

WLEF High-Frequency Flux Data

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General Dataset Description:

This dataset contains the 10 Hz turbulent time series of sonic anemometer 3D winds, CO₂, CH₄ and H₂O concentrations from the WLEF-TV US-PFa Park Falls very tall Ameriflux tower over the Chequamegon Heterogeneous Ecosystem Energy-balance Study Enabled by a High-density Extensive Array of Detectors (CHEESEHEAD) observation period. Raw data is sonic coordinate system, while corrected is after planar fit rotation and lag time correction. Note that corrected data files have "rotated_lagged" in the file names.

Time Period: 2019-06-01 00:00:00 - 2019-10-31 23:59:59

Location: The tower is located at 45.946 N and 90.272 W latitude.

Data Frequency: 0.1 s

Data Spatial Type: Time series data from a single tower at three vertical heights.

Dataset Restrictions: No restrictions.

File Format(s): All files are in netCDF format.

File Naming Convention:

Raw Data: *(Raw data have no corrections.)*

US-PFa_10hz_30m-insitu_YYYYMMDD.nc

US-PFa_10hz_122m-insitu_YYYYMMDD.nc

US-PFa_10hz_396m-insitu_YYYYMMDD.nc

US-PFa_10hz_122m-trailer-picarro_YYYYMMDD.nc

where YYYYMMDD is the year, month, day.

Corrected Data: *(Corrected data have winds after planar fit rotation.)*

US-PFa_10hz_rotated_lagged_30m-insitu_YYYYMMDD.nc

US-PFa_10hz_rotated_lagged_122m-insitu_YYYYMMDD.nc

US-PFa_10hz_rotated_lagged_396m-insitu_YYYYMMDD.nc

US-PFa_10hz_rotated_lagged_122m-trailer-picarro_YYYYMMDD.nc

where YYYYMMDD is the year, month, day.

Instrument Description(s):

3D winds and sonic temperature are measured with an ATI Type K sonic anemometer located on a boom pointed south at three heights, 30, 122 and 396 m.

Carbon dioxide and water vapor concentrations are measured with a Li-Cor LI-7200RS enclosed CO₂/H₂O gas analyzer, non-dispersive infrared located in an enclosure on the tower at each height.

Methane concentrations are measured at the 122 m level, with a Picarro G-1301f fast methane analyzer located in a trailer at the base of the tower. Air is drawn through a tube by pump.

Further instrumentation descriptions are found at: <https://ameriflux.lbl.gov/sites/siteinfo/US-PFa>

Description of parameters (measured and derived/calculated):

fst_u, fst_v, fst_w, fst_T_sonic : 3D vertical winds and sonic virtual temperature measured from sonic anemometer, at 10 Hz

fst_H2O_FD_mole, fst_CO2_mole: water vapor and carbon dioxide concentration in dry air measured by LI-7200 at 10 Hz

fst_T_IRGA_cell and fst_P_IRGA_cell: temperature and pressure of the Li-7200

fst_CH4_FW_mole: CH₄ mixing ratio at 122m in dry air measured by Picarro G-1301f

Data and Instrument Issues:

The sonic anemometer at 122 m has apparent intermittent issues in U and V winds.

Quality Control/Quality Assurance:

These preliminary data are not quality controlled.

Related Publications:

Xu, K., Metzger, S., Desai, A.R., 2018 Surface-atmosphere exchange in a box: Space-time resolved storage and net vertical fluxes from tower-based eddy covariance. *Agricultural and Forest Meteorology*, 255, 81-91, doi:10.1016/j.agrformet.2017.10.011.

Xu, K., Metzger, S., Desai, A.R., 2017. Upscaling tower-observed turbulent exchange at fine spatio-temporal resolution using environmental response functions. *Agricultural and Forest Meteorology*, 232:10-22, doi:10.1016/j.agrformet.2016.07.019.

Desai, A.R., Xu, K., Tian H., Weishampel, P., Thom, J., Baumann, D., Andrews, A.E., Cook, B.D., King, J.Y., and Kolka, R., 2015. Landscape-level terrestrial methane flux observed from a very tall tower. *Agricultural and Forest Meteorology*, 201, 61-75, doi:10.1016/j.agrformet.2014.10.017.

Desai, A.R., 2014. Influence and predictive capacity of climate anomalies on daily to decadal extremes in canopy photosynthesis. *Photosynthesis Research*, 119, 31-47, doi:10.1007/s11120-013-9925-z.

Notes:

Hourly computed eddy fluxes and additional metadata from this tower are available at: <https://flux.aos.wisc.edu/fluxdata>