

FLUX STANDARDIZATION AND INTER CALIBRATION WITHIN THE AMERIFLUX NETWORK

Dave Billesbach, Margaret Torn, Sebastien Biraud, Stephen Chan,
Chad Hanson, and many many others

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What is AmeriFlux?

- “coalition of the willing”
- AmeriFlux is not a large “themed” science project. It has larger-scale goals
- AmeriFlux is a framework under which individual projects coexist and interact
- Management is DOE funded, but many agencies fund AmeriFlux sites
- AmeriFlux management directly funds a small number of sites
- These “core sites” all have long histories and represent key ecosystems

Visit our web site at: <http://ameriflux.lbl.gov/>

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Where are AmeriFlux sites located?



- Began in 1997 with 15 sites
- Over 110 active sites
- Hundreds of site-years of data archived
- Currently led by Margaret Torn at LBNL
- Science leadership comes from the SSC
- Data team is led by Deb Agarwal (LBNL)
- QA/QC (Tech Team) is led by Sebastien Biraud (LBNL)

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AmeriFlux tech team



Left to right:

Stephen Chan (LBNL)

Chad Hanson (OSU)

Dave Billesbach (UNL)

Sebastien Biraud (LBNL)

The main goal of the Tech Team is to: “Foster and maintain precise, accurate, and consistent data across the network”.

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AmeriFlux tech team

How do we achieve this goal?

1. We provide (at little or no cost) calibration standard gases, linked to WMO)
 2. We provide (loan) reference PAR sensors for on-site calibration checks
 3. We are working on other reference standards (like temperature)
 4. We provide “Gold Files”, allowing site PIs to check their post-processing
 5. We do periodic site intercomparison visits with our E.C. reference systems
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AmeriFlux eddy covariance reference system

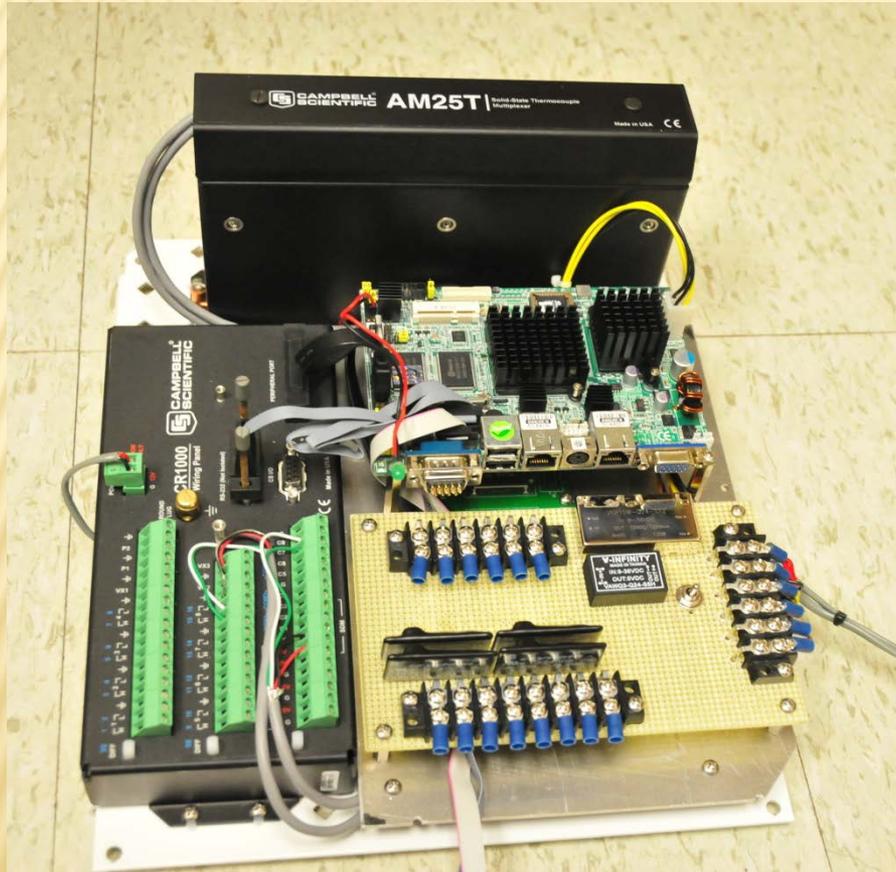


- Gill R3-50 sonic
- LiCor LI-7500A open path IRGA
- LiCor LI-7200 enclosed path IRGA
- K&Z CNR-4 radiometer
- SPN1 direct/diffuse pyranometer
- Up/down K&Z PQS-1 PAR
- Aspirated PRT
- Non-aspirated T/RH
- LiCor LI-7700 CH4 TDLAS



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AmeriFlux eddy covariance reference system



Data are collected by two separate systems. E.C. data (fast response) is collected by a custom program (HuskerFlux) running under Win-XP on a small, single board computer (SBC). All other sensors (slow response) are logged by a Campbell Scientific CR1000 data logger (and multiplexer).

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AmeriFlux eddy covariance reference system

All sensors are connectorized for quick, easy, and error-free system assembly.

The instruments can be mounted on the clients tower with our versatile mounting system, or we can mount them on one of our stand-alone tripods.

We can power our instruments from the clients power system or from a small gasoline generator (we're working on a solar power system).

We connect to the world through a 4G-LTE cellular modem (with fixed IP addressing) that allows us to remotely monitor and operate the instruments. We also receive daily raw data downloads through this link.

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AmeriFlux eddy covariance reference system

We install these instruments near the client site instruments and run for 7 to 10 days.

We request both raw and post-processed data from the site PI. We post-process the site data along with our own (using Eddy-Pro) and compare all results. We can learn from this if there are badly calibrated instruments, failing instruments, incorrectly operated sensors, etc.

Usually we find that almost everything is running well. Occasionally we find some issues. When that happens, we work with the site PI to identify and correct the problems.

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AmeriFlux Gold Files

We also maintain a set of Gold Files. These are 10 Hz, raw E.C. data. These files are freely available to all investigators. They also come with a set of carefully validated post-processed fluxes. Site investigators are encouraged to use their own code to post-process the raw data and to compare their results to the standard ones. This exercise is valuable to identify errors and omissions in data post-processing.

At the current time, the files are a bit dated and are in need of updating. Also, they don't include methane data.

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What can we in the IASOA group do?

Although a roving intercomparison flux system would be nice, it would probably be too costly to, maintain, and operate.

We could explore building our own “Gold Files” to evaluate post-processing at different sites. This would take some thought to assure that all types of sensors would be represented.

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Thanks for listening!

Questions?
