We thank the editor and the anonymous reviewer 2 for their valuable and constructive comments which substantially improve our revised manuscript entitled: "Technical note: A low cost, automatic soil-plant-atmosphere enclosure system to investigate CO_2 and ET flux dynamics.". We have carefully addressed all comments of both reviewers. Please note the color code in our point-by-point answer below:
(I.) reviewer comments are presented in black; (II.) given answers are presented in green; (III.) manuscript passages including suggested changes are presented in italic and gray

The authors present a description of a low-cost mesocosm CO2 flux and ET measurement system. The basic idea of the manuscript and the measurement system is good, as there is a large need for low-cost instrumentation for scientific studies in the developing world; the authors well point out this reasoning for their study. In its current form the manuscript is, however, not publishable without major revisions and further tests.

1.) The level of technical detail within the manuscript is a bit too varying; on the one hand, the Mosfet (the meaning of which many researchers probably are not familiar with!) is described down to a component code and the precise ohm numbers of the resistors, but the manufacturer and model of the linear actuator or the data logging shield, of which there are many available, are not disclosed; neither are the properties of the air-mixing and ventilation fans disclosed: what volume of air do they move per minute.

We understand the importance of providing consistent technical detail throughout the manuscript. In response, we will provide more detailed technical specifications and properties of the components in Table 1, including the manufacturer and model information for the linear actuator, data logging shield, and the air-mixing and ventilation fans, along with their respective specifications, such as Volumetric flow. In addition, we carefully checked the manuscript to avoid presenting in varying levels of details (see also replies to specific comments below).

The schematics in Fig. 2 are of little use: at first sight, they appear detailed, but the small scale of the images makes deciphering the precise connections difficult or impossible. A proper schematic drawing (describing which pins on the microcontroller are connected to which pins on the relay board, for example) should be made available along the Arduino microcode to enable readers to build systems of their own.

We agree and will provide more detailed schematics to make it easier to follow. Additionally, pin connections are provided now within the schematic (before only given within the Arduino code, which is available through a DOI link). We will update the manuscript accordingly to include these details, ensuring that readers have all the necessary information to build and understand the system. Please see the updated figure below.

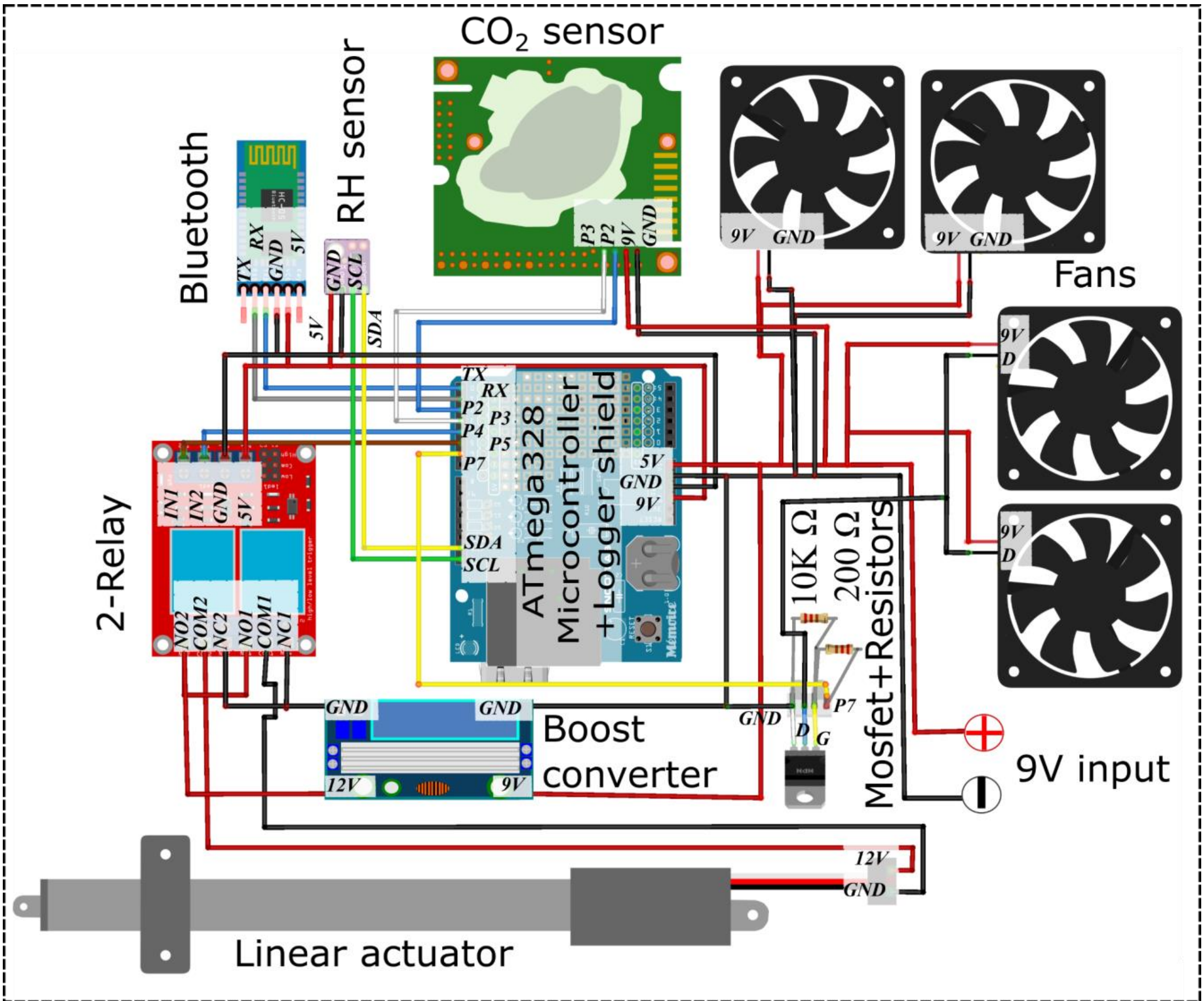

Figure 2 Schematic representation of the wiring of one Greenhouse Coffin in the dependent mode.

2.) The design of the "coffin" is not well described. It's not clear whether it's a ready-made design by the Polish firm Romid (if, then what order code?), or constructed by the authors; and if it's self-constructed, how the door and sliding window are constructed (hinges, rails, etc?), how is a tight seal ensured when the window is closed, etc. These inconsistencies make it unclear whether the manuscript is meant to be a general description of the principles of a measurement system or a blue print. The authors should decide which approach they want to use.

We apologize for the confusion. The design of the Greenhouse coffin was developed by us and all electronic parts were assembled by us. The PVC construction of the coffin, including most drillings, was done by Romid, who received a detailed construction schematic from us for the customized construction. To make that clear, a description column is added to Table 1. which states now the following regarding the chamber body:

*"Design by authors and customized build of the PVC construction (180*40*60 cm) via Romid company."*.

Hence, no order code exists. However, the dimensions of the greenhouse coffin body might differ for other purposes (smaller body for smaller plants, bigger body for bigger plants). Thus, for the working principle of the presented coffin system, the given dimension is an example of how it could be done rather than a fixed standard of how it must be done as long as each chamber design is tested for proper sealing and ventilation.

Tight guiding rails were used as a mechanism for proper window closure and sealing, which we added to the MS as follows:

" The front door is equipped with a sliding window mechanism, which is opened and closed by a linear actuator moving it along guiding rails."

3.) A smaller issue, on line 179, I think the Li-850 already corrects its readings for H2O interference? The authors should double-check this (and present the formula for H2O correction if they need to apply one!).

LI-850 does indeed correct its readings for Instrument Cross-sensitivity. However, we referred to Dilution by Foreign Gases (Hupp, J. et al. 2011). To avoid any misunderstanding based on our wording, we rephrased the sentence. in addition, the used correction function is given as follow:

"Additionally, the CO_2 concentrations measured with the LI-850 were corrected for the changes in water vapor during each chamber measurement (correction for dulation by foreign gas; Webb et al. 1980;Hupp, J. et al. 2011) Eq.(1):

$$C_g^{wr} = C_g^{ws} \frac{1-w_r/1000}{1-w_s/1000} \quad (1)$$

Where C_g^{wr} is the mole fraction of CO_2 in the sample (µmol/mol) corrected to the water vapor content of the reference measurement w_r (mmol/mol), C_g^{ws} is the mole fraction of CO_2 measured in the sample (µmol/mol), and w_s is the water vapor content in the sample (mmol/mol). "

4.) I find the flux calculation method somewhat strange. Using a variable-size moving window and discriminating against larger temperature changes would seem to prioritize moments when the sun is occluded (low temperature rise) or in the case of constant sunlight cases when the temperature difference between inside and outside is already high (higher outflux of heat lessens the T rise within the chamber), or short fitting times. Instinctively I'd prefer a more constant approach to the fitting, e.g. decide that the fitting time is 4 minutes, leaving 1 minute out from the start. This is not a critical issue here, but if the authors plan to use the system for some actual measurement campaign, they should further examine how gas fluxes are estimated in closed-loop setups in other studies.

A discrimination against larger temperature changes is rather unlikely since < 5% of all fluxes showed an increase more than the used 1.5°C threshold and none exceeded 2°C. Various studies have employed different methods to limit the influence of temperature increases in closed-loop systems on calculated fluxes, such as (i) implementing cooling systems (Beetz, S. et al, 2013), (ii) shortening chamber closure time (Grace, P. R. et al., 2020), or focusing on specific parts of the measurement where temperature changes do not exceed a certain threshold (Leiber-Sauheitl, K. et al. 2014;

Hoffmann, M. et al. 2015). A variable moving window has the advantage of automatically finding the optimum time window for fitting a linear regression to nighttime Reco (usually longer) as well as daytime NEE measurements (usually shorter). A fixed measurement window of e.g. 4 minutes could potentially discriminate against non clear sky conditions (characterized by a fast change between full sunlight and cloud-induced shading), with an immanent effect on CO_2 gas exchange. For example, Koskinen, M. et al (2014) found that determining the best interval based only on CO_2 concentration is not possible; the stability of the flux should also be considered.

5.) The method for testing the sealing of the system is seriously lacking: a smoke bomb creates aerosols, which are multiple orders of magnitude larger than the CO2 and H2O molecules which are the object of measurement here. The proper way of estimating leak (which is inavoidable in a system like this!) is to create a large mixing ratio of CO2, such as 1000 or 2000 ppm, in the chamber and then monitor the development of the mixing ratio within the chamber compared to the surrounding mixing ratio (ppm s-1 delta_ppm-1, where ppm is the mixing ratio within the chamber and delta_ppm is the difference between the outside and inside). Thus, a solid estimate of the proportion of air exchanged between the measurement system and the ambient atmosphere can be made. The same method can be used to estimate the rate of leakage between the chambers in multi-chamber mode, without the need to use a semi-random factor such as plants in the process. The method of leak evaluation chosen by the authors is not proper for the job. A small difference between mixing ratios on the inside and outside makes leaks nearly undetectable.

While a smoke bomb test does not prove air tightness, it nicely indicates serious air leakage (and more importantly, where exactly it occurs) from the Greenhouse coffin. To better emphasize this and avoid misunderstandings, we will change it in the MS as following:

"To assess for a serious leakage from the Greenhouse Coffin (and more importantly where exactly on the construction it occurs), a smoke bomb was used as suggested by (Hoffmann et al. 2018) and which was also used by

(Olfs et al. 2018) for the leakage test on their developed chamber design to measure nitrous oxide."

In addition, we extended the magnitude of our leakage test with CO_2 injections, as requested, to a larger mixing ratio of CO_2 (1000 ppm) and will use it to update Figure 4 accordingly. The test results showed no significant difference (pairwise Wilcoxon signed-rank, $p > 0.05$) between ΔCO_2 measured by the LI-850 and the calculated mixing ratio. As previously concluded, this suggests the proper sealing of the coffin. See updated Figure 4 below:

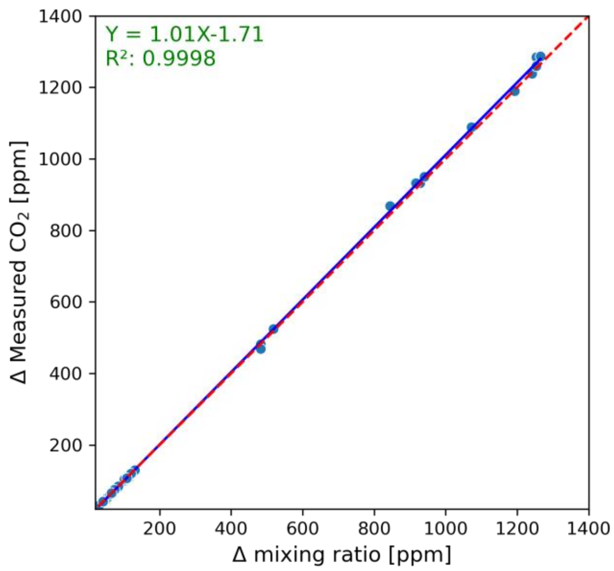

Figure 4:1:1 agreement between the mixing ratio and the measured ΔCO_2 concentration change expressed as in ppm, was obtained during the laboratory validation.

6.) Another thing missing is an estimation of how the enclosure affects air temperature: it's a rather well-closed system without any cooling aside the ventilation, so I suspect that the temperature inside can get quite high on a sunny day.

To prevent temperature increases inside the Greenhouse Coffin, we selected ventilation fans with a volumetric flow rate of 76.4 m^3/h, allowing for a complete air exchange within 20 seconds during the opening period (this information is now added to the MS). Thus, the average temperature difference between the inside and outside of the greenhouse coffin during the measurement period was < 0.25°C.

7.) Currently there is an increasing interest in non-CO2 GHG:s (esp. N2O, CH4) emitted from and/or consumed by plants. These can be tricky to measure as the mixing ratios are low and this makes the estimation of leaks even more important. Another important thing is that the materials used for constructing measurement setups, such as rubbers, plastics, glues etc. can emit the GHGs themselves or volatile organic compounds that can mimic or mask these GHGs in the measurement devices. An estimation of the blank flux rate of other greenhouse gases than H2O and CO2 would be very interesting; or the authors should include mention of the need for such a test in their first enhancement proposal (ll. 343-345).
We agree, for non-CO_2 GHGs the sealing of the Greenhouse coffin needs to be still tested in further experiments. We also agree that for BVOCs the used material needs to be thoroughly chosen and tested for potential outgassing. Hence, we will include the following in the MS:

"Parallel, high-resolution measurements of various gasses such as CO_2, CH_4, N_2O, and H_2O or also stable isotopes through combining high and low cost sensors thus allowing to determine water use efficiency, net system carbon exchange as well as full GHG balances. However, to ensure proper sealing, thorough sealing tests are crucial, particularly since gases like N_2O and CH_4 have low mixing ratios. Additionally, careful consideration must be given to the materials used in the construction, as they may emit GHGs or volatile organic compounds that could affect the accuracy of measurements."

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