

Revision date: October 21, 2009

LBA-ECO CD-04 CO₂ Profiles, km 83 Tower Site, Tapajos National Forest

Summary:

Atmospheric carbon dioxide profiles were measured at 12 levels up to 64 m at the km 83 logged tower site in Tapajos National Forest, Santarem, Para, Brazil. Data were collected over 3.5 years between June 2000-March 2004. An infra-red gas analyzer sequentially measured the concentration of CO₂ at 12 heights (0.1, 0.35, 0.7, 1.4, 3, 6, 10.7, 20, 35, 40, 50, 64 m above the ground) on the tower every 48 minutes. The data, reported on a 30 minute interval, are provided in one single comma separated file.



Km 83 logged tower site in Tapajos National Forest

Data Citation:

Cite this data set as follows:

Miller, S., M. Goulden, and H.R. da Rocha, 2009. LBA-ECO CD-04 CO2 Profiles, km 83 Tower Site, Tapajos National Forest. 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/947](https://doi.org/10.3334/ORNLDAAC/947)

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 Users who download LBA data in the five years after data have been archived must contact the investigators who collected the data, per provisions 6 and 7 in the Policy.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 October of 2009. Users who download the data between October 2009 and September 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://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](#)
- [2 Data Characteristics](#)
- [3 Applications and Derivation](#)
- [4 Quality Assessment](#)
- [5 Acquisition Materials and Methods](#)
- [6 Data Access](#)
- [7 References](#)

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-04 (Goulden / Rocha)

The investigators were Goulden, Prof. Michael L.; Miller, Dr. Scott Dennis and Rocha, Prof. Humberto Ribeiro da . You may contact Miller, Dr. Scott D. (smiller@albany.edu)

LBA Data Set Inventory ID: CD04_CO2_Profiles

Atmospheric carbon dioxide concentrations measured at 12 levels between 10 cm and 64 m at the logged tower site in Tapajos National Forest (km 83). Data were collected over 3.5 years between June 2000-March 2004.

Related Data Set:

- [LBA-ECO CD-04 Meteorological and Flux Data, km 83 Tower Site, Tapajos National Forest](#) (Eddy flux and meteorological data collected at the same site over the same time period)

2. Data Characteristics:

Data were all collected within the Tapajos National Forest, 83 km south of the city of Santarem, Para. Data are presented in one ASCII file: **CD04_km83_CO2_profiles.csv**

There are 19 columns, representing measured or calculated quantities, separated by commas. There are 64992 records (rows), each corresponding to a 30 minute interval for a total 1354 days beginning June 29, 2000 and ending March 11, 2004. The first timestamp is experiment day 181, or June 29, 2000. The last timestamp is day 1535, or March 11, 2004, the day that a tree fell on the tower. The data are not gap-filled.

Data Quality Note: Please note that the data file has a few additional records-before and after the stated timestamps. Users may exclude records as appropriate for their analyses.

CD04_km83_CO2_profiles.csv:

File Contents / Variable Descriptions:

Column #	Heading	Units/format	Description
1	exp_day		experiment day (0 = January 1, 2000, 00:00 hours)
2	year	yyyy	year
3	month	mm	month
4	day	dd	day
5	hour	hh	hour at start of sampling period (GMT:24 hour clock)
6	minute	mm	minute at start of sampling period (GMT)
7	CO2_10cm	ppm	atmospheric CO2 concentration at 10 cm height
8	CO2_35cm	ppm	atmospheric CO2 concentration at 35 cm height
9	CO2_70cm	ppm	atmospheric CO2 concentration at 70 cm height
10	CO2_1_4m	ppm	atmospheric CO2 concentration at 1.4 m height
11	CO2_3m	ppm	atmospheric CO2 concentration at 3 m height
12	CO2_6m	ppm	atmospheric CO2 concentration at 6 m height
13	CO2_10_7m	ppm	atmospheric CO2 concentration at 10.7 m height
14	CO2_20m	ppm	atmospheric CO2 concentration at 20 m height
15	CO2_35m	ppm	atmospheric CO2 concentration at 35 m height
16	CO2_40m	ppm	atmospheric CO2 concentration at 40 m height
17	CO2_50m	ppm	atmospheric CO2 concentration at 50 m height
18	CO2_64m	ppm	atmospheric CO2 concentration at 64 m height
19	fstor_64m	micromoles/m2/s	CO2 storage flux below 64 m
<p>This data set is not gap-filled.</p> <p>Missing data are represented by -999</p>			

Example Data Record:

```

exp_day,year,month,day,hour,minute,CO2_10cm,CO2_35cm,CO2_70cm,CO2_1_4m,CO
2_3m,CO2_6m,CO2_10_7m,
CO2_20m,CO2_35m,CO2_40m,CO2_50m,CO2_64m,fstor_64m

174,2000,6,22,0,0,-999,-999,-999,-999,-999,-999,-999,-999,-999,-999,-999
174.020833,2000,6,22,0,30,486.88,474.91,475.56,472.37,467.14,463.9,462.86,428.48,410.
14,401.06,399.01,399.01,12.46
174.041667,2000,6,22,1,0,494.69,489.22,483.65,474.13,472.1,470.84,466.25,469.44,410.1
1,403.76,399.81,397.55,3.54
...
1536.958333,2004,3,15,23,0,475.15,452.91,467.6,456.81,457.44,442.58,445.46,444.64,42
2.7,404.33,399.93,399.93,-999
1536.979167,2004,3,15,23,30,476.02,476.02,470.48,467.1,455.29,454.46,463.61,461.19,4
23.23,396.67,403.29,-999,-999
1537,2004,3,16,0,0,-999,-999,-999,-999,-999,-999,-999,-999,-999,-999,0

```

Site (Region)	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude	Geodetic Datum
Para Western (Santarem) - km 83 Logged Forest Tower (Para Western (Santarem))	-54.96889	-54.96889	-3.01806	-3.01806	World Geodetic System, 1984 (WGS-84)

Time period:

- The data set covers the period 2000/07/01 to 2004/03/12
- Temporal Resolution: 30-Minute

Platform/Sensor/Parameters measured include:

- TOWER / IRGA (INFRARED GAS ANALYZERS) / CARBON DIOXIDE
- FLUX TOWER / SONIC ANEMOMETER / CARBON DIOXIDE FLUX

3. Data Application and Derivation:

The amount of CO₂ stored beneath the CO₂ measurement inlets (64 m) can be calculated by integrating the CO₂ profile between 0 and 64 m. The storage flux was then calculated by differentiating this quantity with respect to time.

Analysis of eddy covariance observations provides information useful for identifying which physiological and physical processes play dominant roles in controlling CO₂ exchange. In turn, this information contributes to the development and improvement of models of ecosystem-atmosphere CO₂ exchange and to understanding which processes are particularly sensitive to future change.

4. Quality Assessment:

This data set is not gap-filled. Missing values or data that were flagged as unreliable either by an objective algorithm or subjective inspection have been given a value of -999. Please note that gap-filled CO₂ storage flux data are available in the related data set Miller et al. (2009).

5. Data Acquisition Materials and Methods:

An infra-red gas analyzer (IRGA, LI-COR LI7000 or, before Dec. 2000, a LI800, Lincoln NE) sequentially measured the densities of CO₂ and H₂O at 12 altitudes (0.1, 0.35, 0.7, 1.4, 3, 6, 10.7, 20, 35, 40, 50, 64 m above the ground) every 48 minutes. Four slpm (standard liters per minute) of air was drawn through a 2 micron filter at each altitude, down 5.5-mm inner-diameter polyethylene lined tubing (Furon Dekabon 1300), through a solenoid manifold in an enclosure at the base of the tower (Parker General Valve, Fairfield NJ), into the equipment hut, and through the IRGA cell. The average CO₂ and H₂O mixing ratios at each level were calculated during the last minute of each 4-minute sampling interval, and observations were then interpolated to each half-hour to synchronize with the eddy flux measurements.

The pressure in the IRGA cell was actively controlled at 83 kPa (MKS Instruments, Andover MA). The IRGA was calibrated for CO₂ and water vapor daily by sequentially sampling purge air, CO₂ standard in air (+/-1% Scott Marin, Riverside CA), CO₂ free air (Scott Marin, Riverside CA), and 16 degree C dew point air (LI-COR LI610, Lincoln NE).

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:

None cited.

Related Publications

- Miller, S.D., M.L. Goulden, M.C. Menton, H.R. da Rocha, H.C. de Freitas, A.M.E.S. Figueira, and C.A.D. de Sousa. (2004) Biometric and micrometeorological measurements of tropical forest carbon balance. *Ecological Applications* 14(4):S114-126. [doi:10.1890/02-6005](https://doi.org/10.1890/02-6005)
- 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 CO₂ exchange. *Ecological Applications* 14(4):S42-55. [doi:10.1890/02-6008](https://doi.org/10.1890/02-6008)

| [ORNL DAAC Home](#) || [ORNL Home](#) || [NASA](#) || [Privacy, Security, Notices](#) || [Data Citation](#) || [Rate Us](#) || [Help](#) |
[User Services](#) - Tel: +1 (865) 241-3952 or E-mail: uso@daac.ornl.gov
webmaster@daac.ornl.gov