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Interactive comment on "UV and Infrared Absorption Spectra, Atmospheric Lifetimes, and Ozone Depletion and Global Warming Potentials for CCl2FCCl2F (CFC-112), CCl3CClF2 (CFC-112a), CCl3CF3 (CFC-113a), and CCl2FCF3 (CFC-114a)" *by* Maxine E. Davis et al.

Anonymous Referee #2

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This is a very good manuscript reporting UV and IR spectra of four previously under-studied chlorofluorocarbons in the atmosphere as well as deriving relevant properties with regard to global warming and stratospheric ozone depletion. I recommend it for publication once the points below have been addressed, in particular the two major concerns on the discussion of IR data and on model uncertainties.

L49: Should be "atmospheric loadings". Besides, given in the following are actually not loadings but mole fractions.

L50-51: ppt and ppb not explained

L73-74 What is missing from the introduction is an overview of the current literature on the IR spectra of these CFCs (and in particular their shortcomings), such as the papers mentioned in these two lines.

L82-83: Why was this range chosen?

L109: Please define "co-adds". Also, the make of the FTIR, the cell material and the detector type are not given.

L144-49 It needs to be made clearer how equation 2 was used to correct for isomeric impurities, especially since that same equation is later on used for CFC-113a and -114a.

L161 It would be useful to explain to the reader which temperatures are "atmospherically relevant" and why.

L179-180 No discussion of IR spectra in any detail. For instance, which features of the spectra can be assigned to certain functional groups? And which agree best with other recorded spectra? In which spectral region are the biggest differences and what could be causing this?

L198-206 Given that there is a published data set of observed stratospheric mole fractions, which the authors refer to repeatedly I am surprised that no comparison between measurements and model have been attempted at all.

L209-210 Which definitions were used to define those regions?

L215-218 It seems very surprising that the atmospheric model should introduce no uncertainty at all. This is probably the main reason why the uncertainty ranges in the lifetimes given in Table 5 are so small, and in fact probably too small. One idea how to approach this problem would be to compare the loss rates derived by this model with observations for other more well-known molecules with similar loss distributions.

L245-247 This is related to my previous comment. The small range is not caused by the small uncertainty in the UV spectra but due to not including the probably substantially larger model uncertainties. This creates the impression that the lifetimes and ODPs estimated here are far superior to previous work; which they might be, but this is currently not proven.

L256-257 The term "fractional release factors" is explained nowhere in this manuscript. Why would they make a difference to the ODPs?

L258-266 Again, the IR spectra derived in this work are not discussed at all. In this case it is not even mentioned that they were used in this calculation. Also, a comparison with published REs and GWPs would be useful here as well as in Table 6.

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