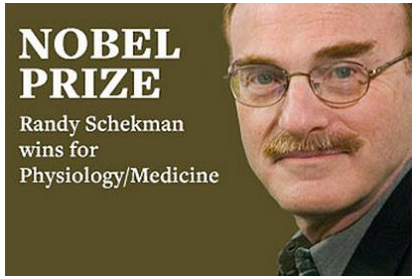
FLUXNET 2017 Berkeley Conference

Dennis Baldocchi

University of California, Berkeley

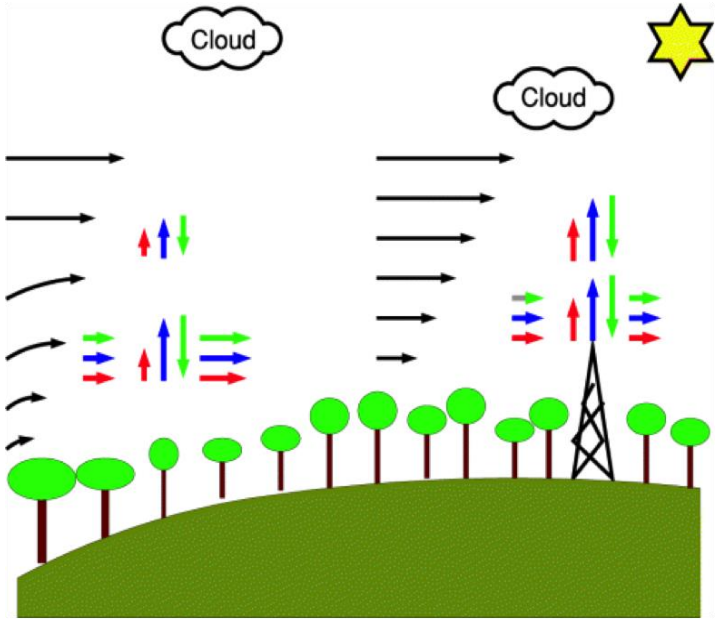
Welcome to Berkeley and California



Goals and Objectives of the Conference

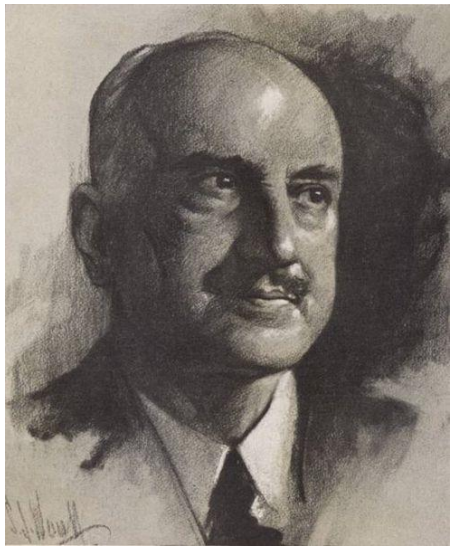
- Foster Interactions and Collaborations Among the Fluxnet Community
- Describe the Attributes and Opportunities of the new Fluxnet dataset
- Discuss Status and Progress of the Regional Networks
- Recruit New and Extended Datasets
- Discuss Technical Issues for the Next Generation of Flux Measurements and Interpretation
- Prioritize Directions of Science and Synthesis
- Discuss Future of Flux Network Science

Over Arching Goal
Fluxes Everywhere, All of the Time



To Do So Effectively Requires Sharing Data

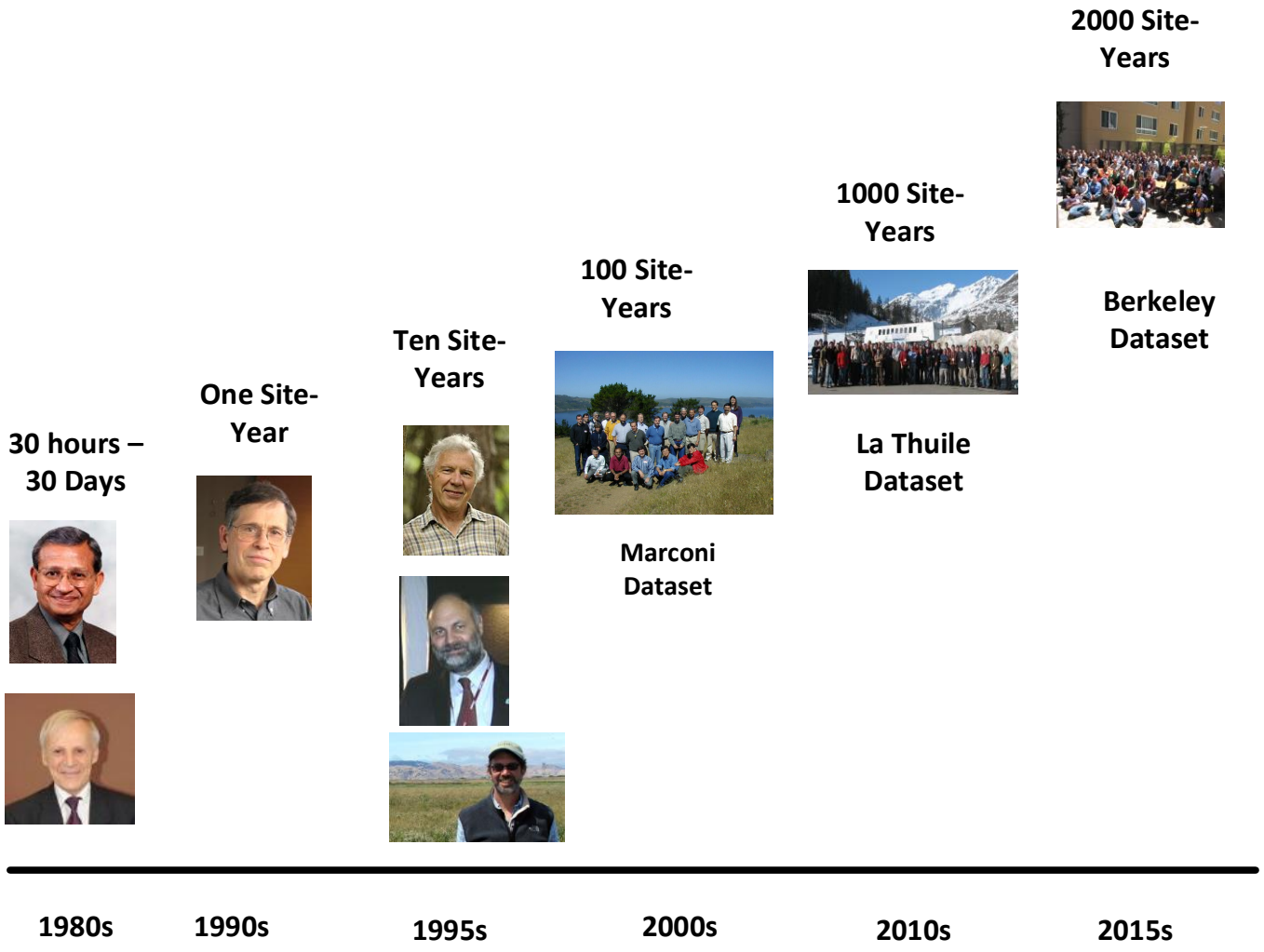
Historical Preamble



George Santayana

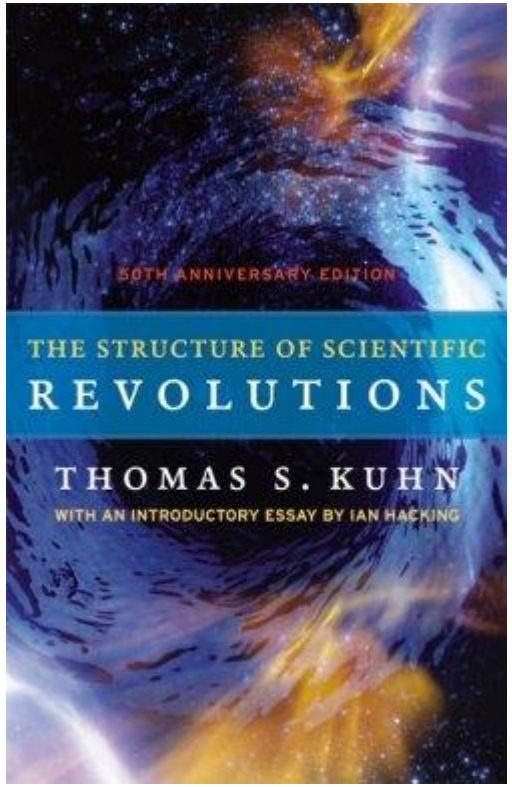
"Those who cannot remember the past are condemned to repeat it",

FLUXNET at 20+ Years
Time Line of Carbon, Water & Energy Flux Measurements and Data

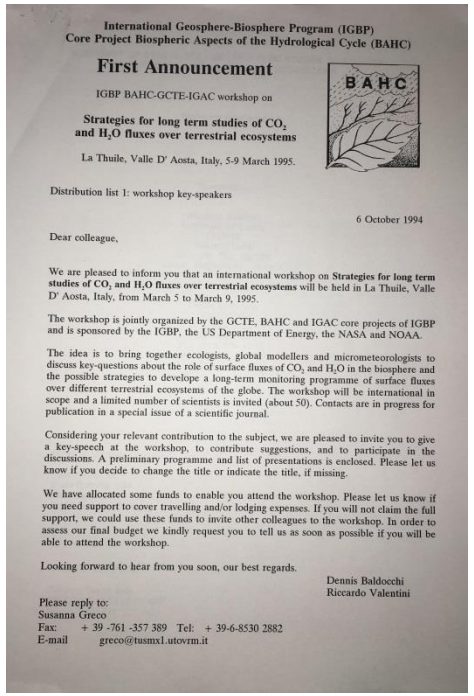


Fluxnet Paradigm Shifts

- Measuring Ecosystem Metabolic Fluxes (CO_2, H_2O), Directly, at Ecosystem Time and Space Scales
- Discovery of Many Scale Emergent Processes
- Providing Data to Assess Carbon and Water Fluxes ‘Everywhere and All of the Time’
- Sharing Data across Many Intellectual and National Cultures and Tribes



La Thuile Workshop on
Strategies for Long Term Studies of CO_2 and H_2O Fluxes over Terrestrial Ecosystems
March, 1995



International Geosphere-Biosphere Program (IGBP)
Core Project Biospheric Aspects of the Hydrological Cycle (BAHC)

First Announcement

BAHC

IGBP BAHC-GCTE-IGAC workshop on

Strategies for long term studies of CO_2 and H_2O fluxes over terrestrial ecosystems

La Thuile, Valle D' Aosta, Italy, 5-9 March 1995.

Distribution list 1: workshop key-speakers

6 October 1994

Dear colleague,

We are pleased to inform you that an international workshop on **Strategies for long term studies of CO_2 and H_2O fluxes over terrestrial ecosystems** will be held in La Thuile, Valle D' Aosta, Italy, from March 5 to March 9, 1995.

The workshop is jointly organized by the GCTE, BAHC and IGAC core projects of IGBP and is sponsored by the IGBP, the US Department of Energy, the NASA and NOAA.

The idea is to bring together ecologists, global modellers and micrometeorologists to discuss key-questions about the role of surface fluxes of CO_2 and H_2O in the biosphere and the possible strategies to develope a long-term monitoring programme of surface fluxes over different terrestrial ecosystems of the globe. The workshop will be international in scope and a limited number of scientists is invited (about 50). Contacts are in progress for publication in a special issue of a scientific journal.

Considering your relevant contribution to the subject, we are pleased to invite you to give a key-speech at the workshop, to contribute suggestions, and to participate in the discussions. A preliminary programme and list of presentations is enclosed. Please let us know if you decide to change the title or indicate the title, if missing.

We have allocated some funds to enable you attend the workshop. Please let us know if you need support to cover travelling and/or lodging expenses. If you will not claim the full support, we could use these funds to invite other colleagues to the workshop. In order to assess our final budget we kindly request you to tell us as soon as possible if you will be able to attend the workshop.

Looking forward to hear from you soon, our best regards.

Dennis Baldocchi
Riccardo Valentini

Please reply to:
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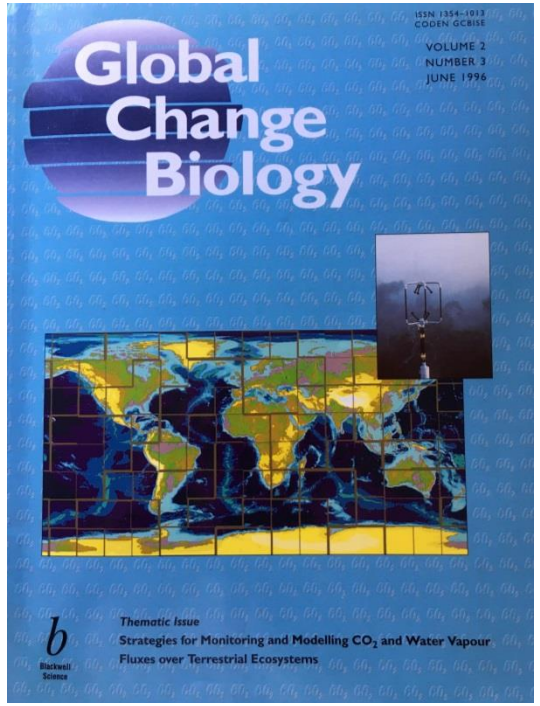
Fax: + 39 -761 -357 389 Tel: + 39-6-8530 2882
E-mail greco@tusmx1.utovrm.it

Are we able to Determine Carbon Budget Components of Terrestrial Ecosystems by Means of Eddy Covariance Measurements?; At what Degree of Accuracy?

Can we supply data for testing and improving existing models of carbon and water exchange?

What are the technological and organization requirements for establishing a global network of flux measurements?



June 1996

EOS Validation Proposal 1997

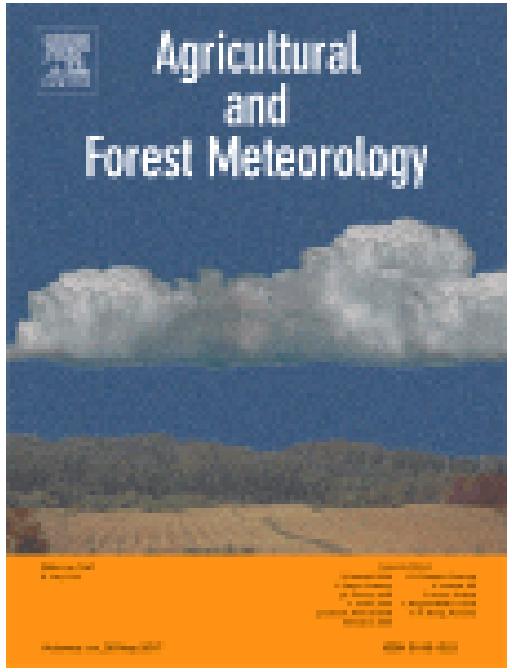
- Establish an infrastructure for guiding, collecting, synthesizing and disseminating long term measurements of CO_2, water and energy exchange from a dispersed array of regional flux networks; environmental, plant canopy and soil variables, that are needed to interpret the flux data, will also be collected and processed.

- Inter-calibrate flux measurement systems that are operating among the networks, so a standardized and un-biased products are derived;

- Develop and provide value-added data products using flux and environmental data acquired within the framework of this network of flux measurement stations.

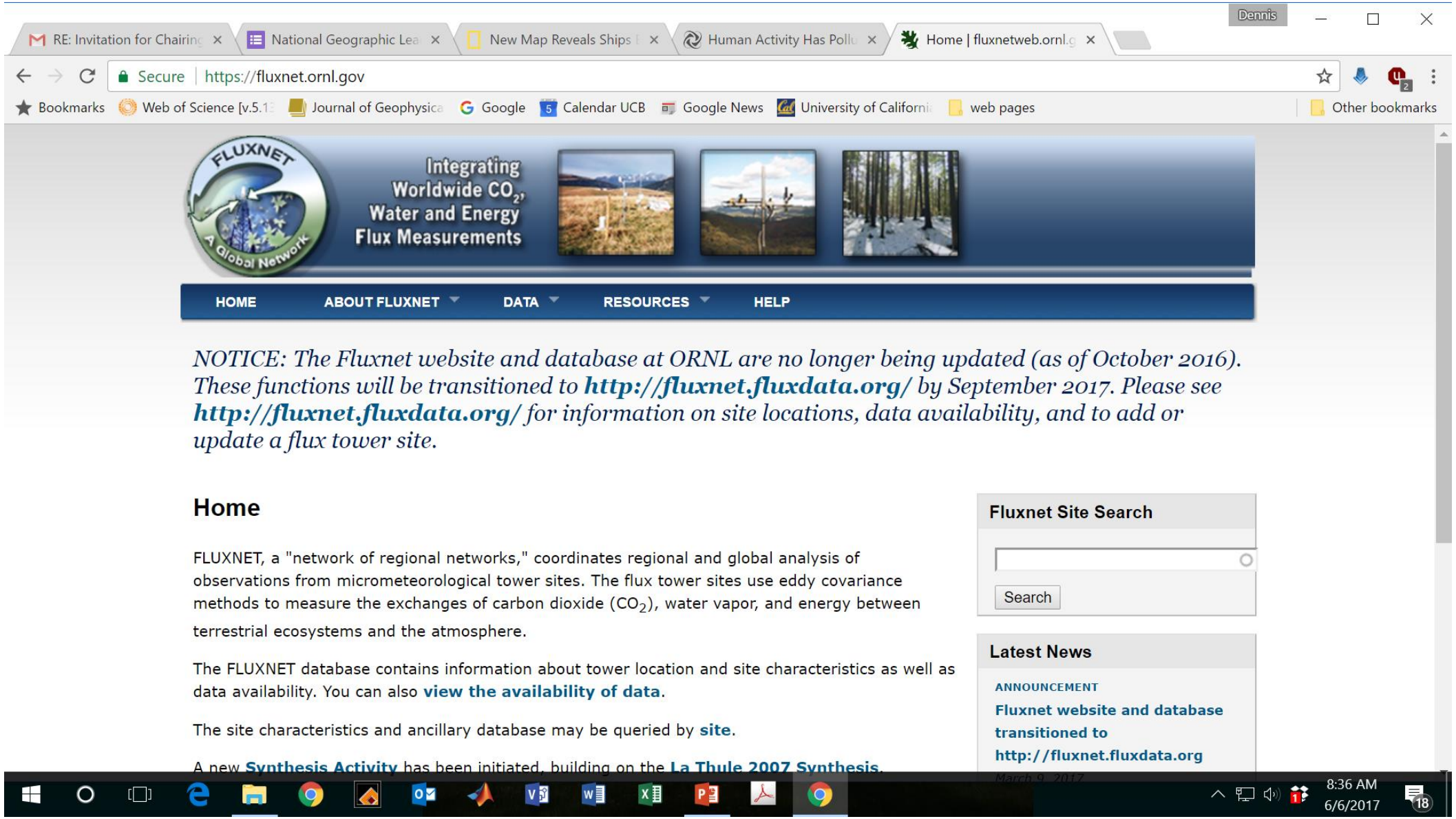
First Harmonized Dataset for Synthesis

Marconi 2000 Fluxnet Workshop



Agricultural and Forest Meteorology
Volume 113, Issues 1–4, Pages 1-246
(2 December 2002)

FLUXNET 2000 Synthesis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FLUXNET
A Global Network
Integrating Worldwide CO_2, Water and Energy Flux Measurements
HOME
ABOUT FLUXNET
DATA
RESOURCES
HELP
NOTICE: The Fluxnet website and database at ORNL are no longer being updated (as of October 2016). These functions will be transitioned to http://fluxnet.fluxdata.org/ by September 2017. Please see http://fluxnet.fluxdata.org/ for information on site locations, data availability, and to add or update a flux tower site.
Home
FLUXNET, a "network of regional networks," coordinates regional and global analysis of observations from micrometeorological tower sites. The flux tower sites use eddy covariance methods to measure the exchanges of carbon dioxide (CO_2), water vapor, and energy between terrestrial ecosystems and the atmosphere.
The FLUXNET database contains information about tower location and site characteristics as well as data availability. You can also view the availability of data.
The site characteristics and ancillary database may be queried by site.
A new Synthesis Activity has been initiated, building on the La Thuile 2007 Synthesis.
Fluxnet Site Search
Search
Latest News
ANNOUNCEMENT
Fluxnet website and database transitioned to http://fluxnet.fluxdata.org
8:36 AM
6/6/2017

FLUXNET 2000 Proposal, part 1

- to quantify the spatial differences in net biosphere-atmosphere carbon dioxide and water vapor exchange rates that are experienced within and across ecological and climatic gradients

- to examine temporal dynamics and variability (seasonal, inter-annual) of carbon, water and energy flux densities
  - examine the influences of phenology, droughts, heat spells, *El Niño*, length of growing season, phenology and presence or absence of snow on canopy-scale fluxes
  - assess the temporal variability of stand-scale model parameters being used by algorithms that are forced by remote sensing products, such as light use efficiency

FLUXNET 2000 Proposal, part 2

- to quantify the sensitivities of carbon dioxide and water vapor fluxes to changes in insolation, temperature, humidity, soil moisture, photosynthetic capacity, nutrition, canopy structure and ecosystem functional type
  - this analysis will allows us to quantify scale-dependent and non-linear response functions for the generate empirical algorithms that can be applied by regional and global carbon balance models that are forced with remote sensing information.
- test the performance of biophysical models across the ecological and climatic range of sites in FLUXNET
  - validated biophysical models can be used to develop mechanistically-based simpler algorithms that can be assessed by sensors residing on satellites;

2nd Harmonized Data Set

La Thuile 2007 Workshop

RE: Invitation for Chairing | National Geographic Lea | New Map Reveals Ships | Human Activity Has Pollu | Fluxdata

fluxnet.fluxdata.org

Bookmarks | Web of Science [v.5.13] | Journal of Geophysica | Google | Calendar UCB | Google News | University of Californi | web pages | Other bookmarks

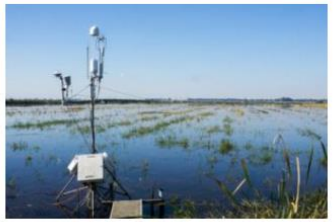
Fluxdata

The Data Portal serving the FLUXNET community

Home | About | Community | Sites | Data | Sign In

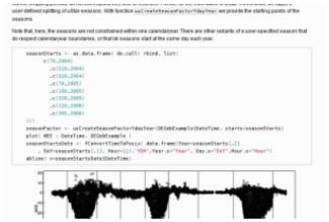
POSTCARDS

FLUXNET2015 Data Set Highlighted in EOS



FLUXNET2015 -- a new data set to keep a sharper eye More

New version of REddyProc available with new features



New version of REddyProc recently made available brings new More

[People] Young Scientist Profile — Angela J. Rigden

This month, we are pleased to interview Angela J. Rigden, More

FLUXNET ANNOUNCEMENTS

FLUXNET2015 Data Set Highlighted in EOS

May 9 2017

FLUXNET2015 — a new data set to keep a sharper eye on land-air exchanges. The latest update of the longest global record of ecosystem carbon, water, and energy fluxes, features improved data quality, new data products, and more open data sharing policies ... (see link for the story) Twitchell Island (US-Twt) in the Sacramento–San Joaquin River Delta

FLUXNET WORKSHOP 2017

FLUXNET Workshop 2017, Berkeley

00 : 08 : 26 : 00

DAYS HOURS MIN SEC

Google Custom Search

ABOUT FLUXNET-FLUXDATA

Today, the eddy covariance flux measurements of carbon, water vapor, energy exchange are being made routinely across a confederation of regional networks in North, Central and South America, Europe, Asia, Africa, and Australia, in a global network, called FLUXNET. Here you have entered the FLUXNET Data Portal—Fluxdata that serves as a vehicle to: 1) facilitate the communication and sharing

8:37 AM
6/6/2017

What FluxNet can Do for Us: Spatial-Temporal Upscaling of Fluxes

- Upscaling of Carbon Fluxes, Net and Gross Primary Productivity
  - Neural Networks
  - Regression Tree
  - Light Use Efficiency Models
- Upscaling Evaporation
- Upscaling Fields of Surface Radiation Measurements
  - PAR, Shortwave, Net Radiation, Longwave, Diffuse Radiation, Albedo, fpar

What FluxNet Can Do for Us: Model Validation and Parameterization

- Providing Ground Truth and Lessons Learned for Land Surface Modeling and Land-Atmosphere Interactions;
- Providing data for Data-Model Fusion Schemes for Carbon Cycle
- Providing Ground Truth and Parameterization Data for Light Use Efficiency Models, coupled to Satellite Remote Sensing
  - MODIS, Hyperion, ECOSTRESS, SpecNet
- Providing Ground Truth to New Product derived from Satellite Radar Platforms
  - SMAP, COSMOS
- Resource on Site MetaData for Synthesis and Distillation
  - Soil Properties (Polaris)
  - Structure and Function (TRY)
  - Phenology (PhenoCam)
  - LIDAR

What is the Optimal Flux Network?

Intensive

- Expensive, Long Term Core Sites with Suite of Soil, Plant, Ecosystem and Biogeochemical Measurements to Parameterize and Validate Models, Understand Biophysical Process and Mechanisms Modulating Fluxes

Extensive

- Many (relatively inexpensive) Flux Towers for Spatial Upscaling of Water, Carbon and Energy Fluxes, as part of Machine Learning and Remote Sensing Schemes

New and Future Challenges

- Interannual Variability at ++Decadal Scales
- Detecting Trends in Response to Climate Change and Elevated CO_2
- Examine Response of Fluxes to Climate Extremes, Land Use Change and Management
- Use Information Theory to Quantify Leads, Lags and Associations among Fluxes and Biophysical Forcings
- Refine and Improve Data Driven Flux Maps
- Incorporating other Gases, Methane, stable isotopes, COS
- Include Underrepresented Ecosystems (Wetlands, Lakes, Tundra) and Regions (Latin America, Central Asia, Africa)
- Sustain the Effort
  - Secure Funding, Train New Scientists, Foster Intergenerational Transfer of Leadership
  - Continue Collaborations with PhenoCam, SpecNet, TRY databases

Organizing Committee

- Housen Chu, UC Berkeley
- Dario Papale, University of Tuscia
- Markus Reichstein, Max Planck Institute of Biogeochemistry
- Margaret Torn, Lawrence Berkeley
- Deb Agarwal, Lawrence Berkeley
- Dennis Baldocchi, UC Berkeley

- Support Staff, Rachel Palmer and Sherry Cooper
- Funding, US DOE Office of Science, Terrestrial Ecosystem Science

0830-0930: Plenary Session: Fluxnet Updates
0830-0840: Welcome, Introduction, Goals and Background (Dennis Baldocchi, UC Berkeley)
0840-0900: Status and Overview of Fluxnet, 2017 (Housen Chu, UC Berkeley)
0900-0930: New Fluxnet Dataset and BADM update (Deb Agarwal, Gilberto Pastorello, Lawrence Berkeley National Lab; Dario Papale, University of Tuscia)

0930-1010: Plenary Session: Regional Network Updates I
0930-0950: North American Flux Networks (Margaret Torn, Lawrence Berkeley National Lab; Stefan Metzger, NEON)
0950-1010: Europe Flux Networks and ICOS (Dario Papale, University of Tuscia, Italy)

1010-1040: Break and Coffee

1040-1200: Plenary Session: Regional Network Updates II
1040-1100: AsiaFlux (Kazuhito Ichii, Chiba University, Japan)
1100-1120: ChinaFlux (Shuli Niu, Chinese Academy of Sciences, China)
1120-1140: OzFlux and TERN (James Cleverly, University of Technology Sydney; Jason Beringer, University of Western Australia, Australia)
1140-1200: Latin America Networks (Rodrigo Vargas, University of Delaware + TBA)
1200-1330: Lunch, Posters and Sun

1330-1450: Plenary Session: Long Term Flux Measurements and Spatial Upscaling Studies Across the Globe
1330-1350: Lessons from Hyytiälä Forest (Timo Vesala, University of Helsinki, Finland)
1350-1410: Lessons from Harvard Forest (Bill Munger, Harvard University)
1410-1430: FLUXCOM (Markus Reichstein, Max Planck Institute of Biogeochemistry, Germany)
1430-1450: Biophysical Modulators of Interannual Variability (Trevor Keenan, Lawrence Berkeley National Lab)

1450-1800: Poster Session/Coffee
1450-1510: Introduction to Poster Session, 5-6 Selected 3 minute, one slide, Lightning Talks
1510-1700: Poster Session with coffee service
1700-1800: Mixer/posters with light hors d'oeuvres
1800 Adjourn

0830-0915: Plenary Session
0830-0845: WMO Standards and Fluxnet (Han Dolman, VU University Amsterdam, Netherlands)
0845-0900: Results from AmeriFlux Comparisons (Sébastien Biraud, Stephen Chan, Sigrid Dengel, Lawrence Berkeley National Lab)
0900-0915: Review on Flux Partitioning (Lianhong Gu, Oak Ridge National Lab)

0920-1030: Concurrent Discussion Breakouts (70 min)
Topic 1. Water Flux Partitioning (Chair: Sebastian Wolf, ETH Zurich, Switzerland; Russ Scott, USDA; Corinna Rebmann, Helmholtz Centre for Environmental Research)
Topic 2. Instrumentation and Data Management, Update, Best Practices, Challenges, and Outlook (Chair: Dario Papale, University of Tuscia, Italy; Peter Isaacs, OzFlux; Oliver Sonnentag, Universite of Montreal)

1030-1050: Break and Posters

1050-1200: Concurrent Discussion Breakouts (70 min)
Topic 3. Carbon Flux Partitioning, Updates, Challenge, and Outlook (Chair: Lianhong Gu, Oak Ridge National Lab; Patty Oikawa, California State University, East Bay)

Topic 4: Long Term Data Analysis (Chair: Ben Ruddell, Northern Arizona University; Paul Stoy, Montana State University)

What has data from FLUXNET and its associated regional networks taught us? Groups of studies have revealed:

1.How annual photosynthesis and respiration co-vary with variations in climate, plant functional type, drought, and heat ;
2.How length of the growing season and phenology modulates annual photosynthesis;
3.How peak photosynthesis acclimates with temperature;
4.How light use efficiency increases with the fraction of diffuse light;
5.How photosynthetic capacity adjusts with time of season;
6.How rain induces pulses in ecosystem respiration;
7.How net carbon exchange varies as a function of time since disturbance;
8.How biophysical variables, like albedo, vary with plant functional type and nutrition.
9.What the relative controls among physical and biological variables are on net and gross carbon fluxes.
10.How interannual variability in weather and climate modulate carbon and water fluxes
11.How trends in carbon dioxide are affecting ecosystem scale water use efficiency
12.How much water is evaporated from ecosystems, as opposed to that inferred as the residual of water budgets.