

Interactive comment on “A growing threat to the ozone layer from short-lived anthropogenic chlorocarbons” by David E. Oram et al.

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The manuscript by Oram et al. reports on observations of short-lived chlorocarbons in East and South East Asia from surface measurements, as well as aircraft measurements in the upper troposphere. These observations show much larger values than previously reported in the tropical marine boundary layer or upper troposphere. Recent studies already have found a large increase in CH₂Cl₂. In the present study, new estimates of CH₂Cl₂ emissions from East Asia are presented and used to present first estimates of the emission of CH₂ClCH₂Cl. This study seems well performed, it is highly relevant and timely and the manuscript is well written. I recommend publication in Atmos. Chem. Phys. after consideration of only a few minor comments.

C1

As one general comment I feel that the presentation of CH₂Cl₂ emission estimates and the correlation with CH₂ClCH₂Cl to infer new CH₂ClCH₂Cl emission estimates (lines 337 - 343) deserves (and requires) more detail, given its importance. Part of the information on estimating the CH₂Cl₂ emissions given in the supplementary material should be included in the main text and a bit more explanation on the "simple correlation" should be included.

Specific comments and corrections

Abstract, I.31: "higher than expected": what is this expectation based upon? Based on previously reported measurements? On line 360 and following it is discussed that many of the previous measurements have been made over a decade ago and in different regions ("...not the 2 key regions..."). I believe it would be good to make a bit clearer from the start if the enhancements seen in this study are likely because of recent increases in emissions, regional differences, or both.

I.36: define "Cl-VSLS" when first used. Moreover better use this consistently throughout (e.g. Table 1 uses VSLS-CL, which I suppose means the same)

I.45: you may want to cite also the recent study by Hossaini et al., The increasing threat to stratospheric ozone from dichloromethane, Nature communications, 2017, that was published after submission of the present manuscript.

I.104: I suggest to break the sentence in two: "...in the TTL. Surface measurements ..."

I. 126: I don't understand the meaning of "globally" here.

I.129: "shorter lifetimes" could be misleading here, as it may imply lifetimes shorter than the 10 days for air masses to travel from East Asia to the TTL, which is probably not what is meant?

I.150: "the CARIBIC aircraft": better include a sentence or two on the CARIBIC project, describing that these are measurements from in-service aircrafts, ideally including a

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reference paper (in addition to the http link).

I.328: "CH₂CICH₂Cl is exclusively anthropogenic in origin...": WMO (2014) lists also biomass burning as a source of CH₂CICH₂Cl. Can you include references on additional sources?

I.334: "Production has increased rapidly...": Can you give a reference for this increase in production?

I. 362: Does the superscript "1" have any meaning? Footnote?

I. 367: "2"-> "two"

Table 1: Why not use the IATA code "FRA" for Frankfurt (rather than "FFT", which is the IATA code for Frankfort, Kentucky)?

Table 1: Why is the sum of VSLS-CL excluding CH₂CICH₂Cl not given for the other data for comparison?

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