Olentangy River Wetland Research Park - metadata file.

The experiment setup

A lot of information about this site can be found through this web site :
http://swamp.osu.edu/Mission/index.html

The "Olentangy River Wetland Research Park" ORWRP is an on going experimental site located north of the Ohio State University campus. Two kidney shaped reconstructed wetlands were flooded in 1995. They have an area of 0.01 km^2. Wetland 1 (the western wetland) was planted, while wetland 2 (the eastern wetland) was self colonized. Water are pumped into the wetlands from the adjacent Olentangy River, so that the water level is in accordance with the river water level. (http://swamp.osu.edu)

Eddie Covariance tower was built in May 2010. Appendix A has a list of instruments by date including hight, frequency and units of measured signal.

- Two 3D ultrasonic anemometers
- Open path gas analyzer for CO_2, H_2O and pressure
- Open path gas analyzer for Methane (CH_4) and pressure
- Air temperature and humidity probe
- Four components radiation sensor
- Fourteen Soil temperature probes (see appendix B for location)

Initially the lower sonic anemometer was at 9.6 m and the higher sonic anemometer was at 11 m, but over the time the trees around the tower grew taller and the instruments were in the sub-canopy zone. At April 24, 2012 after an higher tower was put in place, the higher sonic anemometer was placed at 17 meter above the ground, and the lower sonic anemometer and the rest of the sensors were placed at 15 meter above the ground.

The following table contains all the variables we included in the .csv file and a short description of how they were calculated or measured.

UST - (U*) - Frictional velocity [m s^{-1}]	Calculated from the equation : $U^{*}=\sqrt[4]{\overline{u'w'+u'v'}}$ after despiking wind components and performing 2D rotation to mean wind speed for current half hour
TA - Air Temperature [°C]	Despiked half hour mean of measurement
WD - Wind direction [deg]	Direction of mean wind component from north range is from [0 to 360], 0 is wind coming from North, 90 is wind coming from East.
WS - Wind speed [m s^{-1}]	Wind is being 2D rotated such that cross wind and vertical wind average in half hour window are both zero.
NEE - Net ecosystem exchange [µmol m^{-2} s^{-1}]	Calculated from molar carbon flux after U* filtering
NEE_gf - Net ecosystem exchange gap filled [µmol m^{-2} s^{-1}]	Calculated $NEE_{gf}=RE_{gf}-GPP_{gf}$
FC - Flux of CO_2 [µmol m^{-2} s^{-1}]	Lag-Shift ,WPL frequency correction
H - Heat flux [W m^{-2}]	Lag-Shift ,WPL,KG Sensible Heat flux
LE - Latent heat flux [W m^{-2}]	Lag-Shift ,WPL
TS_80mm - Soil temperature [°C]	Despiked mean of 10 soil temperature probes at 8 cm depth see appendix B for Location
TS_250mm - Soil temperature [°C]	Despiked mean of 4 soil temperature probes at 25 cm depth see appendix B for Location
RH - Relative humidity [%]	Despiked mean Relative Humidity
PA - Air pressure [kPa]	Despiked mean Air Pressure
CO2 - CO_2 concentration [µmol mol^{-1}]	Raw CO_2 concentration, no corrections
VPD - Vapor pressure deficit [kPa]	Calculated $vpd=p_{vapor,sat}-p_{vapor,bar}$
RNET - Net radiation [W m^{-2}]	Calculated $R_{NET}=(R_{ShortUp}+R_{LongUp})-(R_{ShortDown}+R_{LongDown})$
Rg - Short in coming radiation [W m^{-2}]	Despiked half hour mean of short-wave incoming radiation
Rg_out - Short out going radiation [W m^{-2}]	Despiked half hour mean of short-wave outgoing radiation
Rlong_in - Long in coming radiation [W m^{-2}]	Despiked half hour mean of long-wave incoming radiation calculated $R_{LongUp}=R_{LongInMeasured}+(567E^{-10}*T_K^4)$
Rlong_out - Long out going radiation [W m^{-2}]	Despiked half hour mean of long-wave out going radiation calculated $R_{LongDown}=R_{LongOutMeasured}+(567E^{-10}*T_K^4)$
FH2O - Flux of H_2O	Lag-Shift ,WPL
H2O - H_2O concentration [µmol mol^{-1}]	Despiked raw H_2O concentration half hour mean
RE - Respiration [µmol m^{-2} s^{-1}]	NEE at night is assumed to be only RE
RE_gf - Respiration gap filled [µmol m^{-2} s^{-1}]	Gapfilled through 100 iterations of a neural network system

GPP - Gross primary productivity [µmol m^{-2} s^{-1}]	Calculated $GPP = RE_{gf} - NEE_{daytime}$
GPP_gf - Gross primary productivity gap filled [µmol m^{-2} s^{-1}]	Gapfilled through 100 iterations of a neural network system
FCH4 - CH_4 flux [µmol m^{-2} s^{-1}]	Lag-Shift ,WPL
CH4 - CH_4 concentration [µmol mol^{-1}]	Despiked raw CH_4 concentration half hour mean

^{WPL} - Applied WPL correction

$^{Lag\text{-}Shift}$ - Lag shift was found through max cross correlation technique and was eliminated

^{KG} - Kaimal Gaynor 1990 Temperature correction $T_r = \frac{T_K}{1 + \frac{0.32 * RQ}{T_K P}} - 273.16$ where T_K is temperature in Kalvin.