Title: The AmeriFlux Rapid Response System

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BER Program: ESS

Project: AmeriFlux Management Project

Project Website: http://ameriflux.lbl.gov/

Project Abstract: Beginning in 2014, the AmeriFlux Management Project has pioneered a program that allows scientists to rapidly initiate ecosystem flux measurements, to take advantage of special research opportunities. Specifically, we maintain and make available loaner flux systems (Rapid Response Systems; RRS) suitable for quick deployment to help scientists capture valuable research opportunities that arise unexpectedly or have limited measurement windows. The RRS is a stand-alone instrument package with a full complement of flux (carbon, water, and energy), meteorological (relative humidity, air temperature, barometric pressure), and radiation sensors (4-component net radiometer, and photosynthetically active radiation). Power and tower infrastructure are not standard components of the RRS and historically have been provided by the RRS requester. Since 2014, AMP has built five RRS and each was immediately in demand. They have been deployed for:

- Ecosystem response to wildfire in northern New Mexico (PI: Marcy Litvak, Sept. 2014–March 2018);
- Plant species composition change in coastal wetlands, Kennedy Space Center, Florida (PI: Ross Hinkle, March 2017–TBD);
- Large-scale irrigation experiment in rice fields, Arkansas (PI: Ben Runkle, May 2019–Nov. 2020);
- Pinyon-juniper recovery following severe drought in southern Utah (PI: Dave Bowling, June 2019–May 2022);
- Post-fire recovery research in a ponderosa pine forest in Oregon (PI: Chris Still, October 2021- September 2024).

The RRS program is successful and we are anticipating the deployment of several RRS in support of synergetic activities across DOE programs: (1) A deployment in August 2022 in support of the SAIL Campaign (Sept. 2021 through June 2023) in the East River Watershed of the Rocky Mountains (https://sail.lbl.gov/), where they would be used to improve representation of processes affecting modeling of climate and mountainous hydrology; (2) A deployment along with an upcoming multi-year ARM Mobile Facility campaign in the Southeastern United States in 2023 for five years (SEUS;

https://arm.gov/capabilities/observatories/amf/locations/seus). This campaign aims to enhance process understanding and model representations of aerosol, cloud, and land-atmosphere interactions.

To support the growing interest in using the eddy covariance technique in urban environments, the AmeriFlux Management Project has built two additional RRS. These systems (CO_2, H_2O, CH_4, and energy) are similar to previously deployed RRS but are dedicated to deployment in urban environment. These observation packages could support the new BER initiative on Urban Integrated Field Laboratories (Urban IFLs) that will build integrated models and tools to improve our understanding of the links between the natural and human components of the climate system.

Title: **AmeriFlux Community Initiatives**

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BER Program: ESS

Project: DOE Lab-led project: AmeriFlux Management Project (LBNL)

Project Website: https://ameriflux.lbl.gov/

Project Abstract: Community collaboration initiatives are at the core of how AMP enables the community to do transformative research. Examples of such initiatives include focal theme years, workshops, webinar and seminar series, annual community meetings and town halls at conferences. Here we describe a subset of recent and planned initiatives focused on supporting the broader AmeriFlux community.

As part of our community collaboration initiatives, we host theme years of focal interest. We recently launched the Year of Water Fluxes as our next theme year for community action. There are many science opportunities to study water fluxes in AmeriFlux. This theme year will support more water cycle measurements, enhance data quality, and build strong collaborations to work on the various aspects of water and fluxes. Initial activities included an Evapotranspiration workshop focused on measurements of water fluxes between ecosystems and the atmosphere (Nov 2-4th) (https://ameriflux.lbl.gov/community/ameriflux-meetings-workshops/) and a water focused AmeriFlux Annual Meeting. More activities and opportunities for engagement with the community are planned over the coming year.

This year also saw the launch of a new LBL and community-led project focused on FLUXNET, the global network of eddy-covariance research networks. The central goals of the NSF funded FLUXNET coordination project are to provide novel training and exchange opportunities, develop strong international collaborations, and build tools and protocols that ensure continued collaboration and growth. To do so, the FLUXNET coordination project will develop both data-focused processing protocols and pipelines, and people-focused education and exchange opportunities. Through the FLUXNET coordination project, we will use creative and transformative approaches to international collaboration and networked science, to build the next generation of FLUXNET to be a self-sustaining flagship of networked global scientific cooperation.

Title: **Diversity, Equity and Inclusion Initiatives for a Coalition of the Willing**

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BER Program: ESS

Project: DOE Lab-led project: AmeriFlux Management Project (LBNL)

Project Website: https://ameriflux.lbl.gov/

Project Abstract: The AmeriFlux Network is a community of providers and users of eddy covariance flux data. The level of commitment and engagement in the community encompasses a wide spectrum; from mere mailing-list membership, to participation in community events, to sharing best practices and data, to direct operational support for some long-term sites. Members work at institutions from various countries, with various funding levels, and institutional standards around physical and psychological safety. This heterogeneous membership poses particular challenges for Diversity, Equity, and Inclusion (DEI) initiatives.

Driven by member interest, we formed the AmeriFlux DEI committee to understand and address the needs of our diverse community. In the past year, we have identified DEI blind spots via community surveys and panels, and created corresponding resources (e.g., a handbook for safe and inclusive fieldwork). We hope to continue engaging with our community to improve open and inclusive science across AmeriFlux and beyond.

Title: Making AmeriFlux Data More Open and Cite-able

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Project Lead Principal Investigator (PI): Margaret S. Torn

BER Program: ESS

Project: DOE Lab-led project: AmeriFlux Management Project (LBNL)

Project Website: https://ameriflux.lbl.gov/

Project Abstract: AmeriFlux has added a new CC-BY-4.0 data usage license (Creative Commons by Attribution 4.0 International; https://creativecommons.org/licenses/by/4.0/) and so far 374 of the 567 AmeriFlux sites have chosen this license. This new AmeriFlux CC-BY-4 data license makes AmeriFlux data more compatible with other flux networks (e.g. ICOS, OzFlux, and NEON) and FAIR (Findable, Accessible, Interoperable, and Reusable).

It is also a first step toward making the data easier to use and cite. A remaining challenge has been citing the AmeriFlux data in scholarly works where data from a large number of sites are used. A Community of Practice has been working for the last year to develop an approach that will allow 100's of citations to be included as references in a paper through the use of a mechanism referred to as a "reliquary." The AmeriFlux data case is one of the leading use cases in the development of the solution. The Community of Practice is composed of volunteers from across the Earth sciences community including publishers, data repository representatives, leaders of large-scale projects, AGU data management leaders, UN Climate Assessment groups, citation indexers, DataCite, RDA, and government agencies. To learn more about the work of the Community of Practice and to join us if you are interested, visit https://data.agu.org/DataCitationCoP/.