LBA-ECO LC-21 Foliar Nutrients, Logged Areas, Tapajos Forest, Para, Brazil: 2003

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Revision date: July 15, 2014

Summary:

This data set provides measurements for foliar nutrients from logging blocks in the Tapajos National Forest, Para Western Santarem, Brazil. Data are included for calcium (Ca), phosphorus (P), magnesium (Mg), nitrogen (N), and potassium (K) concentrations. In March 2003, foliar samples were collected from the cover types remaining after selective logging in 2002: forest, tree-fall gaps, skids, roads, and deck areas. Fresh foliage was also collected in March 2003 from 192 upper canopy species at an intact forest site 17 km from the logging area.

There are two data files with this data set.

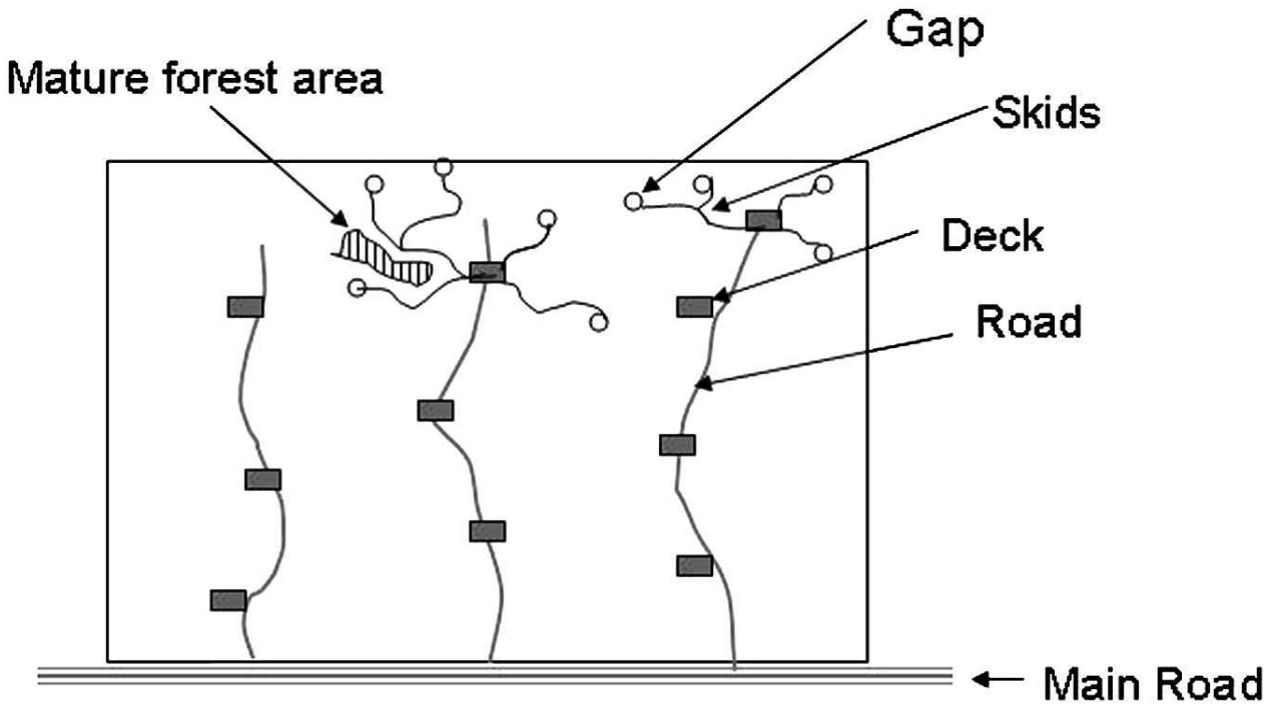

Figure 1. Diagram of a logging block. Image from Olander et al., 2005.

Data Citation:

Cite this data set as follows:

Asner, G.P., L.P. Olander. 2014. LBA-ECO LC-21 Foliar Nutrients, Logged Areas, Tapajos Forest, Para, Brazil: 2003. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. http://dx.doi.org/10.3334/ORNLDAAC/1234

Implementation of the LBA Data and Publication Policy by Data Users:

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 Users who download LBA data in the five years after data have been archived must contact the investigators who collected the data, per provisions 6 and 7 in the Policy.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 July 2014. Users who download the data between July 2014 and July 2019 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-21 (Asner / Bustamante / Silva)

The investigators were Asner, Gregory Paul; Bustamante, Mercedes M.C.; Silva, Jose Natalino Macedo; Broadbent, Eben North; Carlson, Kim; Carvalho, Ana Paula Ferreira; Hare, Anna Quinn; Knapp, David E.; Oliveira, Paulo Jose Silva Costa; Prado, Zayra Azeredo; Silva, Jose Salomao Oliveira and Villagomez,

April Marie. You may contact Bustamante. Mercedes (mercedes@unb.br) and Asner, Gregory P. (gpa@stanford.edu)

LBA Data Set Inventory ID: LC21_Foliar_Nutrients

This data set provides measurements for foliar nutrients from logging blocks in the Tapajos National Forest, Para Western Santarem, Brazil. Data are included for calcium (Ca), phosphorus (P), magnesium (Mg), nitrogen (N), and potassium (K) concentrations. In March 2003, foliar samples were collected from the cover types remaining after selective logging in 2002: forest, tree-fall gaps, skids, roads, and deck areas. Fresh foliage was also collected in March 2003 from 192 upper canopy species at an intact forest site 17 km from the logging area.

Related Data Set:

LBA-ECO LC-13 GIS Coverages of Logged Areas, Tapajos Forest, Para, Brazil : 1996, 1998.

2. Data Characteristics:

There are two comma-delimited data files with this data set.

NOTE: The sampling sites and skid trails were not defined but are believed to be those found in the Asner et al., 2008 data set.

File #1. **LC21_Foliar_Nutrients.csv**

Column	Column Heading	Units/format	Description
1	Sample_ID		*Sample id: B=block #, R=road number, P=patio #, F, S,T, and R=location paired to the number of sample.
2	Location		Forest, gap, skid trail, patio or road
3	Block		Logging block
4	Road		Road ID within each block
5	Landing		Landing ID along each road
6	Skid trail		Skid trail ID associated with each landing (see Figure 1)
7	Sample		Sample ID
8	N	%	N concentration in leaf tissue
9	P	mg kg-1	P concentration in leaf tissue
10	K	mg kg-1	K concentration in leaf tissue
11	Ca	mg kg-1	Ca concentration in leaf tissue
12	Mg	mg kg-1	Mg concentration in leaf tissue

-9999 represents data not provided with this data set.

*The Sample ID description was taken from the data set " LBA-ECO LC-13 GIS Coverages of Logged Areas, Tapajos Forest, Para, Brazil: 1996, 1998", available from the ORNL DAAC.

Example data:

```
Sample ID,Location,Block ,Road,Landing,Skid trail,Sample,N ,P ,K,Ca,Mg
B17RIP3F1,FOREST,17,1,3,-9999,F1,1.67,0.4881,0.9557,8.471,1.754
B17RIP3F2,FOREST,17,1,3,-9999,F2,2.25,0.5259,1.061,12.26,1.699
...
B19R2P3S4T1-4,GAP,19,2,3,4,T1-4,1.62,0.7431,0.8797,7.378,1.758
B19R2P3S4T1-5,GAP,19,2,3,4,T1-5,1.44,0.8123,1.941,9.743,2.483
...
B21R2-1,ROAD,21,2,-9999,-9999,1,-9999,0.4964,0.909,2.721,0.8634
B21R2-5,ROAD,21,2,-9999,-9999,5,-9999,0.3113,0.6271,7.2,1.105
```

File #2. **LC21_Species_Foliar_Nutrients.csv**

Column	Column Heading	Units/format	Description
1	Species		Name of species sampled
2	N	%	N concentration in leaf tissue
3	P	mg kg-1	P concentration in leaf tissue
4	K	mg kg-1	K concentration in leaf tissue
5	Ca	mg kg-1	Ca concentration in leaf tissue
6	Mg	mg kg-1	Mg concentration in leaf tissue

-9999 and "not provided" represent data not provided with this data set.

Example data:

```
Species,N,P,K,Ca,Mg
Piquia verdadeira - 580,,1.69,0.608,2.29,13.87,4.575
Not provided,-9999,0.7509,4.612,4.374,1.533
Murici Branco - 580,1.95,0.4599,4.45,18.63,2.816
...
Breu Sucuruba (30) rep 208,1.66,1.121,0,5.265,1.224
Padrão,2.65,1.382,23.72,15.24,3.863
...
Papo de Mutum (590),1.83,0.5683,3.958,7.314,0.9151
Toren (730) (rep 275),2.62,1.085,0,12.5,1.534
```

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

Site (Region)	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude	Geodetic Datum
Para Western - FLONA Tapajos (Para Western (Santarem))	-55.25	-54.83333	-2.75	-3.58333	World Geodetic System, 1984 (WGS-84)

Time period:

- The data set covers the period 2003/03/01 to 2003/03/01.
- Temporal Resolution: Single data collection

Platform/Sensor/Parameters measured include:

- LABORATORY / ICP-AES (INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION / CALCIUM
- LABORATORY / ICP-AES (INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION / POTASSIUM
- LABORATORY / ICP-AES (INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION / MAGNESIUM
- LABORATORY / ICP-AES (INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION / PHOSPHORUS
- LABORATORY / ICP-AES (INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION / NUTRIENTS
- LABORATORY / COLORIMETERS / NITROGEN

3. Data Application and Derivation:

These data were collected to demonstrate how the nutrient concentration changes from fresh foliage to litter after a selective logging event.

4. Quality Assessment:

The sampling sites and skid trails were not defined but are believed to be those found in the Asner et al., 2008 data set.

5. Data Acquisition Materials and Methods:

Site description

The selective logging site is located in the northern part of the Tapajós National Forest (TNF) in Pará, Brazil, about 50-km south of Santarém, on a plateau that runs along the east side of the Tapajós River. The logging area is minimally bisected by drainages. The soils are 70% clay dominated (ultisols and oxisols) and 30% sand dominated (ultisols; Silver et al. 2000). Mean annual temperature is 25 degrees C and rainfall averages 2,000 mm yr-1 with most inputs during the wet season from January through June (Nepstad et al. 2004).

Selective logging was carried out in blocks of approximately 100 ha, and had four spatially explicit impacts:

- logging roads;
- logging decks, where logs are temporarily stacked for movement off site;
- skids trails along which mechanical skidders pull logs from the forest to the decks;
- tree-fall gaps, where the canopy falls and remains after being cut from the tree bole.

Methods

In March 2003, four blocks logged between August and October 2002 were sampled. These blocks were located on clay-dominated (oxisols) soils. Samples

were ramdomly selected from two logging decks from each block. Samples were collected along the roads leading to the decks every 10 m along a 40-m transect (n=5), and in the decks every 5 m along a central transect (25-m × 25-m) with three additional samples taken in the center spaced at least 2 m apart (n=7). Out from the decks, one skid was sampled every 10 m along a 40-m transect (n=5). At the first tree crown found, five samples were taken in and around the fallen crown (n=5). In the matrix of unlogged forest at least 10 m from any deck, skid, road, or gap, three to five samples were taken at 10-m intervals along transects (n=3 or 5) (Olander et al., 2005).

Fresh foliage was collected from 192 upper canopy species at a site 17 km from the logging area. The species were selected based on relative abundance and comprised of all genera listed by Keller et al. (2001), and Asner et al. (2004). Foliage was shot from full sunlight positions using a shotgun, captured, and pressed for subsequent drying at 70 degrees C for five days. Samples were transported to the University of Brasilia for nutrient analysis using an ICP mass spectrometer (ICP-AES, IRIS/AP, Jarrell-Ash Corp., Franklin, MA, USA). Nitrogen concentration was measured by Nessler colorimetric method. Two analytical replicates per sample were analyzed using reference material (1547, Peach Leaves, NIST). Data were partitioned by mature and pioneer habitat, as described by Parrotta et al. (1995).

6. Data Access:

These data are 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:

Asner, G.P., M. Keller, R. Pereira, and J.C. Zweede. 2008. LBA-ECO LC-13 GIS Coverages of Logged Areas, Tapajos Forest, Para, Brazil : 1996, 1998. 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/893.

Asner, G.P., A.R. Townsend, M.M.C. Bustamante, G.B. Nardoto, and L.P. Olander. 2004. Pasture degradation in the central Amazon: Linking changes in carbon and nutrient cycling with remote sensing. Global Change Biology 10:844-862.

Keller, M., M. Palace, and G. Hurtt. 2001. Biomass estimation in the Tapajos National Forest, Brazil: Examination of sampling and allometric uncertainties. Forest Ecology and Management 154:371-382.

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Parrotta, J. A., J. K. Francis, and R. Rolo de Almeida, 1995: Trees of Tapajos. U.S. Department of Agriculture Forest Service General Tech. Rep. IITF-1.

Silver, W. L., J. Neff, M. McGroddy, E. Veldkamp, M. Keller, and R. Cosme, 2000: Effects of soil texture on belowground carbon and nutrient storage in a lowland Amazonian forest ecosystem. Ecosystems, 3, 193–209.