



Associated ICOS Ecosystem Station Labelling Report

Station: GF-Guy (Guyaflux - French Guiana)

Viterbo (Italy), Antwerp (Belgium), Bordeaux (France), November 15th 2019

Description of the Labelling procedure

Associated stations have a simplified, one step labelling procedure. After a first general evaluation of the station to ensure the compatibility with the ICOS aims and standard, proposed stations must submit data and metadata. There is a list of mandatory variables and related metadata that must be measured and submitted by an Associated station in order to get and maintain their status and it is reported in Table 1. Calculated fluxes and processed data at the final time resolution must be submitted

Table 1. List of variables and metadata that Associated stations must submit

Variable	Specifications	Metadata
GHG flux	At least one GHG flux + concentration (30 minutes resolution) among CO ₂ , CH ₄ and N ₂ O measured with eddy covariance. In case of forest storage flux measured using a vertical profile.	Description of the system (sensors and setup), description of the processing applied to calculate the fluxes.
Incoming radiation	At least one between SW_IN and PPFD_IN, representative of the target area	Description of the system (sensors and setup)
Air Temperature	Representative of the target area	Description of the system (sensors and setup)
Relative Humidity	Representative of the target area	Description of the system (sensors and setup)
Precipitation	Representative of the target area	Description of the system (sensors and setup)
Horizontal wind speed/direction	Representative of the target area	Description of the system (sensors and setup)
Maximum LAI	LAI or GAI measured at its maximum in the year. Method not prescribed.	Description of the method used.
Above Ground Biomass	Above ground biomass, for annual vegetation the biomass at the maximum in the year	Description of method used.
Soil texture	Average soil texture at the site	Description of method used.
Management and disturbances	Info on the disturbances occurring at the site and management practices	-----

In addition to the mandatory variables, the Associated stations can and are invited to submit other micrometeorological and ancillary data collected at the site that can help to better interpret and analyze the flux variables.

The station must be active, submit at least one year of data and continue to submit the data at least yearly by end of February of the year after the acquisition.

Labelling report

The station started the labelling on November 16th 2017 and completed the data and metadata submission on November 2019. Here below a summary of the submitted data and metadata is reported.

Station Description

The site is located in the northernmost part of a region on the Guiana Plateau, characterized by a succession of small, elliptical hills rising to 10-40 m above sea level. The soils are mostly nutrient-poor acrisol. The flux tower site is standing in an area of more than 400 ha undisturbed tropical rainforest. Human activity in the footprint of the flux tower are not known since 1-2 centuries. except a few trees that were illegally logged in the 1880's.

The station coordinates are: Lat. 5.2787 °N, Long. 52.9248 °W. The elevation above sea level is 40 m and the UTC offset is equal to -03.

The site is marked with the following climate characteristics (calculated over a period of 13 years) :

Average annual temperature: 25.73 °C

Average total annual precipitation: 3101 mm

Average annual incoming radiation: 191.44 W m⁻²

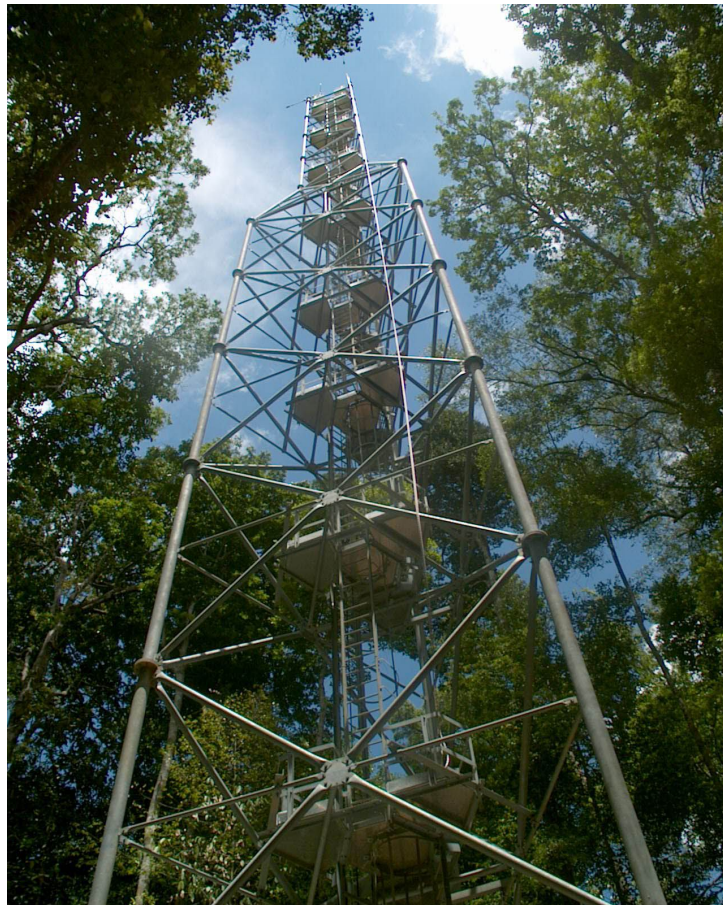


Fig. 1 - GF-Guy tower

Team description

The staff of the site has been defined and communicated in November 2017. It includes in addition to the PI one technician. Below the summary table of the Team members is reported.

Tab. 2 - Team members of site

MEMBER_NAME	MEMBER_INSTITUTION	MEMBER_ROLE	MEMBER_MAIN_EXPERT
Damien Bonal	INRA	PI	PLANT
Benoit Burban	INRA	TEC	MICROMET

Metadata about the sensors

The metadata were sent in November 2019 and for each of the measured variables the sensor has been described, communicant the model, the serial number, its position (height, eastward and northward distances). The Eddy station is characterized by one analyzer LI-COR and one anemometer Gill as reported in the underlying Table 3:

Tab. 3 - The Eddy Covariance system

MODEL	SN	HEIGHT (m)	EASTWARD_DIST (m)	NORTHWARD_DIST (m)
GA_OP-LI-COR LI-7500	75H0489	57	2	0
SA-Gill HS-50	H000271	57	2	0

A set of instruments are located near the tower measuring the following variables: Radiations (Long and Short wave), PPFD, air pressure and temperature, relative humidity, precipitation, wind direction and speed, soil variables. All sensors and variables are reported in the following Table 4.

Tab. 4: The installed sensors and relative codes for the measured meteo and soil variables

MODEL	SN	HEIGHT (m)	EASTWARD_DIST (m)	NORTHWARD_DIST (m)	VARIABLE_H_V_ R
RHTEMP-Vaisala HMP155	M4850203	57	-1	0	TA_1_1_1
					RH_1_1_1
PRES-Other	1803	0	5	0	PA_1_1_1
PREC-EML ARG100	113015	57	0	-1	P_1_1_1
RAD_4C-K&Z CNR4	30576	57	-1	1	SW_IN_1_1_1
					SW_OUT_1_1_1
					LW_IN_1_1_1
					LW_OUT_1_1_1
RAD_4C-K&Z CNR4	161130	57	-1	1	SW_IN_1_1_2

					SW_OUT_1_1_2
					LW_IN_1_1_2
					LW_OUT_1_1_2
RAD-PAR Quantum	S040122527	57	-1	1	PPFD_IN_1_1_1
RAD_PAR-DeltaT BF5	1410	57	-1	1	PPFD_IN_1_1_2
					PPFD_DIF_1_1_1
					PPFD_DIR_1_1_2
WDWS-Young WindMonitor 0510x	WM46753	57	-1	0	WD_1_1_1
					WS_1_1_1
TEMP-Campbell CS107	107_1	0.03	20	-10	TS_1_1_1
TEMP-Campbell CS107	107_2	0.15	20	-10	TS_1_2_1
SWC-Campbell CS616	123	-0.1	20	-10	SWC_1_1_1
SWC-Campbell CS616	124	-0.2	20	-10	SWC_1_2_1
SWC-Campbell CS616	125	-0.26	20	-10	SWC_1_3_1
RHTEMP-Vaisala HMP155	M4850203	57	-1	0	VPD_PI_1_1_1

Ancillary data

To describe the site, the climatic annual averages of temperature, precipitation and radiation (shotwave) have been sent in April 2019 (see the Site Description paragraph). No known disturbance has occurred in the site since the station is active.

The soil data were sent at the end of April 2019 specifying in detail the chemical composition in carbon and nitrogen, the pH, the data of texture, the WTD and SWC not continuous measurements, the soil group according the Soil World Reference Base for Soil Resources and the soil order for tower site according to National Resource Conservation Service (NRCS) Soil Taxonomy.

This forest around the tower has a stand age of 500 years (estimation based on the last human activities discovered there), a tree density of about 466 trees ha⁻¹, with a mean diameter at breast height (dbh) of 22.77 cm. Tree species richness is about 140 species ha⁻¹. Mean tree height is 35 m, with emergent trees exceeding 40 m.

Further and detailed ancillary data have been provided, and in particular:

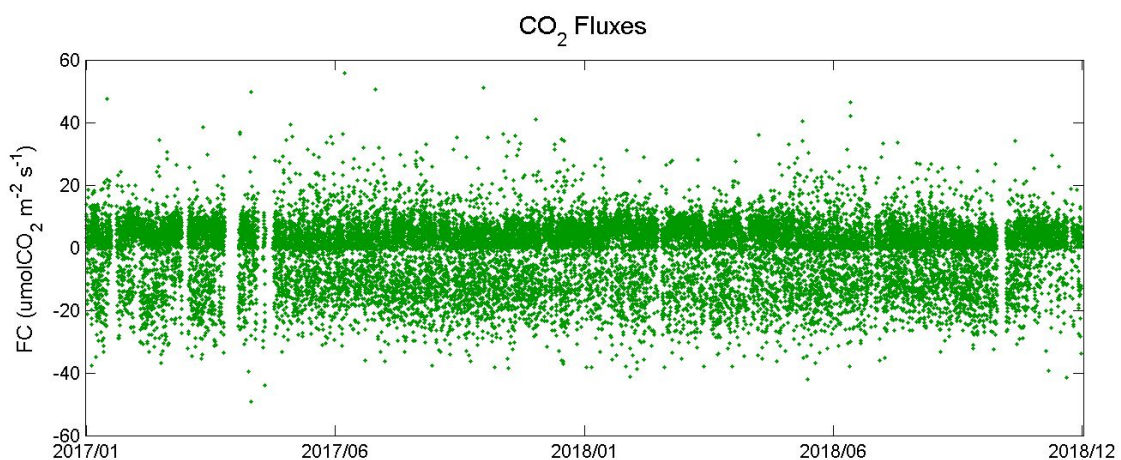
- **PAI:** 7.00 (value in 2018, measured with LAI_2000)
- **Biomass:** total above ground 30.26 KgDM m⁻² (value in 2017, calculated on tree circumference and equations from literature)
- **Canopy height:** 35 m (mean value in 2015 with emergent trees exceeding 40 m)

In addition detailed data of basal area and root depth were also provided.

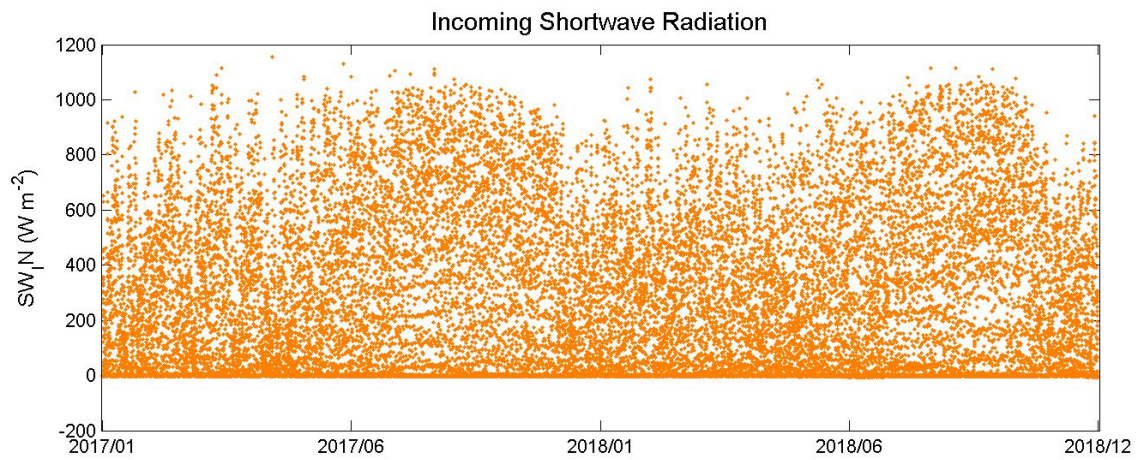
Submitted data

As requested in the labelling procedure, continuous data for 2018 have been submitted. The station has available data from 2004, and that makes its dataset remarkably valid and interesting. The file for the last year has been uploaded in April 2019 and it includes eddy covariance fluxes, meteo and soil measurements. The fluxes variables do not report the Steady State and Integral Turbulence Characteristics Tests results (Foken et al.). The uploaded meteo and soil variables are listed in table 4. In the following figures, plots of some the key variables are presented for 2017-2018 as example in order to evaluate the data continuity and coverage.

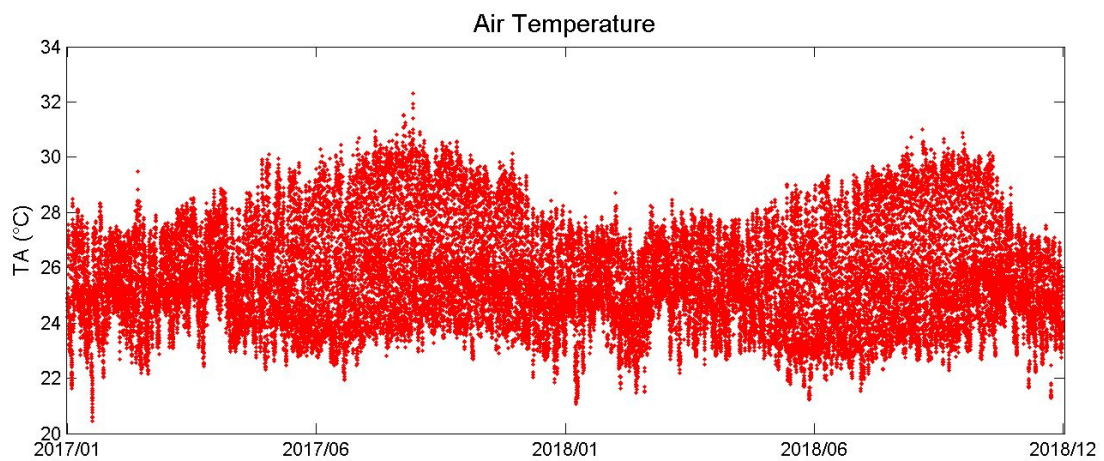
CO₂ fluxes measured with eddy covariance:



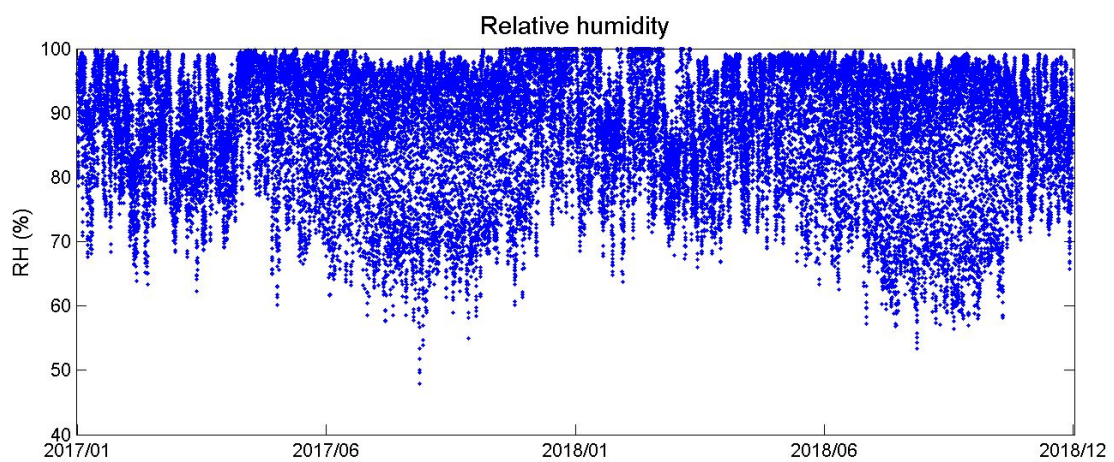
Incoming shortwave radiation:



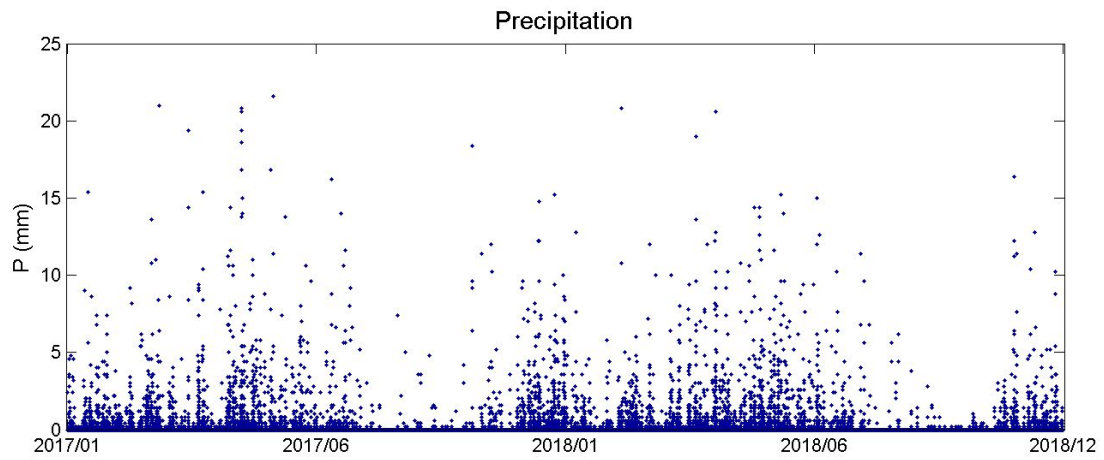
Air temperature:



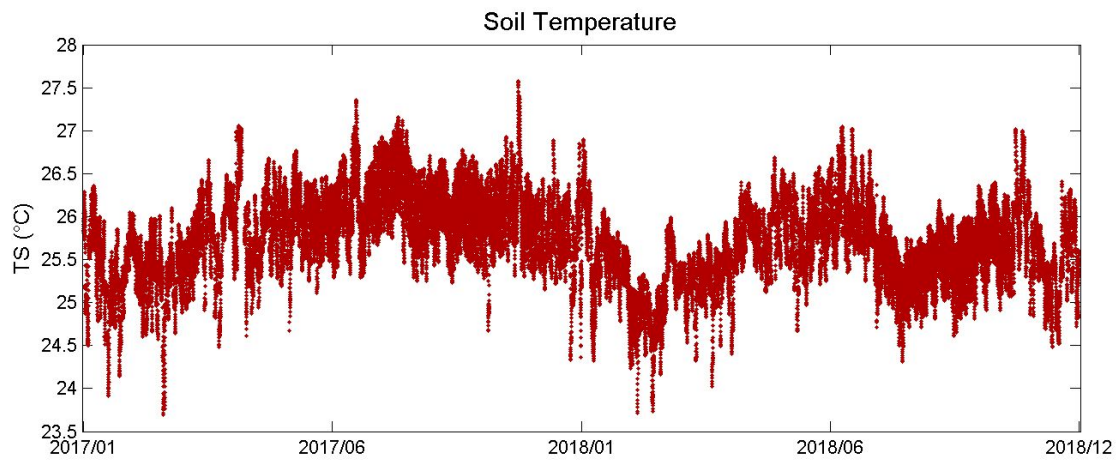
Relative humidity:



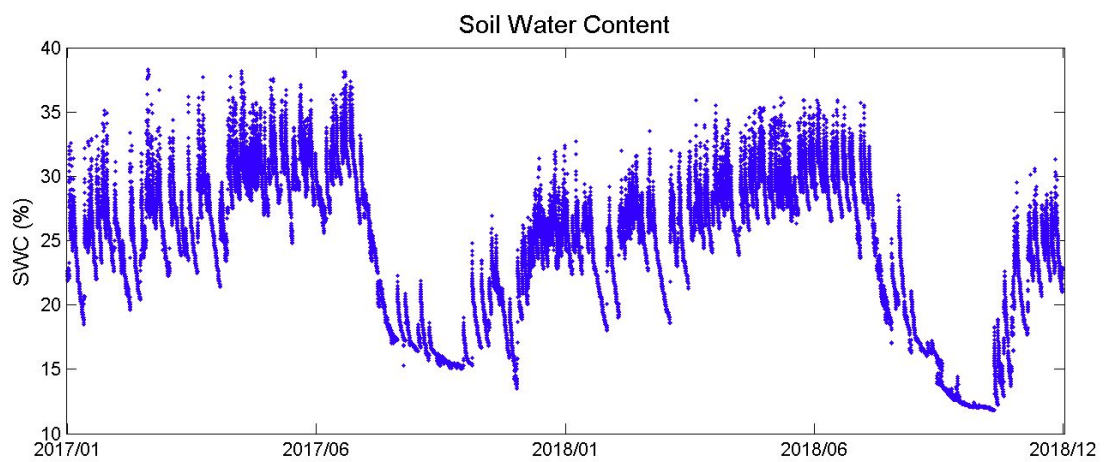
Precipitation:



Soil temperature:



Soil water content:



Labelling summary and proposal

On the basis of the activities performed and data submitted and after the evaluation of the team capacity to be compliant with the ICOS requirements for Associated Ecosystem Stations we recommend that the station Guyaflux (GF-Guy) is labelled as ICOS Associated Ecosystem station.

November 15th 2019

Dario Papale, ETC Director

A handwritten signature in dark ink, appearing to read 'Dario Papale', with a stylized, flowing script.