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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Methane spectroscopy in the near infrared and its implication on atmospheric retrievals" *by* C. Frankenberg et al.

Anonymous Referee #2

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This manuscript presents new, effective spectroscopic parameters for the CH4 absorption in the 1.65 micron region, which is used for the CH4 retrieval from SCIAMACHY spectra. These spectroscopic parameters are inferred with an optimal estimation multi-spectrum retrieval from a set of high-resolution FTS spectra and they are compared to the few available studies of CH4 spectroscopy for this region. To test this new set of parameters, the authors apply them to atmospheric, ground-based FTS observations and they show that they lead to much improved results compared to HITRAN. Finally, the implications on CH4 retrievals from SCIAMACHY observations are discussed.

This new dataset of spectroscopic parameter for the CH4 represents an important step forward towards accurate CH4 retrievals from near-infrared measurements and as shown in the manuscript, they have the potential to remove substantial biases in the

existing CH4 datasets from SCIAMACHY. This manuscript, although focused mostly on spectroscopy, is of large relevance to the atmospheric science community and I highly recommend it for publication in ACP. The manuscript is well written and well structured and I have only a few minor comments.

Minor/technical comments:

p.10028: ...applying the HITRAN database yields wrong line-shapes... -> both HITRAN and this study use Voigt line shapes. Better would be to say that HITRAN yields wrong widths.

p.10029 : ... and insensitive to prior assumptions, accuracies are expected to be about 1%. -> and insensitive to prior assumptions; accuracies are expected to be about 1%.

p. 10031: ... to discrepancies in the broadening coefficient by 3% -> to discrepancies in the broadening coefficient of 3%

p.10031: (line strengths, broadening coefficients and pressure induce shifts) -> (line strengths, broadening coefficients and pressure induced shifts)

p. 10031: A second file incorporated these results... -> A second file gives these results...

p.10034: Second, pressure broadening and shift is less dominant ->Second, pressure broadening and shift are less dominant

p. 10046, Table 5: Please also add the rms of the fit residual which will be a good mean to quantify the improvements in the fit

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Interactive comment on Atmos. Chem. Phys. Discuss., 8, 10021, 2008.

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Interactive Comment