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- Durigan G, Ratter JA (2006) Successional changes in cerrado and cerrado/forest ecotonal vegetation in western São Paulo state, Brazil, 1962–2000. *Edin J Bot* 63:119–130
- Eck TF, Holben BN, Slutsker I, Setzer A (2000) Measurements of irradiance attenuation and estimation of aerosol single scattering albedo for biomass burning aerosols in Amazonia. *J Geophys Res* 103:31865–31878
- Eiten G (1972) The cerrado vegetation of Brazil. *Bot Rev* 38:201–341
- Goldsmith FB, Harrison CM (1976) Description and analysis of vegetation methods in plant ecology. Halsted, New York
- Goodland RJ, Pollard R (1973) The Brazilian cerrado vegetation: A fertility gradient. *Ecology* 61:219–224
- Grace J, Jose JS, Meir P, Miranda HS, Montes RA (2006) Productivity and carbon fluxes of tropical savannas. *J Biogeo* 33:387–400
- Haase R (1999) Litterfall and nutrient return in seasonally flooded and non-flooded forest of the Pantanal, Mato Grosso, Brazil. *For Ecol Man* 117:129–147
- Hanan EJ, Ross MS (2010) Across-scale patterning of plant-soil-water interactions surrounding tree islands in southern everglades landscapes. *Landscape Ecol* 25:463–476
- Harrington RA, Fownes JH, Vitousek PM (2001) Production and resource use efficiencies in N- and P-limited tropical forests: a comparison of responses to long-term fertilization. *Ecosystems* 4:646–657
- Hayes P, Turner BL, Lambers H, Laliberté E (2014) Foliar nutrient concentrations and resorption efficiency in plants of contrasting nutrient-acquisition strategies along a 2-million-year dune chronosequence. *J Ecol* 102:396–410
- Hoffmann WA, Orthen B, Kielse P, do Nascimento V (2003) Comparative fire ecology of tropical savanna and forest trees. *Funct Ecol* 17:720–726
- Hoffmann WA, Geiger EL, Gotsch SG, Rossatto DR, Silva LCR, Lau OL, Haridasan M, Franco AC (2012) Ecological thresholds at the savanna-forest boundary: how plant traits, resources and fire govern the distribution of tropical biomes. *Ecol Lett* 15:759–768
- Holdo RM, Mack MC, Arnold SG (2012) Tree canopies explain fire effects on soil nitrogen, phosphorus and carbon in a savanna ecosystem. *J Veg Sci* 23:352–360
- Jobbágy EG, Jackson RB (2001) The distribution of soil nutrients with depth: global patterns and the imprint of plants. *Biogeosciences* 53:51–77
- Jordan CF, Herrera R (1981) Tropical rainforests: are nutrients really critical? *Am Nat* 117:167–180
- Junk WJ, Nunes da Cunha C (2005) Pantanal: a large South American wetland at a crossroads. *Ecol Eng* 24:391–401
- Junk WJ, Nunes da Cunha C (2012) Pasture clearing from invasive woody plants in the Pantanal: a tool for sustainable management or environmental destruction? *Wetlands Ecol Manag* 20:111–122
- Junk WJ, Nunes da Cunha C, Wantzen KM, Petermann P, Strussmann C, Marques MI, Adis J (2006) Biodiversity and its conservation in the Pantanal of Mato Grosso, Brazil. *Aquat Sci* 68:278–309
- Kauffman JB, Cummings DL, Ward DE (1994) Relationships of fire, biomass and nutrient dynamics along a vegetation gradient in the Brazilian Cerrado. *J Ecol* 82:519–531
- Kellman M (1979) Soil enrichment by neotropical savanna trees. *J Ecol* 67:565–577
- Laurance WF, Fearnside PM, Laurance SG, Delamonica P, Lovejoy TE, Rankin-de Merona JM, Chambers JQ, Gascona C (1999) Relationship between soils and Amazon forest biomass: a landscape-scale study. *For Ecol Man* 118: 127–138
- Lilienfein J, Wilcke W, Zimmermann R, Gerstberger P, Araujo GM, Zech W (2001) Nutrient storage in soil and biomass of native Brazilian cerrado. *J Plant Nut Soil Sci* 164:487–495
- Lilienfein J, Wilcke W, Vilela L, Ayarza MA, Lima SC, Zech W (2003) Soil fertility under native cerrado and pasture in the Brazilian savanna. *Soil Sci Soc Am J* 67:1195–1205
- Lloyd J, Bird MI, Vellen L, Miranda AC, Veenendaal EM, Djabbletey G, Miranda HS, Cook G, Farquhar GD (2008) Contributions of woody and herbaceous vegetation to tropical savanna ecosystem productivity: a quasi-global estimate. *Tree Phys* 28:451–468
- Lopes AS, Cox FR (1977) Cerrado vegetation in Brazil: an edaphic gradient. *Agron J* 69:828–831
- Lorenzi H (2002) *Arvores Brasileiras: Manual de Identificação e Cultivo de Plantas Arbóreas do Brasil*, Ed. Nova Odessa, Brazil, pp. 367
- Malhi Y, Saatchi S, Girardin C, Aragão LEOC (2009) The production, storage, and flow of carbon in Amazon forests. Pages 355–372 in Keller M, Bustamante M, Gash J, Silva Dias P (eds) *Amazonia and Global Change*. Geophysical Monograph 186, American Geophysical Union, Washington, DC, USA.
- McDonald LM, Evangelou VP, Chappell MA (2005) Cation exchange. In: Hillel D, Rosenzweig C, Powlson D, Scow K, Singer M, Sparks D (eds) *Encyclopedia of soils in the environment*, vol 1. Academic, San Diego, pp 180–188
- Nelson DW, Sommers LE (1996) Total carbon, organic carbon, and organic matter. In *Methods of soil analysis: Part 3. Chemical Methods*. Soil Science Society of America Book Series No. 5, Soil Science Society of America, Inc., Madison, WI.
- Nunes da Cunha C, Junk WJ (2001) Distribution of woody plants communities along the flood gradient in the Pantanal of Poconé, Mato Grosso, Brazil. *Int J Ecol Env Sci* 27:63–70
- Nunes da Cunha C, Junk WJ (2004) Year-to-year changes in water level drive the invasion of *Vochysia divergens* in Pantanal grasslands. *Appl Veg Sci* 7:103–110
- Nunes da Cunha CA, Junk WL (2009) Preliminary classification of habitats of the pantanal of Mato Grosso and Mato Grosso do Sul, and its relation to national and international wetland classification systems. In: Junk WJ, Da Silva CJ, da Cunha N, Wantzen KM (eds) *The pantanal: ecology, biodiversity and sustainable management of a large neotropical seasonal wetland*. Pensoft Publishers, Moscow, pp 127–141
- Oliveira RS, Bezerra L, Davidson EA, Pinto F, Klink CA, Nepstad DC, Moreira A (2005) Deep root function in soil water dynamics in cerrado savannas of central Brazil. *Funct Ecol* 19:574–581
- Ostertag R (2010) Foliar nitrogen and phosphorus accumulation responses after fertilization: an example from nutrient-limited Hawaiian forests. *Plant Soil* 334:85–98

- Paoli GD, Curran LM, Slik JWF (2008) Soil nutrients affect spatial patterns of aboveground biomass and emergent tree density in southwestern Borneo. *Oecologia* 155:287–299
- Parolin P, Waldhoff D, Piedade MTF (2010) Gas exchange and photosynthesis. In: Junk W, Piedade MTF, Wittmann F, Schoengart J, Parolin P (eds) Amazonian floodplain forests: ecophysiology biodiversity and sustainable management. Ecological studies. Springer, Dordrecht, pp 195–214
- Pasquini SC, Santiago LS (2012) Nutrients limit photosynthesis in seedlings of a lowland tropical forest tree species. *Oecologia* 168:311–319
- Pott A, Pott VJ (1994) Plantas do Pantanal. Empresa Brasileira de Pesquisa, Agropecuaria, Centro de Pesquisa Agropecuaria do Pantanal, Corumba, MS, Brasil. pp. 319
- Quesada CA, Lloyd J, Schwarz M, Baker TR, Phillips OL, Patiño S, Czimczik C, Hodnett MG, Herrera R, Arneith A, Lloyd J, Malhi Y, Dezzee N, Luizão FJ, Santos AJB, Schmerler J, Arroyo L, Silveira M, Priante-Filho N, Jimenez EM, Paiva R, Vieira I, Neill DA, Silva N, Peñuela MC, Monteagudo A, Vasquez R, Prieto A, Rudas A, Almeida S, Higuchi N, Lezama AT, Lopez-Gonzalez G, Peacock J, Fyllas NM, Alvarez Davila E, Erwin T, di Fiore A, Chao KJ, Honorio E, Killeen T, Peña Cruz A, Pitman N, Nuñez Vargas P, Salomão R, Terborgh J, Ramirez H (2009) Regional and large-scale patterns in Amazon forest structure and function are mediated by variations in soil physical and chemical properties. *Biogeosci Disc* 6:3993–4057
- Ribeiro JF, Walter BMT (2008) As principais fitofisionomias do bioma Cerrado. Pages 151–212 in Sano SM, Pedrosa de Almeida S, Ribeiro JF (eds), Cerrado Ecologia e Flora, Vol. 1. Emprapa Informacao Tecnologica, Ministerio da Agricultura, Pecuaría e Abastecimento, Brasília, Distrito Federal, Brasil.
- Richardson SJ, Peltzer DA, Allen RB, McGlone MS (2005) Resorption proficiency along a chronosequence: responses among communities and within species. *Ecology* 86:20–25
- Robertson GP, Coleman DC, Bledsoe CS, Sollins P (1999) Standard soil methods for long-term ecological research. Oxford University Press, New York
- Rossatto DR, Hoffmann WA, Franco AC (2009) Differences in growth patterns between co-occurring forest and savanna trees affect the forest-savanna boundary. *Funct Ecol* 23: 689–698
- Ruggiero PGC, Batalha MA, Pivello VR, Meirelles ST (2002) Vegetation-soil relationships in cerrado (Brazilian savanna) and semideciduous forest, Southeastern Brazil. *Plant Ecol* 160:1–16
- Saha AK, O'Reilly Sternberg LS, Ross MS, Miralles-Wilhelm F (2010) Water source utilization and foliar nutrient status differs between upland and flooded plant communities in wetland tree islands. *Wetl Ecol Manag*. doi:10.1007/s11273-010-9175-1
- Sano SM, Pedrosa de Almeida S, Ribeiro JF (2008) Cerrado Ecologia e Flora, Vol. 2. Emprapa Informacao Tecnologica, Ministerio da Agricultura, Pecuaría e Abastecimento, Brasília, Distrito Federal, Brasil. pp. 1279
- Santos AJB, Silva GTDA, Miranda HS, Miranda AC, Lloyd J (2003) Effects of fire on surface carbon, energy and water vapour fluxes over campo sujo savanna in central Brazil. *Funct Ecol* 17:711–719
- Santos SA, Nunes da Cunha C, Tomás W, Pinto de Abreu UG, Arieira J (2006) Plantas invasoras no Pantanal: Como entender o problema e soluções de manejo por meio de diagnóstico participativo. Boletim de Pesquisa e Desenvolvimento 66, Embrapa Pantanal, Corumba, MS, Brasil.
- Schöngart J, Wittmann F, Worbes M (2010) Biomass and NPP of Central Amazonian floodplain forests. In: Junk WJ, Piedade MTF, Wittmann F, Schöngart J, Parolin P (eds) Amazonian floodplain forests: Ecophysiology, biodiversity and sustainable management. Springer, Heidelberg, pp 347–388
- Schöngart J, Arieira J, Felfili Fortes C, de Arruda EC, Nunes da Cunha CN (2011) Age-related and stand-wise estimates of carbon stocks and sequestration in the aboveground coarse wood biomass of wetland forests in the northern Pantanal, Brazil. *Biogeosciences* 8:3407–3421
- Shimamura S, Yamamoto R, Nakamura T, Shimada S, Komatsu S (2010) Stem hypertrophic lenticels and secondary aerenchyma enable oxygen transport to roots of soybean in flooded soil. *Ann Bot* 106:277–284
- Silva LCR, Sternberg LSL, Haridasan M, Hoffmann WA, Miralles-Wilhelm F, Franco AC (2008) Expansion of gallery forests into central Brazilian savannas. *Glob Chang Biol* 14: 2108–2118
- Silva LCR, Haridasan M, Sternberg LSL, Franco AC, Hoffmann WA (2010) Not all forests are expanding over central Brazilian savannas. *Plant Soil* 333:431–442
- Silva LCR, Hoffmann WA, Rossatto DR, Haridasan M, Franco AC, Horwath WR (2013) Can savannas become forests? A coupled analysis of nutrient stocks and fire thresholds in central Brazil. *Plant Soil* 373:829–842
- Sokal RR, Rohlf FJ (1995) Biometry: The principles and practice of statistics in biological research. 3rd ed. W.H. Freeman and Co, New York
- Vargas R, Allen MF, Allen EB (2008) Biomass and carbon accumulation in a fire chronosequence of a seasonally dry tropical. *Glob Change Biol* 14:109–124
- Viani RAG, Rodrigues RR, Dawson TE, Oliveira RS (2011) Savanna soil fertility limits growth but not survival of tropical forest tree seedlings. *Plant Soil* 349:341–353
- Vourlitis GL, da Rocha HR (2011) Flux dynamics in the Cerrado and Cerrado-Forest Transition of Brazil. In Ecosystem Function in Global Savannas: Measurement and Modeling at Landscape to Global Scales. CRC, Inc., Boca Raton, FL, USA.
- Vourlitis GL, Lobo FA, Biudes MS, Ortiz CER, Nogueira JS (2011) Spatial variations in soil chemistry and organic matter content across a *Vochysia divergens* invasion front in the Brazilian Pantanal. *Soil Sci Soc Am J* 75:1554–1561
- Vourlitis GL, Lobo FA, Lawrence S, Lucena IC, Borges OP Jr, Dalmagro HJ, Ortiz CER, Nogueira JS (2013) Variations in stand structure and diversity along a soil fertility gradient in a Brazilian savanna (Cerrado) in southern Mato Grosso. *Soil Sci Soc Am J* 77:1370–1379
- Vourlitis GL, Lobo FA, Lawrence S, Holt K, Zappia A, Pinto OB Jr, Nogueira JS (2014) Nutrient resorption in tropical savanna forests and woodlands of central Brazil. *Plant Ecol* 215:963–975. doi:10.1007/s11258-014-0348-5
- Wantzen KM, Couto EG, Mund EE, Amorim RSS, Siqueira A, Tielbörger K, Seifan M (2012) Soil carbon stocks in stream-

- valley-ecosystems in the Brazilian Cerrado agroscape. *Ag Ecosys Env* 151:70–79
- Wigley BJ, Coetsee C, Hartshorn AS, Bond WJ (2013) What do ecologists miss by not digging deep enough? Insights and methodological guidelines for assessing soil fertility status in ecological studies. *Acta Oecol* 51:17–27
- Wood TE, Lawrence D, Clark DA, Chazdon RL (2009) Rain forest nutrient cycling and productivity in response to large-scale litter manipulation. *Ecology* 90:109–121
- Worbes M (1997) The forest ecosystem of the floodplains. In: Junk WJ (ed) *The central amazon floodplains. Ecology of a Pulsing System*. Springer-Verlag, USA, pp 223–266
- Wright SJ, Yavitt JB, Wurzbürger N, Turner BL, Tanner EVJ, Sayer EJ, Santiago LS, Kaspari M, Hedin LO, Harms KE, Garcia MN, Corre MD (2011) Potassium, phosphorus or nitrogen limit root allocation, tree growth and litter production in a lowland tropical forest. *Ecology* 92:1616–1625