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**Congo Basin Institute
Bouamir Weather Station Metadata**

Contact person: Vincent Deblauwe (v.deblauwe@cgiar.org)

Weather data is continuously collected at Bouamir Field Station via two different systems:

1. Manual weather data is collected daily by a MINFOF official.
2. A DAVIS vantage pro 2 weather station collects data automatically at 15 minute intervals.

Start dates

Date format for all dates: YYYY-MM-DD

Manual weather station: 2017-10-24

DAVIS weather station: 2019-10-19

- From 2019-10-19 to 2022-11-19 Davis weather station data was manually uploaded from the weather station.
- Beginning on 2022-11-20 to present, weather data is now automatically uploaded to the cloud via weatherlink.com.

Data Collection frequency

Manual weather data:

- Daily around 10:00

DAVIS weather data:

- 2019-10-29 at 12:00 to 2020-11-23 at 23:00 → every 30 minutes
- 2020-11-23 at 23:45 to 2021-02-18 at 21:30 → every 15 minutes
- 2021-02-18 at 22:00 to 2022-11-20 at 23:00 → every 60 minutes
- 2021-11-20 at 12:15 to present → every 15 minutes

Location

Manual weather data collection: Latitude: 3.19056 E; Longitude: 12.81194 N

Davis weather station: Latitude: 3.19056 E; Longitude: 12. 81194 N

Data citation

Please use the following citation when using this dataset:

Deblauwe, V., Smith, T., Ordway, E., Stouter, H., Lebreton, M., Tatemnao, J.J.R., Puemo, F.A.W., Ndjock, G.O., Assola, S. (2023). Bouamir weather station data [Data set]. Zenodo. DOI: 10.5281/zenodo.1067263

Available files

File description	Description
Bouamir_Weather_Cleaning.R	Cleans manual and DAVIS weather data separately, combines manual and DAVIS datasets, adds quality flags, outputs clean data files in .csv file format.
Bouamir_Weather_Cleaning_Functions.R	Functions to clean weather data in Bouamir_Weather_Cleaning.R
Bouamir_Weather_Summary_Plots.R	Code to create summary weather plots
Bouamir_Weather_Ombrothermic_Plots.R	Code to create ombrothermic plots
manual_24oct2017_23july2023.csv	Manual data before cleaning
weatherlink_20nov2022_15feb2023.csv	Weatherlink data before cleaning
davis_19oct2019_21nov2022.csv	Davis data before cleaning
manual_clean.csv	Clean manual data
davis_clean.csv	Clean davis and weatherlink data
combined_weather_clean.csv	Clean and combined manual, davis and weatherlink data

Description of Variables

- For the description of variables in combined_weather_clean.csv, see [Bouamir_Weather_metadata.xlsx](#)

Data cleaning

The DAVIS and Manual data were cleaned using R version 4.3.1 and RStudio version 2023.06.01. Please refer to the R scripts for data cleaning details.

Quality flags

0 (black) = best quality data

1 (orange) = low confidence in these data, but the values are reasonable

2 (red) = no confidence in these data, we recommend not using them

3 (purple) = comment attached to datapoint

4 (green) = transition to weather link data upload system

NA = no quality flag for that datapoint

Data flagging parameters

Not all data points have a quality flag. Here are the ones that do:

1. Data that is simultaneously being collected by the DAVIS and Manual weather stations.
 - a. This includes:
 - i. Daily max temp (°C) , Daily min temp (°C), Daily rain (mm) from 2019-10-21 to 2019-12-12 and 2020-11-23 to present.
 - b. 0 = the value is the same in both data sets
 - c. 1 = the values are within 1 standard deviations from the mean difference
 - d. 2 = the values are above 1 standard deviations from the mean difference
2. Values in the Manual over $\geq 40^{\circ}\text{C}$ or $\leq 10^{\circ}\text{C}$
 - a. Data points above or below these values represent an error with the sensor or when converting from Fahrenheit to Celsius. Data outside of this range is flagged as 2.
3. If there is a comment in the manual data noting an error
 - a. Comment denoting data is not trustworthy (i.e “Repeated data”), then data flagged as 3.
4. Weatherlink was installed Nov 20-21, 2022. Data collected during this two-day transition period do not exactly line up with each other, despite being collected with the same instrument.

Technical specifications

Manual Weather Station collection methods:

The Manual weather station is checked daily by a Cameroon Ministry of Forestry and Fauna (MINFOF) eco-guard. Collected in °C at 10:20. Rainfall observation collected for the previous 24 hours.

- Rainfall (mm) is measured with a Tru-Check Direct Reading Rain Gauge. The gauge is graduated from 0.1mm to 150mm. The uppermost part/opening of the rain gauge is located 2 meters above ground level.
- Minimum and maximum temperature within the previous 24 hours are recorded with a Forestry Suppliers Digital Max/Min Thermometer. The measurement range of this thermometer is -40°C to $50^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The temperature sensor is located 1.5 meters above ground level.

DAVIS Vantage Pro 2 system (model #6162)

The DAVIS weather station is an automatic weather station that collects data for the following parameters and derived variables every 15 minutes:

- Rainfall ($\pm 3\%$ of total or \pm one top of the bucket (0.01”/0.2mm), whichever is greater)

- Temperature ($\pm 0.5^{\circ}\text{F}$ or $\pm 0.3^{\circ}\text{C}$; Radiation Induced Error: $\pm 4^{\circ}\text{F}$ or 2°C at solar noon (insolation = 1040 W/m^2 , avg. wind speed)
- Humidity ($\pm 2\%$)
- Wind speed ($\pm 2\text{ mph}$ (2 kts, 3.2 km/h, 0.9 m/s) or $\pm 5\%$, whichever is greater)
- Wind direction ($\pm 3^{\circ}$)
- Atmospheric pressure ($\pm 0.03''\text{ Hg}$ or $\pm 0.8\text{ mm Hg}$ or $\pm\text{ hPa/mb}$)
- Ultra Violet (UV) Radiation Dose ($\pm 5\%$ of daily total, drift up to $\pm 2\%$ per year)
- Ultra Violet (UV) Radiation Index ($\pm 5\%$ of full scale)
- Visible light Solar Radiation ($\pm 5\%$ of full scale, drift up to $\pm 2\%$ per year)
- Heat Index ($\pm 2^{\circ}\text{F}$ or $\pm 1^{\circ}\text{C}$)
- Dewpoint ($\pm 2^{\circ}\text{F}$ or $\pm 1^{\circ}\text{C}$)
- THSW Index (Temperature-Humidity-Sun-Wind) ($\pm 4^{\circ}\text{F}$ or $\pm 2^{\circ}\text{C}$)
- THW Index (Temperature-Humidity-Wind)
- Barometric Pressure ($\pm 0.3''\text{ Hg}$ or $\pm 0.8\text{ mm Hg}$ or $\pm 1.0\text{ hPa/mb}$)
- Rain rate ($\pm 5\%$ for rain rates)
- ET (Evapotranspiration) (Greater of $0.01''$ (0.25mm) or $\pm 5\%$)
- Wind Chill ($\pm 2^{\circ}\text{F}$ or $\pm 1^{\circ}\text{C}$)