

Metadata Information for the San Joaquin Freshwater Marsh Leaf Flux Data

Wu Sun (wu.sun@ucla.edu)

2018-03-07

Contents

1	General description	1
2	Terms of use	2
3	Data file description	2
3.1	Leaf flux and meteorological data	2
3.2	Leaf relative uptake ratio versus PAR table	4
3.3	Daily leaf relative uptake values	4
4	Contact	5

1 General description

- Name of the dataset: San Joaquin Freshwater Marsh Leaf Flux Data (Version 2018.03.07)

- Investigators:
 - UCLA: Wu Sun, Ulli Seibt
 - The Open University (UK): Kadmiel Maseyk
 - LSCE (France): Céline Lett
- Publication: Sun, W., Maseyk, K., Lett, C. and Seibt, U. (2017). Stomatal control of leaf fluxes of carbonyl sulfide and CO₂ in a *Typha* freshwater marsh. *Biogeosciences Discuss.*, <https://doi.org/10.5194/bg-2017-431>, in review.
- Site location: San Joaquin Marsh (UC Natural Reserve), Irvine, California (33.662333 N, 117.851139 W, altitude 3 m). More information is available at <http://www.ucnrs.org/reserves/san-joaquin-marsh-reserve.html>.
- Period of the record: 31 May 2013 through 6 July 2013
- Funding sources: European Research Council (ERC) Starting Grant #202835 and NSF CAREER Award #1455381 to U.S.

2 Terms of use

This dataset is made available under the Creative Commons CC0 1.0 Universal (CC0 1.0) Public Domain Dedication license: <https://creativecommons.org/publicdomain/zero/1.0/>, per policy of DataONE Dash (<https://oneshare.cdlib.org/>), an online self-service tool of UC3 Merritt data repository. For a plain language summary of the CC0 1.0 license, please see <https://creativecommons.org/publicdomain/zero/1.0/>. Please cite the original publication when using this dataset.

3 Data file description

All data files are in CSV format with UTF-8 encoding and are readable through Microsoft Excel or mainstream scientific programming languages like Python and R. Description of data files and variables are as follows.

3.1 Leaf flux and meteorological data

File name: `sjm2013_leaf_fluxes.csv`

Variable list

- `datetime_utc`: Date and time in UTC following the ISO 8601 standard (yyyy-mm-dd HH:MM:SS).
- `doy_utc`: Days since 1 Jan 2013 00:00 (UTC).
- `doy_local`: Days since 1 Jan 2013 00:00 in local summer time (Pacific Daylight Time, or UTC-7).
- `cos_atm`, `sd_cos_atm`: Atmospheric concentration of COS at 5 m height and its standard deviation in parts per trillion (pmol mol^{-1}).
- `co2_atm`, `sd_co2_atm`: Atmospheric concentration of CO_2 at 5 m height and its standard deviation in parts per million ($\mu\text{mol mol}^{-1}$).
- `h2o_atm`, `sd_h2o_atm`: Atmospheric concentration of H_2O at 5 m height and its standard deviation in parts per thousand (mmol mol^{-1}).
- `cos_can`, `sd_cos_can`: Canopy concentration of COS at 2 m height and its standard deviation in parts per trillion (pmol mol^{-1}).
- `co2_can`, `sd_co2_can`: Canopy concentration of CO_2 at 2 m height and its standard deviation in parts per million ($\mu\text{mol mol}^{-1}$).
- `h2o_can`, `sd_h2o_can`: Canopy concentration of H_2O at 2 m height and its standard deviation in parts per thousand (mmol mol^{-1}).
- `cos_lcc_bld`: COS concentration baseline drift (pmol mol^{-1}) during leaf chamber measurements.
- `co2_lcc_bld`: CO_2 concentration baseline drift ($\mu\text{mol mol}^{-1}$) during leaf chamber measurements.
- `h2o_lcc_bld`: H_2O concentration baseline drift (mmol mol^{-1}) during leaf chamber measurements.
- `fcos_lc`, `sd_fcos_lc`: Leaf COS flux and its standard error ($\text{pmol m}^{-2} \text{s}^{-1}$).
- `fco2_lc`, `sd_fco2_lc`: Leaf CO_2 flux and its standard error ($\mu\text{mol m}^{-2} \text{s}^{-1}$).
- `fh2o_lc`, `sd_fh2o_lc`: Leaf H_2O flux and its standard error ($\text{mmol m}^{-2} \text{s}^{-1}$).
- `T_atm`: Atmospheric temperature ($^{\circ}\text{C}$) at 5 m height.
- `rh_atm`: Atmospheric relative humidity at 5 m height.
- `f_ch_lc`: Leaf chamber flow rate at ambient temperature (liter per minute).
- `T_ch_lc`: Air temperature ($^{\circ}\text{C}$) inside the leaf chamber.
- `T_leaf`: Leaf temperature ($^{\circ}\text{C}$) during the opening period before flux measurement.
- `PAR_EC`: Photosynthetically available radiation flux ($\mu\text{mol m}^{-2} \text{s}^{-1}$) received at the eddy covariance tower (5 m).
- `PAR_ch`: Photosynthetically available radiation flux ($\mu\text{mol m}^{-2} \text{s}^{-1}$) received near the leaf chamber (2 m).
- `Tch_b_lc`: Air temperature ($^{\circ}\text{C}$) inside the leaf chamber during the opening period before

flux measurement.

- MFVD_atm: Mole fraction water vapor deficit in the atmosphere ($\text{mmol H}_2\text{O mol}^{-1} \text{ air}$).
- MFVD_lc, sd_MFVD_lc: Mole fraction water vapor deficit in the leaf chamber, and its standard deviation ($\text{mmol H}_2\text{O mol}^{-1} \text{ air}$).
- g_sw: Stomatal conductance ($\text{mol m}^{-2} \text{ s}^{-1}$) estimated from leaf water flux (fh2o_lc) and vapor deficit (MFVD_leaf).
- t_lag: Time lag between the data logger and the QCL spectrometer in seconds.
- solar_elevation_angle: Solar elevation angle calculated from a function based on the NOAA Solar Calculator (<https://www.esrl.noaa.gov/gmd/grad/solcalc/>).
- MFVD_leaf: Leaf-to-air vapor deficit in mole fraction ($\text{mmol H}_2\text{O mol}^{-1} \text{ air}$).
- daytime_indicator: Daytime if 1, nighttime if 0.
- water_table_index: Standing water exists if 1.

3.2 Leaf relative uptake ratio versus PAR table

File name: sjm2013_LRU_vs_PAR.csv

Variable list

- PAR: Photosynthetically available radiation flux ($\mu\text{mol m}^{-2} \text{ s}^{-1}$) received near the leaf chamber (2 m).
- LRU: Leaf COS : CO₂ relative uptake ratio.

3.3 Daily leaf relative uptake values

File name: sjm2013_daily_LRU.csv

Variable list

- date: Local date (yyyy-mm-dd).
- doy_int: Day of year number as integer. Note that Jan 1st has the day of year value of 1.
- PAR_avg: Daytime mean photosynthetically available radiation flux near the leaf chamber ($\mu\text{mol m}^{-2} \text{ s}^{-1}$).

- `n_fcos_dt`, `n_fcos_nt`: Numbers of valid COS flux observations at daytime and nighttime, respectively.
- `n_fco2_dt`, `n_fco2_nt`: Numbers of valid CO₂ flux observations at daytime and nighttime, respectively.
- `n_cos_dt`, `n_cos_nt`: Numbers of valid COS canopy concentration observations at daytime and nighttime, respectively.
- `n_co2_dt`, `n_co2_nt`: Numbers of valid CO₂ canopy concentration observations at daytime and nighttime, respectively.
- `flag_calc_LRU`: Mean LRU values are calculated if and only if this variable is True.
- `cos_dtavg`, `cos_ntavg`: Daytime and nighttime mean concentrations of COS (pmol mol⁻¹), respectively.
- `cos_avg`: 24 h mean concentration of COS (pmol mol⁻¹).
- `co2_dtavg`, `co2_ntavg`: Daytime and nighttime mean concentrations of CO₂ (μmol mol⁻¹), respectively.
- `co2_avg`: 24 h mean concentration of CO₂ (μmol mol⁻¹).
- `co2_cos_dtavg`: Daytime mean CO₂ : COS ratio (μmol pmol⁻¹).
- `co2_cos_avg`: 24 h mean CO₂ : COS ratio (μmol pmol⁻¹).
- `fcos_dtavg`, `fcos_ntavg`: Daytime and nighttime mean COS fluxes (pmol m⁻² s⁻¹), respectively.
- `fcos_avg`: 24 h mean COS flux (pmol m⁻² s⁻¹).
- `fco2_dtavg`, `fco2_ntavg`: Daytime and nighttime mean CO₂ fluxes (μmol m⁻² s⁻¹), respectively.
- `fco2_avg`: 24 h mean CO₂ flux (μmol m⁻² s⁻¹).
- `LRU_dtavg`: Daytime mean LRU.
- `LRU_avg`: 24 h mean LRU.
- `sem_LRU_dtavg`: Standard error of the daytime mean LRU.
- `sem_LRU_avg`: Standard error of the 24 h mean LRU.

4 Contact

For questions regarding this dataset, please contact Wu Sun (wu.sun@ucla.edu) or Ulli Seibt (useibt@ucla.edu).