

Interactive comment on “New and improved infrared absorption cross sections for trichlorofluoromethane (CFC-11)” by Jeremy J. Harrison

Anonymous Referee #1

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General comments

In this paper, Harrison presents a new data set of absorption cross sections for trichlorofluoromethane (CFC13 or CFC-11). The cross sections have been measured for about 30 pressure/temperature combinations, using an experimental setup and methodology introduced earlier by the same author. Overall, the paper is well written and concise. It fits in the scope of AMT and I would recommend it for publication, subject to a few specific comments listed below.

Specific comments

152-53: It might be good to add a few words on how the new data set improves upon

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the existing Varanasi data set in the abstract.

I62-65: Add a reference for the polar ozone chemistry, e.g., Solomon (1999)?

Solomon, S. (1999), Stratospheric ozone depletion: A review of concepts and history, *Rev. Geophys.*, 37(3), 275–316, doi: 10.1029/1999RG900008.

I94: Add references for the GEISA and HITRAN databases?

I144-151: I have a question regarding the measurements which mostly arises out of my curiosity, but perhaps other readers might also be interested: How long does it actually take to make those measurements of the absorption cross sections? Is this a piece of work completed within a few hours or days? Could you easily add more p/T combinations?

I197-198: It is stated that the total systematic error of the new cross sections is $\sim 3\%$. Is this sufficient to improve retrievals for the satellite instruments? How does it compare to the Varanasi data?

I206-208: This is just one sentence, but it may go into a separate "data availability" section, following AMT author guidelines?

I216-219: Not sure if those tiny relative correction factors (1.000002 ... 1.000007) really need to be reported in addition to the absolute wavenumber shifts?

I251-252: You say it is difficult, but perhaps you could still try to show an illustrative example comparing the SNRs from your data set and the Varanasi data set? This could help demonstrate that the new data set is improving upon the existing one.

I270-272: The new data set is improving the p/T coverage, but the sampling density actually seems to be lower (fewer data points in your data set). Do you consider this lower sampling density in p/T space to be negligible, as there might potentially be low variability in the data? It would be good to show climatological p/T profiles in Fig. 5 to illustrate that your data set covers atmospheric variability.

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This might be a source of climatological data (in Leicester): Remedios, J. J., Leigh, R. J., Waterfall, A. M., Moore, D. P., Sembhi, H., Parkes, I., Greenhough, J., Chipperfield, M. P., and Hauglustaine, D.: MIPAS reference atmospheres and comparisons to V4.61/V4.62 MIPAS level 2 geophysical data sets, Atmos. Chem. Phys. Discuss., 7, 9973-10017, <https://doi.org/10.5194/acpd-7-9973-2007>, 2007.

Table 1: This is a nice overview of CFC-11 measurements from space. You might consider adding the time frame of the measurements, e.g., 2002-2012 for MIPAS, 2005-2008 for HIRDLS, etc. and add "References" as header for the third column of the table.

Technical corrections

l84: "very many" -> "many" ?

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-51, 2018.

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