

Interactive comment on “Reviewing the development of a ground-based FTIR water vapour profile analysis” by M. Schneider and F. Hase

Anonymous Referee #1

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This is a well written technical paper which reviews the dependence of retrievals of water vapour profiles from ground based solar Fourier transform spectrometry on various choices and extensions available to the retrieval. The “review” is predominantly of the authors’ own work. The general retrieval process is succinctly described and the effects of various options on the retrieval accuracy are assessed. These options are:

- linear vs logarithmic retrieval
- using an interspecies constraint between H₂O and HDO
- using a non-Voigt line profile, in this case speed-dependent Voigt
- including the effects of atmospheric emission in the forward model

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- simultaneously retrieving the temperature profile.

The results are presented in an easy-to-follow fashion and provide a useful guide to others wishing to retrieve water vapour profiles from ground based FTS spectra. The figures are well constructed but text is often small and they may not reproduce well.

I recommend the paper be published with only a few minor technical corrections detailed below.

Technical corrections:

3.3 line 15: Since H₂O and HDO retrievals have different. . .

3.3 line 17: ratioing, not rationing

3.3 line 22: HDO/H₂O ratios between -700 and +50 per mil.

3.3 line 24: from not form

3.3 line 26: Where, not Whereas

3.3 line 28: State what is important about high and low quantum numbers – presumably high and low temperature sensitivity.

3.4 section name Replace “proper” – suggest “Refined” or “Speed dependent non-Voigt”

3.4 line 9: perhaps shapes is better than signatures in this context.

3.4 line 28: In addition, improving the lineshape model. . . .

3.6 Reanalysis should not be capitalised (several instances).

4 line 20: The logarithmic scale inversion is important, but

4 line 22-24: The consistency between And H₂O lines (between 775 and 1200 cm⁻¹) is particularly large.

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Fig 3 caption: state that noise-to-signal ratio is in %

Fig 6. It is not clear what the greyed areas are, only the mean and standard deviation are mentioned. DdD should be σ D.

Fig 7: The precise meaning of “relative baseline offset” is not clear. “Intensity” is a much overused and imprecise word.

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