LBA-ECO LC-14 Biophysical Measurements, Rainfall Exclusion, Tapajos National Forest

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Revision date: October 11, 2013

Summary:

This data set reports forest biophysical measurements from a rainfall exclusion experiment conducted at the km 67 Seca Floresta site, Tapajos National Forest, Brazil from 1998 to 2006. The purpose was to observe the potential effects of severe water stress on a humid Amazonian forest (Nepstad 2002).

Data are reported for stem inventory, tree diameter at breast height (DBH) and height, dendrometer measurements of tree diameter growth increments, canopy density, leaf area index (LAI), and coarse and fine litter mass.

The measurements were made monthly from September 28, 1998 through November 10, 2006. There are six comma-delimited data files (.csv), and one text file (.txt) with this data set.

Data Citation:

Cite this data set as follows:

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This data set was archived in October of 2013. Users who download the data between October 2013 and September 2018 must comply with the LBA Data and Publication Policy.

Data users should use the Investigator contact information in this document to communicate with the data provider.

Data users should use the Data Set Citation and other applicable references provided in this document to acknowledge use of the data.

Table of Contents:

1. Data Set Overview:

Project: LBA (Large-Scale Biosphere-Atmosphere Experiment in the Amazon)

Activity: LBA-ECO

LBA Science Component: Land Use and Land Cover

Team ID: LC-14 (Nepstad / Moutinho)

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LBA Data Set Inventory ID: LC14_Aboveground_Prod

This data set reports forest biophysical measurements from a rainfall exclusion experiment conducted at the km 67 Seca Floresta site, Tapajos National Forest, Brazil from 1998 to 2006. The purpose was to observe the potential effects of severe water stress on a humid Amazonian forest (Nepstad 2002).

Data are reported for stem inventory, tree diameter at breast height (DBH) and height, dendrometer measurements of tree diameter growth increments, canopy density, leaf area index (LAI), and coarse and fine litter mass.

The measurements were made monthly from September 28, 1998 through November 10, 2006.

Related Data Sets:

- LBA-ECO ND-02 Soil Gas and Water Content, Rainfall Exclusion, Tapajos National Forest: 1999-2002 (Related measurements from the same study and time period)
- LBA-ECO CD-05 Soil VWC and Meteorology, Rainfall Exclusion, Tapajos National Forest (Related measurements from the same study and time period)
- LBA-ECO ND-30 Water Chemistry, Rainfall Exclusion, km 67, Tapajos National Forest (Related measurements from the same study and time period)

2. Data Characteristics:

There are seven files with this data set which includes six comma-delimited data files (.csv), and one text file (.txt) with the DBH measurement dates and the actual midpoint calculation dates for the control and exclusion groups.

File names:

File #1: Stem_inventory_REE_plots_2000_2004.csv

File #2: Dendrometers_REE_plots_1999_2006.csv

File #3: REE_Dendrometer_Midpoint_dates.txt

File #4: Canopy_density_REE_plots_1998_2004.csv

File #5: LAI_REE_plots_1999_2006.csv

File #6: Coarse_litter_REE_plots_1998_2006.csv

File #7: Fine_Litter_REE_plots_1998_2006.csv

File #1: Stem_inventory_REE_plots_2000_2004.csv

This file contains data from an initial survey of stems greater than or equal to 1 cm DBH completed in March 2000. The survey was repeated in June, 2004.

COLUMN	COLUMN HEADING	Units/format	Description
1	Treatment		Plot in which the stem was located: control or treatment
2	Life_form		Life form: trees palms and vines were measured
3	Family		Scientific family to which the stem belongs
4	Scientific_name		Identification reported as Genus species
5	DBH_2000	cm	Diameter at breast height measured in June 2000 when the experiment was established

			and reported in centimeters (cm)
6	DBH_2004	cm	Diameter at breast height measured in September 2004 when the experiment was terminated and reported in centimeters (cm)
7	OBS_final		Field observations on the status of the tree made in September 2004 when the experiment was terminated

Missing data are represented by -9999

Sample data for File #1: Stem_inventory_REE_plots_2000_2004.csv

```
Treatment,Life_form,Family,Scientific_name,DBH_2000,DBH_2004,OBS_final
Exclusion,TREE,Moraceae,Brosimum guianense ( Aubl. ) Huber.,22.8,24.5,LIVE
Exclusion,PALM,Arecaceae,Astrocaryum gynacanthum Mart.,4.3,-9999,DEAD
 ...
Exclusion,TREE,Sapindaceae,Talisia cerasina ( Benth ) Radlk.,3.34,3.5,LIVE
Exclusion,TREE,Violaceae,Amphirrhox surinamensis Eichl.,2.46,2.6,LIVE
...
Control,TREE,Apocynaceae,Tabernaemontana angulata Mart. ex Muell Arg.,5.12,-9999,DEAD
Control,TREE,Violaceae,Amphirrhox surinamensis Eichl.,2.31,2.5,LIVE
```

File #2: Dendrometers_REE_plots_1999_2006.csv

This file contains DBH measurements made June 1999 to March 2006 on trees greater than or equal to 10 cm DBH (diameter at 1.3 m or above buttresses), and on vines greater than 5 cm DBH.

COLUMN	COLUMN HEADING	Units/format	Description
1	Treatment		Plot in which the stem was located: control or treatment
2	Tree_ID		Tree identification
3	Life_form		Life form: trees palms and vines were measured
4	Family		Scientific family to which the stem belongs
5	Genus_species		Identification reported as Genus species
6	Common_name		Local name for tree in Portuguese
7	Height_m	m	Tree height estimated reported in meters (m)
8	DBH_init	m	Initial DBH measured at 1.3-m above ground level or above the butress where appropriate
9 through 83	DBH_MMMYY	cm	Estimated DBH at the midpoint reported in centimeters (cm) and calculated from the DBHs recorded at the previous and following sampling points. For actual midpoint date see the accompanying Midpoint dates file
84	Date_death	YYYYMMDD	Date on which field observations included a report that the tree palm or vine was dead for those trees that died during the sampling period
85	Field_notes		Observations about the state of the tree vine or palm and the dendrometer with associated dates

Sample data for File #2: Dendrometers_REE_plots_1999_2006.csv

```
Treatment,Tree_ID,Life_form,Family,Genus_species,Common_name,Height_m,DBH_init,
DBH_Jun99,DBH_Aug99,DBH_Oct99,DBH_Nov99,DBH_Dec99,DBH_Feb00,DBH_Mar00,
DBH_Apr00,DBH_May00,DBH_Jun00,DBH_Jul00,DBH_Aug00,DBH_Sep00,DBH_Dec00,
DBH_Jan01,DBH_Feb01,DBH_Apr01,DBH_May01,DBH_Jun01,DBH_Jul01,DBH_Aug01,
DBH_Sep01,DBH_Oct01,DBH_Nov01,DBH_Dec01,DBH_Jan02,DBH_Feb02,DBH_Mar02,
DBH_Apr02,DBH_May02,DBH_Jun02,DBH_Jul02,DBH_Aug02,DBH_Sep02,DBH_Oct02,
DBH_Nov02,DBH_Dec02,DBH_Jan03,DBH_Feb03,DBH_Mar03,DBH_Apr03,DBH_May03,
DBH_Jun03,DBH_Jul03,DBH_Aug03,DBH_Sep03,DBH_Oct03,DBH_Nov03,DBH_Dec03,
DBH_Jan04,DBH_Feb04,DBH_Mar04,DBH_Apr04,DBH_May04,DBH_Jun04,DBH_Jul04,
DBH_Aug04,DBH_LateAug04,DBH_Oct04,DBH_Nov04,DBH_lateNov04,DBH_Dec04,
DBH_Jan05,DBH_Mar05,DBH_May05,DBH_Jun05,DBH_Jul05,DBH_Aug05,DBH_Sep05,
DBH_Oct05,DBH_Nov05,DBH_Dec05,DBH_lateDec05,DBH_Jan06,DBH_Mar06,
```

```
Date_death,Field_notes
Control,1,tree,Elacocarpaceae,Sloanea brevipes Benth,Urucurana,
10,13.3,13.5,13.5,13.5,13.5,13.6,13.7,13.7,13.8,13.8,13.8,13.9,13.9,14,
14.2,14.4,14.5,14.6,14.7,14.7,14.7,14.7,14.7,14.8,14.8,14.8,14.8,14.9,14.9,
14.9,15,15.1,15.1,15.1,15.1,15.2,15.2,15.2,15.2,15.3,15.4,15.5,15.5,15.5,15.5,
15.6,15.68,15.7,15.7,15.8,15.8,15.9,15.9,15.9,15.9,15.9,15.9,16,16,16.1,16.1,
16.1,16.1,16.1,16.1,16.1,16.1,16.1,16.1,16.1,16.1,16.1,16.1,16.1,16.1,16.2,
-9999,no notes
...

Control,100,tree,Lauraceae,Ocotea tomentella Sandw,Louro leque,
13,12.9,13.3,13.3,13.3,13.4,13.5,13.5,13.6,13.7,13.7,13.7,13.7,13.7,13.7,
13.9,14,14,14,14,14,14.1,14.1,14.1,14.1,14.1,14.2,14.2,14.3,14.3,14.4,14.4,
14.5,14.5,14.5,14.5,14.6,14.7,14.6,14.8,14.8,14.9,15,15.2,15.4,15.4,15.4,15.41,
15.5,15.5,15.6,15.7,15.8,15.9,15.9,16,16.1,16.1,16.1,16.1,16.2,16.3,16.5,16.7,
16.8,16.9,17,17,17,17,17,17.1,17.2,17.3,17.4,17.6,17.7,
-9999,Field notes: November 2001 INT; January 2002 band; January 2005 band will be
changed;
March 2005 band will be changed; September 2005 just new
...
Exclusion,102,tree,Melastomataceae,Miconia ruficalyx Gleason,Papa terra grande,
15,16.1,-9999,17.4,17.4,17.4,17.5,17.5,17.5,17.5,17.6,17.6,17.6,17.6,17.6,17.6,17.7,17.7,
17.7,17.8,17.8,17.8,17.8,17.8,17.8,17.8,17.8,17.8,17.8,17.9,17.9,18,18,18,17.9,17.9,
17.9,18,18,18,18.2,18.1,18.1,18.1,18.2,18.2,18.2,18.23,18.2,18.3,18.3,18.4,18.5,18.5,18.6,
18.6,18.7,18.7,18.7,18.7,18.7,18.7,18.7,18.7,18.7,18.7,18.7,18.7,18.7,18.7,18.7,18.7,
18.7,18.7,18.7,18.7, -9999,
Field notes: August through November 2004 broken; October 2005 reported dead
Exclusion,103,tree,Euphorbiaceae,Pausandra trianae Baill,Arataciurana,
11,15.7,-9999,15.6,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.7,
15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.6,15.6,15.7,15.7,15.7,15.7,15.7,
15.7,15.7,15.6,15.7,15.6,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.7,15.71,
15.7,15.7,15.7,15.7,15.7,15.8,15.8,15.8,15.8,15.8,15.8,15.8,15.8,15.8,15.8,15.8,
15.8,15.9,15.9,15.9,15.9,15.9,15.9,15.9,15.9,15.9,15.9,15.9,-9999,
no notes
...
Exclusion,97,tree,Annonaceae,Onichopetalum amazonicum R. E. Fries,Envira amarela,
20,25.3,-9999,25.7,25.7,25.7,25.7,25.8,25.8,25.9,25.9,26,26,26,26,26,26.1,26.1,26.1,26.2,26,
26.1,26.2,26.2,26.2,26.2,26.1,26.2,26.2,26.2,26.2,26.3,26.3,26.3,26.2,26.2,26.2,26.3,26.3,26.2,
26.3,26.3,26.3,26.3,26.3,26.3,26.3,26.34,26.2,26.4,26.4,26.5,26.6,26.7,26.7,26.7,26.7,26.7,26.7,

26.7,26.7,26.7,26.7,26.7,26.7,26.8,26.8,26.8,26.8,26.8,26.8,26.9,27,27,27.1,27.2,27.2,-9999,
no notes
Exclusion,98,tree,Mimosaceae,Inga rubiginosa (Rich) DC.,Inga folha peluda,
19,23.1,-9999,23.2,23.2,23.2,23.2,23.2,23.2,23.2,23.2,23.2,23.2,23.2,23.2,23.2,23.2,
23.2,23.2,23.2,23.2,23.2,23.2,23.2,23.2,23.1,23.1,23.2,23.2,23.2,23.2,23.2,23.2,23.2,
23.2,23.2,23.1,23.2,23.2,23.2,23.2,23.3,23.3,23.3,23.3,23.3,23.3,23.29,23.3,23.3,23.3,
23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,
23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,23.3,20051007,
Field notes: November 2003 through March 2004 broken; October 2005 reported dead
```

File #3: REE_Dendrometer_Midpoint_dates.txt

This is a text file with the DBH measurement dates and the actual midpoint calculation dates for the control and exclusion groups.

Column_heading	Actual_Midpoint_date Control	Actual_Midpoint_date Exclusion
DBH_init	19990315	19990323
DBH_Jun99	19990623	19990619
...		
DBH_Apr02	20020412	20020412
DBH_May02	20020511	20020512
...		
DBH_Jan06	20060127	20060126
DBH_Mar06	20060303	20060301

File #4: Canopy_density_REE_plots_1998_2004.csv

This file contains data on canopy light gaps which were visually quantified using a spherical densitometer**.** Data were collected December 17, 1998 through May 23, 2003.

COLUMN	COLUMN HEADING	Units/format	Description
1	Treatment		Plot identification: control or exclusion
2	Date	YYYYMMDD	Sampling date
3	Sampling_location		Location within the plot see accompanying documentation for grid map
4	Open	%	Percent of open canopy above the sampling point
5	Cover	%	Percent of closed canopy above the sampling point

Sample data for File #4: Canopy_density_REE_plots_1998_2004.csv

```
Treatment,Date,Sampling_location,Open,Cover
Exclusion,19981217,A1,8.84,91.16
Exclusion,19981217,A2,5.2,94.8
...
Exclusion,20040523,Q6,4.16,95.84
Exclusion,20040523,Q7,3.9,96.1
...
Control,20040523,L11,4.16,95.84
Control,20040523,L12,4.68,95.32
```

File #5: LAI_REE_plots_1999_2006.csv

This file contains LAI data from February 05, 1999 through November 10, 2006. LAI was measured before and during the throughfall exclusion treatment at each of the grid sampling points using two Li-Cor 2000 Plant Canopy Analyzers.

COLUMN	COLUMN HEADING	Units/format	Description
1	Treatment		Treatments were either control or exclusion
2	Grid		Location within the plot see attached plot grid file
3	Date	YYYYMMDD	Sampling date
4	LAI	m2 per m2	Leaf area index reported in meters squared of leaf tissue per meter squared of ground
5	Gap_fraction		Gap fraction reported in proportion
6	MTA	degrees	Mean tilt angle reported in degrees

Missing data are represented by -9999

Sample data for File #5: LAI_REE_plots_1999_2006.csv

```
Treatment,Grid,Date,LAI,Gap_fraction,MTA
Control,B1,19990205,3.03,0.123,56
Control,B2,19990205,3.16,0.13,64
...
Exclusion,J4,20001125,4.71,0.037,38
Exclusion,J5,20001125,5.13,0.031,62
...
Exclusion,P7,20061110,5.9,0.014,52
Exclusion,P8,20061110,5.43,0.024,60
```

File #6: Coarse_litter_REE_plots_1998_2006.csv

This file contains data for coarse litter samples (stems and twigs greater than 1 cm in diameter) collected October 12, 1998 through May 22, 2006):

COLUMN	COLUMN HEADING	Units/format	Description
1	Treatment		Treatment is either control or exclusion
2	Date		Sampling date

3	Production_coarse_litter	g m-2 d-1	Mean production of coarse litter (defined as stems and twigs greater than 1 cm diameter) reported in grams per meter squared per day (g m-2 d-1)
4	SE_Production	g m-2 d-1	Standard error of the mean mass of coarse litter collected reported in grams per meter squared per day (g m-2 d-1)
5	N		Number of samples included in the calculation of the mean

Sample data for File #6: Coarse_litter_REE_plots_1998_2006.csv

```
Treatment,Date,Mass_coarse_litter,SE_Mass,N
Control,19981012,0.36,0.13,3
Control,19981027,0.49,0.09,3
...
Control,20060508,0.96,0.21,3
Control,20060522,0.99,0.16,3
...
Exclusion,20060508,0.65,0.23,3
Exclusion,20060522,0.77,0.39,3
```

File #7: Fine_Litter_REE_plots_1998_2006.csv

This file contains data for fine litter samples (leaves, reproductive parts, and twigs) collected September 28, 1998 through June 09, 2006**:**

COLUMN	COLUMN HEADING	Units/format	Description
1	Treatment		Plot identification: control or exclusion
2	Date	YYYYMMDD	Collection date
3	Point		Location within the plot see accompanying documentation for grid map
4	Mass_fine_litter	g m-2 d-1	Mass of total fine litter collected in the previous 2 week sampling period reported in grams per meter squared per day
5	Mass_foliage	g m-2 d-1	Mass of the foliage contained in the total fine litter collected in the previous 2 week sampling period reported in grams per meter squared per day
6	Mass_reproduct	g m-2 d-1	Mass of the reproductive structures (fruits and flowers) contained in the total fine litter collected in the previous 2 week sampling period reported in grams per meter squared per day
7	Mass_fruits	g m-2 d-1	Mass of the fruits contained in the total fine litter collected in the previous 2 week sampling period reported in grams per meter squared per day
8	Mass_flowers	g m-2 d-1	Mass of the flowers contained in the total fine litter collected in the previous 2 week sampling period reported in grams per meter squared per day

Missing data are represented by -9999

Sample data for File #7: Fine_Litter_REE_plots_1998_2006.csv

```
Treatment,Date,Point,Mass_fine_litter,Mass_foliage,Mass_reproduct,Mass_fruits,Mass_flowers
Control,19980928,B1,4.75,-9999,-9999,-9999,-9999
Control,19980928,B3,3.91,-9999,-9999,-9999,-9999
...
Exclusion,20001108,C7,3.65,3.65,0,0,0
```

```
Exclusion,20001108,O3,11.2,7.76,3.44,0.26,3.68
...
Exclusion,20060609,P7,2.15,2.15,0,0,0
Exclusion,20060609,P8,4.21,4.21,0,0,0
```

Site boundaries: (All latitude and longitude given in decimal degrees)

Site (Region)	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude	Geodetic Datum
Para Western (Santarem) - km 67 Seca-Floresta Site (Para Western (Santarem))	-54.959	-54.959	-2.857	-2.857	World Geodetic System, 1984 (WGS-84)

Time period:

- The data set covers the period 1998/09/28 to 2006/11/10
- Temporal Resolution: Resolution varied across the different measurement

Platform/Sensor/Parameters measured include:

- FIELD INVESTIGATION / DENSIOMETER / COMMUNITY STRUCTURE
- FIELD INVESTIGATION / BALANCE / LITTER CHARACTERISTICS
- FIELD INVESTIGATION / STEEL MEASURING TAPE / BIOMASS
- FIELD INVESTIGATION / PLANT CANOPY ANALYZER / COMMUNITY STRUCTURE
- FIELD INVESTIGATION / DENDROMETERS / BIOMASS

3. Data Application and Derivation:

Data can be used to calculated biomass, productivity and rates of mortality for the control and rainfall exclusion treatments.

4. Quality Assessment:

Data have been reviewed for accuracy. To avoid confounding effects associated with trenching the experimental plots, trees located close to the trenches (< 5 m) were excluded from analyses of wood increment and tree mortality rates. In so doing, the areas of treatment and control plots were reduced from ~1 ha to 0.81 and 0.77 ha.

Canopy light gaps were visually quantified using a spherical densitometer. Measurements were made in each of the four cardinal directions then averaged to provide a value for each sampling point. One technician made all of the measurements to reduce observer error.

LAI was measured before and during the throughfall exclusion treatment at each of the grid sampling points using two Li-Cor 2000 Plant Canopy Analyzers in differential mode (Welles, 1990; LI-COR, 1992). The instruments were intercalibrated above the canopy at the beginning of each set of measurements.

5. Data Acquisition Materials and Methods:

Site description

The Tapajos National Forest, located in east-central Amazonia, receives 600 to 3000 mm of rain each year, with a mean of 2000 mm, most of which falls during the wet season from January to June. The forest is situated on a terrace of tertiary sediments capped by the Belterra Clay Formation (Clapperton, 1993). The Oxisol soil (Haplustox) is acidic (pH 4 to 5), is dominated by kaolinite clay minerals (60 to 80% clay), and is free of hardpan or iron oxide concretions in the upper 12-m; the water table is more than 100-m deep. The forest has emergent trees up to 55-m in height, with a continuous canopy at approximately 30-m (Nepstad et al., 2002).

Experiment Description

Drought effects on forest processes were studied by comparing a 1 ha forest plot from which a portion of throughfall was excluded with a nearby 1 ha control plot. Two floristically and structurally similar, 1 ha (100 by 100-m) plots were selected for the experiment from an initial survey of 20 ha of forest. The forest surrounding the plots had emergent trees up to 55-m in height, with continuous canopy varying in height from 18 to 40-m. The study plots were placed in areas where most of the canopy was less than 30 m high to facilitate access to the tree crowns. A 1.5-m deep trench was excavated around the perimeter of the treatment plot to reduce the potential for lateral movement of soil water from the surrounding forest into the plot. A similar trench was excavated around the control plot to avoid the confounding of treatment and trenching effects.

A 1 to 1.7-m deep trench was excavated around the treatment plot to reduce the potential for lateral movement of soil water from the surrounding forest into the plot, and to provide a conduit for water excluded from the plot. A similar trench was excavated around the control plot to avoid the confounding of throughfall exclusion and trenching effects Following an intercalibration period of approximately one-year starting in November of 1998 throughfall was partially excluded during the rainy seasons of 2000 through 2006 using plastic panels and wooden gutters installed in the understory.

Methods:

Sampling grids with 10 m distances between points were established with 100 points inside of each plot and a perimeter of sampling points outside of each plot, for a total of 144 points. These grids were used for measurements of leaf area index, canopy openness and litterfall. After the intercalibration period and the initiation of the throughfall exclusion treatment, measurements of LAI, canopy openness, and litterfall in the treatment plot were made

above the plastic panels, at points along the wooden drainage gutters, described below. This elevated sampling grid had 102 sampling points inside of the plot, with a spacing of 6 m between each gutter, and 16 m between each point along each gutter (See accompanying grid sketch)

Stem Inventory and DBH Measurements (March 2000 and June 2004):

An initial survey of stems greater than or equal to 1 cm DBH was completed in March 2000, including identification to species and measurement of DBH at 1.3 m. Diameters of highly irregular or buttressed stems were measured just above the irregularity. The survey was repeated in June 2004.

Dendrometer Measurements (DBH measurements made June 1999 through March 2006):

Dendrometer bands were installed on trees greater than or equal to 10 cm DBH (diameter at 1.3 m or above buttresses) and on vines greater than 5 cm DBH between January and March 1999, with measurements starting after a 3 to 5 month settling period. Trees that were 5-m or closer to the trenches in the exclusion plot were removed from the data set. Bands were installed on 342 trees in the exclusion plot and 409 trees in the control plot. Diameter increment was monitored monthly between 2000 and 2006 using an electronic caliper from which relative stem diameter growth was calculated. From the calculated growth rates, an estimated diameter at the midpoint between sampling points was determined. A text file is included with this data set which provides the DBH measurement dates and the actual midpoint calculation dates for the control and exclusion groups.

Canopy Density (data collected December 17, 1998 through May 23, 2003):

Canopy light gaps were visually quantified using a spherical densitometer (a concave mirror etched with 24 quarter-inch squares and leveling bubble). Measurements were made in each of the four cardinal directions then averaged to provide a value for each sampling point. One technician made all of the measurements to reduce observer error. Data were collected from December 15, 1998 through June 24, 2005. These measurements were made from the ground prior to panel installation. Following panel installation and continuing after panel removal, treatment plot measurements were made from the water collection gutters, 1 to 3-m above the ground.

LAI (data collected February 05, 1999 through November 10, 2006):

LAI was measured before and during the throughfall exclusion treatment at each of the grid sampling points using two Li-Cor 2000 Plant Canopy Analyzers in differential mode (Welles, 1990; LI-COR, 1992). One instrument was placed above the canopy on a wooden tower to measure incoming radiation with no canopy influence; the other instrument was used for the understory measurement, made with the same directional orientation as the above-canopy instrument. The instruments were intercalibrated above the canopy at the beginning of each set of measurements. The light field of each sensor was reduced to 90 degrees opaque, 270 degree sensor caps.

Measurements were made under conditions of diffuse skylight, usually before 0800 in the morning or after 1700 in the afternoon local time. LAI calculations were made using the inner three quantum sensor rings to minimize the overlap among measurements made at adjacent grid points, and because this number of rings corresponded most closely with measurements calibrated in seasonally deciduous forests where LAI could be measured directly (Cutini et al., 1998).

Coarse Litter (samples collected October 12, 1998 through May 22, 2006)**:**

Coarse litter, defined as stems and twigs greater than 1 cm in diameter, was collected at two-week intervals using three 1 by 100-m transects in each plot. All coarse litter which fell in the transect line was collected on each sampling date. Samples were dried at 65 degrees C, and weighed. When panels were installed, coarse litterfall in the treatment plot was measured by collecting twigs and branches that fell on three 50 by 6-m sections of panel. This sample area was reduced by the area of the gaps that occurred.

Fine litter (samples collected September 28, 1998 through June 09, 2006)**:**

Fine litter (leaves, reproductive parts, and twigs) was collected at 2-week intervals from 25 collectors (September 28, 1999 through April, 2000) and 100 collectors (remainder of study period). Collectors were 0.5 m2 in area (0.8 by 0.62 m) made of nylon mesh screen and located at each of the sampling grid points within the plots (see accompanying sketch). Twigs greater than 1 cm diameter were excluded from the fine litter collectors. Samples were dried at 65 degrees C, and weighed. Reproductive parts (buds, flowers, fruits, and seeds) were separated manually, dried and weighed. The collectors were suspended at 0.1 m height initially, and were elevated above the plastic throughfall exclusion panels (1.5 to 3.5-m height) and to 1.5-m height in the control plot following panel installation.

6. Data Access:

This data set is available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

Data Archive Center:

E-mail: uso@daac.ornl.gov
Telephone: +1 (865) 241-3952

7. References:

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Related Publications

- Brando P.M., S.J. Goetz, A. Baccini, D.C. Nepstad, P.S.A. Beck, and M.C. Christman. 2010. Seasonal and interannual variability of climate and vegetation indices across the Amazon. PNAS 107: 14685-14690. doi/10.1073/pnas.0908741107
- Nepstad DC, Tohver IM, Ray D, Moutinho P, Cardinot G. (2007) Mortality of large trees and lianas following experimental drought in an amazon forest. Ecology, 88, 2259-2269.
- Brando PM, Nepstad DC, Davidson EA, Trumbore SE, Ray D, Carmargo P. (2008) Drought effects on litterfall, wood production and belowground carbn cycling in an Amazon forest: results of a throughfall reduction experiment. Philosophical Transactions of the Royal Society of London Series B-Biological Sciences