LBA-ECO CD-11 Biophysical Measurements of Logged and Fire-Treated Forests, Brazil

Summary:

This data set reports the results of vegetation field surveys of tree height and diameter at breast height (DBH) in defined size classes at three study sites -- Santarem, Para; Paragominas, Para; and Alo Brasil, Mato Grosso, Brazil, from 2001-2003.

At each site, plots and transects within plots were defined that represented different types of logging and fire treatments, each including one primary forest plot used as a control. Along each transect all trees with more than 30 cm DBH were measured. Dead standing trees were also measured and classified in three levels of decomposition. A 4-m wide transect was used to measure individuals between 10 and 30 cm DBH. Six small subplots were set along each transect to measure regeneration individuals from 2-10 cm DBH and 0-2 cm DBH. Diameter is also provided for stumps found in each of the logged forest plots. There are ten comma-delimited data files with this data set.

Data Citation:

Cite this data set as follows:

Alencar, A.C., O. Carvalho Jr., R.A. Houghton, D.C. Nepstad, and S.N. Hayashi. 2012. LBA-ECO CD-11 Biophysical Measurements of Logged and Fire-Treated Forests, Brazil. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. http://dx.doi.org/10.3334/ORNLDAAC/1118

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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 Users who download LBA data in the five years after data have been archived must contact the investigators who collected the data, per provisions 6 and 7 in the Policy.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 September of 2012. Users who download the data between September 2012 and August 2017 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://lba.inpa.gov.br/lba/] 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: Carbon Dynamics

Team ID: CD-11 (Houghton / Alencar)

The investigators were Houghton, Richard A.; Alencar, Ane A.C.; Carvalho Jr., Oswaldo de; Hayashi, Sanae Nogueira; Lameira, Wanja Janayna Miranda; Scott, Neal A. and Stone, Thomas A. You may contact Houghton, Dr. Richard A. (houghton@whrc.org) and Alencar, Ms. Ane A.C. (ane@ipam.org.br).

LBA Data Set Inventory ID: CD11_Forest_Degradation

This data set reports the results of vegetation field surveys of tree height and diameter at breast height (DBH) in defined size classes at three study sites -- Santarem, Para; Paragominas, Para; and Alo Brasil, Mato Grosso, Brazil, from 2001-2003.

At each site, plots and transects within plots were defined that represented different types of logging and fire treatments, each including one primary forest plot used as a control. Along each transect all trees with more than 30 cm DBH were measured. Dead standing trees were also measured and classified in three levels of decomposition. A 4-m wide transect was used to measure individuals between 10 and 30 cm DBH. Six small subplots were set along each transect to measure regeneration individuals from 2-10 cm DBH and 0-2 cm DBH. Diameter is also provided for stumps found in each of the logged forest plots.

2. Data Characteristics:

Data are presented in 10 ASCII comma separated files:

File #1: CD11_STM_Inventory.csv
File #2: CD11_MT_Inventory.csv
File #3: CD11_PGM_Inventory.csv
File #4: CD11_PGM_E_Inventory.csv
File #5: CD11_STM_Regeneration_0-2cm.csv
File #6: CD11_MT_Regeneration_0-2cm.csv
File #7: CD11_PGM_Regeneration_0-2cm.csv
File #8: CD11_STM_Regeneration_2-10cm.csv

File #9: CD11_MT_Regeneration_2-10cm.csv
File #10: CD11_PGM_Regeneration_2-10cm.csv

For each of the three sites-Santarem, Paragominas, and (Alo Brasil) Mata Grosso- there are three files with the site identified by code in the file name (Santarem= STM, Paragominas= PGM and Mato Grosso= MT).

Files labeled inventory include measurements of all stems with a DBH of 10 cm or greater. For the Paragominas primary forest site, species were identified and those data are presented in their own inventory file: CD11_PGM_E_Inventory.csv.

Measurements of stems with diameters less than 10 cm are included in the files labeled Regeneration_0-2cm and Regeneration_2-10cm. Area sampled varied according to stem size and is detailed in the methods section.

Data organization for files 1-3:

File 1:CD11_STM_Inventory.csv
File 2: CD11_MT_Inventory.csv
File 3: CD11_PGM_Inventory.csv

Column	Heading	Units/format	Description
1	Site		Sampling site see associated text file for more information on the sampling sites
2	Plot		Plot identification
3	Transect		Transect identification
4	Section		Transect section: each transect was divided into 20 25 x 100 meter sections. Stems greater than or equal to 30 cm diameter were inventoried throughout the full section; stems between 10 and 30 cm were inventoried in a 4 by 25 meter sub-section along the main axis of the transect
5	Status		Status of the stem: L =live, D=dead and Logged= stump that was logged
6	DBH	cm	Diameter at breast height (1.3 meters above ground) in centimeters (cm): for stumps resulting from logging diameter was measured at the top of the stump
7	Ht	m	Stem height in meters
8	Decomposition		For standing dead trees state of decomposition was estimated: (1) Good condition, recently dead, (2) Medium condition, (3) Rotten, dead long time
9	Notes		Field notes including identification of palms, vines and cecropia stems or "None Provided"
missing data are represented by -9999			

Example data records for files 1-3:

Site,Plot,Transect,Section,Status,DBH,Ht,Decomposition,Notes
STM,B,1,0-25m,L,12.8,7.0,-9999,Cecropia
STM,B,1,0-25m,L,12.2,7.5,-9999,Cecropia
STM,B,1,0-25m,L,14.1,6.0,-9999,Cecropia
STM,B,1,0-25m,L,19.1,7.0,-9999,Cecropia
STM,B,1,0-25m,L,12.3,8.0,-9999,None Provided
STM,B,1,0-25m,L,12.0,5.0,-9999,None Provided
STM,B,1,0-25m,L,11.0,6.0,-9999,None Provided
STM,B,1,0-25m,L,58.3,5.0,-9999,Palm

File 4: CD11_PGM_E_Inventory.csv

Column	Heading	Units/format	Description
1	Site		Sampling site see associated text file for more information on the sampling sites
2	Plot		Plot identification
3	Transect		Transect identification
4	Status		Status of the stem: L =live, D=dead
5	DBH	cm	Diameter at breast height (1.3 meters above ground) in centimeters (cm): for stumps resulting from logging diameter was measured at the top of the stump
6	Ht	m	Stem height in meters
7	Local_name		Species identification to local name where possible or "Not identified"
8	Notes		Field notes including identification of palms, vines and cecropia stems or "None provided"
missing data are represented by -9999			

Example data records for file 4:

Site,Plot,Transect,Status,DBH,Ht,Local_name,Notes
PGM,E,1,D,11,7,Not identified,None Provided
PGM,E,1,D,13,14.7,Not identified,None Provided
PGM,E,1,D,13.5,4,Not identified,None Provided
PGM,E,1,D,16.5,7,Not identified,None Provided
PGM,E,1,D,18.4,5.5,Not identified,None Provided
PGM,E,1,D,22.3,3,Not identified,None Provided
PGM,E,1,D,30.7,10,Not identified,None Provided
PGM,E,1,D,36,11.5,Not identified,None Provided
PGM,E,1,D,38.1,14,Not identified,None Provided
PGM,E,1,D,39,6.8,Not identified,Stump

Data organization for files 5-7 (0-2 cm DBH) and files 8-10 (2-10 cm DBH):

File 5: CD11_STM_Regeneration_0-2cm.csv
File 6: CD11_MT_Regeneration_0-2cm.csv
File 7: CD11_PGM_Regeneration_0-2cm.csv

File 8: CD11_STM_Regeneration_2-10cm.csv
File 9: CD11_MT_Regeneration_2-10cm.csv
File 10: CD11_PGM_Regeneration_2-10cm.csv

Column	Heading	Units/format	Description
1	Site		Sampling site- see associated text file for more information on the sampling sites
2	Plot		Plot identification
3	Transect		Transect identification
4	Section		Transect section: each transect was divided into 20 25 x 100 meter sections
5	DBH	cm	Diameter at breast height (1.3 meters above ground) in centimeters (cm)
6	Ht	m	Stem height in meters
7	Notes		Field notes including identification of palms, vines and cecropia stems or "None Provided"
missing data are represented by -9999			

Example data records for files 5-7, 0-2 cm DBH:

```
Site,Plot,Transect,Section,DBH,Ht,Notes
STM,B,1,0-25m,0.70,0.18,None Provided
STM,B,1,0-25m,0.20,0.08,None Provided
STM,B,1,0-25m,0.30,-9999,Vine
STM,B,1,0-25m,0.70,-9999,Vine
STM,B,1,0-25m,1.70,1.30,None Provided
STM,B,1,0-25m,1.40,-9999,Vine
STM,B,1,0-25m,0.80,-9999,Vine
STM,B,1,0-25m,0.80,-9999,Vine
```

Example data records for files 8-10, 2-10 cm DBH:

```
Site,Plot,Transect,Section,DBH,Ht,Notes
STM,B,1,25-50m,4.6,2.50,None Provided
STM,B,1,75-100m,2.5,2.50,None Provided
STM,B,1,75-100m,2.2,2.50,None Provided
STM,B,1,75-100m,2.1,2.50,None Provided
STM,B,1,75-100m,2.7,1.80,None Provided
STM,B,1,75-100m,2.7,2.50,None Provided
STM,B,1,75-100m,3.8,3.50,None Provided
```

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

Site (Region)	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude	Geodetic Datum
PGM--Para Western (Santarem) - Paragominas (Para Western (Santarem))	-47.58	-47.04	-2.65	-3.28	World Geodetic System, 1984 (WGS-84)
STM--Para Western (Santarem) - Fazenda Treviso (Para Western (Santarem))	-54.9500	-54.7300	-3.09000	-3.21000	World Geodetic System, 1984 (WGS-84)
MT--Mato Grosso - Alo Brasil (Mato Grosso)	-52.33	-50.97	-11.28	-12.29	World Geodetic System, 1984 (WGS-84)

Time period

- The data set covers the period 2001/07/15 to 2003/09/01.
- Temporal Resolution: Annual

Platform/Sensor/Parameters measured include:

- FIELD INVESTIGATION / ANALYSIS / LAND USE CLASSES
- FIELD SURVEY / HUMAN OBSERVER / BIOMASS BURNING
- FIELD INVESTIGATION / HUMAN OBSERVER / FOREST COMPOSITION/VEGETATION STRUCTURE
- FIELD SURVEY / CAMERAS / RECLAMATION/REVEGETATION/RESTORATION

3. Data Application and Derivation:

Biomass inventories can be used to directly estimate carbon stocks using allometric equations to convert dbh and height into biomass. The regeneration surveys allow for the estimation of population structure and with growth data permit the estimation of recovery time for the forests post-logging.

4. Quality Assessment:

All data have been checked and no further changes to the data are anticipated. Estimates of total and commercial heights are considered accurate to within 1 meter. Measurements of diameter have an

associated error of plus or minus 0.2 cm while the estimated diameter values have an associated error of plus or minus 1 cm. Species identifications where given were done by local mateiros in the field and botanical specimens were not sent to an herbarium for confirmation. Local names may vary from location to location so caution is urged when assigning scientific names from the local identification.

5. Data Acquisition Materials and Methods:

Study Sites:

Measurements were collected from three study sites. Each site had five forested areas with five to six 500 x 500 m plots in each area. The forested areas are listed below:

- Alo Brasil, in the state of Mato Grosso, January and August of 2003.
  - AREA A - Transitional forest burned
  - AREA B - Transitional forest with conventional logging and one understory fire in 1998
  - AREA C - Transitional primary forest (no logging and understory fires)
  - AREA D - Transitional forest logged
  - AREA E - Transitional forest with two consectuves understory fires 2001 and 2002

- Santarem, in the state of Para, Brazil, July 2001 and August, 2002 :
  - AREA B - Dense forest with two understory fires, one in 1997 and another in 1998
  - AREA C - Dense forest with one light understory fire in 1998
  - AREA D - Dense forest with three understory fires, one in 1997 and two in 1998
  - AREA E - Dense primary forest
  - AREA G - Dense forest with traditional logging

- Paragominas, in the state of Para, Brazil, February and June, 2003:
  - AREA A - Dense forest logged
  - AREA A - Dense forest logged
  - AREA A - Dense forest logged
  - AREA D - Dense forest logged
  - AREA E - Dense primary forest

Methods

For each study site, the field survey was conducted in five to six 500 x 500 m plots including one for primary forest used as a control plot and the rest with different types of logging and/or fire treatments. In each plot there were five transects 500 m long and 100 m apart, covering an area of 25 ha per plot. The only exception was the primary forest plot in Paragominas, which had 3 transects of 1000 m.

- The width of each transect was 14 m (7 m to each side of the transect path) where all trees with more than 30 cm diameter at breast height (DBH) were measured. Dead standing trees were also measured and classified in three classes of decomposition: (1) Good condition, recently dead, (2) Medium condition, or (3) Rotten, dead a long time.
- A 4 m width transect was used to measure individuals between 10 and 30 cm DBH.
- Six small subplots were set along each transect to measure regeneration individuals in the following categories: 2 to 10 cm DBH and less than 2 cm DBH.
- All the stumps found in each of the logged forest plots had their diameter measured and were mapped using GPS to estimate the amount of wood harvested.

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:

Alencar, A., D. Nepstad, M.C. Vera Diaz. 2006. Forest understory fire in the Brazilian Amazon in ENSO and non-ENSO Years: area burned and committed carbon emissions. Earth Interactions. Vol. 10. Paper 6: 1-17.

Alencar, A.; Solorzano, L.; Nepstad, D. Modeling Forest Understory Fires in an Eastern Amazonian Landscape. Ecological Application. 14(4) Supplement, 2004, pp. S139–S149