Performance of analytical footprint models in mixed fetch conditions: Application to fragmented, heterogeneous croplands

README file

Flux-footprint-estimation-under-hetergoneous- canopy (C1 and C2)cropland condition

This README file describes the data used in the study that are obtained from EC flux towers. Raw data at 10 Hz frequency obtained from three synchronized EC towers were analyzed to estimate the fluxes using EddyPro software, version 6.2.1 and was further averaged at half-hourly time interval.

The experimental setup consisted of three EC flux towers with one each located in the cotton T2 ($Zm = 3$ m) and sugarcane T1 ($Zm = 6$ m) fields to capture the homogeneous fluxes originated from individual fields, with a third, taller tower located in the sugarcane field T3 ($Zm = 8$ m) to capture the mixed fluxes originated from both the fields

EC flux System Components

3D sonic anemometer,

One open-path fast response infrared gas analyzer (IRGASON-EB-IC, Campbell Sci. Inc., USA),

logger (CR3000, Campbell Sci.Inc., USA)

1) Overview of the data file contents

The folder contained the EddyPRO version 6.2.1. output files with the Timestamp.These data files are provided as comma-separated values (CSV) formating. Missing data records are indicated by the -9999 value.

2) Variable List

Eddy pro full output variables can be accessed

Variable List

List of Data

The field experiments took place from 1 Aug 2017 to 19 Dec 2017. All the experimental data are kept in .csv file in the respective folders named after observations.

1. EC_fluxdata folder contains observed EC fluxes from the three EC systems during the experimental period. Het, Cot, and Sug represent the EC fluxes from T3, T2, and T1 respectively.

Ust, Lin, ASin, LE, Uin, Xin, CO2, WUE, and wdir represents friction velocity, Obukhov length, Atmospheric stability, Latent heat of Evaporation, mean wind speed, upwind distance, CO2 flux, water use efficiency, and wind direction respectively.

2. Flux_aggregation_and_Parameter_aggregation folder contains flux footprint predicted by the FFP and KM model considering Arithmetic average, Area-weighted average, and Effective input parameter for the calculation of effective roughness length (zoeff).

FFP and KM performance under these three flux aggregation and parameter aggregation are in the respective file that is further used to calculate the relative bias between the observed and predicted flux footprint considering heterogeneity of canopy surface.

3.Supplementary folder consists of KM and FFP flux footprint prediction considering parameter and flux aggregation and also has the observed CO2 flux values that are further used to compute the biases between observed and predicted values.

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