

Author's Response to Referee Comments on: "Comparison of atmospheric CO, CO₂ and CH₄ measurements at Schneefernerhaus and the mountain ridge at Zugspitze

We thank the editor and the reviewers for the second review of this manuscript and their constructive revisions and their useful suggestions. We have revised the manuscript accordingly.

[Referee #2] This is my second review of this manuscript by Hoheisel et al. I recognise that the authors addressed in a good way all the points that I reported in the review. I can only suggest a few further revisions before the publication of this interesting paper (please refer to the Author's tracked changes document)

1) page 5, line 146: 5 ppm -> 5 ppb

[Hoheisel et al.] Thanks for pointing it out, we have of course corrected it.

[Referee #2] 2) Page 5, line 142 - 148: Thanks to the authors for providing details about the test performed to evaluate the impact of WV to CO. However, the authors should be aware that the influence of WV to CO measurements by CRDS is erratic and can significantly vary on time (see e.g. <https://doi.org/10.5194/amt-14-89-2021>, section 4.5). I suggest that the authors comment on the manuscript about the limitation of their approach (i.e. "one-shot" test, no information about the dependency of the CO impact as a function of WV values).

[Hoheisel et al.] We have included a sentence about the limitations of our approach.
Since there is no information about the exact dependence of the CO mole fraction as a function of water vapour, the applied CO correction is based on the previously described comparison measurement, which was performed only once.

[Referee #2] 3) Page 12, line 379 -382: I suggest to clearly state (as the authors nicely did in the Author's Response) that also in the period 2002-2007 differences between the diurnal cycles for weekend and during the week can be detected even if so small that that the significance test for weekly dependence did not detect a significant weekend effect.

[Hoheisel et al.] Thank you for this comment. We have included some further clarifications.
Even visually, the difference between the weekly cycles for 2008–2014 and the other two time periods is obvious. As expected, the weekly cycle for the time interval 2015–2021 shows no significant ($p < 0.05$) weekend effect, as does the weekly cycle for the time period 2008–2014. A slight tendency towards higher values during the week can also be observed for the 2002-2007 time interval compared to the 2015-2021 period. However, the variation is so small that the significance test ($p < 0.05$) shows no significant weekend effect for the period 2002-2007.