

# LBA-ECO CD-02 Leaf Water Potential, Forest and Pasture Sites, Para, Brazil: 2000-2001

## Summary:

Data are reported for leaf water potential of leaves of seven species of trees and lianas from the primary forest at the km 67 Tower Site, Tapajos National Forest, and measurements of five sapling tree species and the grass *Brachiaria brizantha* from a pasture site located near the km 77 Pasture Tower Site, approximately 10 km from the primary forest site. The research area is situated within the Tapajos National Forest reserve, south of the city of Santarem, Para, Brazil. Measurements were made quarterly between March 2000 and March 2001. There is one comma-delimited data file with this data set.

## Data Citation:

Cite this data set as follows:

Almeida, D.,T.F. Domingues, J. Ehleringer, L.A. Martinelli, C. Cook, L. Flanagan, J. Berry, and J.P. Ometto. 2012. LBA-ECO CD-02 Leaf Water Potential, Forest and Pasture Sites, Para, Brazil: 2000-2001. 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/1100>

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This data set was archived in July of 2012. Users who download the data between July 2012 and June 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 website [<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.

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## 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-02 (Ehleringer / Martinelli)

The investigators were Cook, Craig; Domingues, Tomas Ferreira; Ehleringer, James; Flanagan, Lawrence; Martinelli, Luiz Antonio; Ometto, Jean Pierre H.B.; Berry, Joseph and Almeida, Diane. You may contact Domingues, Tomas (tdomingu@staffmail.ed.ac.uk).

**LBA Data Set Inventory ID:** CD02\_Leaf\_Water\_Potential

Data are reported for leaf water potential of leaves of seven species of trees and lianas from the primary forest at the km 67 Tower Site, Tapajos National Forest, and measurements of five sapling tree species and the grass *Brachiaria brizantha* from a pasture site located near the km 77 Pasture Tower Site, approximately 10 km from the primary forest site. The research area is situated within the Tapajos National Forest reserve, south of the city of Santarem, Para, Brazil. Measurements were made quarterly between March 2000 and March 2001.

## 2. Data Characteristics:

Data are presented in one comma-delimited ASCII file: CD02\_Leaf\_Water\_Potential.csv.

Column	Heading	units/format	Description
1	Site		Sampling location
2	Date	yyyymmdd	Sampling date (yyyymmdd)
3	Time		Sampling time: either predawn or midday
4	Vegetation		Surrounding vegetation: either forest or pasture
5	Common_name		Common name of the species sampled where known
6	Scientific_name		Scientific name (genus species) of the species sampled where known
7	LWP_1	MPa	The 1st of 6 replicate measurements of leaf water potential made with a Scholender's pressure chamber, in mega Pascals (MPa)
8	LWP_2	MPa	The 2nd of 6 replicate measurements of leaf water potential made with a Scholender's pressure chamber, in mega Pascals (MPa)
9	LWP_3	MPa	The 3rd of 6 replicate measurements of leaf water potential made with a Scholender's pressure chamber, in mega Pascals (MPa)
10	LWP_4	MPa	The 4th of 6 replicate measurements of leaf water potential made with a Scholender's pressure chamber, in mega Pascals (MPa)

			Pascals (MPa)
11	LWP_5	MPa	The 5th of 6 replicate measurements of leaf water potential made with a Scholender's pressure chamber, in mega Pascals (MPa)
12	LWP_6	MPa	The 6th of 6 replicate measurements of leaf water potential made with a Scholender's pressure chamber, in mega Pascals (MPa)
13	Mean_LWP		Mean leaf water potential for the individual based on an average of the measurements made
14	St_dev_LWP		Standard deviation of the mean leaf water potential
Missing data are represented by -9999			

**Example data records:**

```

Site,Date,Time,Vegetation,Common_name,Scientific_name,LWP_1,LWP_2,LWP_3,LWP_4,LWP_5
,LWP_6,Mean_LWP,St_dev_LWP
STM km 67 tower,20000321,Predawn,forest,Breu,Protium sp.,-0.05,-0.05,-0.05,-9999,-9999,-9999,-
0.05,0
STM km 67 tower,20000321,Predawn,forest,Caferana,Coussarea racemosa,-0.05,-0.05,-0.05,-
9999,-9999,-9999,-0.05,0
...
STM km 67 tower,20001012,Predawn,forest,Breu,Protium sp.,-0.1,-0.2,-0.15,-9999,-9999,-9999,-
0.15,0.05
STM km 67 tower,20001012,Predawn,forest,Caferana,Coussarea racemosa,-0.25,-0.2,-0.2,-9999,-
9999,-9999,-0.22,0.03
...
STM km 77 tower,20010302,Midday,pasture,Shrub 7,Not identified,-0.2,-0.25,-0.25,-9999,-9999,-
9999,-0.23,0.03
STM km 77 tower,20010302,Midday,pasture,Shrub 8,Not identified,-0.25,-0.25,-0.25,-9999,-9999,-
9999,-0.25,0

```

**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 Primary Forest Tower Site (Para Western (Santarem))	-54.95900	-54.95900	-2.85700	-2.85700	World Geodetic System, 1984 (WGS-84)
Para Western (Santarem) - km 77 Pasture Tower Site (Para Western (Santarem))	-54.88850	-54.88850	-3.02020	-3.02020	World Geodetic System, 1984 (WGS-84)

## **Time period**

- The data set covers the period 2000/03/01 to 2001/03/31.
- Temporal Resolution: Quarterly

## **Platform/Sensor/Parameters measured include:**

- FIELD INVESTIGATION / PRESSURE CHAMBER / LEAF CHARACTERISTICS

## **3. Data Application and Derivation:**

These data, in combination with leaf level gas flux measurements, can be used to better understand ecophysiological parameters related to leaf level water and carbon fluxes, and the influence of wet and dry season on gas exchange parameters.

## **4. Quality Assessment:**

Data have been checked and no further changes are anticipated.

## **5. Data Acquisition Materials and Methods:**

### **Site description:**

Measurements and leaf collections occurred at both undisturbed eastern Amazonian lowland tropical rain forest and pasture ecosystems, between March 2000 and March 2001, covering both wet and dry seasons. Edaphic and biological information about these sites were presented elsewhere (Silver et al., 2000, Vieira et al., 2004). The forest site was situated within the Tapajos National Forest reserve of the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) located 67 km south of the city of Santarem, in the state of Para. Annual precipitation averaged 2,097 mm per year between 1999 and 2003. From July through November that region usually experiences a five month dry season when precipitation averages less than 100 mm per month. Daily evapotranspiration averages 3.6 mm per day during the wet season and 4 mm per day during the dry season, while soil water content at a depth of 10 cm typically remained above 0.3 cm<sup>3</sup> cm<sup>-3</sup> (da Rocha et al. 2004). Air temperature above the canopy varies little throughout the year with maximum daily temperatures ranging between 24 and 32 degrees C and minimum daily temperatures ranging between 20 and 25 degrees C (Goulden et al., 2004).

The km 77 Pasture Tower Site site used in this study was located approximately 10 km from the primary forest site and is subject to similar regional climatic patterns. The pasture was characteristic of an old (ca. 13 years) cattle ranch farm planted with the C4 grass *Brachiaria brizantha* Stapf. and moderately colonized by saplings of forest species (Sakai et al., 2004).

### **Sampling of foliage:**

Leaves of seven tree and liana species were collected pre-dawn and mid-day from the two 25 m walk-up towers adjacent to the eddy covariance tower at the site during four field trips spanning from the wet season of 2000 to the wet season of 2001.

At the pasture site, samples were collected from five sapling species and the grass *Brachiaria brizantha* during the wet and dry seasons of 2001.

Four to five leaves were collected from each individual and stored inside plastic bags containing wet paper towels, and then placed inside a cooler containing ice.

#### **Leaf water potential measurements:**

Analyses of leaf water potential were made within two hours after cutting the plant material. Six replicate measurements were made on each sample. Pre-dawn and mid-day leaf water potentials were measured with a Scholander pressure chamber (Plant Water Status Console, Model 3005-1422, Soil Moisture Corp., Goleta, CA).

## **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](mailto:uso@daac.ornl.gov)

Telephone: +1 (865) 241-3952

## **7. References:**

da Rocha, H.R., M.L. Goulden, S.D. Miller, M.C. Menton, L.D.V.O. Pinto, H.C. de Freitas and A.M. e S. Figueira. 2004. Seasonality of water and heat fluxes over a tropical forest in eastern Amazonia. *Ecol. Appl.* 14:22-32.

Goulden, M.L., S.D. Miller, H.R. da Rocha, M.C. Menton, H.C. de Freitas, A.M.E.S. Figueira, and C.A.D. de Sousa. 2004. Diel and seasonal patterns of tropical forest CO<sub>2</sub> exchange. *Ecological Applications* 14(4):S42-55.

Sakai, R.K., D.R. Fitzjarrald, O.L.L. Moraes, R.M. Staebler, O.C. Acevedo, M.J. Czikowsky, R. Da Silva, E. Brait, and V. Miranda. 2004. Land-use change effects on local energy, water, and carbon balances in an Amazonian agricultural field. *Global Change Biology* 10(5):895-907.

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(2):193-209.

Vieira, S., P.B. de Camargo, D. Selhorst, R. Da Silva, L. Hutryra, J.Q. Chambers, I.F. Brown, N. Higuchi, J. dos Santos, S.C. Wofsy, S.E. Trumbore, and L.A. Martinelli. 2004. Forest structure and carbon dynamics in Amazonian tropical rain forests. *Oecologia* 140(3):468-479.