Dear Editor and Reviewers,

We would like to thank the Editor and the Reviewers for their constructive comments and valuable suggestions on our manuscript [egusphere-2025-5295]. We have carefully addressed each point raised, which has significantly improved the clarity and quality of our Technical Note.

In accordance with your feedback, we have extensively restructured the document without altering the original results or data. Our primary goal was to enhance the flow and clarity of the ideas to provide a better reading experience. As a key step, we conducted a thorough revision of the Introduction and rewritten several paragraphs throughout the text to improve articulation.

In response to specific comments regarding the length of the manuscript, we have reorganized the numbering and figures, and merged sections to eliminate redundancies. This restructuring has resulted in a more concise and focused Technical Note.

Furthermore, we would like to clarify a formatting change. While our initial submission followed a different style, this revised version has been fully adapted to the official EGUSphere (HESS) format. Please note that the "track changes" document remains in the original format used during the first submission to allow for a direct comparison of edits. In contrast, the clean revised manuscript is presented in the final required format.

Summary of Major Changes:

- **Title:** The title has been modified following the reviewers' recommendations to better reflect the scope and focus of the study.
- **Introduction and Objectives:** The Introduction has been refined, and the objectives have been realigned to ensure better consistency with the presented findings.
- **Materials and Methods:** This section was completely restructured. We improved the numbering and provided a clear, step-by-step description of the laboratory protocols to enhance reproducibility.
- **Figures:** All figures were improved and modified for better visual clarity, including more descriptive captions and the explicit inclusion of sample sizes (n).
- **Discussion and Conclusions:** These sections were streamlined to eliminate redundancies and rewritten to better highlight the practical implications of our findings and their integration with existing literature.

Below, we provide a point-by-point response to the reviewers' specific comments.

Response to Reviewer 1 (Ruth Magh)

General author response:

We sincerely appreciate the reviewer’s thorough assessment and the constructive feedback provided. We have addressed the general concerns as follows:

- **Language and Grammar:** The manuscript has undergone a comprehensive linguistic review. We have collaborated with a native speaker to ensure that the grammar, syntax, and overall flow meet the high standards required for publication in HESS.
- **Methodology (MM) Section:** We have rewritten this section, shifting the perspective from a specialized "expert-only" focus to one that is accessible to a broader audience. The experimental steps are now described with greater clarity and detail to ensure reproducibility.
- **Figures and Visuals:** Following the reviewer's suggestion, we have significantly improved the figures. We merged redundant visuals to streamline the manuscript and added comprehensive legends. Specifically, Figure 1 (now Figure X) has been clarified, and the scale in Figure 13 (now Figure Y) was corrected to avoid the misleading interpretation identified by the reviewer.
- **Redundancy and Structure:** We have performed a critical review of the Discussion and Results sections. Redundancies have been eliminated, and the text has been tightened to ensure a more concise and impactful narrative without repeating findings unnecessarily

Responses to the specific comments to the text:

Abstract:

L 16: specify flow rates; e.g. sampling flow rates or measuring?

We agree that this clarification is necessary (L12: sampling flow rates (35, to 125 mL min^{-1}).).

L 19: delete “with” and then “deviating”

Thank you for this correction. We to improve the grammatical flow of the sentence

Keywords:

Replace “tightness” with “air-tightness” and “container” with “storage container”?

Thank you for the suggestions!

Introduction:

L 49: wrong citation style

We apologize for the oversight. The citation style has been corrected throughout the manuscript to follow the HESS/EGUS guidelines.

LL 52 ff: redundant, delete

We agree that this section was repetitive

LL 81 ff: this paragraph is missing the original publication of Havranek’s 2020 publication

(**https://doi.org/10.1002/rcm.8783**)about the SWISS system, please add for completeness.

Thank you for pointing this out and providing a direct link to the paper. The reference (Havranek et al., 2020) has been added

L 87: add information about the length of the storage period.

We have now included the specific duration of the storage period in this sectio.

LL 109 ff: Please rewrite and structure this section more carefully, so that the RQ's gain visibility and it becomes clear to the reader which of these you aim to actually address with this work. Please also rewrite the next paragraph, it reads awkward and partially redundant.

Structure the objectives and number them to increase visibility. Also, the last paragraph: "Innovation" does either need a proper header or rewriting to integrate the Innovation.

We agree that the research questions and objectives required better visibility and a more logical flow. Following the reviewer's suggestion, we have completely rewritten this section. We moved away from an unstructured narrative to a numbered list of specific objectives. This allows the reader to clearly identify the scope of our work. Additionally, the "Innovation" aspect has been integrated into the final part of the introduction to better justify the technical novelty of our study without redundancy. (LL 65-80)

Material and Methods:

Generally, it would be a good idea to replace the section headers with experiment and number? This way every experiment is described with every step needed to carry it out, and nothing is left out or to imagination as it is now.

We thank the reviewer for this excellent suggestion. We have completely restructured the Materials and Methods section to follow a chronological and experimental. Each experiment is now clearly identified with a numbered header. Under each header, we provide a detailed, step-by-step description of the laboratory protocols, ensuring that no technical details are left to the reader's imagination and improving the reproducibility of the study.

Figure 1 and Paragraphs 2.1.1/2.1.2: I don't understand why the 4. Point (ND20 and 1L Tedlar bags) is in parentheses and which the tested material is. Please clarify.

We appreciate the reviewer's attention to this detail. Initially, preliminary tests were conducted with ND20 vials and 1 L Tedlar bags. However, because these initial trials yielded inconsistent results and did not meet our data quality standards, they were excluded from the final analysis to ensure the study remained focused on the most reliable and high-performing systems. To avoid confusion, we have now removed all references to these preliminary containers from the figures and the methodological description. The revised manuscript and the updated Figure 1 now focus exclusively on the three main container types discussed in the results.

Also, the figure could use a proper legend, probably making it easier to differentiate between material and test. Now it looks like there's 2 main experiments, while from the text it seems there should be 4, so maybe a better color-code and symbol legend would enhance understanding at first glance without having to read everything twice?

We agree. Figure 1 has been completely redesigned to align with the new four-experiment structure of the manuscript. The revised figure clearly distinguishes between **Phase 1** (Container testing) and **Phase 2** (Sampling procedure testing), with distinct numbering (1–4) for each experiment. We have also added a clearer visual hierarchy and a descriptive caption to act as a legend, ensuring the methodological flow is intuitive at first glance

Also, I understand the decision criteria, but what if the container that was tightest didn't score as high on the isotope test?

We agree that isotopic stability is the most critical factor. For this laboratory validation, we used an integrated scoring approach to identify the most practical container for future field applications. To maintain scientific rigor, isotopic stability acted as a primary filter. The sum of all the criteria provided an indicator of which container is most optimal. We would not always achieve the best results for every criterion, but the overall total would determine the selection.

How do you proceed from there?

We understand the need for clarity regarding the final selection process. To address this, we have carefully reviewed and restructured the "Decision Criteria" section. We now explicitly describe the weighting process used to determine the most suitable container. This ensures the reader understands how each criterion—from isotopic stability to practical handling—contributes to the final recommendation for a robust and reliable sampling protocol.

Also, what kind of criterion is 3. "time to analysis"?

The **time to analysis** is a critical technical criterion because our results show that isotopic composition is a time-dependent variable, sensitive to storage duration and temperature. In remote areas without *in situ* instrumentation, minimizing this interval (0–1 days) is essential to suppress fractionation and diffusive losses.

Also, this section is missing the reference to how long the storage is and what was stored?

We have updated the section to include these essential technical details.

Section 2.1.3:

The rationale for syringe size is not explained. Please elaborate.

The reasoning behind testing it was that a small syringe might potentially constrain the flow rate to the analyzer and cause rapid pressure drops/increases that could lead to isotopic effects. We have added the technical rationale for the syringe sizes (section 2.3.1).

L 198: which method was developed in this study?

The study developed a robust laboratory protocol for the standardized sampling and storage of water vapor using glass bottles. This method optimizes container selection, flow rates, and storage conditions to ensure isotopic stability.

L 200: after the first day of sampling? So 7 + 1 day?

We apologize for the confusion; this was a drafting error. The measurements were conducted within the 7-day period already described. We meant that the first critical assessment occurred 24 hours after sampling. We have corrected the text to ensure the timeline is clear and consistent.

L 201: I don't understand, did you measure the same sample after 3 days and again after 7? Or is this a replica? And if so, why is this only mentioned for 3 and 7 days, did you not also measure after 6h and 1 day?

We have clarified the experimental design to resolve this confusion. We used independent replicates for each time step: three separate containers were prepared for each storage period

(6h, 24h, 3d, and 7d). Each sample was measured only once after its designated storage time to ensure that the measurement process itself did not affect the results.

L 203: yes, I get it, but again, readers do not know this yet.

We have restructured the **Materials and Methods** section to provide a better logical sequence. This ensures that the experimental setup and replicates are fully explained before the results are presented, improving clarity for the reader.

L 206: but this is not a repetition, this is a new experiment with the syringe size. Please be careful with wording.

We have corrected the wording. This was a specific experiment designed to test if different syringe diameters or sizes affect sample integrity or septum airtightness during puncturing. It was a fundamental step to rule out any mechanical bias in our final isotopic results.

L 209: so, the dry air test was not conducted using different flow rates?

The purpose of this specific test was solely to determine if the syringe diameter used to puncture the septum compromised the container's airtightness. It was a mechanical leak test, not a flow rate experiment. We have clarified this distinction to avoid further confusion (experiment 3).

L 209 ff: which are the isotopic references?

The isotopic references are detailed in Table 1 (2.3.2. Experiment 4). However, to improve clarity and avoid back-referencing, we have now included their specific values directly in this section.

L 214: please stick to either days or hours, this is getting confusing.

We have standardized the time units throughout the entire manuscript. We chose to use days as the consistent unit to avoid confusion and ensure clarity across all sections and figures.

L 216: this flow rate depends on analyzer and type it is not a predefined setting for all Picarros.

We have clarified that this flow rate is specific to our Picarro model (L 82).

L 218: So the reference material was stored at these temperatures, or the samples were after sampling?

The temperatures refer to the storage of the water vapor samples once they were collected from the isotopic standards. We have clarified that the stability test was performed on these captured vapor samples under different thermal conditions.

Section 2.1.4 should be logically before section 2.1.2

We agree. As part of the general restructuring of the Materials and Methods, we have swapped these sections to follow a more logical and chronological sequence.

L228: are those the same bottles as the ND32?

Yes, they are the same bottles. We have corrected the terminology to ensure consistency throughout the manuscript and avoid any confusion regarding the container types.

L235/236: how were those bags treated before reuse?

Only the 1L FlexFoil sample bags were reused and rinsed three times with dry air through the valves before sampling to minimize memory effects. The 500ml aluminum bags did not get reused. We will elaborate on this aspect in the revised version (section 2.2.1).

Section 2.1.5 again, I think assigning each section to a specific experiment would be beneficial to not have to go back and forth between the sections.

This is a great idea which we will aim to implement in the revised ms.

LL 242 ff: this is confusing, I would imagine that you used different flow rates for sampling not for measuring? If so, why did you use larger syringes for measuring, I think the flowrate here would be determined by the laser and therefore be low? Pls elaborate and rewrite.

We will carefully review the description of sampling and measurement procedures to improve clarity.

LL246 ff: so all this is only relevant for experiment number 1? Or 3,4?

We agree. In the revised manuscript, we have restructured the sections so that this specific part now precedes the individual experiments. This provides the reader with the necessary context regarding preparation before diving into the results of each experiment (section 2.2.1).

Section 2.1.7

L 287: I don't see how (3) "time to analysis" would be a critical condition, it is however related to points 1 and 2 but not a point itself, imo. You can decide to sample more often when aiming for an in situ like approach, but you do not need the data in real time, which makes this approach so beautifully suitable for remote regions, where you might find a great experimental site but no infrastructure. If I misunderstand, I would ask you to clarify in the text.

We agree that real-time data is not the primary goal of this method, which is indeed designed for remote infrastructure-limited sites. However, we consider "time to analysis" critical because it defines the **stability window** of the sample. Factors like temperature fluctuations during transport and storage duration can trigger isotopic fractionation or contamination within the vessel. Our goal was to determine how long a sample remains representative of the original source before these effects compromise data quality.

LL 296 ff: I would argue that isotopic stability should have more weight than 50% since it is the most important criterion in defining the usability of the methods. If all other criteria in um add to 50% but the sample is not isotopically stable, it is not useful at all and should not be considered.

We completely agree with this assessment. Isotopic stability is indeed the "gatekeeper" criterion for the viability of any storage method. Following your suggestion, we have reevaluated our weighting system and increased the weight of isotopic stability to 70% (section 2.2.3).

Section 2.1.8 and subsections, sorry but this is too many subsections, again, I think restructure would enormously benefit the readability here.

We agree that the excessive number of subsections hindered readability. We have completely restructured this section, consolidated the information and reduced the number of subheadings.

L 310: and a reference to the respective section would be nice here.

We have inserted the specific references to the corresponding sections as requested (L197)

LL 311 ff: I think that is not entirely correct. The test conditions only provide an assessment for the tightness of the entire storage container, not the syringe size per se. E.g. with the crimped vials the leakage might be due to the lid not fitting properly while you assess it as a syringe size problem. Please either elaborate if I misunderstood or rephrase so that this is clear.

We appreciate this clarification. Our intention was to evaluate how the puncture caused by different syringe sizes affected the overall airtightness of the container. We have rephrased this section to clarify that we assessed the integrity of the storage system as a whole, specifically focusing on the seal's performance after being compromised by the sampling needle (L195).

L350 ff: Is this not redundant? I feel you have described this before in the treatment section

Thank you for pointing this out. Upon review, we agreed that this description was repetitive. We have streamlined this section to avoid redundancy, ensuring that the treatment details remain in their primary section while keeping the discussion here focused on the results.

2.1.4 or is this a different treatment?

This section refers to the preliminary preparation required before starting the experiments. We understand how the previous organization could have been misleading; therefore, we have reordered the sections to follow the actual experimental sequence, placing this preparation at the beginning (2.2.1).

L348: mas flow controller (MFC)

We appreciate the observation. In the revised manuscript, we have decided to use the full term **"mass flow controller"**.

L353: drawn not withdrawn

We have updated the terminology to use "drawn".

L369: this should be section 2.1.9 not 2.1.8 please check the remaining sections for correction after this point.

We have thoroughly audited the section numbering and cross-references throughout the manuscript. Following the major restructuring of the materials and methods, all section headers and internal references have been carefully updated to ensure a logical and correct sequence.

Section 2.2

L435: the liquid values, not fluid?

We have updated the manuscript accordingly to ensure technical precision (L269).

Section 2.3

L459: Furthermore…?

The word was indeed misplaced and out of context. It has been removed from the sentence to ensure clarity and correct grammar.

Results:

Figure 5: the resolution of the figure is very poor, please resubmit with a better resolution and larger axis text etc.

We have replaced Figure 5 (now Figure 3) with a high-resolution version. Additionally, we have increased the font size for the axis labels and legends to ensure clear readability in the final layout.

Section 3.1.1 What were the initial sampled H_2O concentrations? Did you test whether the bottle truly contained 0 ppm H_2O?

We appreciate the opportunity to clarify this point. The bottles did not contain 0 ppm of H_2O; after the drying process and dry-air rinse, a final check with the Picarro analyzer confirmed an initial concentration of approximately 200 ppm of H_2O.

Section 3.1.2

L 494 ff: If you do not show the data I think it would be beneficial to the reader if you did not mention the tests at all. Also it would save some time when this is also deleted from the MM section.

We agree with this suggestion to improve the focus of the manuscript. We have specifically removed these tests and their descriptions.

Figure 6 also needs a re-do in resolution and text size etc

Figure 8 also needs a re-do in resolution and text size etc

We have replaced both figures with high-resolution versions and increased the font size of all text and axis labels to ensure clear readability

Section 3.2.2.1

The text does not really reflect the results shown in the figure: for example the statement in line 619 ff in the text you combine flow rate, storage time and condition, while the figure pools all samples into the respective condition. So, the present presentation does not support your conclusion. Please either adapt the text or the figure 9. Also, just from looking at the storage time, there is no real effect even at 72 hours storage (i.e. the box of the boxplots as well as the interquartile range does not look so different from the 6 hour storage..)

Figure 9 s.a. and additionally horizontal lines would benefit readability

We agree with this observation. We have completely rewritten this section and redesigned the presentation of these results. Figure 9 has been merged with Figure 10 to provide a more cohesive comparison, and we have updated the text to accurately reflect the findings. We also improved the figure resolution and added horizontal lines to enhance readability (now figure 7)

Section 3.2.1

Either I overread it or the information about how many replicas per flow rate and standard you have is missing for this section. It would be nice if you could add this information to the boxes of the boxplots and the tables you show in this section.

We agree that this information is essential for clarity. We have now specified the number of samples (N) directly in the legend of Figure 7 and updated the corresponding tables. This ensures the reader can easily identify the replicates used for each flow rate and standard.

Section 3.2.2.2

It is interesting to see that the low flow rate influences the measurements so much, one would assume the opposite, do you have an idea why?

Our results suggest that with a low flow rate, the sampling time used was insufficient, as we observed a slow but steady increase rather than a plateau. We hypothesize this is due to connecting three samples simultaneously. We have updated the text to include this explanation and noted that future work will test single samples and longer durations to identify when levels stabilize.

Can you please reference the Figure 10 sooner? It is much easier to follow the text with the figure already seen.

Figure 10: s.a. and add horizontal lines, also the y axis should read either δ2H or δD but not δ2D

We have addressed this by merging the original Figure 10 with Figure 9. These are now presented together as a single Figure 7, which is referenced much earlier in the text to help the reader follow the results more effectively.

Section 3.2.3

What is the corresponding analysis you mean here? The rest of the paragraph reads fuzzy and confusing. Please clarify which analysis is the basis for this conclusion and then draw the conclusions. E.g. it is not obvious that flow rates of 125 ml/min truly is the best suited as the results look very similar for all flow rates except the lowest.

Figure 11 seems redundant and considering that the paper already has too many figures, maybe it would be good to delete this one.

We agree that the previous wording was confusing. To improve the clarity and flow of the manuscript, we have removed this entire section as it was redundant with the results now consolidated in Figure 7. The conclusions are now drawn more clearly based on the integrated data shown in that figure

Figure 12 can be turned into a table imo

We agree that a tabular format presents this data more effectively. Following your suggestion, we have converted Figure 12 into a table (now Table 2).

Figure 13: I feel this representation is misleading, 2H as a fact always has a larger uncertainty in measurements. Since it is roughly 8 times as sensitive you could adapt the sclae by that factor and therewith enhance the readability and comparativeness between the two isotopes. You could then also plot both in one plot and in different hues of the

same storage time. This is also true for the previous figures and would save you from having to delete too many figures.

We sincerely appreciate this insightful and constructive suggestion. The reviewer is correct regarding the difference in sensitivity and uncertainty between 2H and 18O. We carefully analyzed the possibility of scaling the axes by a factor of 8 as suggested. However, we found that this approach made the 18O values difficult to interpret visually due to the magnitude of the resulting scale. Instead, to achieve the reviewer's goal of enhanced readability and comparativeness, we have opted to calculate and plot the relative error. This allows for a direct and balanced comparison between both isotopes in a single representation without distorting the visual data

Discussion:

The discussion is very long and many stretches are simply a repetition of the results (e.g. LL780 ff). It would greatly benefit from being rewritten and shortened. The results should not be repeated, if necessary, reference the respective section.

We agree. We have thoroughly revised and shortened the discussion section to eliminate the repetition of results. The text now focuses strictly on the interpretation and implications of the findings, with references to the specific Results sections where necessary.

LL 833 ff: Conclusion i: then the argument would be that you should sample the bags longer and use an outlet so that the bag is flushed instead of simply filled. Is that something you did?

We appreciate this suggestion. The idea of flushing the bags with an outlet—similar to the successful rinsing process used for our bottles—is a logical step to ensure isotopic stability. However, this specific procedure was not implemented in the current study; the bags were filled directly as described in the methodology. We have now clarified in the Conclusion that while rapid filling was used, implementing a "flushing" or "rinsing" protocol with an outlet remains a valuable potential improvement for future research.

LL 893 ff: This paragraph can be shortened into its main message, which is lines 904-906. The rest is repetition of results.

We agree that this paragraph was overly repetitive. Following your suggestion, we have significantly shortened it to focus exclusively on the main message. We also refined the language to ensure the core argument is clear and impactful without repeating the results.

LL 914 ff: I have trouble with that conclusion; your results show stability within the first 72 hours as well as did mine in 2022. Why do you then recommend measurements have to happen in the first 24 h?

We appreciate this critical observation. We agree that our data, consistent with the reviewer's 2022 findings, demonstrate isotopic stability up to 72 hours. However, our 24-hour recommendation is intended as a **risk-mitigation strategy** to minimize isotopic variations caused by external factors (e.g., temperature fluctuations) when post-sampling environmental control is not logistically feasible. We have restructured the conclusion to clarify that while analysis within 72 hours is scientifically valid, the 24-hour window is recommended for optimal precision in field conditions lacking automated control systems, such as those described by Havranek et al. (2023)

LL935 ff: Again, this can be boiled down to the main message which is a recommendation based on the results. It does not need to be this long.

We agree. This section has been shortened to focus strictly on the main recommendation based on our results. We removed all redundant information to ensure the message is concise and clear.

Section 4.3 should be shortened and integrated into section 5 Conclusions.

Section 5 is not a conclusion but a nice summary, which could be used in the abstract. Otherwise, it may be redundant and could be removed.

We agree. Following your suggestion, we **shortened** Section 4.3 and **integrated** its content into the Conclusions. Additionally, we **restructured** Section 5 to eliminate redundancy, ensuring it serves as a concise synthesis of the study's findings rather than a simple summary

Response to Reviewer 2 ()

General comments:

In the manuscript by Iraheta et al. the authors present an optimized approach of obtaining water vapor samples for analysing the isotopic composition of water vapor. They performed systematic laboratory experiments initially for three different materials to test the effect of storage time, storage temperatures, and flow rates on tightness and isotopic stability of water vapor samples. To select the optimal container they defined ratings for each decision criterion, which resulted in a final score. With the identified optimal container further experiments were performed with three isotopically different waters, again testing and optimizing storage time, storage temperature and sampling flow rate.

The manuscript is well structured but it is far too long and contains largely redundant sections and figures, which makes it difficult to read. Also the discussion should be more focused, not repeating so many results. Manuscript lengths of Technical notes in other journals are sometimes limited to 7000 words - which is almost double for this manuscript.

We appreciate this helpful and constructive feedback and agree that the manuscript would benefit from a more concise structure. During the editing significant shortening will be undertaken by reducing redundant sections, combining sections and simplifying the presentation of the results and discussion. To improve readability, figures will be discussed and carefully evaluated before removing or merging those, that provide repetitive information.

My second concern is that the title is highly misleading. No water vapor sampling in trees and soils was conducted in this study. Water vapor was sampled from the headspace of 250 mL glass bottles, instead. Further, 'optimizing sampling protocols' promises somehow that several existing protocols which are used by the community could eventually be compared or optimized, which is not the case. The presented optimized method which the authors favor is more or less a follow up of two studies (Magh et al. (2022) and Havranek et al. (2021)) which also used glass bottles for vapor sampling. But in contrast to those studies, only data of water vapor sampling from glass bottles in lab experiments and no data of field applications were presented here.

I therefore recommend rephrasing the title and significantly shortening the manuscript.

We agree that the previous title was misleading regarding the study's scope. We have rephrased the title to more accurately reflect the laboratory-based nature of our experiments and the development of the protocol. Additionally, we shortened the manuscript significantly to focus on the optimization process and removed references that implied direct field sampling in trees or soils "**Technical note: Water vapor sampling for stable isotope analysis: systematic testing of sampling conditions and development of a robust protocol**".

Regarding the poor performance due to limited isotopic stability (L 549-551) of the 500 mL aluminum bags: I agree and I also guess there is a slight exchange at the zip-type seals (L 759-762) but this is probably the reason why the supplier recommends heat sealing! Maybe the results would have been significantly different with proper closed bags.

We agree with the reviewer that the sealing method is a critical factor for the isotopic stability of aluminum bags. In this study, we did not compare different sealing methods for aluminum bags. However, we agree that this is an important aspect to consider. Future studies would benefit from comparing sealing methods, such as zip-type seals versus heat seals, to assess whether this factor may limit the isotopic stability of water vapor samples. We acknowledge that differences in sealing methods could influence results and represent an interesting opportunity for further research.

Specific Comments:

L 152 Figure 1: Blue and green lines are hard to distinguish, please change one of the colors.

We agree that the original color scheme lacked sufficient contrast. We **changed** the color of the lines in Figure 1 to ensure they are clearly distinguishable, improving the overall readability.

L 205 Why 'Summary' here?

We **revised** this section to improve clarity and maintain a consistent flow. The summary heading **was removed**.

L 347 'bar' is not the correct unit for flow rate. Please change appropriately.

We acknowledge that the use of 'bar' in this context was incorrect and caused confusion. This sentence was intended to refer to the pressure of the dry air bottle rather than the flow rate. To improve clarity and simplify the description of the experimental setup, we removed this specific reference from the text.

L 349 What is '1/8 PPT tubing'? 1/8 inch? or 1/8"? PTFE tubing? Please check.

We appreciate the correction. The term was a typographical error; we meant to refer to 1/8" PTFE tubing.

L 374-383 describes Fig. 4B, please add '(s. Fig 4B)' somewhere.

L 384-393 describes Fig. 4A, please add '(s. Fig 4A)' somewhere. Please swap these two sections so that it matches the order in the figure.

We agree with the need for better alignment between the text and the visual aids. As part of our overall effort to condense the manuscript and improve readability, we restructured the figures.

The information previously contained in Figure 4A was integrated into a new, comprehensive schematic (Figure 2), which illustrates the sampling and measurement workflows. We reordered the corresponding text sections to strictly match the sequence presented in this new figure and added the appropriate citations (e.g., "see Fig. 2") throughout the description.

L 494-497 please delete – or does this information become relevant later?

We reviewed this section and concluded that the information was not essential for the main message of the manuscript. To improve conciseness and avoid potential confusion, we deleted these lines as suggested.

L 525-527 This is already an interpretation of the results -> to discussion

We agree that these lines provided an interpretation rather than a direct report of the data. Accordingly, we moved this specific content to the discussion section to maintain a clear distinction between the presentation of results and their analysis

L 595 How was 'stable' defined?

We agree that the term "stable" required a more precise definition. In this study, we defined isotopic stability based on the observation of a consistent plateau during the sampling process. Specifically, at flow rates of 100 and 125 mL/min, the isotopic values remained on a single, continuous line with minimal variance. In contrast, flow rates of 35 and 75 mL/min showed fluctuations or drifts. We revised this section to explicitly state these criteria and clarify the comparison between flow rates.

L 598 Can't find Fig. S4, do you mean Fig. S1? And where do you refer to Fig. S2 in the text?

We appreciate the reviewer's attention to detail. You are correct; the reference to Fig. S4 was a typographical error, and it was changed to Fig. S1

Figure S1 Small differences can't be recognized due to the scaling of the y-axis for both isotopes. I suggest depicting d18-O from -5 to -25 and d2-H from -50 to -150‰.

We agree that the original scaling obscured important details in the isotopic data. We **adjusted the y-axis ranges** for Figure S1 as suggested. This modification significantly improves the visibility of the differences between samples and enhances the overall clarity of the results

Figure 9: Please add dashed lines at 0.0

Figure 10: Please add dashed lines at 0.0

Figure 10: Please change ^{2}D to ^{2}H

We appreciate these suggestions to improve the clarity and accuracy of our visual data. As part of the manuscript's restructuring to reduce its length, we merged the original Figures 9 and 10 into a single composite figure, now presented as Figure 7. In this new version, we added the requested dashed reference lines at 0.0 for all panels. Additionally, we corrected the label from ^{2}D to ^{2}H to follow standard isotopic notation

The data in Figure 11 are already shown in Fig. 9 and Fig. 10, correct? If so, please delete Fig. 11

We agree that the manuscript contained redundant visual information. To address this and improve the focus of the Results and Discussion sections, we **deleted** the original Figure 11. The essential data from that figure was already covered or integrated into the previous sections, ensuring no loss of critical information while significantly shortening the text

Figure 12: Could you perhaps include the information about the MAE in Fig. 9 and Fig. 10? If so, you could delete Fig. 12.

Figure 12 was removed, and its data was integrated into Table 2. We also updated the text in the results section to reference this table.

L 965-971 Which parts of your approach are 'semi-in-situ'? Where did you show that 'it enables the capture of water vapor in equilibrium with soil and xylem'? Please rephrase.

We acknowledge that the term "semi-in-situ" and the reference to soil and xylem equilibrium were misleading, as our current study was strictly limited to laboratory experiments. We have revised this paragraph to clarify that our method provides a robust, laboratory-validated protocol. We now present it as a reliable foundation that has the potential to be adapted for future semi-in-situ sampling in soil and plant studies, rather than claiming it was demonstrated in this work.

Technical corrections:

L 54 'a need' (blank is missing)

We have implemented all the typographical, spacing, and terminological corrections suggested by the reviewer

L 87 and throughout the manuscript: no blank between number and ‰

We agree with the reviewer's observation. We have inserted a blank space between all numerical values and the ‰ symbol throughout the entire manuscript to comply with standard technical notation

L 135 Please delete 'Innovation.'

We agree with the reviewer's suggestion. The word 'Innovation' has been deleted to maintain a more objective and concise tone.

L 146 Please insert 'Table' before S1

We have addressed this comment. However, since S1 consists of a descriptive list of materials and equipment rather than a table, we have updated the reference to 'Text S1' to more accurately reflect the nature of the supplementary material

L 203 'words,' or 'words:' instead of 'words.'

We agree with the reviewer. The punctuation has been corrected, and the typographical error in this section has been fixed to ensure better sentence flow and clarity

L 281 Change 'Seven' to 'Six'

We agree with the reviewer's observation. The text has been updated to correctly reflect the number of elements described, changing 'Seven' to 'Six'

L 411 "…equation 1 (Craig (1961); Coplen (2011)):"

We agree with the reviewer. The citation format has been corrected to avoid double parentheses. Additionally, we have performed a comprehensive review of the bibliographical references to ensure consistency in style and that all cited works are properly listed.

L 414 Two blanks are missing: 'where R_{sample}' 'and R_{VSMOW}'

We will add it

L 414, 418, 428, 434: spacing between letters and superscripted numbers is too large

We agree with the reviewer's observation. The spacing between letters and superscripted numbers has been adjusted throughout the manuscript to ensure a standard and cohesive scientific format. Additionally, we have performed a full review of the blanks and overall spacing as part of the manuscript's restructuring

Figure 4, Figure 5: change 'bag' to 'bags', to be consistent with 'bottles'

We have updated the labels in Figure 3 and Figure 4 to use the plural form ('bags')

Figure 6: error bars are missing

We agree with the reviewer. Error bars have been added to Figure 4 to represent the variability of the measurements (e.g., standard deviation). This provides a clearer indication of the data's precision and strengthens the overall presentation of the results

L 611 IQR - define this acronym in the first instance

We agree with the reviewer. The acronym IQR has been defined as Interquartile Range at its first mention in the manuscript to ensure clarity for all

L 813 Please replace 'one-liter' by '1L' to be consistent

We have replaced 'one-liter' with '**1L**' to maintain consistency with the SI units used throughout the manuscript. Additionally, we have carefully reviewed the entire text to ensure all volume measurements follow this format

L 822 Please insert 'vapor' before 'concentration'

We agree with the reviewer's suggestion. We have inserted the word 'vapor' before 'concentration' to clarify that we are referring to the atmospheric water vapor content, ensuring there is no ambiguity for the reader.

L 844 Please insert 'adsorptive' before 'isotope exchange'

We have updated this section to specify the nature of the isotope exchange. We clarified that the process is driven by interactions at the interface, ensuring the technical description aligns with the physical mechanisms observed in our study

L 936 leorting?? …the feasibility

We thank the reviewer for pointing out this typo. The word 'leorting' has been corrected to 'feasibility'. Furthermore, as part of the manuscript's restructuring, this entire paragraph has been revised to enhance its clarity and ensure that the conclusions regarding the method's practical application are straightforward and comprehensible

L 981 I suggest ‘hot glue’ instead of ‘adhesivo termofusible’

We agree with the reviewer's suggestion. The term 'adhesivo termofusible' has been replaced with 'hot glue'. Additionally, this section was revised during the manuscript's restructuring to improve the description of the experimental setup

S1. List of materials: Refrigerator is probably ‘Samsung’ not ‘Sansung’

We thank the reviewer for identifying this typographical error. The brand name has been corrected to 'Samsung'. Additionally, following the manuscript's restructuring, this section is now referred to as Text S1.