

Supporting Information

Hilker et al. 10.1073/pnas.1404870111

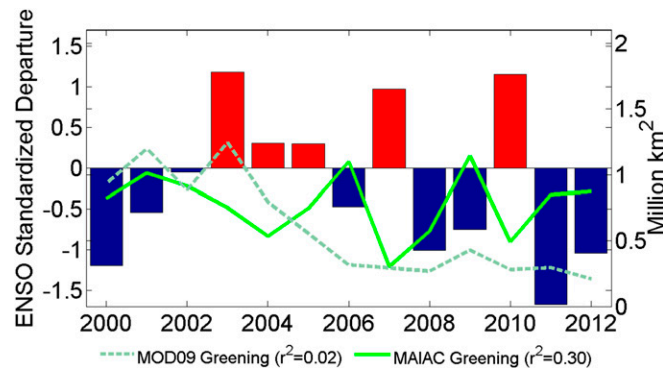


Fig. S1. Comparison between ENSO events shown as departure from the multivariate ENSO index and total area with satellite observed increases in NDVI using MAIAC (solid line) and the C5 standard MODIS product (dashed line). The r^2 values show the correspondence between ENSO and NDVI from MAIAC and MODIS collection 5 standard surface reflectance product (MOD09), respectively.

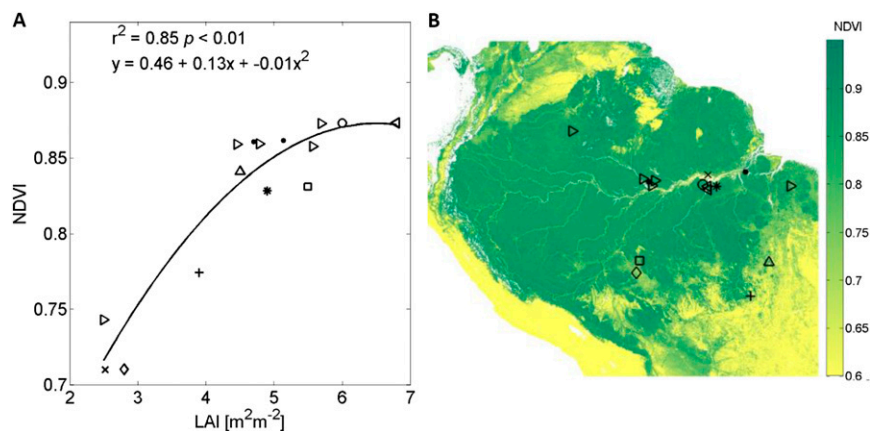


Fig. S2. (A) Comparison between mean monthly estimates of NDVI and field estimates of leaf area index (LAI). LAI was obtained from published values in the works by Mahli et al. (1) (●), Domingues et al. (2) (○), Doughty and Goulden (3) (*), Negrón Juárez et al. (4) (×), Andreae et al. (5) (□), Zanchi et al. (6) (◇), Restrepo-Coupe et al. (7) (△), Figuera et al. (8) (left-facing triangle), Scurlock et al. (9) (right-facing triangle), and Galvão et al. (10) (+). Remote sensing data were obtained for the closest available month of the described field dataset. In some cases, only year of acquisition was provided; in these cases, NDVI from June of the closest available year was used to match field observations. (B) shows the location of the respective field plots superimposed on mean NDVI estimates.

- Mahli Y, et al. (2009) Comprehensive assessment of carbon productivity, allocation and storage in three Amazonian forests. *Glob Chang Biol* 15(5):1255–1274.
- Domingues TF, Berry JA, Martinelli LA, Ometto JPHB, Ehleringer JR (2005) Parameterization of canopy structure and leaf-level gas exchange for an eastern Amazonian tropical rain forest (Tapajós National Forest, Pará, Brazil). *Earth Interact* 9(17):1–23.
- Doughty CE, Goulden ML (2008) Are tropical forests near a high temperature threshold? *J Geophys Res* 113:G00B07.
- Negrón Juárez RI, da Rocha HR, Figueira AMS, Goulden ML, Miller SD (2009) An improved estimate of leaf area index based on the histogram analysis of hemispherical photographs. *Agric Meteorol* 149(6):920–928.
- Andreae MO (2002) Biogeochemical cycling of carbon, water, energy, trace gases, and aerosols in Amazonia: The LBA-EUSTACH experiments. *J Geophys Res* 107(D20):8066.
- Zanchi FB, et al. (2009) Estimativa do Índice de Área Foliar (IAF) e Biomassa em pastagem no estado de Rondônia, Brasil. *Acta Amazon* 39(2):335–348.
- Restrepo-Coupe N, et al. (2013) What drives the seasonality of photosynthesis across the Amazon basin? A cross-site analysis of eddy flux tower measurements from the Brasil flux network. *Agric Meteorol* 182–183:128–144.
- Figuera AMS, et al. (2011) LBA-ECO CD-04 Leaf Area Index, Km 83 Tower Site, Tapajós National Forest, Brazil. Available at daac.ornl.gov. Accessed September 17, 2014.
- Scurlock JMO, Asner GP, Gower ST (2001) *Global Leaf Area Index from Field Measurements, 1932–2000*. Available at www.eosdis.ornl.gov/cgi-bin/dsviewer.pl?ds_id=584. Accessed September 16, 2014.
- Galvão LS, et al. (2011) On intra-annual EVI variability in the dry season of tropical forest: A case study with MODIS and hyperspectral data. *Remote Sens Environ* 115:2350–2359.

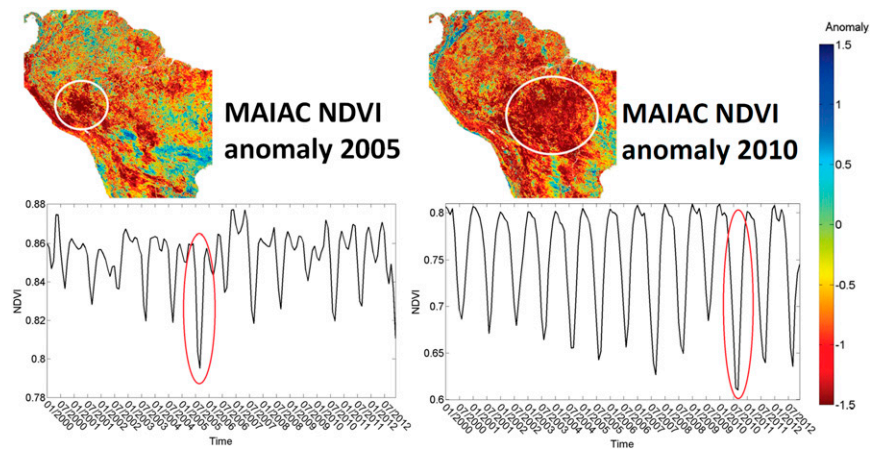


Fig. S4. Time series of NDVI for the 2005 and 2010 drought areas. The 2005 drought affected primarily the southwest and central regions of the Amazon forest (1, 2), whereas the 2010 drought was more widespread and affected large areas in the eastern and southern parts of Amazonia (3). Both droughts peaked during the July to September quarter (3, 4). During the 2005 drought, dry season NDVI was about 8% below its longer-term mean across the southwestern part of Amazonia; the 2010 drought saw a 5% reduction in dry season NDVI across 1.68 million km² (5).

1. Marengo JA, Nobre CA, Tomasella J, Cardoso MF, Oyama MD (2008) Hydro-climate and ecological behaviour of the drought of Amazonia in 2005. *Philos Trans R Soc Lond B Biol Sci* 363 (1498):1773–1778.
2. Samanta A, et al. (2010) Amazon forests did not green-up during the 2005 drought. *Geophys Res Lett* 37(5):L05401.
3. Lewis SL, Brando PM, Phillips OL, van der Heijden GM, Nepstad D (2011) The 2010 Amazon drought. *Science* 331(6017):554.
4. Saleska SR, Didan K, Huete AR, da Rocha HR (2007) Amazon forests green-up during 2005 drought. *Science* 318(5850):612.
5. Xu L, et al. (2011) Widespread decline in greenness of Amazonian vegetation due to the 2010 drought. *Geophys Res Lett* 38(7):L07402.

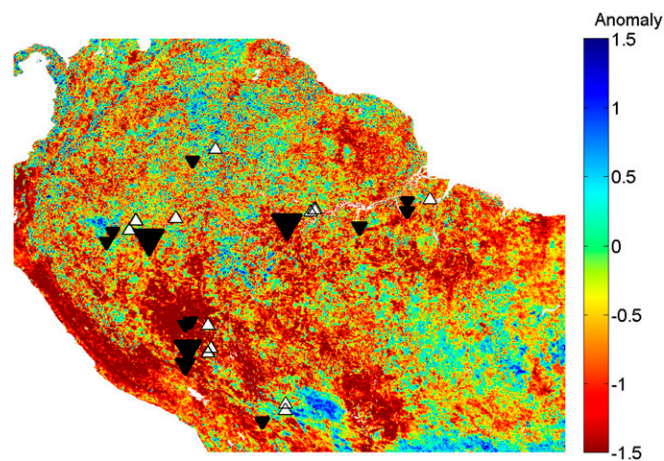


Fig. S5. Comparison of spatial patterns in the NDVI anomaly of the 2005 Amazon drought and spatial changes in aboveground biomass (2005 – pre-2005) as reported by Phillips et al. (1). The size of the symbol represents the relative size in changes of biomass: ▲ represents a biomass gain, and ▼ represents a biomass loss (between +8 and –18 mg ha⁻¹ y⁻¹) (1).

1. Phillips OL, et al. (2009) Drought sensitivity of the Amazon rainforest. *Science* 323(5919):1344–1347.