

# Long-term legacy of the LBA-ECO Project: Data archives

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- 2) LBA-DIS, CPTEC
- 3) ORNL Biogeochemical Data Archive Center



## Phase 3 Synthesis & Integration

# LBA -ECO

a component of the  
Large-Scale  
Biosphere-  
Atmosphere

SEARCH SITE 

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Experiment  
in

Amazonia

### Synthesis

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### Data

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Investigator Checklist  
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Document Your Data  
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### Education

Activities  
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Personnel Quick Search

## Upcoming Event

### 12th Science Team Meeting Join LBA-ECO Friday, August 13, 2010 -LEARN MORE-

To be held following the [Meeting of the Americas](#)  
[LBA-related sessions](#) at the Meeting of Americas

## Project Results

- [Peer-reviewed Publications](#)
- [Documented Data Sets](#)
- [Investigation Profiles](#)
- [Meeting Archives](#)
- [Book Now Available](#)  
[Amazonia and Global Change](#): a synthesis of LBA results



## NEWS

**DEADLINE EXTENSION** -  
LBA Program is recruiting a  
Scientific Officer [posted  
4.26.10]

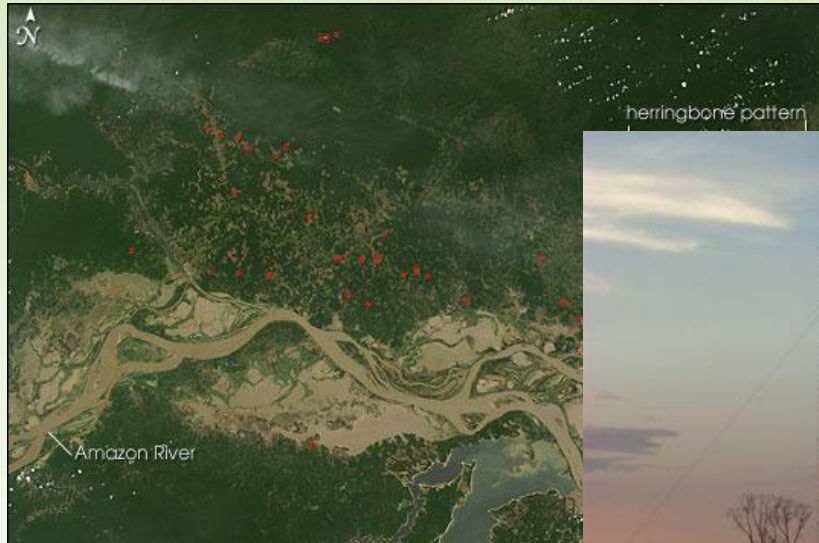
**Accused Americans Could  
be Stuck in Brazil for  
Months** Two University of  
Arizona geoscientists and  
one University of Minnesota-  
Duluth student were  
arrested by federal police  
June 16, 2009 while working  
on a climate change project  
with the University of the  
State of Sao Paulo using  
only tourist visas. [posted  
July 2009]

**NASA's Earth Observatory  
hosts web series on LBA**

**World of Change: Amazon  
Deforestation** The state of  
Rondonia in western Brazil is  
one of the most deforested  
parts of the Amazon.  
[posted June 2009]

**Fires and Deforestation  
on the Amazon Frontier**

# Integrated Research Approach







# LBA Data and Publication Policies

1. Data generated by LBA will become public domain and will be permanently archived in Brazil.
2. All LBA data should be available to all LBA researchers.
3. There will be no periods of exclusive rights to publish LBA results.
4. Individual investigators may make their own data more widely available at any time.
5. Each LBA module is responsible for establishing a time schedule for data exchange and data delivery to LBA DIS.
6. Data should be analyzed cooperatively by all scientists involved in obtaining them.
7. Where data are used for modeling or integrating studies, the scientist collecting the data will be credited either by co-authorship or by citation.
8. Specific constraints for certain data sources may be subject to copyright restrictions which are more limiting than this LBA data policy



# Measures of the project's long-term impact:

## Publications produced

LBA-ECO funded research has resulted in more than 600 articles, book chapters and dissertations.

## Scientists trained

Over 150 Masters and Doctoral degrees have been granted to participants of the LBA-ECO project, with hundreds more participating in short courses and training seminars

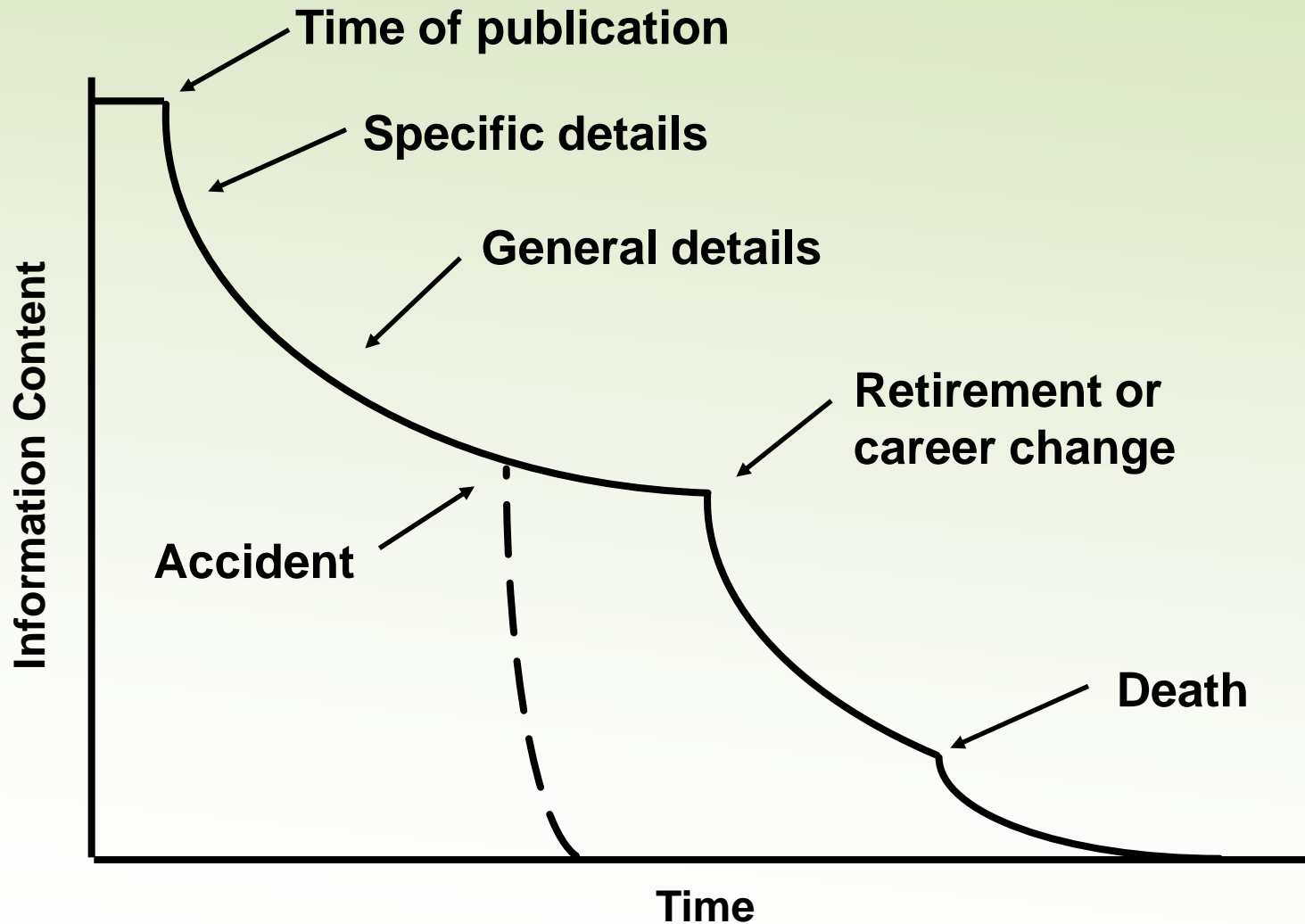
## Datasets archived

More than a terabyte of original field data, as well as copies of quality-assured, documented data, are also archived at the LBA-Data and Information System (LBA-DIS) at INPE's CPTEC.

Currently ~ 250 documented datasets from NASA's LBA-ECO research are either in preparation or archived in the Oak Ridge National Laboratory NASA Distributed Active Archive Center for Biogeochemistry (ORNL DAAC).

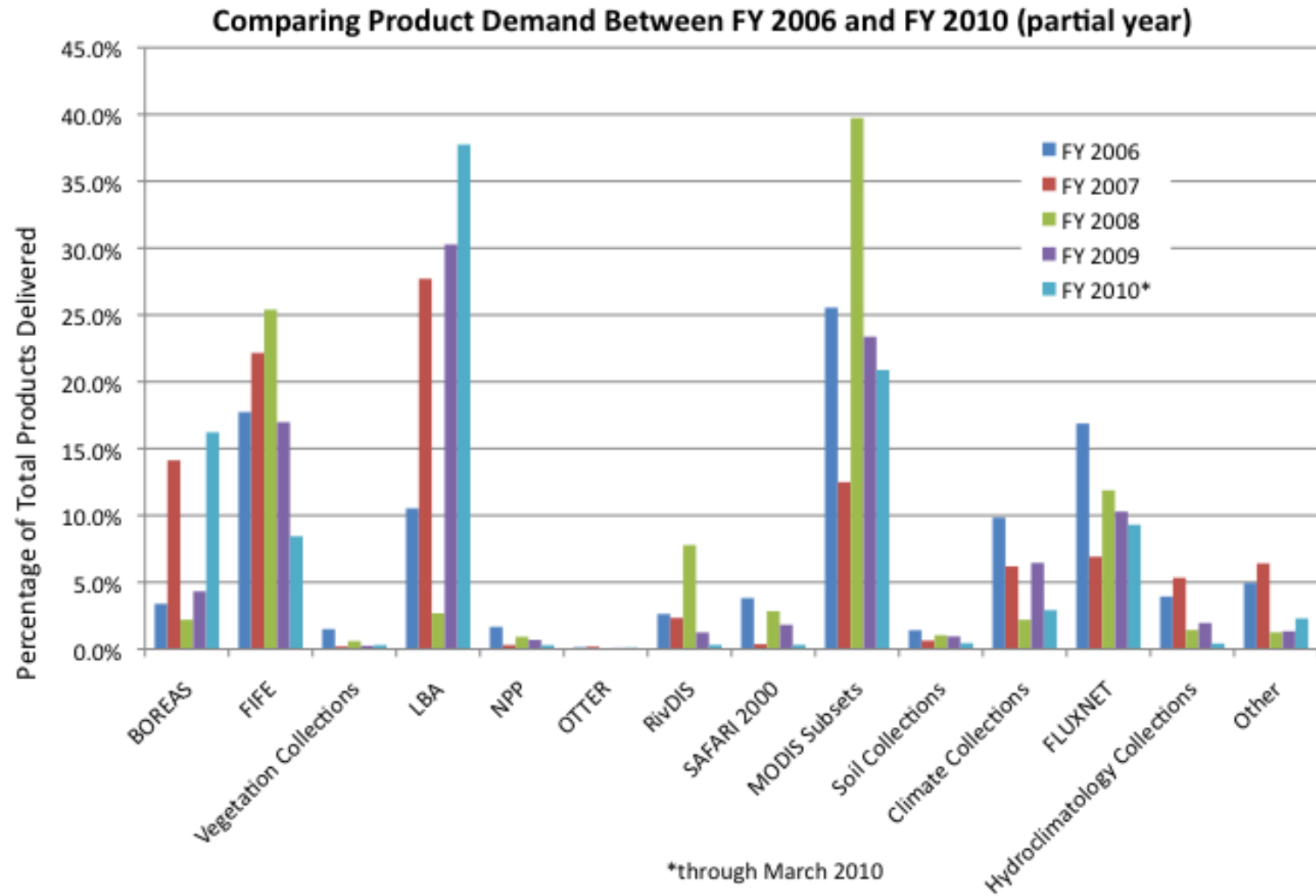
All data are freely available via ftp sites at both archives

# Data Entropy



# Interest in BOREAS and FIFE data remain high 10 to 20 years after the projects ended

(Relative products delivered each year by the ORNL DAAC)





# BOREAS and FIFE data sets used in publications

(citations from 1998 – 2010)

Project	Cited	Referred	Total
BOREAS	84	75	159
FLUXNET	24	72	96
Soil Collections	78	11	89
Net Primary Productivity	57	22	79
FIFE	5	53	58
SAFARI 2000	19	19	38
Vegetation Collections	27	8	37
MODIS Subsets	8	24	32
Climate Collections	21	9	30
Vegetation-Ecosystem Modeling (VEMAP)	7	18	25

Example Citation: Fitzjarrald, D. R. 2000. BOREAS TF-08 NSA-OJP Tower Flux, Meteorological, and Soil Temperature Data. Data set. Available on-line [<http://www.daac.ornl.gov>] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.  
doi:10.3334/ORNLDAAAC/516

# Data Milestones

PI and science team members

1. make field observations / run models / create remote sensing products
2. register metadata (LME)
3. transfer original data to LBA DIS at CPTEC in Brazil
4. report publications; link data sets to pubs
5. QA/QC and reformat data / complete documentation [ROADBLOCK!!]

LBA-ECO Project Office and ORNL DAAC staff

1. reviews data and documentation
2. prepare data for archive at ORNL DAAC
3. approve data for public release by the DAAC; notify LBA community
4. copy final data & documentation to archive at LBA DIS in Brazil

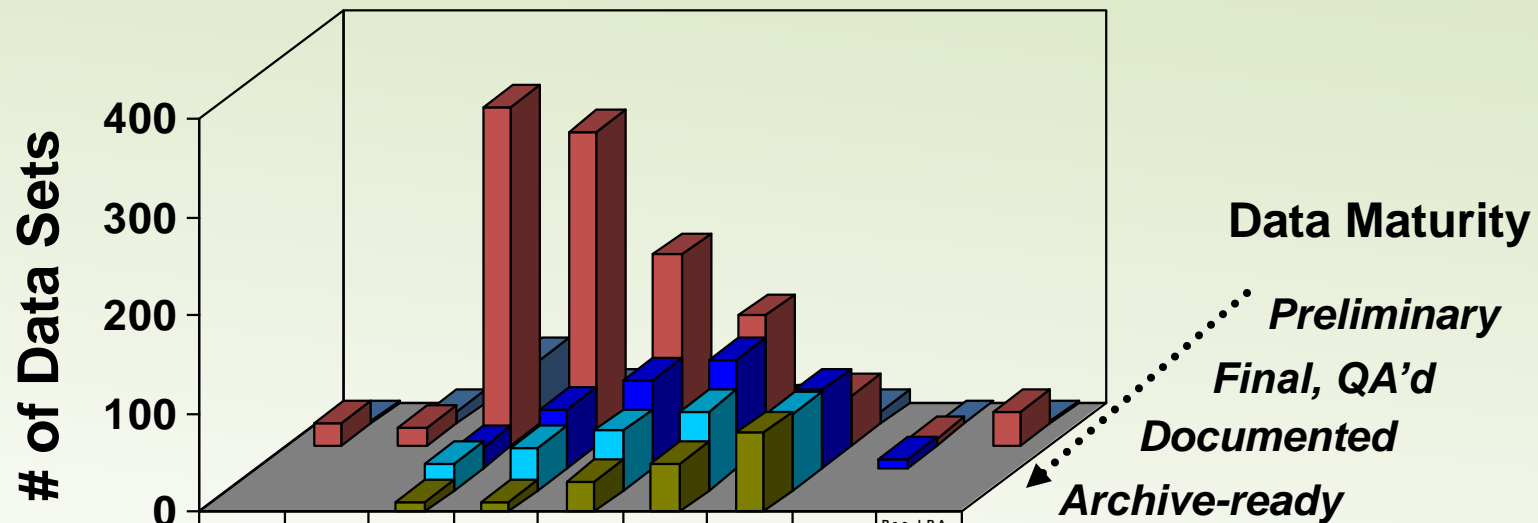


# Modified approach since 2007

- LBA-ECO project office staff and investigators collaborate to
  - Identify data products generated by the science team (from published papers, project profiles, and existing metadata)
  - Enter / modify metadata entries in LME
  - Develop data set documentation using LME
  - Convert certain data files to formats that are archive-suitable
  - Perform quality checks to make sure that data are well-described in documentation
- Investigators must diligently complete final review of metadata, data files, and data set documentation

# Data Progress toward Long-Term Archive

## November 2007 – August 2010



	BR	BR-EU	LBA-ECO (11/07)	LBA-ECO (5/08)	LBA-ECO (3/09)	LBA-ECO (12/09)	LBA-ECO (06/10)	LBA-Hyd	Pre-LBA & Other LBA
Preliminary	2	13	65	33	32	17	13	1	2
Final	23	19	345	321	195	133	51	7	35
Preparation for Archive			21	60	90	111	79	9	
Submitted for Archive			26	43	60	79	78		
Archived at ORNL DAAC (LBA-ECO only)			10	10	31	49	80		

PI  
responsibility

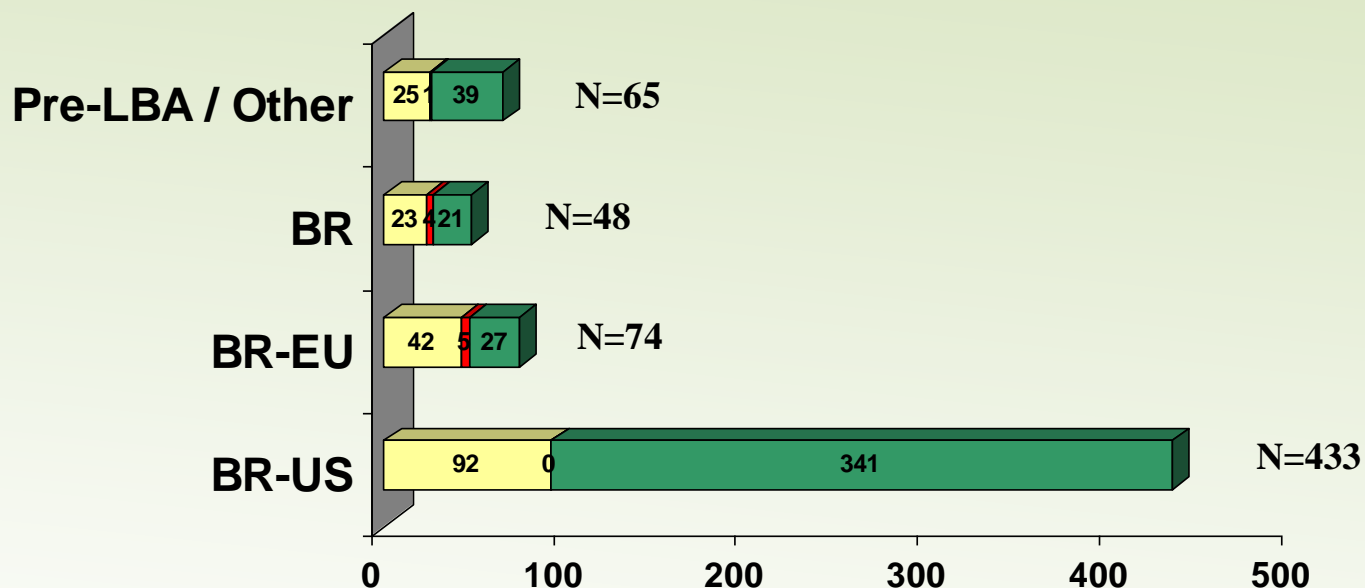
Project Office  
responsibility

Still under PI control -- not yet in archive process

PI has completed data QA & provided  
metadata & documentation to archive team



# LBA Metadata Registration Status by Component

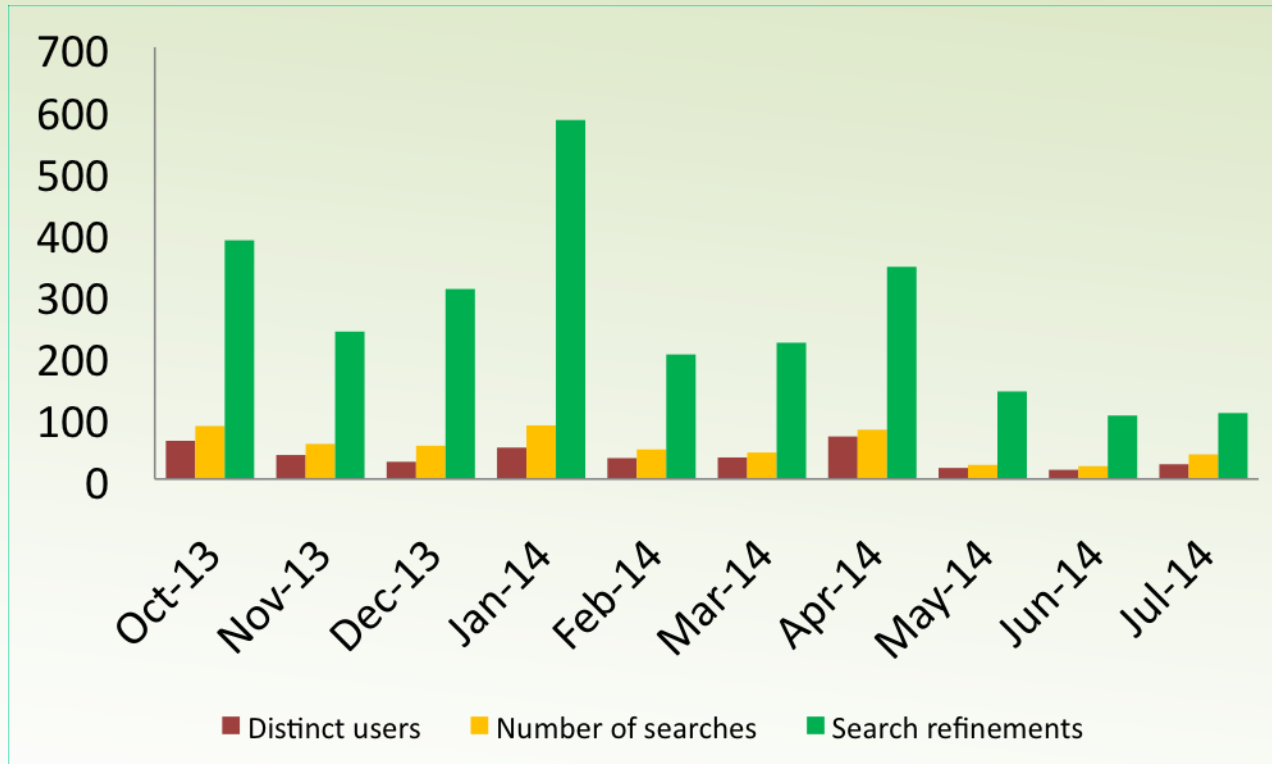


	BR-US	BR-EU	BR	Pre-LBA / Other
Data Sets with data available	341	27	21	39
Data Sets w/o data	0	5	4	1
Posters	92	42	23	25

There are still a few data sets with unavailable or restricted data and several BR and BR-EU teams have no data registered -- only posters.

# Beija-flor Searches

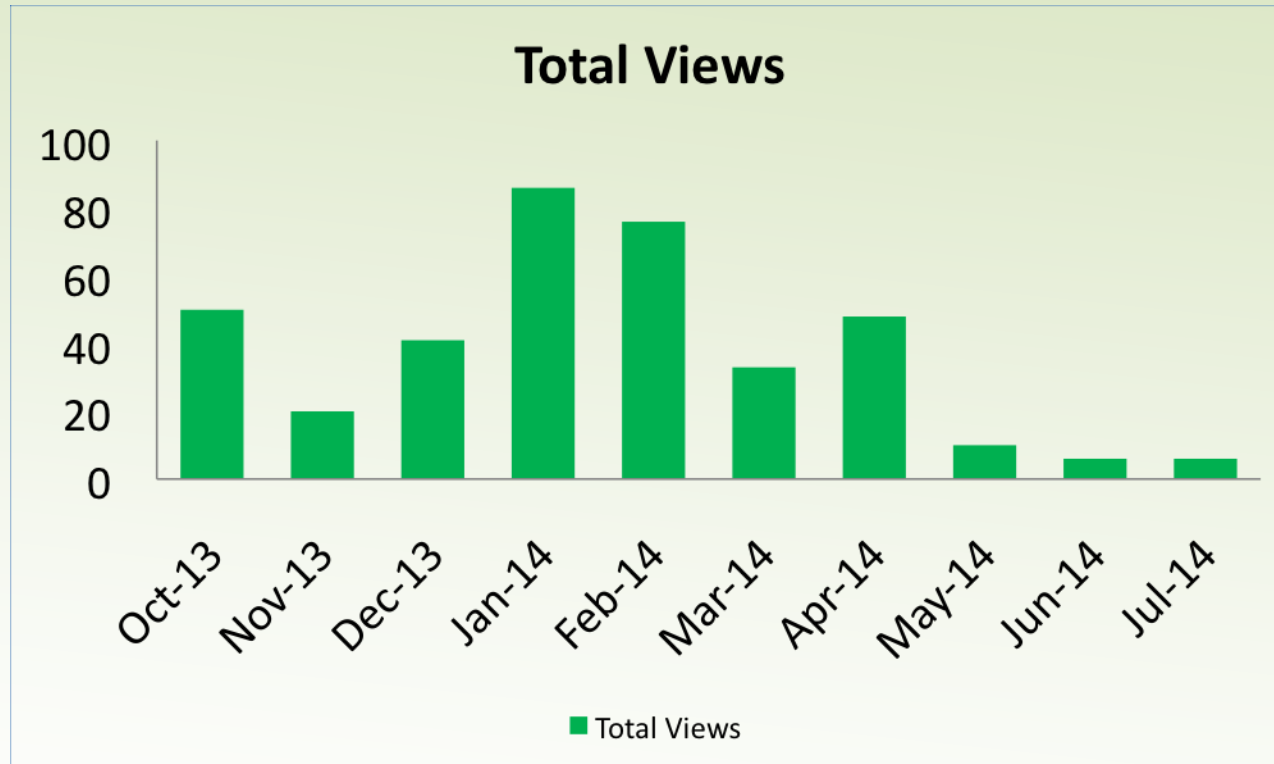
## October 2009 – July 2010





# Users Viewing Metadata Reports

## October 2009 – July 2010



# Beija-flor: Most Referred Data Sets

October 2009 – July 2010

Rank	Data Set Title (File ID)	Count
1	LBA-ECO CD-04 Logged Forest Tower Site Post-Logging Damage Survey, FLONA Tapajos km 83	17
2	LBA-ECO CD-10 CO2 and H2O Eddy Fluxes at km 67 Tower Site, Tapajos National Forest	16
3	LBA-ECO CD-04 Meteorological and Flux Data, km 83 Tower Site, Tapajos National Forest	14
4	LBA-ECO CD-04 Soil Moisture Data, Logged Forest Tower Site, TNF, Brazil: 2002-2003	14
5	LBA-ECO CD-04 Biomass Survey, Logged Forest Tower Site, TNF Km 83, Brazil: March 2000	12
6	LBA-ECO CD-04 CO2 Profiles, km 83 Tower Site, Tapajos National Forest	12
7	LBA-ECO LC-14 Amazon Scenarios Program, Modeled Deforestation Scenarios: 2002-2050	10
8	The Effects of Rainfall Exclusion on Biogeochemical Cycles in Tapajos National Forest, Eastern Amazonia (Poster)	9
9	LBA-ECO CD-04 Dendrometry, Logged Forest Tower Site, TNF Km 83, Brazil: 2001-2004	9
10	NASA Ames CASA 8-km Regional Mapping Data Sets of Brazil	7

Between January and June 2010 researchers from 44 countries have downloaded 30,293 data files from the ftp site supported at CPTEC

### **Top 10 Downloads, FY2010**

#### **Name**

LBA REGIONAL MONTHLY CLIMATOLOGY FOR THE 20TH CENTURY (NEW ET AL.)  
LBA-ECO CD-07 GOES-8 L3 GRIDDED SURFACE RADIATION AND RAIN RATE FOR AMAZONIA: 1999  
LBA-ECO CD-03 MESOSCALE METEOROLOGICAL DATA, SANTAREM REGION, PARA, BRAZIL: 1998-2006  
LBA-ECO LC-23 ASTER AND MODIS FIRE DATA COMPARISON FOR BRAZIL: 2003-2004  
LBA-ECO CD-10 TREE DBH MEASUREMENTS AT THE KM 67 TOWER SITE, TAPAJOS NATIONAL FOREST  
LBA REGIONAL RIVER DISCHARGE DATA (COE AND OLEJNICZAK)  
LBA-ECO CD-08 TROPICAL FOREST ECOSYSTEM RESPIRATION, MANAUS, BRAZIL  
LBA-ECO CD-08 COARSE WOOD LITTER RESPIRATION AND DECOMPOSITION, MANAUS, BRAZIL  
LBA-ECO LC-18 HYPERION 30-M SURFACE REFLECTANCE, MATO GROSSO, BRAZIL: JULY 2004  
LBA-ECO LC-13 GIS COVERAGES OF LOGGED AREAS, TAPAJOS FOREST, PARA, BRAZIL: 1996, 1998

### **Top 10 Downloads, FY2009**

#### **Name**

LBA-ECO CD-07 GOES-8 L1 RADIANCE DATA FOR AMAZONIA: 1998-2001  
LBA REGIONAL MONTHLY CLIMATOLOGY FOR THE 20TH CENTURY (NEW ET AL.)  
LBA-ECO CD-07 GOES-8 L3 GRIDDED SURFACE RADIATION AND RAIN RATE FOR AMAZONIA: 1999  
LBA-ECO LC-10 LANDSAT TM DATA FOR LEGAL AMAZON: 1986-1994  
LBA-ECO LC-23 ASTER AND MODIS FIRE DATA COMPARISON FOR BRAZIL: 2003-2004  
LBA-ECO LC-10 ORTHORECTIFIED LANDSAT ETM+ DATA FOR LEGAL AMAZON: 1999-2001  
LBA-ECO CD-10 TREE DBH MEASUREMENTS AT THE KM 67 TOWER SITE, TAPAJOS NATIONAL FOREST  
LBA-ECO LC-13 GIS COVERAGES OF LOGGED AREAS, TAPAJOS FOREST, PARA, BRAZIL: 1996, 1998  
LBA-ECO LC-13 GIS COVERAGES OF LOGGED AREAS, CAUAXI, PARA, BRAZIL: 1996, 1998  
LBA-ECO LC-13 GIS COVERAGES OF LOGGED AREAS, JURUENA, MATO GROSSO, BRAZIL: 2002

# Factors contributing to the success of the archive process:

◆ **CO-OPERATION:** A robust partnership among NASA's LBA-ECO Project Office, the ORNL DAAC, and the LBA-DIS at CPTEC

◆ **PLANNING:** A requirement to elaborate a credible data management plan when proposing their research

◆ **ACCOUNTABILITY:** Progress in data documentation and archiving was considered along with publications and education and training benchmarks when evaluating individual projects and their requests for funding renewal and other LBA grants



# Factors contributing to the success of the archive process:

## ◆ FACILITATION:

◆ Personnel at NASA's LBA-ECO Project Office were available to assist teams with the formatting and documentation of their data.

◆ The documentation process was made as user-friendly as possible with a menu-driven program developed specifically for the LBA project

◆ A set of guidelines and examples of the best practices for preparing data to share were developed for the distinct types of data generated by LBA ECO scientists

# Factors contributing to the success of the archive process:

## ◆ DATA SEARCH AND RETRIEVAL:

◆ An application of the Mercury suite of search and retrieval systems was developed specifically for the LBA project. Users can search for data by keyword or team id at the ftp sites in both Brazil and the US.

◆ Care was taken to adopt metadata conventions for the LBA project data that are consistent with universal metadata standards, facilitating forward migration of the LBA metadata to new systems as the technology evolves.

# Take home lessons for future projects:

Data documentation and archiving works best when integrated into the research project on every level from institutional to individual research team.

With multi-disciplinary and integrated projects a number of different kinds of data will be generated. Required documentation and formats should be worked out as early as possible in the process.

Time and resources to properly document and format data should be built into the project budget and timeline.

Many scientists delay archiving until after publication which in some cases is months to years after the end of the funding so it is important that the data are documented and prepared while these activities are supported.

## What's Next?

A thorough review of milestone publications to ensure that the data they were based on are archived.

Thursday: Synthesis of Major LBA Results

U41B at 0800 room A3

U44A at 1630 room A1

Then come to the LBA-ECO Science Team meeting on Friday here at the Rafain Center on the 5<sup>th</sup> floor “Iguaçu” meeting rooms.