LBA-ECO LC-09 Vegetation Composition and Structure in the Brazilian Amazon: 1992-1995

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Revision date: August 28, 2009

Summary:

This data set contains two files with vegetation data for five Amazonian sites: Altamira, Bragantina, Tome-Acu, and Ponta de Pedras, all in the state of Para, and Yapu, Colombia. One file describes vegetation composition and structure (basal area, biomass, species composition) with different land use histories for all five study sites; the second file describes more specific information about individual plant characteristics (family/species names, DBH, stem and total plant height) within each plot.

Data Citation:

Cite this data set as follows:

Brondizio, E.S., M. Batistella, and E.F. Moran. 2009. LBA-ECO LC-09 Vegetation Composition and Structure in the Brazilian Amazon: 1992-1995. 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/939

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The LBA Data and Publication Policy [http://daac.ornl.gov/LBA/lba_data_policy.html] is in effect for a period of five (5) years from the date of archiving and should be followed by data users who have obtained LBA data sets from the ORNL DAAC. Users who download LBA data in the five years after data have been archived must contact the investigators who collected the data, per provisions 6 and 7 in the Policy.

This data set was archived in August of 2009. Users who download the data between August 2009 and July 2014 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. Alternatively, the LBA Web Site [http://lbaeco-archive.ornl.gov/] in Brazil will have current contact information.

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-09 (Moran / Batistella)

The investigators were Moran, Emilio Federico; Batistella, Mateus; Adams, Ryan Thomas; Boucek, Bruce William; Brondizio, Eduardo S.; D'Antona, Alvaro; Demming, Kristin Rooke; Fiorini, Stefano; Futemma, Celia Regina Tomiko; Hedin, Lars; Hetrick, Scott S.; Jensen, Ryan R.; Lu, Dengsheng; Ludewigs, Thomas; Mausel, Paul; McGroddy, Megan; Menzies, John Iral; Navarro, Doris Graziela; Ponzoni, Flavio Jorge; Randolph, J.C.; Schmid, Hans Peter E.; Siqueira, Andrea Dalledone; Toniolo, Maria Angelica; Valeriano, Dalton De Morisson; Valladares, Gustavo Souza; VanWey, Leah and Yu, Genong . You may contact Brondizio, Dr Eduardo S. (ebrondiz@indiana.edu)

LBA Data Set Inventory ID: LC09_Vegetation_Composition

This data set contains two files describing vegetation for five Amazonian sites: Altamira, Bragantina, Tome-Acu, and Ponta de Pedras, all in the state of Para, and Yapu, Colombia. One file describes vegetation composition and structure (basal area, biomass, species composition) with different land use histories for all five study sites; the second file describes more specific information about individual plant characteristics (family/species names, DBH, stem and total plant height) within each plot.

For additional information, please see the following web sites:

- ACT, Indiana University (http://www.indiana.edu/~act/)
- Instituto Nacional de Meteorologia (http://www.inmet.gov.br/)

Related Data Set(s):

- LBA-ECO LC-09 Soil Composition and Structure in the Brazilian Amazon: 1992-1995 (Soil data from 4 of the same 5 Amazonian study sites)
- LBA-ECO LC-09 Daily Precipitation for Altamira and Santarem, Para, Brazil: 1961-1998 (Precipitation data from 3 of the 5 Amazonian study sites)

2. Data Characteristics:

File 1: LC09_Vegetation_Composition_Structure.csv. Missing data values are represented as -9999. Data are in a comma-separated ASCII format.

Column Number	Column Heading	Units/Format	Variable Description
1	Sample_year	YYYY	Sampling year (1992, 1993, 1994, 1995)
2	Latitude	UTM	X coordinates of center of site or site border - UTM, Brazil sites are generally Zone 22S, WGS84, Yapu site is Zone 19S,
3	Longitude	UTM	Y coordinates of center of site or site border - UTM, Brazil sites are generally Zone 22S, WGS84, Yapu site is Zone 19S
4	Location		Sampling location name (Altamira , Bragantina, Ponta de Pedras, Tome-Acu, Yapu) (sites of Acai (Euterpe oleracea) agroforestry are not included for the Ponta de Pedras region; agroforestry sites not included for Tome-Acu)
5	Sample_ID		Sample ID: site code + year of inventory, (e.g. A001-92, B001-92, P001-92, T001-02, YA008-95) (soil sampling was also carried out at each site, from 0 to 1 meter at 20 cm intervals)
6	LC_type		Land cover type sampled
7	LC_age	year	Land cover age (years)
8	LU_type		Land use type reported (years of use)
9	LULC_hist		Land use/land cover history with dates where available
10	Man_mec_ag		Agriculture methods (Manual, Mechanized, Mechanized/Manual)
11	Num_burn		Number of burnings
12	Fert_use		Fertilizer use (no, yes, no/yes)
13	Lrg_plot_area	m2	Large plot area
14	Med_plot_area	m2	Medium plot area
15	Sm_plot_area	m2	Small plot area
16	Veg_ba_und	m2/ha	Vegetation basal area (understory)
17	Veg_ba_ovr	m2/ha	Vegetation basal area (overstory)
18	Veg_ba_tot	m2/ha	Vegetation basal area (total)
19	Veg_biom_und	t/ha	Vegetation biomass (understory)
20	Veg_biom_ovr	t/ha	Vegetation biomass (overstory)
21	Veg_biom_tot	t/ha	Vegetation biomass (total)
22	Num_ind_und	n/ha	Number of individual plants (understory) per hectare
23	Num_ind_ovr	n/ha	Number of individual plants (overstory) per hectare
24	Veg_ht_avg	m	Vegetation height (average)

25	Veg_ht_max	m	Vegetation height (maximum)
26	Num_fam_und		Species composition - number of families (understory)
27	Num_fam_ovr		Species composition - number of families (overstory)
28	Num_fam_tot		Species composition - number of families (total)
29	Num_sp_und		Species composition - number of species (understory)
30	Num_sp_ovr		Species composition - number of species (overstory)
31	Num_sp_tot		Species composition - number of species (total)

Example Data Records:

Header records omitted
Column Number,Column Heading,Units/Format,Variable Description
1995,-9999,347822,Yapu,YA005-95,SS,15,Swidden agriculture,Before 1979-forest or old growth; 1979-crop; 1980-fallow ,No data reported,-9999,No data reported,1500,50,-9999,7.3,12.2,19.5,-9999,-9999,-9999,-9999,-9999,11.8,13.6,-9999,-9999,-9999,-9999,-9999,-9999
1995,-9999,346460,Yapu,YA004-95,SS,20,Swidden agriculture,Before 1974-forest or old growth; 1974-crop; 1975-fallow ,No data reported,-9999,No data reported,1500,50,-9999,7.8,10.7,18.5,-9999,-9999,-9999,-9999,-9999,11.42,12.7,-9999,-9999,-9999,-9999,-9999,-9999
...
1995,-9999,347910,Yapu,YA001-95,Upland forest,-9999,No use reported,No use reported,No data reported,-9999,No data reported,1500,50,-9999,6.4,34.1,40.5,-9999,-9999,-9999,-9999,-9999,16.5,20.9,-9999,-9999,-9999,-9999,-9999,-9999
1995,-9999,348417,Yapu,YA002-95,Sabana Alta,-9999,No use reported,No use reported,No data reported,-9999,No data reported,1500,50,-9999,4.59,15.24,19.75,-9999,-9999,-9999,-9999,-9999,13.3,15.5,-9999,-9999,-9999,-9999,-9999,-9999
1995,-9999,348417,Yapu,YA003-95,Savana Baixa,-9999,No use reported,No use reported,No data reported,-9999,No data reported,1500,50,-9999,0.72,-9999,0.72,-9999,-9999,-9999,-9999,-9999,1.12,2.8,-9999,-9999,-9999,-9999,-9999,-9999

File 2: LC09_VegetationSpecies_PlotData.csv. Missing data values are represented as -9999. Data are in a comma-separated ASCII format.

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Column Number	Column Heading	Units/format	Description
1	Sample_year	YYYY	Sampling year (1992, 1993, 1994, 1995)
2	Latitude	UTM	X coordinates of center of site or site border - UTM, Brazil sites are generally Zone 22S, WGS84, Yapu site is Zone 19S
3	Longitude	UTM	Y coordinates of center of site or site border - UTM, Brazil sites are generally Zone 22S, WGS84, Yapu site is Zone 19S
4	Location		Sampling location name (Altamira, Bragantina, Ponta de Pedras, Tome-Acu, Yapu) (sites of Acai (Euterpe oleracea) agroforestry are not included for the Ponta de Pedras region; agroforestry sites not included for Tome-Acu)
5	Site_num		Site number
6	Plot_num		Plot number
7	Subplot_num		Subplot number
8	Plot_area	m2	Plot area
9	SS_age		Age of secondary succession (years)
10	SS_state		State of secondary succession
11	Family		Plant family name
12	Species		Plant species name
13	Com_name		Plant common name. None, if not provided.
14	Num_ind		Number of individuals
15	Perc_cov	%	Percent of soil surface covered in vegetation
16	DBH	cm	Diameter at breast height in centimeters (cm)
17	Stem_ht	m	Stem height in meters (m)
18	Tot_ht	m	Total tree height in meters (m)
19	Broken_tree	yes	Yes, if measured plant was a broken tree. Otherwise, No.
20	Obs		Additional observations. None, if there are no observations.

Example Data Records:

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Header records omitted
Sample_year,Latitude,Longitude,Location,Site_num,Plot_num,Subplot_num,Plot_area,SS_age,SS_state,Family,Species,Com_name,Num_ind,Perc_cov,
DBH,Stem_ht,Tot_ht,Broken_tree,Obs
1992,9637017,344603,Altamira,1,1,0,2250,16,3,Cecropiaceae,Cecropia (folha fina),None,1,-9999,
27.12,10,18,No,None
1992,9637017,344603,Altamira,1,1,0,2250,16,3,Cecropiaceae,Cecropia (folha fina),None,1,-9999,
32.7,10,18,No,None
1992,9637017,344603,Altamira,1,1,0,2250,16,3,Lauraceae,Nectandra guianensis,None,1,-9999,
12.5,4,6,No,None
...
1995,19-0068933,351892,Yapu,8,10,0,100,3,1,Cecropiaceae,Cecropia sciadophylla,guarumo,6,-9999,
-9999,-9999,-9999,No,None
1995,19-0068934,351893,Yapu,8,10,0,100,3,1,-9999,-9999,yabiri (samambaia),30,-9999,
-9999,-9999,-9999,No,None
1995,19-0068935,351894,Yapu,8,10,0,100,3,1,Melastomataceae,Miconia sp. 2,tou,51,-9999,
-9999,-9999,-9999,No,None
```

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

Site (Region)	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude	Geodetic Datum
Para Eastern (Belem) - Bragantina (Para Eastern (Belem))	-53.80000	-53.52000	-2.50000	-1.00000	South-American Datum, 1969 (SAD-69)
Para Western (Santarem) - Altamira (Para Western (Santarem))	-54.00000	-51.00000	-2.5.0000	-4.00000	South-American Datum, 1969 (SAD-69)
Para Eastern (Belem) - Tome Acu (Para Eastern (Belem))	-48.18000	-48.18000	-2.40000	-2.40000	South-American Datum, 1969 (SAD-69)
Para Eastern (Belem) - Ponta de Pedras (Para Eastern (Belem))	-48.86000	-48.86000	-1.36000	-1.36000	South-American Datum, 1969 (SAD-69)
Colombia - Yapu (Colombia)	-72.00000	-69.00000	-1.50000	-2.50000	South-American Datum, 1969 (SAD-69)

Time period:

- The data set covers the period 1992/01/01 to 1995/12/31
- Temporal Resolution: each site was sampled once

Platform/Sensor/Parameters measured include:

- FIELD SURVEY/STEEL MEASURING TAPE/FOREST COMPOSITION/VEGETATION STRUCTURE
- FIELD SURVEY/HUMAN OBSERVER/LAND COVER

3. Data Application and Derivation:

In conjunction with other studies these data provide the basis to link patterns of regrowth and secondary succession to site characteristics such as soil classification and land use history as well as to remote sensing.

4. Quality Assessment:

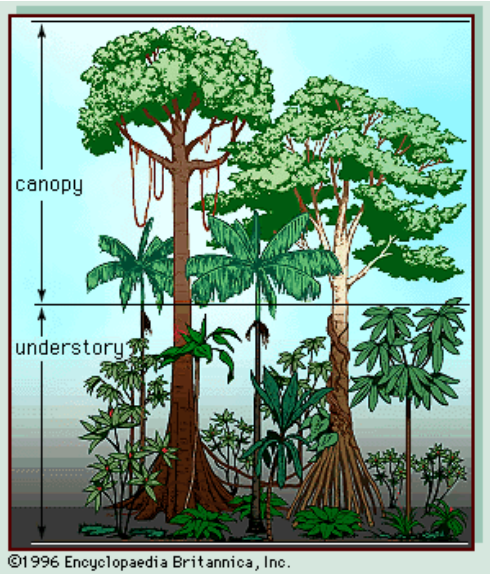
Plant characteristics was carried out by experienced botanists in the field and doubtful identifications were checked at the herbarium of EMBRAPA in Belem, Para. Botanical samples were collected from half of all species identified to ensure accuracy of taxonomic identification.

5. Data Acquisition Materials and Methods:

The sampling strategy used was comparable across sites and regions. The same plot and subplot sizes were used at each site and region, allowing cross-comparison and integration at the level of plot, site, and region. See the companion file, LC09_Vegetation_Sampling_Scheme.pdf for more information. Plots (10 x 15m) and subplots (5 x 2m) were randomly distributed, but nested inside each other to account for the detailed inventory of trees (DBH>10cm), saplings (DBH 2-10cm), seedlings (DBH<2 cm), and herbaceous vegetation. In the plots, all the individual trees were identified, and measured for DBH, stem height (height of the first major branch), and total height. In the subplots, all individual saplings were identified and measured for diameter and total height, while all

seedlings and herbaceous vegetation were identified and counted.

Above-ground dry biomass was derived from inventory data using allometric equations from the literature. Two different biomass equations were used to differentiate between trees and saplings. Brown et al.(1989) equation was used to estimate tree biomass (DBH>10cm). Another equation from Uhl et al. (1988) was used to estimate sapling biomass (DBH 2-10cm). Brown et al. (1989) equation, selected due to its focus on estimating mature forest biomass, was developed based on a large number of forest inventories from different areas of the tropics, focusing on adult trees and mature stands. Uhl et al. (1988) equation was developed from data collected from different stages of secondary succession sites in eastern Amazonia, derived mainly from sapling data. Uhl's generic species equation was selected due to its applicability to a wide range of species. One representative site of each vegetation type was selected for drawing a vegetation profile. Profile drawings were carried out in transects of 50-100 m. All individuals with DBH>2cm were identified, measured, and represented in the profile. Attention was paid to individual architecture, such as shape of trunk, branch distribution, canopy shape and intersection between different canopies. This vegetation profile was an important source of information about vegetation structure and stratification.



Typical drawing of a forest vegetation profile.

6. Data Access:

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

Data Archive Center:

Contact for Data Center Access Information:

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

7. References:

Brown, S., Gillespie, A.J.R., Lugo, A., 1989. Biomass estimation methods for tropical forests with applications to forest inventory data. For. Sci. 35 (4), 881-902.

Uhl, C., Buschbacher, R., Serrao, A.S., 1988. Abandoned pastures in eastern Amazonia. I. Patterns of plant succession. J. Ecol. 76, 663-681.doi:10.2307/2260566