

Comments reviewer 1

Faurès et al. (2026) calculated flux correction factors for CO₂ and H₂O using power spectra and cospectra across multiple ICOS ecosystem sites. For CO₂, both methods yielded similar results, whereas significant differences were found for H₂O. Overall, the cospectral approach provided more robust results for the standard ICOS flux setup.

The authors compared their corrected fluxes with fluxes processed through the ICOS flux-processing pipeline and found significant differences, particularly for H₂O. Their work is a valuable contribution to the scientific community working with eddy-covariance flux measurements and is suitable for publication in Atmospheric Measurement Techniques. I also appreciate that the authors have made their code available under an open-source license. As a result, research groups working on flux measurements of other greenhouse gases and short-lived reactive gases can benefit from their work as well.

The manuscript is well written, clearly structured, and the methods and results are scientifically sound. I have a few minor comments and several technical comments, which are listed below.

Minor Comments:

L. 41–46: I would be more specific here. Please add the name of the instrument (LI-7200(RS)) and mention that it measures both CO₂ and H₂O. Otherwise, this section sounds somewhat vague.

⇒ We agree with the reviewer's suggestion. The section has been revised to specify the instrument (LI-7200(RS)) and to clarify that it measures both CO₂ and H₂O.

L. 80: Was there a specific reason for selecting the year 2024? Were the results from other years similar to those obtained for 2024?

⇒ 2024 was the last annual L2 ICOS data release (named "archive" on the Carbon Portal) available in 2025, when most of the analysis work for this paper was performed. 2023 was also analysed and gave very similar results, the reason why we decided to work with a single year, which is a sufficiently long period for a representative spectral analysis. The sentence now reads : "The analysis was based on the 2024 data, the latest dataset available when most of the analyses for this paper were performed."

L. 101: How many bins were used for the smoothing/averaging procedure?

⇒ Fifty. We added the info in the sentence that now reads: "Spectra and co-spectra were computed for each half-hour using the Fourier transform and smoothed using fifty exponentially spaced frequency bins".

Technical comments:

L. 38: Change the capital "I" to a lowercase "i".

⇒ Done

L. 53–56: This is a relatively long sentence containing a large amount of information. Consider splitting it into two sentences.

⇒ This sentence has been revised and expanded and now reads: “Recognition of other sources of spectral losses in more complex EC systems, such as the presence of particle filter(s) and rain caps in the gas sampling system, is necessary. The same applies to the non-neutral spectral characteristics of some gases in (en)closed-path analysers, which are associated with the adsorption and desorption of water molecules and influenced by air relative humidity. For these sources of flux loss, either no transfer function expressions are available, or the relevant transfer functions depend on aspects that are difficult to parameterise, such as the evolution of tube dirtiness. In all these cases, an experimental approach is recommended (Ibrom et al., 2007; Mammarella et al., 2009).”

L. 83: There is an unclosed bracket.

⇒ Useless bracket deleted.

L. 127: Missing reference.

⇒ Now showing Eugster and Senn, 1995

L. 183, L. 477, L. 483: Add a "/" between z and L. Please check for other occurrences throughout the manuscript.

⇒ Done.

L. 212: a dot is missing between "exchange" and "This".

⇒ The dot has been added.

L. 221, L. 232, L. 234, L. 243, L. 347, L. 348, L. 368, L. 384, caption of Fig. 10: Change italic font to upright (roman) font.

⇒ Done.

Table 2, L. 384, L. 584: H₂O fluxes are not expressed in units of energy. Please replace "H₂O" with "LE" (latent heat flux).

⇒ Agree. We first added to the sentence in former line 206 the fact that H₂O fluxes will be shown in the form of latent heat fluxes : “The impact of the two spectral correction approaches on CO₂ and H₂O fluxes (the latter expressed as latent heat flux, LE) was assessed for both their half-hourly fluxes and their cumulative yearly fluxes.”. And “H₂O” was replaced by “LE” in the suggested places.

L. 408: Add a hyphen between "first" and "order" ("first-order").

⇒ Done.

L. 534: Remove the opening bracket at the end of the sentence.

⇒ Done.

Fig. 3, Fig. 4, Fig. 8, Fig. D2, Fig. D3: Format the exponent "-1" in the x-axis label as a superscript.

⇒ Done.

Fig. 5: Add an explanation of the boxplot elements to the caption, for example: "Box frame = 25–75% interquartile range (IQR), bold line = median, whiskers = $1.5 \times \text{IQR}$." Also add: "Red bold labels represent the low measurement-height sites." Please make the labels bold.

⇒ Done.

Fig. 6: Make the red labels bold and change the titles to labels. Format the "2" in CO_2 and H_2O as a subscript.

⇒ Done.

Fig. 9: Change the caption opening to: "Boxplot of LE ..." and add a description of the boxplot elements. Replace "titles" with "labels" in the caption.

⇒ Done.

Fig. 10: No comment provided.

⇒ We do not understand what is requested here. Figure 10 is described in the result section and used/discussed in the discussion section (L367-374 and L444-452 of the initially submitted manuscript, respectively). Its caption and plot seems to be complete. So no modifications were made to the text. In association with the following comment, which refers to a figure that does not appear to exist, we assume that there may have been some confusion.

Fig. 11: Use a capital "C" in "Co-spectra" in the first line of the caption.

⇒ There is no Fig 11 in the manuscript, and we did not find any caption starting with "Co-spectra", so no modifications were made to the text.

Figures B1–B4: Format the exponent "-1" in m s^{-1} as a superscript. Also check the y-axis units.

⇒ Done, and the y-axis has been described as dimensionless.

Fig. C1: The title "SE-Deg" is missing. Format the exponent "-2" in the y-axis unit as a superscript.

⇒ Title added and exponent formatted.

Fig. C2: Change the unit to W m^{-2} and replace " H_2O " with "LE" in the caption.

⇒ Since this is a cumulative LE (so a LE integrated over time), we confirm that units must be J m^{-2} and not W m^{-2} as suggested. So we kept the initial units.
 H_2O was replaced by LE in the caption, thanks.

Fig. D3: Add the percentage ranges corresponding to the RH classes.

⇒ Good idea, done.

Fig. E1: Add a "/" between z and L in the caption.

⇒ Done.

Fig. E2: Are the outliers necessary? I would consider removing them to improve visibility. Also add a description of the boxplot elements.

⇒ We followed your suggestion and removed the outliers which are not so informative. The x-axis was also replaced by a traditional black solid line and the legend improved.