

Review to Hassler et al.: “Multivariate characterisation of a blackberry-alder agroforestry system in South Africa: Hydrological, pedological, dendrological and meteorological measurements”

General comments:

In the paper “Multivariate characterisation of a blackberry-alder agroforestry system in South Africa: Hydrological, pedological, dendrological and meteorological measurements” an impressive data set is presented. The data set was collected at a unique agroforestry site, characterised by a diverse orientation of tree strips and fairly complex terrain. The authors made a great effort to get a big picture of the site and its hydrological, pedological, dendrological and meteorological conditions. Overall the paper is well written, is concise and kept short. But, I found some inaccuracies in the text and in the data itself, which I think have to be clarified. Please correct these before the paper can be published and the data can easily be used by users. I wish the authors best of success with the publication of the paper.

Specific comments:

1. Introduction: For me the linkage between the experiment in South Africa and agroforestry is missing. I think it would be good to mention which environmental problems occur at that region and how agroforestry can solve and mitigate these problems. I see that you, in a more general way, mentioned/ listed positive effects of AF, but as I said, it would be good to be more specific from the beginning.

2. All sections on data processing and quality control: I am missing a more detailed description on how e.g. the meteorological and soil data were filtered, using e.g. upper and lower limits (and which) or other despiking routines, such that the user knows about the quality of the data. Here you mainly report on wind speed and relatively vague on other parameter, but often not specific enough.

3. I am aware that the data are linked to the paper of Hoffmeister et al. (2023) and that some data are presented there. From my perspective it would be nice to include a results section, where you present timeseries of the relevant parameter mentioned, such that I as an intended data user get an idea on how the data look like and about their quality. This would later on also support the “Application” section, where you can link your data/figure and the suggested future applications.

4. I also had a look on the data and found some errors. In parallel I checked the document “2023-028_Hassler-et-al_Data_Description.pdf”, which is not always in line with the data found in the files. I am wondering, whether the published data are raw data or whether these are filtered? Otherwise I suggest checking the data again and updating the description file. From a user perspective this would be of high value.

Details on the files are:

2023-028_Hassler-et-al_Meteo_MeteorologicalMeasurements.csv:

- i) Wind velocity (Wind_v) is not in m s^{-1} , the magnitude is off and especially at the end of 2020 and whole 2021 there are many spikes, which might correspond to the filtered data for wind speed $> 30 \text{ m s}^{-1}$
- ii) Gust_v: values of 30 m s^{-1} at the end of 2020 and whole 2021 are not realistic and seems to be not filtered

iii) MaxPrecipRate: In the document it says mm h^{-1} and in the paper it says “maximum rate for each 10-minute interval.” So what is the truth?

2023-028_Hassler-et-al_Hydro_SoilMoistureMatricPotential.csv:

i) the soil water content is in % and not in $\text{m}^3 \text{m}^{-3}$

ii) spikes in ThetaWB60, ThetaWB80, ThetaWB10, ThetaB20, ThetaB40, ThetaB60, ThetaB80, TmatPotWB10, MatpotWB30, MatpotWB40, TmatpotWB40 should be removed

iii) I am wondering why the matric potential is always positive, shouldn't it be negative, as you also state in the paper at l. 175?

Technical corrections:

l. 12: The sentence sound weird: “The provided data is intended to explore the interaction between trees and crops in agroforestry landscapes.”

Maybe better:

The provided dataset can be used to explore the interaction between trees and crops in agroforestry landscapes.

And I would also add an additional sentence as outlook on the potential use of the data set for different user, similar to what you've done in section 4 'Applications', but just summarised.

l. 29: please include a reference after this sentence: “By applying...it is demonstrated that AFS on an equivalent land area (e.g. ... citation).”

l. 30: same here, include reference please

l. 40: separate sentences: ... (Hombegowda et al., 2016). The presence...

l. 44: The question is, which temperature and humidity you refer to; I guess air temperature and humidity, if so, please write this, e.g.: ... both *air* temperature and *air* humidity...

l. 47: plural: ... in agricultural *fields*

l. 76: ... focused *on* two ...

Caption Figure 1: rewrite caption: Images from the field site taken in a) winter and b) late spring.

l. 85: remove second *and*

l. 86: which manual measurements of the windbreak trees were done? Have you measured the BHD or what else? Clarify please.

l. 91: include city and country of company: (METER Group,?,?) and also here ZL6 cloud Data Logger (company?, city?, country?)

I. 93-108: I suggest to place the list of variables into a table. This would be easier to follow. You could then include the range, the resolution, the accuracy and the unit each in one column. And also include all other instruments described in the text and then include the company, city and country. This would be consistent.

I. 94: is 1750 W m^{-2} the maximum possible value the sensor can measure or is this also the value you used to filter the data for outlier? If the latter applies keep in mind that global radiation can be max 1360 W m^{-2} .

Caption Figure 2: a point is missing at the end.

I. 98: what are the values in brackets behind 0-100% (0-1.0), indicate! How is the accuracy changing with temperature and humidity? Please indicate!

I. 100: out of curiosity: what is the temperature of the humidity sensor? Is there a second temperature sensor, e.g. used to calculate VPD? Or is this rather the dewpoint temperature calculated out of RH?

I. 122: comma missing: Additionally, ...

I. 124:

- as mentioned already, maybe include the sensor information into one common table.
- Here also be consistent in how you separate sensor name and company, use a comma instead of a semicolon.
- Also rewrite this sentence, e.g.: Soil moisture was monitored continuously ... accuracy: $\pm 2\%$) in two profiles from If it is a profile, maybe directly mention the different installation depths in brackets behind.
- from my point of view TDR is also an abbreviation, which you also used in Fig. 3, so please once write TDR out completely and abbreviate in brackets behind.

I. 128: include comma: In each tube, ...

I. 149-152: I guess values in mm and μm refer to particle diameter, write this maybe like $d_p = \dots$. With d_p the particle diameter

I. 153: include country (UMS GmbH, Munich, Germany).

Figure 4: Write θ instead of Theta, this is more consistent with Eq. (1).

I. 165: please include units for the different water contents or state that the soil water content is in either $\text{m}^3 \text{ m}^{-3}$ or %.

I. 173: what does this standard soil calibration refer to? Is the soil density of $1.40675 \text{ g cm}^{-3}$ used in an equation to convert from e.g. raw voltage/resistance into soil water content? If an equation is used I suggest including it here.

Figure 5: → ... according to *the* IUSS ...

→ reference to sub-figures a) and b) is missing in the caption

I. 202 ff: split sentence in two and rewrite the sentence, this sounds weird. One suggestion would be:

The samples were homogenized, air-dried and sieved (<2 mm), and two sub-samples of each sample were transferred to Germany for laboratory analyses. Carbon and nitrogen contents *were estimated* at the Soil Ecology laboratory at the chair of Soil Ecology at the University of Freiburg, Germany, and soil texture was *estimated* at the laboratory of the research area Landscape Functioning at the Leibniz Centre for Agricultural Landscape Research (ZALF) in Müncheberg, Germany.

I. 213: include city and country of company (Siebtechnik...)

I. 214: include comma: ... dried at 105°C, combusted ...

I. 220: delete "two methods"

I. 222: ... University of Freiburg, Germany.

I. 226: These sieved particles were dried at 105°C [space] and the *sand fraction* [check missing text] was calculated

I. 229: ... particle size analysis *presented* in ...

I. 233: remove space between bracket and point.

I. 234: which external standards were used?

I. 236: include city and country of company behind LiDAR (city, country).

I. 241: include reference to software and what is the standard protocol?

I. 245: specify where this video is included? E.g.: A video animation is included to the data set for ...

I. 255: Split and rewrite sentence: The *studied* windbreak section was extracted from the co-registered project point cloud *and* filtered by pulse deviation (equal or lower than 10; Pfennigbauer and Ullrich, 2010). The isolated points were removed and exported as a separate file.

I. 266-267: What do the values in brackets refer to? What is the unit? Diameter maybe m?

I. 272: (>2mm) what do this refer to? Is it root diameter? If yes, please indicate.

Figure 6: include indication on position of sub-figure in caption, e.g.: Bird's eye (*top*) and side view (*bottom*) of ...

I. 288 and I. 289: include reference behind the R-packages

I. 306: it is not crops your are referring to, aren't these shrubs or better just berry bushes? I think "... nutrient distribution and microclimate on the berry bushes." is better suited.

I. 306-312:

→ Here you seem to refer to results from Hoffmeister et al. (2023). Present these results in past tense.

→ I. 306: By combining... This paragraph sounds out of place without a figure. From my perspective it doesn't make sense without presenting the results or at least some time series. Maybe it would be wise to include a results section in addition to/ before the Applications section?! This would also be different from results presented in Hoffmeister et al. (2023) and would give a quick overview on how the data look like. See also my comment at the beginning.

I. 317: TLS not defined: write out and abbreviate and "scans" can be deleted, as this is included in TLS