

Atmos. Meas. Tech. Discuss., referee comment RC1
<https://doi.org/10.5194/amt-2022-139-RC1>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on amt-2022-139

Anonymous Referee #1

Referee comment on "Cavity ring-down spectroscopy of water vapor in the deep-blue region" by Qing-Ying Yang et al., Atmos. Meas. Tech. Discuss.,
<https://doi.org/10.5194/amt-2022-139-RC1>, 2022

The manuscript "Cavity ring-down spectroscopy of water vapor in the near-UV region" is well written and structured and addresses the important question of water vapour absorption in the near-UV region from about 33000-24000 cm⁻¹ or 300-420nm. These absorption are typically not used to obtain water vapour concentrations in the atmosphere or in experiments, but may overlay other absorbers and thus introduce systematic biases in measurements of various trace gases as mentioned in the manuscript. Water vapour is not the only absorber where work needs to be done for further advances in remote sensing applications, but often one of the strongest interferences in the near UV region. For other gases important progress was reported e.g. in Finkenzeller and Volkamer 2022 in the same spectral range.

Only a few comments follow:

Figure 5: The line colour might be chosen differently to distinguish the upper limits by Wilson et al and Lampel et al better. Lampel et al 2017 reported the upper limit only up to 350nm, this is wrong in the plot. The same publication also estimated the actual absorption cross-section around 363nm at a lower spectral resolution, which might also be included in the plot. The reported discrepancy there between observations and POKAZATEL was explained later in Conway et al 2020.

Lampel et al 2015 estimated scaling factors for older HITRAN versions also for the spectral range around 400 and 415nm, but this might be difficult to include in the figure, and no dominating scaling factor for individual water vapour absorption lines listed in Table 1 between modelled and measured intensities can be seen.

Maybe also Conway et al 2020 or a recent line list could be included in the plot, as HITRAN based absorption cross sections were underestimating the actual absorptions especially in the UV due to a relatively large line-cutoff value.

Henning Finkenzeller, Rainer Volkamer, O₂-O₂ CIA in the gas phase: Cross-section of weak bands, and continuum absorption between 297–500 nm, *Journal of Quantitative Spectroscopy and Radiative Transfer*, Volume 279, 2022, 108063, ISSN 0022-4073, <https://doi.org/10.1016/j.jqsrt.2021.108063>.