. F. Laurance, S. L. Lewis, A. Monteagudo, D. A. Neill, P. Nunez Vargas, N. C. A. Pitman, J. N. M. Silva, and R. Vasquez Martinez. 2004. Increasing biomass in Amazonian forest plots. Philosophical Transactions of the Royal Society B: Biological Sciences 359:353–365.

Becknell, J. M., and J. S. Powers. 2014. Stand age and soils as drivers of plant functional traits and aboveground biomass in secondary tropical dry forest. Canadian Journal of Forest Research 44:604–613.

Behera, N., S. K. Joshi, and D. P. Pati. 1990. Root contribution to total soil metabolism in a tropical forest soil from Orissa, India.

Broadbent, E. N., A. M. Almeyda Zambrano, G. P. Asner, M. Soriano, C. B. Field, H. R. de Souza, M. Peña-Claros, R. I. Adams, R. Dirzo, and L. Giles. 2014. Integrating Stand and Soil Properties to Understand Foliar Nutrient Dynamics during Forest Succession Following Slash-and-Burn Agriculture in the Bolivian Amazon. PLoS ONE 9:e86042.

Buchmann, N. 2000. Biotic and abiotic factors controlling soil respiration rates in Picea abies stands. Soil Biology and Biochemistry 32:1625–1635.

Chambers, J. Q., E. S. Tribuzy, L. C. Toledo, B. F. Crispim, N. Higuchi, J. Dos Santos, A. C. Araújo, B. Kruijt, A. D. Nobre, and S. E. Trumbore. 2004. Respiration from a tropical forest ecosystem: Partitioning of sources and low carbon use efficiency. Ecological Applications 14.

Chan, N., S. Takeda, R. Suzuki, and S. Yamamoto. 2013. Establishment of allometric models and estimation of biomass recovery of swidden cultivation fallows in mixed deciduous forests of the Bago Mountains, Myanmar. Forest Ecology and Management 304:427–436.

Clark, D. A., S. Brown, D. W. Kicklighter, J. Q. Chambers, J. R. Thomlinson, J. Ni, and E. A. Holland. 2013. NPP Tropical Forest: Consistent Worldwide Site Estimates, 1967-1999, R1. Data set. Available on-line [http://daac.ornl.gov] from the Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. doi:10.3334/ORNLDAAC/616.

Clark, D. A., S. Brown, D. W. Kicklighter, J. Q. Chambers, J. R. Thomlinson, J. Ni, and E. A. Holland. 2001. Net primary production in tropical forests: An evaluation and synthesis of existing field data.

Cleveland, C. C., and A. R. Townsend. 2006. Nutrient additions to a tropical rain forest drive substantial soil carbon dioxide losses to the atmosphere. Proceedings of the National Academy of Sciences of the United States of America 103:10316–10321.

da Costa, A. C. L., D. B. Metcalfe, C. E. Doughty, A. A. R. de Oliveira, G. F. C. Neto, M. C. da Costa, J. de A. Silva Junior, L. E. O. C. Aragão, S. Almeida, D. R. Galbraith, L. M. Rowland, P. Meir, and Y. Malhi. 2014. Ecosystem respiration and net primary productivity after 8–10 years of experimental through-fall reduction in an eastern Amazon forest. Plant Ecology & Diversity 7:7–24.

Davidson, E. A., K. Savage, P. Bolstad, D. A. Clark, P. S. Curtis, D. S. Ellsworth, P. J. Hanson, B. E. Law, Y. Luo, K. S. Pregitzer, J. C. Randolph, and D. Zak. 2002. Belowground carbon allocation in forests estimated from litterfall and IRGA-based soil respiration measurements. Agricultural and Forest Meteorology 113:39–51.

del Aguila-Pasquel, J., C. E. Doughty, D. B. Metcalfe, J. E. Silva-Espejo, C. A. J. Girardin, J. A. Chung Gutierrez, G. E. Navarro-Aguilar, C. A. Quesada, C. G. Hidalgo, J. M. Reyna Huaymacari, K. Halladay, D. del Castillo Torres, O. Phillips, and Y. Malhi. 2014. The seasonal cycle of productivity, metabolism and carbon dynamics in a wet aseasonal forest in north-west Amazonia (Iquitos, Peru). Plant Ecology & Diversity 7:71–83.

Delaney, M., S. Brown, A. E. Lugo, A. Torres-Lezama, and N. B. Quintero. 1997. The distribution of organic carbon in major components of forests located in five life zones of Venezuela. Journal of Tropical Ecology 13:697.

Doughty, C. E., D. B. Metcalfe, M. C. da Costa, A. A. R. de Oliveira, G. F. C. Neto, J. A. Silva, L. E. O. C. Aragão, S. S. Almeida, C. A. Quesada, C. A. J. Girardin, K. Halladay, A. C. L. da Costa, and Y. Malhi. 2014. The production, allocation and cycling of carbon in a forest on fertile terra preta soil in eastern Amazonia compared with a forest on adjacent infertile soil. Plant Ecology & Diversity 7:41–53.

Egunjobi, J. K., and S. O. Bada. 1979. Biomass and Nutrient Distribution in Stands of Pinus caribea L. in the Dry Forest Zone of Nigeria. Biotropica 11:130.

Epron, D., Y. Nouvellon, P. Deleporte, S. Ifo, G. Kazotti, A. Thongo M’Bou, W. Mouvondy, L. Saint Andre, O. Roupsard, C. Jourdan, and O. Hamel. 2006. Soil carbon balance in a clonal Eucalyptus plantation in Congo: Effects of logging on carbon inputs and soil CO2 efflux. Global Change Biology 12:1021–1031.

Gehring, C., M. Denich, M. Kanashiro, and P. L. G. Vlek. 1999. Response of secondary vegetation in Eastern Amazonia to relaxed nutrient availability constraints. Biogeochemistry 45:223–241.

Gehring, C., M. Denich, and P. L. G. Vlek. 2005. Resilience of secondary forest regrowth after slash-and-burn agriculture in central Amazonia. Journal of Tropical Ecology 21:519–527.

Giardina, C. P., M. G. Ryan, D. Binkley, and J. H. Fownes. 2003. Primary production and carbon allocation in relation to nutrient supply in a tropical experimental forest. Global Change Biology 9:1438–1450.

Grimm, U., and H. W. Fassbender. 1999. NPP Tropical Forest: San Eusebio, Venezuela, 1970-1971. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/480. http://daac.ornl.gov.

Hughes, R. F., J. B. Kauffman, and V. J. Jaramillo. 1999. Biomass, carbon, and nutrient dynamics of secondary forests in a humid tropical region of Mexico. Ecology 80:1892–1907.

Kadeba, O. 1991. Above-ground biomass production and nutrient accumulation in an age sequence of Pinus caribaea stands. Forest Ecology and Management 41:237–248.

Kira, T. 1978. Community architecture and organic matter dynamics in tropical lowland rain forests of Southeast Asia with special reference to Pasoh Forest, West Malaysia. Pages 561–590*in* P. B. Tomlinson and M. H. Zimmerman, editors.Tropical trees as living systems. Cambridge University Press, New York, USA.

Kira, T. 1998. NPP Tropical Forest: Khao Chong, Thailand, 1962-1965. http://daac.ornl.gov.

Letcher, S. G., and R. L. Chazdon. 2009. Rapid Recovery of Biomass, Species Richness, and Species Composition in a Forest Chronosequence in Northeastern Costa Rica. Biotropica 41:608–617.

Lewis, S. L., G. Lopez-Gonzalez, B. Sonké, K. Affum-Baffoe, T. R. T. R. Baker, L. O. L. O. Ojo, O. L. O. L. Phillips, J. M. J. M. Reitsma, L. White, J. A. J. A. Comiskey, M.-N. D. M.-N. D. K, C. E. N. C. E. N. Ewango, T. R. T. R. Feldpausch, A. C. A. C. Hamilton, M. Gloor, T. Hart, A. Hladik, J. Lloyd, J. C. J. C. Lovett, J.-R. J.-R. Makana, Y. Malhi, F. M. F. M. Mbago, H. J. H. J. Ndangalasi, J. Peacock, K. S. H. K. S.-H. Peh, D. Sheil, T. Sunderland, M. D. M. D. Swaine, J. Taplin, D. Taylor, S. C. S. C. Thomas, R. Votere, H. Wöll, B. Sonke, K. Affum-Baffoe, T. R. T. R. Baker, L. O. L. O. Ojo, O. L. O. L. Phillips, J. M. J. M. Reitsma, L. White, J. A. J. A. Comiskey, M.-N. D. M.-N. D. K, C. E. N. C. E. N. Ewango, T. R. T. R. Feldpausch, A. C. A. C. Hamilton, M. Gloor, T. Hart, A. Hladik, J. Lloyd, J. C. J. C. Lovett, J.-R. J.-R. Makana, Y. Malhi, F. M. F. M. Mbago, H. J. H. J. Ndangalasi, J. Peacock, K. S. H. K. S.-H. Peh, D. Sheil, T. Sunderland, M. D. M. D. Swaine, J. Taplin, D. Taylor, S. C. S. C. Thomas, R. Votere, and H. Woll. 2009. Increasing carbon storage in intact African tropical forests. Nature 457:1003–1006.

Li, Y., M. Xu, O. J. Sun, and W. Cui. 2004. Effects of root and litter exclusion on soil CO2 efflux and microbial biomass in wet tropical forests. Soil Biology and Biochemistry 36:2111–2114.

Lugo, A. E. 1992. Comparison of Tropical Tree Plantations with Secondary Forests of Similar Age. Ecological Monographs 62:1.

Maass, M., and A. Martinez-Yrizar. 2001. NPP Tropical Forest: Chamela, Mexico, 1982-1995. http://daac.ornl.gov.

Malhi, Y., T. R. Baker, O. L. Phillips, S. Almeida, E. Alvarez, L. Arroyo, J. Chave, C. I. Czimczik, A. Di Fiore, N. Higuchi, T. J. Killeen, S. G. Laurance, W. F. Laurance, S. L. Lewis, L. M. M. Montoya, A. Monteagudo, D. A. Neill, P. N. Vargas, S. Patino, N. C. A. Pitman, C. A. Quesada, R. Salomao, J. N. M. Silva, A. T. Lezama, R. V. Martinez, J. Terborgh, B. Vinceti, and J. Lloyd. 2004. The above-ground coarse wood productivity of 104 Neotropical forest plots. Global Change Biology 10:563–591.

Malhi, Y., F. Farfán Amézquita, C. E. Doughty, J. E. Silva-Espejo, C. A. J. Girardin, D. B. Metcalfe, L. E. O. C. Aragão, L. P. Huaraca-Quispe, I. Alzamora-Taype, L. Eguiluz-Mora, T. R. Marthews, K. Halladay, C. A. Quesada, A. L. Robertson, J. B. Fisher, J. Zaragoza-Castells, C. M. Rojas-Villagra, Y. Pelaez-Tapia, N. Salinas, P. Meir, and O. L. Phillips. 2014. The productivity, metabolism and carbon cycle of two lowland tropical forest plots in south-western Amazonia, Peru. Plant Ecology & Diversity 7:85–105.

Martinez-Yrizar, A., J. M. Maass, L. A. Perez-Jimenez, and J. Sarukhan. 1996. Net primary productivity of a tropical deciduous forest ecosystem in western Mexico. Journal of Tropical Ecology 12:169.

Martinez-Yrizar, A., J. Sarukhan, A. Perez-Jimenez, E. Rincon, J. M. Maass, A. Solis-Magallanes, and L. Cervantes. 1992. Above-ground phytomass of a tropical deciduous forest on the coast of Jalisco, México. Journal of Tropical Ecology 8:87.

Montagnini, F. 2000. Accumulation in above-ground biomass and soil storage of mineral nutrients in pure and mixed plantations in a humid tropical lowland. Forest Ecology and Management 134:257–270.

Moser, G., C. Leuschner, D. Hertel, S. Graefe, N. Soethe, and S. Iost. 2011. Elevation effects on the carbon budget of tropical mountain forests (S Ecuador): the role of the belowground compartment. Global Change Biology 17:2211–2226.

Navarro, M. N. V, C. Jourdan, T. Sileye, S. Braconnier, I. Mialet-Serra, L. Saint-Andre, J. Dauzat, Y. Nouvellon, D. Epron, J. M. Bonnefond, P. Berbigier, A. Rouziere, J. P. Bouillet, and O. Roupsard. 2008. Fruit development, not GPP, drives seasonal variation in NPP in a tropical palm plantation. Tree physiology 28:1661–1674.

Rocha, W., D. B. Metcalfe, C. E. Doughty, P. Brando, D. Silvério, K. Halladay, D. C. Nepstad, J. K. Balch, and Y. Malhi. 2014. Ecosystem productivity and carbon cycling in intact and annually burnt forest at the dry southern limit of the Amazon rainforest (Mato Grosso, Brazil). Plant Ecology & Diversity 7:25–40.

Roupsard, O., J.-M. Bonnefond, M. Irvine, P. Berbigier, Y. Nouvellon, J. Dauzat, S. Taga, O. Hamel, C. Jourdan, L. Saint-André, I. Mialet-Serra, J.-P. Labouisse, D. Epron, R. Joffre, S. Braconnier, A. Rouzière, M. Navarro, and J.-P. Bouillet. 2006. Partitioning energy and evapo-transpiration above and below a tropical palm canopy. Agricultural and Forest Meteorology 139:252–268.

Saldarriaga, J. G., D. C. West, M. L. Tharp, and C. Uhl. 1988. Long-Term Chronosequence of Forest Succession in the Upper Rio Negro of Colombia and Venezuela. The Journal of Ecology 76:938.

Schuur, E. A. G. 2005. NPP Tropical Forest: Maui, Hawaii, U.S.A., 1996-1997. http://daac.ornl.gov.

Sierra, C. A., J. I. del Valle, and H. I. Restrepo. 2012. Total carbon accumulation in a tropical forest landscape. Carbon Balance and Management 7:12.

Sierra, C. A., J. I. del Valle, S. A. Orrego, F. H. Moreno, M. E. Harmon, M. Zapata, G. J. Colorado, M. A. Herrera, W. Lara, D. E. Restrepo, L. M. Berrouet, L. M. Loaiza, and J. F. Benjumea. 2007. Total carbon stocks in a tropical forest landscape of the Porce region, Colombia. Forest Ecology and Management 243:299–309.

Steininger, M. K. 2000. Secondary forest structure and biomass following short and extended land-use in central and southern Amazonia.

Uhl, C., R. Buschbacher, and E. A. S. Serrao. 1988. Abandoned Pastures in Eastern Amazonia. I. Patterns of Plant Succession. The Journal of Ecology 76:663.

Uhl, C. 1987. Factors Controlling Succession Following Slash-and-Burn Agriculture in Amazonia. The Journal of Ecology 75:377.

Uhl, C., and C. F. Jordan. 1984. Succession and Nutrient Dynamics Following Forest Cutting and Burning in Amazonia. Ecology 65:1476.

Valentini, R., G. Matteucci, A. J. Dolman, E.-D. Schulze, C. Rebmann, E. J. Moors, A. Granier, P. Gross, N. O. Jensen, K. Pilegaard, A. Lindroth, A. Grelle, C. Bernhofer, T. Grünwald, M. Aubinet, R. Ceulemans, A. S. Kowalski, T. Vesala, Ü. Rannik, P. Berbigier, D. Loustau, J. Guðmundsson, H. Thorgeirsson, A. Ibrom, K. Morgenstern, R. Clement, J. Moncrieff, L. Montagnani, S. Minerbi, and P. G. Jarvis. 2000. Respiration as the main determinant of carbon balance in European forests. Nature 404:861–865.

Weaver, P. L. 2001. NPP Tropical Forest: Cinnamon Bay, U.S. Virgin Islands, 1982-1993, R1. Data set. Available on-line [http://www.daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/473.

Weaver, P. L., and P. G. Murphy. 1990. Forest Structure and Productivity in Puerto Rico’s Luquillo Mountains. Biotropica 22:69.

Williams, M., E. B. Rastetter, D. N. Fernandes, M. L. Goulden, G. R. Shaver, and L. C. Johnson. 1997. Predicting Gross Primary Productivity in Terrestrial Ecosystems. Ecological Applications 7:882.

Yan, J., Y. Wang, G. Zhou, and D. Zhang. 2006. Estimates of soil respiration and net primary production of three forests at different succession stages in South China. Global Change Biology 12:810–821.

Zarin, D. J., M. J. Ducey, J. M. Tucker, and W. A. Salas. 2001. Potential Biomass Accumulation in Amazonian Regrowth Forests. Ecosystems 4:658–668.

# ALLOMETRY REFERENCES

Baker, T. R., O. L. Phillips, Y. Malhi, S. Almeida, L. Arroyo, A. Di Fiore, T. Erwin, N. Higuchi, T. J. Killeen, S. G. Laurance, W. F. Laurance, S. L. Lewis, A. Monteagudo, D. A. Neill, P. Nunez Vargas, N. C. A. Pitman, J. N. M. Silva, and R. Vasquez Martinez. 2004. Increasing biomass in Amazonian forest plots. Philosophical Transactions of the Royal Society B: Biological Sciences 359:353–365.

Baker, T. R., O. L. Phillips, Y. Malhi, S. Almeida, L. Arroyo, A. Di Fiore, T. Erwin, T. J. Killeen, S. G. Laurance, W. F. Laurance, S. L. Lewis, J. Lloyd, A. Monteagudo, D. A. Neill, S. Patino, N. C. A. Pitman, J. N. M. Silva, and R. Vasquez Martinez. 2004. Variation in wood density determines spatial patterns in Amazonian forest biomass. Global Change Biology 10:545–562.

Brown, S. 1997. Estimating Biomass and Biomass Change of Tropical Forests: a Primer. (FAO Forestry Paper - 134). Food and Agriculture Organization of the United Nations, Urbana, Illinois, USA.

Brown, S., A. J. R. Gillespie, and A. E. Lugo. 1989. Biomass estimation methods for tropical forests with applications to forest inventory data. Forest Science.

Cairns, M. A., S. Brown, E. H. Helmer, and G. A. Baumgardner. 1997. Root biomass allocation in the world’s upland forests. Oecologia 111:1–11.

Chan, N., S. Takeda, R. Suzuki, and S. Yamamoto. 2013. Establishment of allometric models and estimation of biomass recovery of swidden cultivation fallows in mixed deciduous forests of the Bago Mountains, Myanmar. Forest Ecology and Management 304:427–436.

Chave, J., C. Andalo, S. Brown, M. A. Cairns, J. Q. Chambers, D. Eamus, H. Fölster, F. Fromard, N. Higuchi, T. Kira, J.-P. Lescure, B. W. Nelson, H. Ogawa, H. Puig, B. Riéra, and T. Yamakura. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecologia 145:87–99.

Chave, J., M. Réjou-Méchain, A. Búrquez, E. Chidumayo, M. S. Colgan, W. B. C. Delitti, A. Duque, T. Eid, P. M. Fearnside, R. C. Goodman, M. Henry, A. Martínez-Yrízar, W. A. Mugasha, H. C. Muller-Landau, M. Mencuccini, B. W. Nelson, A. Ngomanda, E. M. Nogueira, E. Ortiz-Malavassi, R. Pélissier, P. Ploton, C. M. Ryan, J. G. Saldarriaga, and G. Vieilledent. 2014. Improved allometric models to estimate the aboveground biomass of tropical trees. Global Change Biology 20:3177–3190.

Feldpausch, T. R., L. Banin, O. L. Phillips, T. R. Baker, S. L. Lewis, C. A. Quesada, K. Affum-Baffoe, E. J. M. M. Arets, N. J. Berry, M. Bird, E. S. Brondizio, P. de Camargo, J. Chave, G. Djagbletey, T. F. Domingues, M. Drescher, P. M. Fearnside, M. B. França, N. M. Fyllas, G. Lopez-Gonzalez, A. Hladik, N. Higuchi, M. O. Hunter, Y. Iida, K. A. Salim, A. R. Kassim, M. Keller, J. Kemp, D. A. King, J. C. Lovett, B. S. Marimon, B. H. Marimon-Junior, E. Lenza, A. R. Marshall, D. J. Metcalfe, E. T. A. Mitchard, E. F. Moran, B. W. Nelson, R. Nilus, E. M. Nogueira, M. Palace, S. Patiño, K. S.-H. Peh, M. T. Raventos, J. M. Reitsma, G. Saiz, F. Schrodt, B. Sonké, H. E. Taedoumg, S. Tan, L. White, H. Wöll, and J. Lloyd. 2011. Height-diameter allometry of tropical forest trees. Biogeosciences 8:1081–1106.

Frangi, J. L., and A. E. Lugo. 1985. Ecosystem Dynamics of a Subtropical Floodplain Forest. Ecological Monographs 55:351.

Gehring, C., S. Park, and M. Denich. 2004. Liana allometric biomass equations for Amazonian primary and secondary forest. Forest Ecology and Management 195:69–83.

Goodman, R. C., O. L. Phillips, D. del Castillo Torres, L. Freitas, S. T. Cortese, A. Monteagudo, and T. R. Baker. 2013. Amazon palm biomass and allometry. Forest Ecology and Management 310:994–1004.

Hughes, R. F., J. B. Kauffman, and V. J. Jaramillo. 1999. Biomass, carbon, and nutrient dynamics of secondary forests in a humid tropical region of Mexico. Ecology 80:1892–1907.

Lugo, A. E. 1992. Comparison of Tropical Tree Plantations with Secondary Forests of Similar Age. Ecological Monographs 62:1.

Nelson, B. W., R. Mesquita, J. L. . Pereira, S. Garcia Aquino de Souza, G. Teixeira Batista, and L. Bovino Couto. 1999. Allometric regressions for improved estimate of secondary forest biomass in the central Amazon. Forest Ecology and Management 117:149–167.

Overman, J. P. M., H. J. L. Witte, and J. G. Saldarriaga. 1994. Evaluation of regression models for above-ground biomass determination in Amazon rainforest. Journal of Tropical Ecology 10:207.

Ovington, J. D., and J. S. Olson. 1970. Biomass and chemical content of El Verde lower montane rain forest plants. Odum, H. T. Tropical rain forest.

Saldarriaga, J. G., D. C. West, M. L. Tharp, and C. Uhl. 1988. Long-Term Chronosequence of Forest Succession in the Upper Rio Negro of Colombia and Venezuela. The Journal of Ecology 76:938.

Sierra, C. A., J. I. del Valle, S. A. Orrego, F. H. Moreno, M. E. Harmon, M. Zapata, G. J. Colorado, M. A. Herrera, W. Lara, D. E. Restrepo, L. M. Berrouet, L. M. Loaiza, and J. F. Benjumea. 2007. Total carbon stocks in a tropical forest landscape of the Porce region, Colombia. Forest Ecology and Management 243:299–309.

Steininger, M. K. 2000. Secondary forest structure and biomass following short and extended land-use in central and southern Amazonia.

Uhl, C., R. Buschbacher, and E. A. S. Serrao. 1988. Abandoned Pastures in Eastern Amazonia. I. Patterns of Plant Succession. The Journal of Ecology 76:663.

Uhl, C. 1987. Factors Controlling Succession Following Slash-and-Burn Agriculture in Amazonia. The Journal of Ecology 75:377.

Uhl, C., and C. F. Jordan. 1984. Succession and Nutrient Dynamics Following Forest Cutting and Burning in Amazonia. Ecology 65:1476.

van Breugel, M., J. Ransijn, D. Craven, F. Bongers, and J. S. Hall. 2011. Estimating carbon stock in secondary forests: Decisions and uncertainties associated with allometric biomass models. Forest Ecology and Management 262:1648–1657.

Weaver, P. L., and A. J. R. Gillespie. 1992. Tree biomass equations for the forests of the Luquillo Mountains, Puerto Rico. Commonwealth Forestry Review 71:35–39.

Zarin, D. J., M. J. Ducey, J. M. Tucker, and W. A. Salas. 2001. Potential Biomass Accumulation in Amazonian Regrowth Forests. Ecosystems 4:658–668.