

Interactive comment on “On the relative absorption strengths of water vapour in the blue wavelength range” by J. Lampel et al.

Anonymous Referee #1

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This paper investigates the consistency of different water vapour absorption cross-sections in the blue wavelength range (394–480 nm) calculated from recent updates of the HITRAN spectroscopic compilation. These investigations are performed through the retrieval of water vapour column density ratios for different spectral interval from Long-path and Multi-Axis – DOAS measurements. A significant improvement of the DOAS evaluation is found when using the updated HITRAN data. However, the authors also showed that there are still problems with the relative strength of the different absorption bands in the 394–480 nm wavelength interval and their derived correction factors range from 0.5 to 1.9, which is highly significant. I recommend this paper for publication in AMT after addressing the following specific comments:

1/Page 5899, line 24–26 and Page 5900, line 1–3: In both cases, I would add a sentence
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about the general objectives of these SOPRAN and HaloCaVe campaigns.

2/Page 5902, lines 8–10: I would add the list of elevation angles used by the MAX-DOAS instrument during this campaign.

3/Page 5904, lines 13–19: The authors should better justify their choice for the water vapour and aerosol profiles used for the radiative transfer calculations. Are these profiles representative of the conditions encountered during the campaign? Why using constant profiles for the whole campaign period?

4/Page 5904, lines 20–21: It is said that ‘The magnitude of the resulting water vapour dSCD obtained from the model agreed with the MAX-DOAS observations’. I find this sentence very vague. Is it valid for all elevation angles? A figure showing the level of agreement between measured and calculated water vapour dSCD would help the reader.

5/Page 5906–7, Section 4.1: Since there are a lot of Tables in the manuscript, maybe a figure could illustrate the comparison results between water vapour mixing ratios from LP-DOAS and meteorological stations.

6/Page 5908, lines 21–25: The water vapour absorptions appear to be present in the measurement data when using the Thalman and Volkamer O4 cross sections. Does it mean that the water vapour absorptions are less or not present when using other O4 cross sections like for instance Hermans et al. and Greenblatt et al.? I think this point should be discussed in more detail.

Technical corrections:

1/page 5899, line 17: To be consistent with the other molecules, I would replace ‘Formaldehyde’ by ‘HCHO’

2/Page 5900, line 1: ‘Longpath’ should be replaced by ‘Long-path’. Should be also corrected at other places in the manuscript.

3/Page 5911, line 20: 'given by 3' should be replaced by 'given Eq. (3)'

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