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AmeriFlux Site and Data Exploration System

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The AmeriFlux network was established in 1996. The network provides continuous observations of ecosystem-level exchanges of CO2, water, energy and momentum spanning diurnal, synoptic, seasonal, and interannual time scales. The current network, including both active and inactive sites, consists of 141 sites in North, Central, and South America. The Carbon Dioxide Information Analysis Center (CDIAC) at Oak Ridge National Laboratory (ORNL) provides data management support for the AmeriFlux network including long-term data storage and dissemination.
AmeriFlux offers a broad suite of value-added data products (http://public.ornl.gov/ameriflux/available.shtml). Original, Level 0, data (i.e. voltages from the data logger) are maintained by individual site measurement teams and processed to form Level 1 data products at 30 minute or hourly time reporting intervals. The Level 1 data files submitted to CDIAC by the site teams are reviewed and processed by CDIAC to enable production of higher level data products (Levels 2, 3 and 4). For Level 2 data products, the review process includes data quality checks and checks for consistent units, naming conventions, and reporting intervals. Reformatting is often necessary to maintain consistency within the larger network-wide database. AmeriFlux Level 2 files are processed by the European flux data activity to produce Level 3 and 4 files identical to the European regional network. Level 3 files contain the same values as Level 2 files but with quality flags assigned and net ecosystem exchange (NEE) calculated using standardized techniques. Level 4 files contain gap-filled (by two different techniques) and u-star filtered records, complete with calculated gross primary productivity (GPP) and total ecosystem respiration (Re) terms on varying time intervals including hourly, daily, weekly, and monthly with flags regarding the quality of the original and gap-filled data.
CDIAC has developed a relational database to house the vast array of AmeriFlux data and information and a web-based interface to the database, the AmeriFlux Site and Data Exploration System (http://ameriflux.ornl.gov), to help users worldwide identify, and more recently, download desired AmeriFlux data. AmeriFlux and CDIAC offer numerous value-added AmeriFlux data products (i.e. Level 1-4 data products, biological data) and most of these data products are or will be available through the new data system. Vital site information (e.g., location coordinates, dominant species, land-use history) is also displayed in the new system.
The data system provides numerous ways to explore and extract data. Searches can be done by site, location, measurement status, available data products, vegetation types, and by reported measurements just to name a few. Data can be accessed through the links to full data sets reported by a site, organized by types of data products, or by creating customized datasets based on user search criteria. The new AmeriFlux download module contains features intended to ease compliance of the AmeriFlux fair-use data policy, acknowledge the contributions of submitting investigators, inform AmeriFlux investigators of users of their data, and facilitate meaningful usage statistics. Comprehensive site descriptions are available via the same interface along with site-related publications. This presentation reflects the present state and functionality of the AmeriFlux Site and Data Exploration System as well as future plans for expansion. For example, future plans call for expansion of the relational database to house similar data from large-scale ecosystem experiments (e.g., FACE, NGEE – Next Generation Ecosystem Experiment), addition of visualization capabilities, and inclusion of enhanced query capabilities (e.g., sorting data via day and night).