Biological, Ancillary, Disturbance, and Metadata (BADM) Overview

Data Team: Deb Agarwal, You-Wei Cheah, **Danielle Svehla Christianson**, Housen Chu,
Rachel Hollowgrass, Marty Humphrey, Fianna O'Brien, Yeongshnn Ong, Gilberto Pastorello

Data / Tech Workshop 2019, Berkeley, CA

1. BADM Basics
2. BADM Rebuild / Revision Updates
3. How to submit BADM (we want your input!)
4. Download and Use BADM (BIF and Juypter Notebook tool)

AMERIFLUX MANAGEMENT PROJECT

BERKELEY LAB
Lawrence Berkeley National Laboratory

Terrestrial Ecosystem SCIENCE

U.S. DEPARTMENT OF ENERGY | Office of Science

BADM = Biological, Ancillary, Disturbance, and Metadata

A standard ...

(formats variable names, units, descriptions)

... that tries to capture all the other observations of interest to researchers using flux-met data

Spearheaded by Bev Law in 2000s

Followed by ICOS and European Flux

AMERIFLUX

European Fluxes Database Cluster

ICOS INTEGRATED CARBON OBSERVATION SYSTEM

BADM = Biological, Ancillary, Disturbance, and Metadata

Soil properties
- Texture, density
- Classification

Soil nutrients
- Carbon, NPK

Vegetation properties
- Canopy height
- LAI
- Vegetation Cover

Biomass

Disturbance
- Fire / Drought
- Agriculture info

Site Characteristics
- Location, IGBP, Climate
- Team info
- Tower info

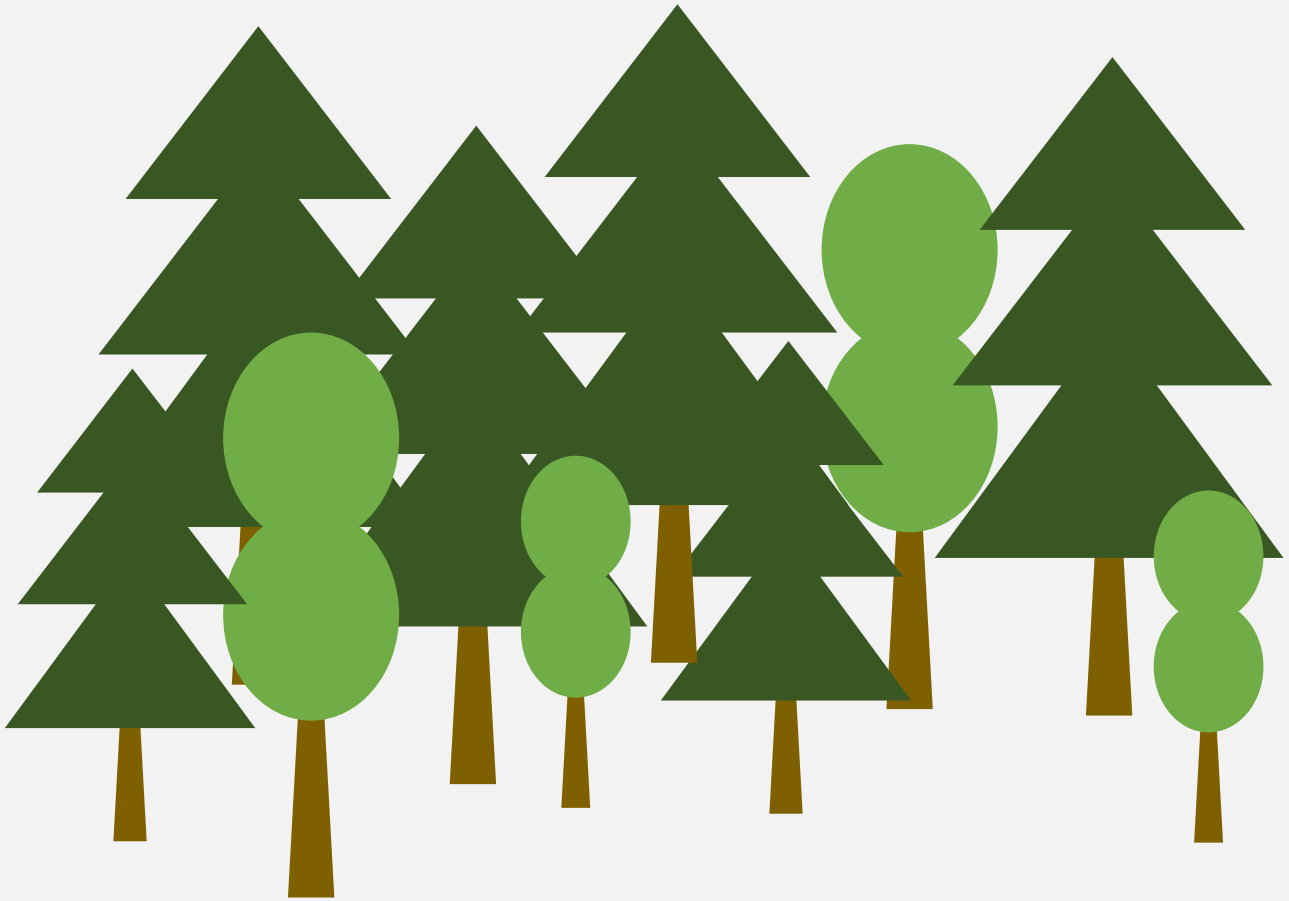
Instruments
- SN/Model
- Installation
- Calibrations

Variable Info
- Height / Depth
- Model
- Aggregation

Disturbance

BADM currently designed to support site-level information

Mean canopy height = 32.6m



mean LAI = 7.04 m2/m2

BADM Templates describe BADM standard (variables, units)

https://ameriflux.lbl.gov/data/badm-data-templates/

Home / Data / BADM Data Templates

BADM Data Templates

The Biological, Ancillary, Disturbance and Metadata (BADM) protocol is standardized across AmeriFlux, ICOS, Fluxnet and other networks. To learn more about BADM, check out these resources:

- B E Law, T Arkebauer, J L Campbell, J Chen, Osbert Sun, Mark Schwartz, Catharine van Ingen, Shashi Verma (2008). Terrestrial carbon observations: Protocols for vegetation sampling and data submission. Global Terrestrial Observing System, Rome.
- An explanation of the BADM Data Product is available here

To register a new AmeriFlux site, download the BADM-Site_General_Info template below, enter current site information (sheets in the template provide variable naming, units, descriptions and reporting conventions), and upload the completed template via the Upload Data page.

To update the BADM for an existing AmeriFlux site, send your request to ameriflux-support@lbl.gov. Specify the specific BADM spreadsheet(s) in the AmeriFlux database to be updated.

Templates

Use these MS Excel spreadsheet templates to add or update BADM data for a site.

Download: **BADM-Site_General_Info-Template**

View (pdf) or download (MS Excel) an example of a completed Site-General-Info template.

New Feature: BADM Site General Info edits can be made through the BADM online editor. The BADM online editor is accessible through the BADM tab on your site info page.

The following additional BADM templates are available (AmeriFlux sites: see note under General Instructions below before using).

Download: **BADM-Disturbance_and_Management-Template**

Download: **BADM-Instrument_Ops-Template**

Quick Sites: Sign in to Use

DATA

- Data Policy
- About Data
  - BADM Data Product
  - Data Variables
  - Data Processing Levels
- Data Blog
- Data Change Log
- Data Download Log
- How to Upload/Download Data
  - Uploading High Frequency Data
  - Half-Hourly / Hourly Data Upload Format
- Data Availability
- Download Data
- Measurement Height
- Upload Data
- BADM Data Templates
- Download ONEFlux

SITE SEARCH & MAPS

BADM Templates describe variables (including units)

BADM-Site_General_Info-v2019-Template

Variable name | Description | Units

	Variable	Description	Units	dataValue
2	SITE_ID	Six character site identifier. MANDATORY if site is already registered	CC-Sss	
3	SITE_NAME	Site name	free text	
4	SUBMISSION_CONTACT_NAME	Name of person who submitted this template	free text	
5	SUBMISSION_CONTACT_EMAIL	E-mail address of the person who submitted this template	free text	
6	SUBMISSION_DATE	Date this submission was last edited/modified	YYYYMMDD	
7	TEAM_MEMBER_NAME	Site tower team member name (First/Given Last/Family)	free text	
8	TEAM_MEMBER_ROLE	Site tower team member role	LIST(TEAM_ROLE)	
9	TEAM_MEMBER_EMAIL	Site tower team member email	free text	
10	TEAM_MEMBER_INSTITUTION	Site tower team member institution (required for PI only)	free text	
11	TEAM_MEMBER_ADDRESS	Site tower team member address (not required)	free text	
12	SHIPPING_ADDRESS	Site tower shipping address	free text	
13	NETWORK	Network affiliation(s) of the site	LIST(NETWORK)	
14	FLUX_MEASUREMENTS_METHOD	Method used to measure the flux variables	LIST(FLUX_METHOD)	
15	FLUX_MEASUREMENTS_VARIABLE	Flux variable measured	LIST(FLUX_VARIABLE)	
16	FLUX_MEASUREMENTS_DATE_START	Date when data collection for the reported flux variable/method started	YYYYMMDDHHMM	
17	FLUX_MEASUREMENTS_DATE_END	Date when data collection for the reported flux variable/method ended	YYYYMMDDHHMM	
18	FLUX_MEASUREMENTS_OPERATIONS	Operational status of flux measurements	LIST(FLUX_OPERATIONS)	
19	FLUX_MEASUREMENTS_COMMENT	Flux measurements comments	free text	
20	STATE	State or province	LIST(STATE_PROVINCE)	
21	SITE_DESC	Short description of the site characteristics and history	free text	

Site_General_Info | LIST(Vocabulary) | Explanations

Units often are controlled vocabulary (CV)

BADM-Site_General_Info-v2019-Template

Use the shortname

	A	B	C
1	vocabulary	shortname	description
64	DIST_MGMT	Agriculture	Agricultural management of any kind, such as cultivation (including tillage, plowing, or discing), harvest, irrigation, pesticides, planting, or liming.
65	DIST_MGMT	Drought	Prolonged water deficiency; hydrologic or climatic drought.
66	DIST_MGMT	Fire	Wildfire or managed burns
67	DIST_MGMT	Forestry	Forest management such as logging of any kind, plantation planting, or herbicide application.
68	DIST_MGMT	Grazing	Herbivory or browsing by mammals, managed or wild.
69	DIST_MGMT	Hydrologic event	Drainage, persistent flooding, or chronic flooding. Does not include storm events or irrigation
70	DIST_MGMT	Land cover change	Land use and land cover change; invasion; woody or urban encroachment
71	DIST_MGMT	Pests and disease	Plant or soil damage from pests, insects, pathogens, blight, and other disease.
72	DIST_MGMT	Storm or wind	Major storms including unusually high-precipitation and unusually high-wind events e.g. hurricane, tornado, blizzard, hail, flooding from storm, etc.
73	DIST_MGMT	Temperature extreme	Heat wave or freeze
74	DIST_MGMT	Undisturbed	No disturbance or management has occurred on the site.
75	FLUX_METHOD	Chambers	
76	FLUX_METHOD	Eddy Covariance	

Site_General_Info | LIST(Vocabulary) | Explanations

It's all about GROUPS (e.g., Site General Info)

BADM-Site_General_Info-v2019-Template

Variable	Description	Units	dataValue
SITE_ID	Six character site identifier. MANDATORY if site is already registered	CC-Sss	
SITE_NAME	Site name	free text	
SUBMISSION_CONTACT_NAME	Name of person who submitted this template	free text	
SUBMISSION_CONTACT_EMAIL	E-mail address of the person who submitted this template	free text	
SUBMISSION_DATE	Date this submission was last edited/modified	YYYYMMDD	
TEAM_MEMBER_NAME	Site tower team member name (First/Given Last/Family)	free text	
TEAM_MEMBER_ROLE	Site tower team member role	LIST(TEAM_ROLE)	
TEAM_MEMBER_EMAIL	Site tower team member email	free text	
TEAM_MEMBER_INSTITUTION	Site tower team member institution (required for PI only)	free text	
TEAM_MEMBER_ADDRESS	Site tower team member address (not required)	free text	
SHIPPING_ADDRESS	Site tower shipping address	free text	
NETWORK	Network affiliation(s) of the site	LIST(NETWORK)	
FLUX_MEASUREMENTS_METHOD	Method used to measure the flux variables	LIST(FLUX_METHOD)	
FLUX_MEASUREMENTS_VARIABLE	Flux variable measured	LIST(FLUX_VARIABLE)	
FLUX_MEASUREMENTS_DATE_START	Date when data collection for the reported flux variable/method started	YYYYMMDDHHMM	
FLUX_MEASUREMENTS_DATE_END	Date when data collection for the reported flux variable/method ended	YYYYMMDDHHMM	
FLUX_MEASUREMENTS_OPERATIONS	Operational status of flux measurements	LIST(FLUX_OPERATIONS)	
FLUX_MEASUREMENTS_COMMENT	Flux measurements comments	free text	
STATE	State or province	LIST(STATE_PROVINCE)	
SITE_DESC	Short description of the site characteristics and history	free text	

It's all about GROUPS (e.g., canopy height: GRP_HEIGHTC)

BADM-VegCover-v2018-Template

Home Insert Page Layout Formulas Data Review View

A1 Variable

	A	B	C	
1	Variable	Description	Units	dataValue
41	LAI_COMMENT	Vegetation (Plant, Leaf, Green) Area Index comments	free text	
42	HEIGHTC	Canopy height	m	
43	HEIGHTC_SPP	Canopy height species (taxa)	Scientific name	
44	HEIGHTC_VEGTYPE	Canopy height vegetation type	LIST(VEGTYPE)	
45	HEIGHTC_STATISTIC	Canopy height statistic	LIST(STATISTIC)	
46	HEIGHTC_STATISTIC_TYPE	Canopy height statistic type	LIST(STATISTIC_TYPE)	
47	HEIGHTC_STATISTIC_NUMBER	Number of observations used to determine canopy height statistic	integer number	
48	HEIGHTC_U	Understory canopy height	m	
49	HEIGHTC_U_SPP	Understory canopy height species (taxa)	Scientific name	
50	HEIGHTC_U_VEGTYPE	Understory canopy height vegetation type	LIST(VEGTYPE)	
51	HEIGHTC_U_STATISTIC	Understory canopy height statistic	LIST(STATISTIC)	
52	HEIGHTC_U_STATISTIC_TYPE	Understory canopy height statistic type	LIST(STATISTIC_TYPE)	
53	HEIGHTC_U_STATISTIC_NUMBER	Number of observations used to determine understory canopy height statistic	integer number	
54	HEIGHTC_APPROACH	Canopy height measurement approach	free text	
55	HEIGHTC_DATE	Canopy height measurement date	YYYYMMDDHHMM	
56	HEIGHTC_DATE_START	Start date of canopy height measurment	YYYYMMDDHHMM	
57	HEIGHTC_DATE_END	End date of canopy height measurment	YYYYMMDDHHMM	
58	HEIGHTC_DATE_UNC	Uncertainty in the canopy height measurement date, start date, and/or end date	days	
59	HEIGHTC_COMMENT	Canopy height comments	free text	
60	SA	Stand age	years	

VegCover LIST(Vocabulary) Explanations

Ready 125%

Some variables in a group are Required

BADM-VegCover-v2018-Template

Home Insert Page Layout Formulas Data Review View

A1 VariableGroup

	A	B	C	D	E	F	G
1	VariableGroup	Variable	Primary	reqd_qual	Multiple	Description	Explanation
42	GRP_HEIGHTC	HEIGHTC	s		m	Canopy height	Height of the canopy. In a forest ecosystem, canopy height is the distribution of overstory trees that see light at the top of the canopy. Forest understory canopy height is reported in HEIGHTC_U. If overstory / understory distinction is necessary for non-forest ecosystems, describe details in Approach.
43	GRP_HEIGHTC	HEIGHTC_SPP			m	Canopy height species (taxa)	Vegetation species being described by the measurement. To enter a plant species, use the scientific name (Genus species Author or Genus Author). Please refer to www.theplantlist.org for current scientific names and authors. If the measurement includes all vegetation present, do not enter a value. Do not use SPP if reporting VEGTYPE.
44	GRP_HEIGHTC	HEIGHTC_VEGTYPE			m	Canopy height vegetation type	Use the predefined list to indicate the type of vegetation being described by the measurement (e.g., Grass, Evergreen Tree, Deciduous Tree, etc). If the measurement includes all vegetation present, do not enter a value. If vegetation type is not in predfined list, enter "Other/Not in list" and describe briefly in Approach. Do not use VEGTYPE if reporting SPP.
45	GRP_HEIGHTC	HEIGHTC_STATISTIC		r	m	Canopy height statistic	The statistic for the measurement reported. Use predefined list (e.g., mean, min / max, standard deviation, etc). If appropriate, report the type of statistic (e.g., spatial for spatial standard deviation) in STATISTIC_TYPE.
46	GRP_HEIGHTC	HEIGHTC_STATISTIC_TYPE			m	Canopy height statistic type	The type of statistic reported if appropriate (e.g., spatial). Use predefined list.
47	GRP_HEIGHTC	HEIGHTC_STATISTIC_NUMBER			m	Number of observations used to determine canopy height statistic	Number of observations (samples / replicates) used to calculate the STATISTIC for the reported measurement.
48	GRP_HEIGHTC	HEIGHTC_U	s		m	Understory canopy height	Canopy height of the understory. Typically reported only for forest ecosystems. Describe how understory was determined in Approach. If HEIGHTC_U is reported for non-forest ecosystems, clearly describe ecosystem and methodological details in Approach.
49	GRP_HEIGHTC	HEIGHTC_U_SPP			m	Understory canopy height species (taxa)	Vegetation species being described by the measurement. To enter a plant species, use the scientific name (Genus species Author or Genus Author). Please refer to www.theplantlist.org for current scientific names and authors. If the measurement includes all vegetation present, do not enter a value. Do not use SPP if reporting VEGTYPE.
50	GRP_HEIGHTC	HEIGHTC_U_VEGTYPE			m	Understory canopy height vegetation type	Use the predefined list to indicate the type of vegetation being described by the measurement (e.g., Grass, Evergreen Tree, Deciduous Tree, etc). If the measurement includes all vegetation present, do not enter a value. If vegetation type is not in predfined list, enter "Other/Not in list" and describe briefly in Approach. Do not use VEGTYPE if reporting SPP.
							The statistic for the measurement reported. Use predefined list (e.g., mean, min / max, standard

VegCover LIST(Vocabulary) Explanations

Ready 100%

Some variables in a group are Required

Primary

p = primary = must be provided

s = secondary = one secondary within group must be provided

Req_Qual

r = required

Multiple

1 = only one instance of group can be reported

m = multiple = any number of groups can be reported

Some variables in a group are Required: examples Site General Info

p | m | TEAM_MEMBER_NAME
r | m | TEAM_MEMBER_ROLE
r | m | TEAM_MEMBER_EMAL
- | m | TEAM_MEMBER_INSTITUTION
- | m | TEAM_MEMBER_ADDRESS

p | 1 | SHIPPING_ADDRESS

p | m | NETWORK

Some variables in a group are Required: example GRP_HEIGHTC

s | m | HEIGHTC
- | m | HEIGHTC_SPP
- | m | HEIGHTC_VEGTYPE
r | m | HEIGHTC_STATISTIC
- | m | HEIGHTC_STATISTIC_TYPE
- | m | HEIGHTC_STATISTIC_NUMBER
s | m | HEIGHTC_U
- | m | HEIGHTC_U_SPP
- | m | HEIGHTC_U_VEGTYPE
r | m | HEIGHTC_U_STATISTIC
- | m | HEIGHTC_U_STATISTIC_TYPE
- | m | HEIGHTC_U_STATISTIC_NUMBER
- | m | HEIGHTC_APPROACH
r | m | HEIGHTC_DATE
r | m | HEIGHTC_DATE_START
- | m | HEIGHTC_DATE_END
- | m | HEIGHTC_DATE_UNC
- | m | HEIGHTC_COMMENT

Feedback: Marking sub-group required variables?

R1	m	HEIGHTC
—	m	HEIGHTC_SPP
—	m	HEIGHTC_VEGTYPE
R1	m	HEIGHTC_STATISTIC
—	m	HEIGHTC_STATISTIC_TYPE
—	m	HEIGHTC_STATISTIC_NUMBER
R2	m	HEIGHTC_U
—	m	HEIGHTC_U_SPP
—	m	HEIGHTC_U_VEGTYPE
R2	m	HEIGHTC_U_STATISTIC
—	m	HEIGHTC_U_STATISTIC_TYPE
—	m	HEIGHTC_U_STATISTIC_NUMBER
—	m	HEIGHTC_APPROACH
Ra	m	HEIGHTC_DATE
Ra	m	HEIGHTC_DATE_START
—	m	HEIGHTC_DATE_END
—	m	HEIGHTC_DATE_UNC
—	m	HEIGHTC_COMMENT

R# – One subgroup is required

R[a-z] Required with any subgroup

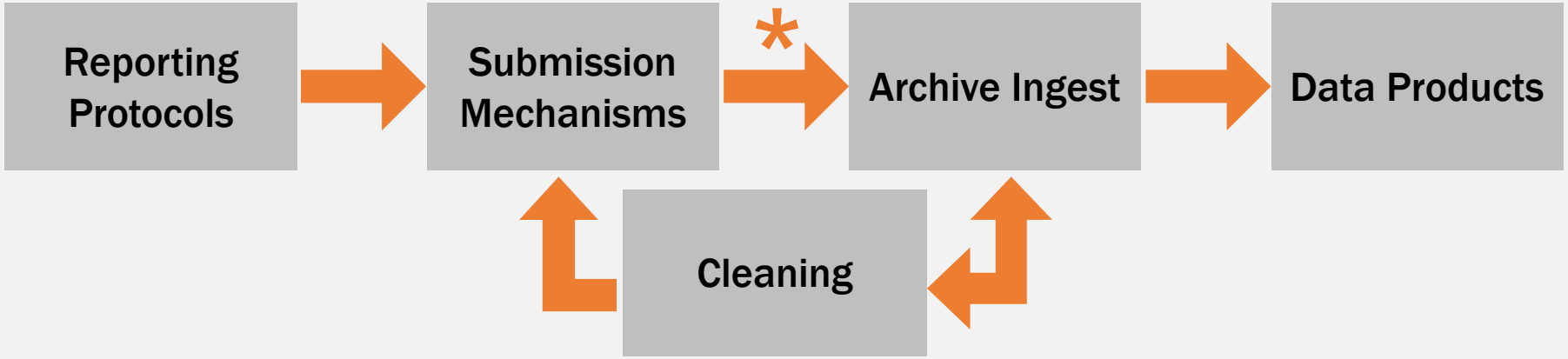
BADM Infrastructure Update

- ~✓ Move BADM archive to new software technologies
- ➤ Reconcile / Incorporate with previously submitted data
- ➤ New reporting formats / methods
- Open BADM submissions for campaigns of new submissions
- Automated BADM Processing Pipeline

BADM standard revisions (ongoing with European partners)

- ✓ Site General Info, Disturbance & Management, VegCover
- ➤ NEW: Variable Information (network generated), Flux Chamber
- Queued: Inst / Inst Ops, Soil

AmeriFlux BADM processing



* Validation:
    - Compliance with standard
    - Cross-group validation
    - Reconcile with previously submitted data

BADM Standard: undergoing revision

BADM-VegCover-v2018-Template

Home Insert Page Layout Formulas Data Review View

A1 Variable

	A	B	C	
1	Variable	Description	Units	dataValue
2	SITE_ID	Six character site identifier. MANDATORY if site is already registered	CC-Sss	
3	SITE_NAME	Site name	free text	
4	SUBMISSION_CONTACT_NAME	Name of person who submitted this template	free text	
5	SUBMISSION_CONTACT_EMAIL	E-mail address of the person who submitted this template	free text	
6	SUBMISSION_DATE	Date this submission was last edited/modified	YYYYMMDD	
7	SPP_O	Overstory species (taxa)	Scientific name	
8	SPP_O_VEGTYPE	Overstory vegetation type	LIST(VEGTYPE)	
9	SPP_O_PERC	Overstory species or vegetation type percent cover (by mass, number, estimated abundance, or area)	%	
10	SPP_O_PERC_STATISTIC	Overstory species or vegetation type percent cover statistic	LIST(STATISTIC)	
11	SPP_O_PERC_STATISTIC_TYPE	Overstory species or vegetation type percent cover statistic type	LIST(STATISTIC_TYPE)	
12	SPP_O_PERC_STATISTIC_NUMBER	Number of observations used to determine overstory species or vegetation type percent cover statistic	integer number	
13	SPP_U	Understory species (taxa)	Scientific name	
14	SPP_U_VEGTYPE	Understory vegetation type	LIST(VEGTYPE)	
15	SPP_U_PERC	Understory species or vegetation type percent cover (by mass, number, estimated abundance, or area)	%	
		Understory species or vegetation type percent cover		

BADM Reporting: Excel templates, online forms, and beyond

Access BADM online tools via Site Info page

http://ameriflux.lbl.gov/sites/siteinfo/<site_id>

Home | About | Community | Sites | Data | Tech | Year of Methane | Resources

Home / Sites / Siteinfo / US-VFP

US-VFP: Virginia Coast Reserve Fowling Point

Overview	Windroses	DOI	Data Use Log	Image Gallery	MODIS	Publications	BADM

BADM for This Site

Access the Biological, Ancillary, Disturbance and Metadata (BADM) information and data for this site.

BADM contain information for many uses, such as characterizing a site's vegetation and soil, describing disturbance history, and defining instrumentation for flux processing. They complement the flux/met data.

- Download BADM for this site*
- View Site General Info for this site (Overview tab)*
- Use Online Editor to update Site General Info (Site team only)
- Update information about submitted data (Variable Information tool).
- More BADM resources

Online BADM reporting: Site General Info

BADM Editor: Site General Info

US-PFa: Park Falls/WLEF

* *indicates required field*

get more information

GRP_TEAM_MEMBER

Add New Entry

TEAM_MEMBER_NAME
Ankur Desai

TEAM_MEMBER_ROLE
PI

TEAM_MEMBER_EMAIL
desai@aos.wisc.edu

TEAM_MEMBER_INSTITUTION
University of Wisconsin

TEAM_MEMBER_ADDRESS
Department of Atmospheric and Oceanic Sciences, 1225 W Dayton St, Madison, WI 53706

TEAM_MEMBER_NAME
Jonathan Thom

TEAM_MEMBER_ROLE
FluxContact

TEAM_MEMBER_EMAIL
jthom@ssec.wisc.edu

TEAM_MEMBER_INSTITUTION
University of Wisconsin

TEAM_MEMBER_ADDRESS
Space Sciences and Engineering, 1225 W Dayton St,Madison, WI 53706

TEAM_MEMBER_NAME
Arlyn E. Andrews

TEAM_MEMBER_ROLE
Affiliate

TEAM_MEMBER_EMAIL
arlyn.andrews@noaa.gov

TEAM_MEMBER_INSTITUTION
National Oceanic and Atmospheric Administration (NOAA)

TEAM_MEMBER_ADDRESS
NOAA/ESRL Global Monitoring Division, CCGG, 325 Broadway, R/GMD1,Boulder, CO USA

Online BADM reporting: DOI Authorship (NEW!!)

BADM Editor: DOI

US-UMB: Univ. of Mich. Biological Station

* *indicates required field*
get more information

GRP_DOI_ORGANIZATION

Add New Entry

DOI_ORGANIZATION
Ohio State University
DOI_ORGANIZATION_ROLE
Originator

DOI_ORGANIZATION
Virginia Commonwealth University
DOI_ORGANIZATION_ROLE
Originator

DOI_ORGANIZATION
DOE/NICCR/NOAA/NSF/Ameriflux
DOI_ORGANIZATION_ROLE
Sponsor

GRP_DOI_CONTRIBUTOR

Add New Entry

DOI_CONTRIBUTOR_NAME
Christopher Gough
DOI_CONTRIBUTOR_ROLE
Author
DOI_CONTRIBUTOR_ORDINAL
DOI_CONTRIBUTOR_ORCID
DOI_CONTRIBUTOR_EMAIL
cmgough@vcu.edu
DOI_CONTRIBUTOR_INSTITUTION
Virginia Commonwealth University
DOI_CONTRIBUTOR_DATE_START
DOI_CONTRIBUTOR_DATE_END

DOI_CONTRIBUTOR_NAME
Gil Bohrer
DOI_CONTRIBUTOR_ROLE
Author
DOI_CONTRIBUTOR_ORDINAL
DOI_CONTRIBUTOR_ORCID
DOI_CONTRIBUTOR_EMAIL
bohrer.17@osu.edu
DOI_CONTRIBUTOR_INSTITUTION
Ohio State University
DOI_CONTRIBUTOR_DATE_START
DOI_CONTRIBUTOR_DATE_END

DOI_CONTRIBUTOR_NAME
Peter Curtis
DOI_CONTRIBUTOR_ROLE
Author
DOI_CONTRIBUTOR_ORDINAL
DOI_CONTRIBUTOR_ORCID
DOI_CONTRIBUTOR_EMAIL
curtis.7@osu.edu
DOI_CONTRIBUTOR_INSTITUTION
Ohio State University
DOI_CONTRIBUTOR_DATE_START
DOI_CONTRIBUTOR_DATE_END

GRP_DOI_RELATED_DATA_DOI

Online Variable Information Tool

Your sites: US-PFa

US-PFa: Variable Information

Instrument Model List | Variable Information

Save

Status
- Reviewed (Saved)
- Updated (NOT Saved)
- Not yet addressed (Saved)
- To be deleted (to undo)

Show Historical Instruments

Customize Columns: 11 Columns Shown

+ New Variable

Gray columns are data in older formats and cannot be edited. Hover over column for details. View only useful columns with Customize Columns at right.

Early-version BASE Variable	Status	Reset	Delete	FP-In Variable	Reuse values from...	Height (meters)	Instrument Model	Start Date for Height / Instrument Model	Height / Instrument Model Change	Comment
CO2_2				CO2_1_5_1		30	GA_CP-LI-COR LI-7000	start of data	Add	
Not included				CO2_1_6_1		11	GA_CP-LI-COR LI-7000	start of data	Add	
CO2_1				CO2_1_7_1			GA_CP-LI-COR LI-7000	start of data	Add	
Not included				FC_1_1_1		396	GA_CP-LI-COR LI-6262 SA-ATI SATI K Style	start of data	Add	
Not included				FC_1_2_1		122	GA_CP-LI-COR LI-6262 SA-ATI SATI K Style	start of data	Add	

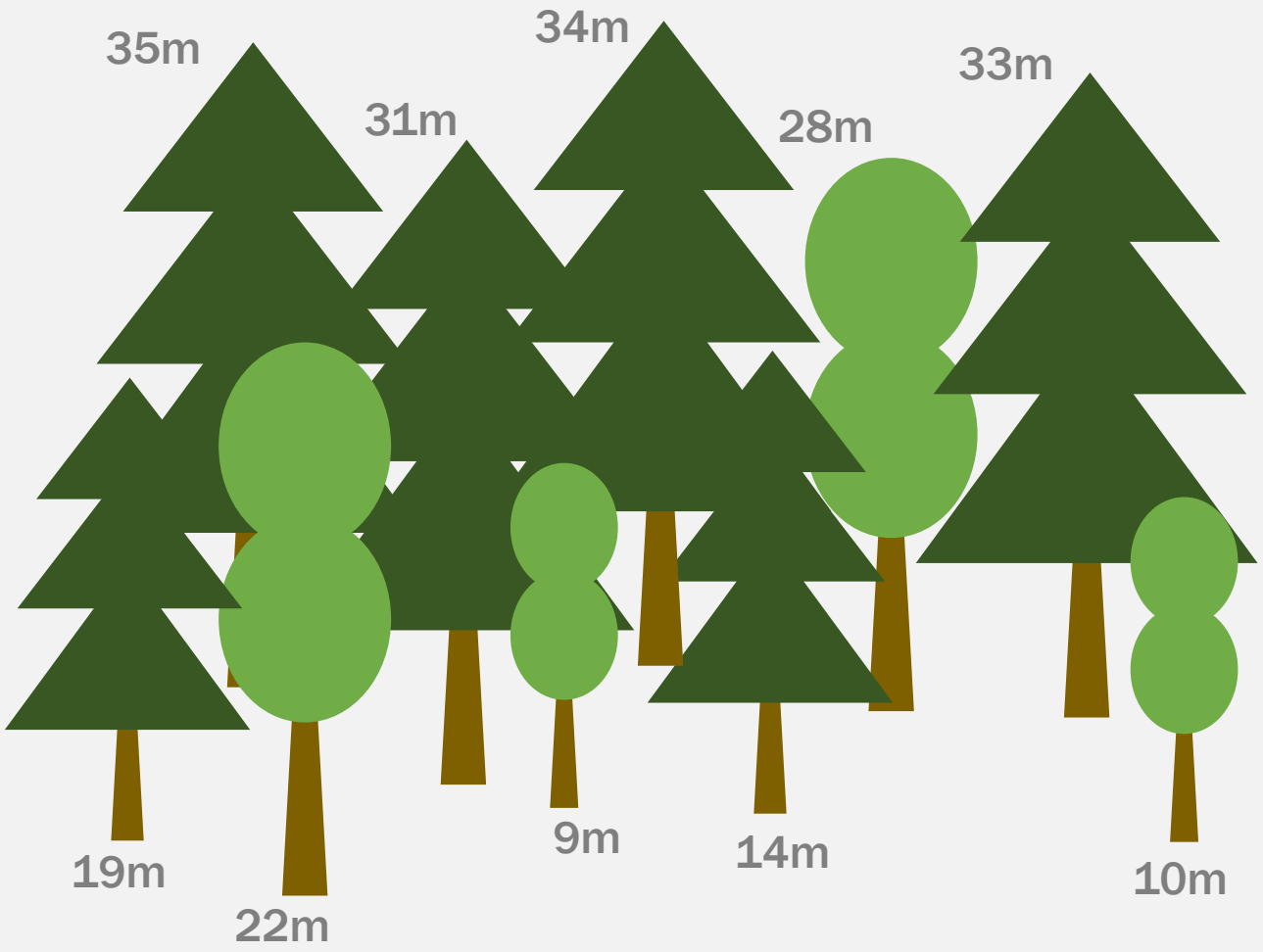
BADM Reporting: Translating your site data to BADM formats

Mean canopy height = 32.2m

HEIGHTC = 32.2
HEIGHTC_STATISTIC = Mean
HEIGHTC_DATE = 201910

HEIGHTC_STATISTIC_NUMBER = 5
HEIGHTC_STATISTIC_TYPE = Spatial

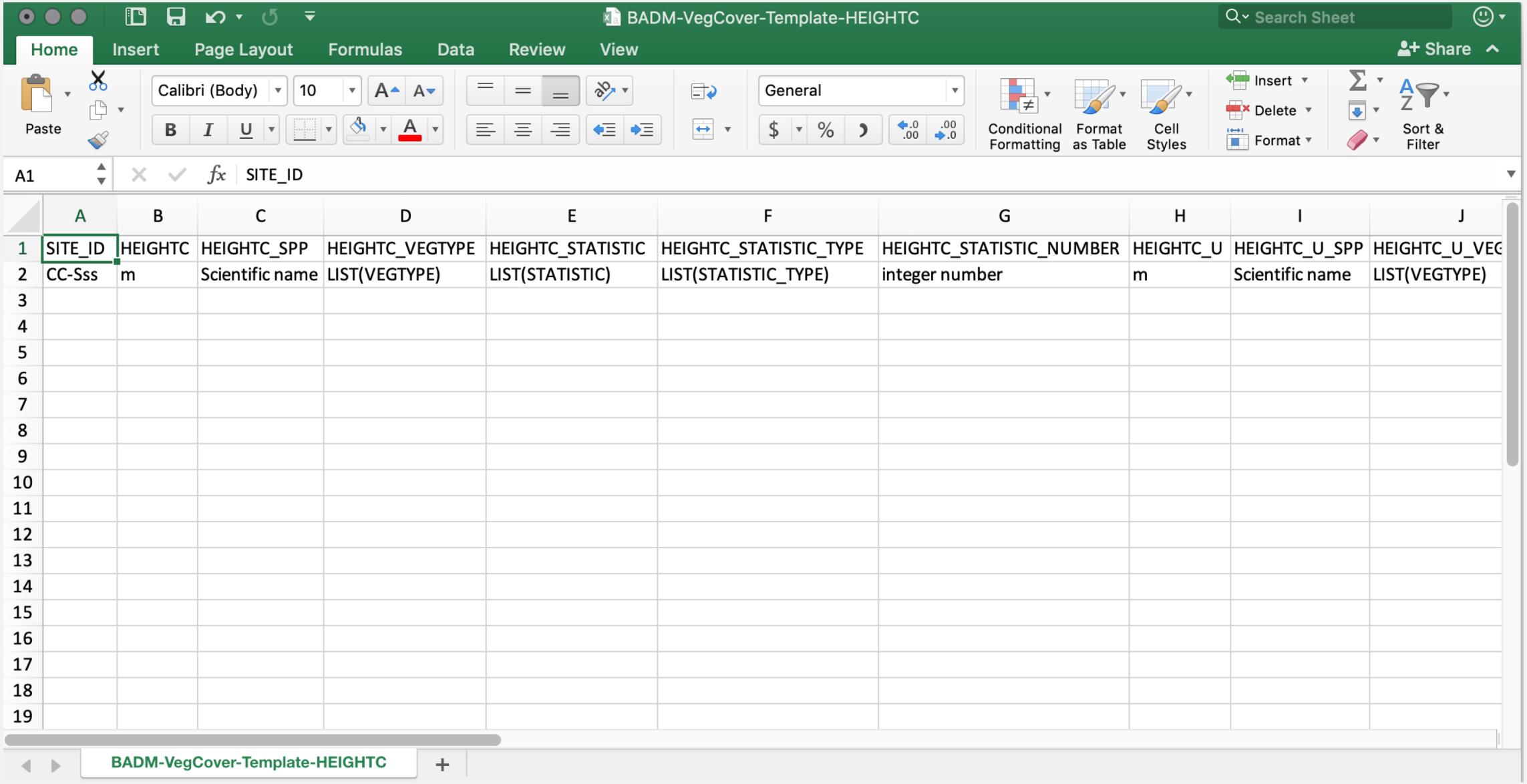
BADM Reporting: Translating your site data to BADM formats



What else could you report?

HEIGHTC_U (understory)
SPP specific
VEGTYPE specific
Other statistics:
- Standard Deviation
- Min, Max
- Percentiles of distribution

CSV files per group with online documentation



	A	B	C	D	E	F	G	H	I	J
1	SITE_ID	HEIGHTC	HEIGHTC_SPP	HEIGHTC_VEGTYPE	HEIGHTC_STATISTIC	HEIGHTC_STATISTIC_TYPE	HEIGHTC_STATISTIC_NUMBER	HEIGHTC_U	HEIGHTC_U_SPP	HEIGHTC_U_VEG
2	CC-Sss	m	Scientific name	LIST(VEGTYPE)	LIST(STATISTIC)	LIST(STATISTIC_TYPE)	integer number	m	Scientific name	LIST(VEGTYPE)

CSV files per group with online documentation

HEIGHTC Variables

Variable	Required	Multiple	Units	Description
HEIGHTC	R1	M	m	**Canopy height** Height of the canopy. In a forest ecosystem, canopy height is the distribution of overstory trees that see light at the top of the canopy. Forest understory canopy height is reported in HEIGHTC_U. If overstory / understory distinction is necessary for non-forest ecosystems, describe details in Approach.
HEIGHTC_SPP	R1-Optional	M	Scientific name	**Canopy height species (taxa)** Vegetation species being described by the measurement. To enter a plant species, use the scientific name (Genus species Author or Genus Author). Please refer to www.theplantlist.org for current scientific names and authors. If the measurement includes all vegetation present, do not enter a value. Do not use SPP if reporting VEGTYPE.
HEIGHTC_VEGTYPE	R1-Optional	M	LIST(VEGTYPE)	**Canopy height vegetation type** Use the predefined list to indicate the type of vegetation being described by the measurement (e.g., Grass, Evergreen Tree, Deciduous Tree, etc). If the measurement includes all vegetation present, do not enter a value. If vegetation type is not in predfined list, enter "Other/Not in list" and describe briefly in Approach. Do not use VEGTYPE if reporting SPP.
HEIGHTC_STATISTIC	R1	M	LIST(STATISTIC)	**Canopy height statistic** The statistic for the measurement reported. Use predefined list (e.g., mean, min / max, standard deviation, etc). If appropriate, report the type of statistic (e.g., spatial for spatial standard deviation) in STATISTIC_TYPE.
HEIGHTC_STATISTIC_TYPE	R1-Optional	M	LIST(STATISTIC_TYPE)	**Canopy height statistic type** The type of statistic reported if appropriate (e.g., spatial). Use predefined list.
HEIGHTC_STATISTIC_NUMBER	R1-Optional	M	integer number	**Number of observations used to determine canopy height statistic** Number of observations (samples / replicates) used to calculate the STATISTIC for the reported measurement.
HEIGHTC_U	R2	M	m	**Understory canopy height** Canopy height of the understory. Typically reported only for forest ecosystems. Describe how understory was determined in Approach. If HEIGHTC_U is reported for non-forest ecosystems, clearly describe ecosystem and methodological details in Approach.

CSV files per group with onl

HEIGHTC Variables

Variable	Required	Multiple	Units
HEIGHTC	R1	M	m
HEIGHTC_SPP	R1-Optional	M	Scientific nan
HEIGHTC_VEGTYPE	R1-Optional	M	LIST(VEGTYP
HEIGHTC_STATISTIC	R1	M	LIST(STATIST
HEIGHTC_STATISTIC_TYPE	R1-Optional	M	LIST(STATIST
HEIGHTC_STATISTIC_NUMBER	R1-Optional	M	integer numb
HEIGHTC_U	R2	M	m

understory was determined in Approach. If HEIGHTC_U is reported for non-forest ecosystems, clearly describe ecosystem and methodological details in Approach.

STATISTIC Options (back to top)

Option	Definition
Minimum	Minimum value
1st Percentile	Quantile at 1% of distribution
5th Percentile	Quantile at 5% of distribution
10th Percentile	Quantile at 10% of distribution
25th Percentile	Quantile at 25% of distribution
Median – 50th Percentile	Median – Quantile at 50% of distribution
75th Percentile	Quantile at 75% of distribution
90th Percentile	Quantile at 90% of distribution
95th Percentile	Quantile at 95% of distribution
99th Percentile	Quantile at 99% of distribution
Maximum	Maximum value
Mean	Average (mean) value of sample population
Standard Deviation	Standard deviation may be reported from a sample population that consists of individual or aggregated samples (observations). If the distinction is important, specify in Comments.
Measurement Uncertainty	Report uncertainty as a plus or minus value in the measurement units. For example, enter 1.5 for +/- 1.5 units. Uncertainty may be reported from the instrument's specifications, determined empirically, or estimated by the tower team. Please describe such details in Approach. For uncertainty values that are better described by a range, a percent, or other, please enter information in Comments.
Single observation	Single observation

Other formats? (e.g., differently formatted Excel files?)

AmeriFlux Data Products: BIF contains BADM

flux-met

BADM

BASE+

(QA/QC'ed flux-met data)

BIF

(QA/QC'ed BADM**)

ONEFlux / Fluxnet

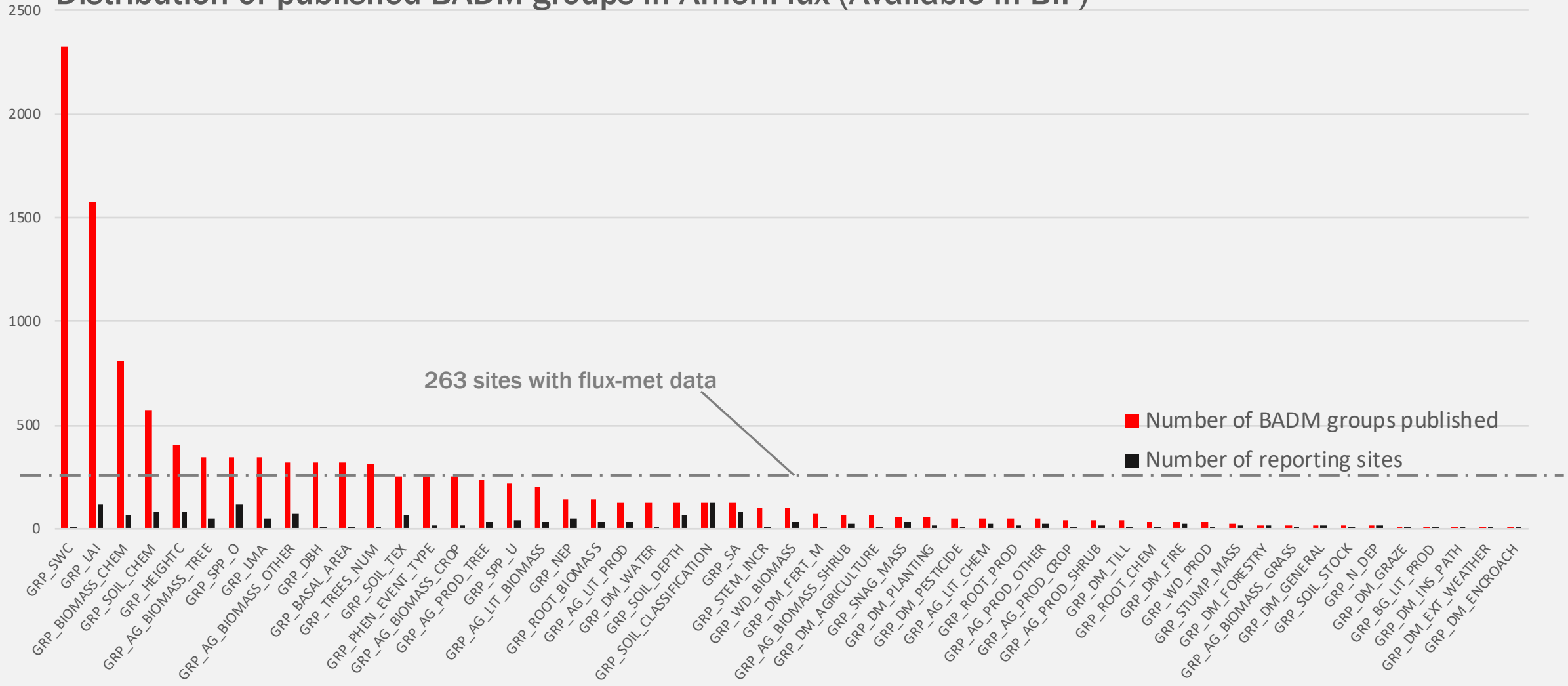
(flux-met with gap-fill, uncertainty, partitioning)

+ Measurement Height temporary product

**BADM = Biological, Ancillary, Disturbance, & Metadata

AmeriFlux BADM archive

Distribution of published BADM groups in AmeriFlux (Available in BIF)



BIF Flavors

https://ameriflux.lbl.gov/data/download-data/

Home / Data / Download Data

Download Data

Bulk download in the new file and variable formats is available below (See the README for further information)

A request for data will give you the following:

- Download Manifest
- Zip file per site containing both Flux-met data and BADM data

BADM data can be downloaded without Flux-met data if BADM only option is selected below.

☐ **Download BADM data only**

All Sites

BR-Sa1: Santarem-Km67-Primary Forest
BR-Sa3: Santarem-Km83-Logged Forest
CA-Gro: Ontario - Groundhog River, Boreal Mixedwood Fores
CA-Man: Manitoba - Northern Old Black Spruce (former BOR.
CA-NS1: UCI-1850 burn site
CA-NS2: UCI-1930 burn site
CA-NS3: UCI-1964 burn site
CA-NS4: UCI-1964 burn site wet
CA-NS5: UCI-1981 burn site
CA-NS6: UCI-1989 burn site

> <

Your Selections *

Select all sites

Clear site list

Additional Data Files

☐ **BADM data for all AmeriFlux sites that have half-hourly data**

☐ **BADM data for all AmeriFlux sites**

BIF Flavors

https://ameriflux.lbl.gov/data/download-data/

Home / Data / Download Data

Download Data

Bulk download in the new file and variable form

A request for data will give you the following:

- Download Manifest
- Zip file per site containing both Flux-me

BADM data can be downloaded without Flux-m

☐ **Download BADM data only**

All Sites

BR-Sa1: Santarem-Km67-Primary Forest
BR-Sa3: Santarem-Km83-Logged Forest
CA-Gro: Ontario - Groundhog River, Boreal Mixedwo
CA-Man: Manitoba - Northern Old Black Spruce (forn
CA-NS1: UCI-1850 burn site
CA-NS2: UCI-1930 burn site
CA-NS3: UCI-1964 burn site
CA-NS4: UCI-1964 burn site wet
CA-NS5: UCI-1981 burn site
CA-NS6: UCI-1989 burn site

Select all sites

Clear site list

Additional Data Files

☐ **BADM data for all AmeriFlux sites that have half-hourly data**

☐ **BADM data for all AmeriFlux sites**

Data and Manifest

< Back to Download Page

Download Manifest

```
#downloadDate:20190719003219
#numberOfSitesDownloaded:1
#emailForSitePIs:jranders@uci.edu
#dataFiles
SITE_ID,filename,start_year,end_year,version,filetype,timestamp
```

Copy to Clipboard

Note: The download manifest contains the emails of the data contributors, site information and the data download URLs

Data Download URLs

Click on each URL to download the files. Consider using a plugin like DownThemAll or GetThemAll to download all the files at once

README	US-Bn1_BASE-BADM	AA-Flx_BIF	AA-Net_BIF

BIF = BADM Interchange Format

AMF_US-Ton_BIF_CURRENT

Home Insert Page Layout Formulas Data Review View

A2 US-Ton

	A	B	C	D	E
1	SITE_ID	GROUP_ID	VARIABLE_GROUP	VARIABLE	DATAVALUE
97	US-Ton	8463	GRP_DOM_DIST_MGMT	DOM_DIST_MGMT	Grazing
98	US-Ton	10194	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_METHOD	Eddy Covariance
99	US-Ton	10194	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_VARIABLE	CO2
100	US-Ton	10194	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_DATE_START	2001
101	US-Ton	10194	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_OPERATIONS	Continuous operation
102	US-Ton	2700439	GRP_HEADER	SITE_NAME	Tonzi Ranch
103	US-Ton	8615	GRP_IGBP	IGBP	WSA
104	US-Ton	19464	GRP_LAI	LAI_TYPE	LAI
105	US-Ton	19464	GRP_LAI	LAI_U	0.49
106	US-Ton	19464	GRP_LAI	LAI_U_SPATIAL_REP_NUMBER	3
107	US-Ton	19464	GRP_LAI	LAI_METHOD	Direct
108	US-Ton	19464	GRP_LAI	LAI_APPROACH	400cm2 sampling square; 3 replicants; measured throught Li-cor area meter
109	US-Ton	19464	GRP_LAI	LAI_DATE	20010106
110	US-Ton	19464	GRP_LAI	LAI_COMMENT	operated by Liukang Xu
111	US-Ton	19465	GRP_LAI	LAI_TYPE	LAI
112	US-Ton	19465	GRP_LAI	LAI_U	0.45
113	US-Ton	19465	GRP_LAI	LAI_U_SPATIAL_REP_NUMBER	3
114	US-Ton	19465	GRP_LAI	LAI_METHOD	Direct
115	US-Ton	19465	GRP_LAI	LAI_APPROACH	400cm2 sampling square; 3 replicants; measured throught Li-cor area meter
116	US-Ton	19465	GRP_LAI	LAI_DATE	20010223
117	US-Ton	19465	GRP_LAI	LAI_COMMENT	operated by Liukang Xu

AMF-BIF

Ready Average: 553 Count: 5 Sum: 553 100%

It’s all about GROUPS

AMF_US-Ton_BIF_CURRENT

Group by GROUP_ID

	A			D	E
1	SITE_ID	GROUP_ID	VARIABLE_GROUP	VARIABLE	DATAVALUE
97	US-Ton	8463	GRP_DOM_DIST_MGMT	DOM_DIST_MGMT	Grazing
98	US-Ton	10194	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_METHOD	Eddy Covariance
99	US-Ton	10194	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_VARIABLE	CO2
100	US-Ton	10194	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_DATE_START	2001
101	US-Ton	10194	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_OPERATIONS	Continuous operation
102	US-Ton	2700439	GRP_HEADER	SITE_NAME	Tonzi Ranch
103	US-Ton	8615	GRP_IGBP	IGBP	WSA
104	US-Ton	19464	GRP_LAI	LAI_TYPE	LAI
105	US-Ton	19464	GRP_LAI	LAI_U	0.49
106	US-Ton	19464	GRP_LAI	LAI_U_SPATIAL_REP_NUMBER	3
107	US-Ton	19464	GRP_LAI	LAI_METHOD	Direct
108	US-Ton	19464	GRP_LAI	LAI_APPROACH	400cm2 sampling square; 3 replicants; measured throught Li-cor area meter
109	US-Ton	19464	GRP_LAI	LAI_DATE	20010106
110	US-Ton	19464	GRP_LAI	LAI_COMMENT	operated by Liukang Xu
111	US-Ton	19465	GRP_LAI	LAI_TYPE	LAI
112	US-Ton	19465	GRP_LAI	LAI_U	0.45
113	US-Ton	19465	GRP_LAI	LAI_U_SPATIAL_REP_NUMBER	3
114	US-Ton	19465	GRP_LAI	LAI_METHOD	Direct
115	US-Ton	19465	GRP_LAI	LAI_APPROACH	400cm2 sampling square; 3 replicants; measured throught Li-cor area meter
116	US-Ton	19465	GRP_LAI	LAI_DATE	20010223
117	US-Ton	19465	GRP_LAI	LAI_COMMENT	operated by Liukang Xu

Python Jupyter Notebook (available by request)

jupyter BIF-PythonJupyterNotebookUserTools Last Checkpoint: 10/25/2018 (autosaved)

Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

Run Markdown

Header ✖ ... Add tag

AmeriFlux and FLUXNET BIF File Parser

This notebook walks the user through reading in an AmeriFlux or FLUXNET BIF (BADM Interchange Format file) and manipulating the contents for the purposes of answering questions and/or writing out useful subsets of the data in a simple usable format.

To start using this notebook, you will need an Excel BIF file that you downloaded from either AmeriFlux or FLUXNET. In this example, the file is in my home directory and I started with the AmeriFlux all sites BIF. This code should be able to read any BIF.

To execute the whole notebook, choose "Cell->Run All" from the menu above. If you have updated a single segment of code in a notebook, select the cell you want to execute and choose "Cell->Run Cells". The first code cell in this notebook does all of the setup and must be run to completion before any of the other cells can be run. When it is done running, it will print 'DONE' below the code box.

In several of the code segments there are mechanisms that you can use to customize the code to do something different than it currently does. For instance, you can have it look for a different VARIABLE_GROUP or limit down the list of sites by specifying a sites filter. You can also specify whether you want to print to a file in the printtofile variable in the cells that can print to a file.

If no path is defined in the file specification, the file is assumed to be in the same directory as this notebook.

Setup ✖ ... Add tag

Initialize the notebook by reading in the BIF and parsing it into useful data structures

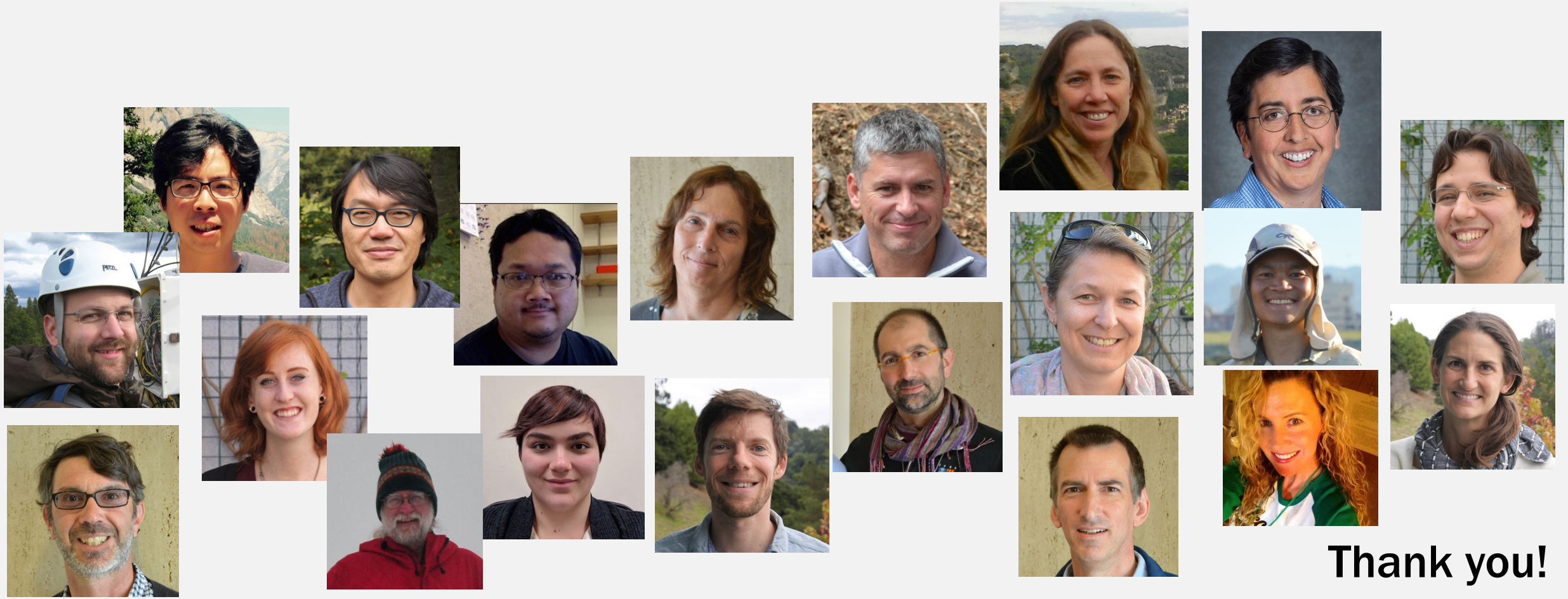
The first three code blocks below must always be executed before trying to do any of the other activities in this notebook. Before executing the first block below, you will need to specify the name and location of the BIF file. See the first line of code in the next box to specify. The code below completes three steps described below.

AMERIFLUX

We welcome questions / feedback

ameriflux-support@lbl.gov

https://ameriflux.lbl.gov



Thank you!