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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Oceanic bromine emissions weighted by their ozone depletion potential" *by* S. Tegtmeier et al.

Anonymous Referee #1

Received and published: 27 July 2015

Tegtmeier et al presents a quantitative estimate of the ozone depletion potential (ODP)-weighted emission calculation for the most abundant very-short-lived brominated compound, CHBr3. They concluded that (i) presently, the ODP-weighted CHBr3 emissions amount to ∼50% of ODP-weighted anthropogenic emissions of CFC-11, and (ii) the ODP-weighted CHBr3 emissions will increase by 31% by 2100 due to increases in surface emissions and convective activity. While I have reserved opinions on the importance of calculation of ODP for CHBr3, which is predominantly of natural oceanic origin, I agree that its ODP information may be of use to some extent and the manuscript should be published after addressing the following comments.

1. Section 2.1, 2nd paragraph. It would be good to add brief details of how the bottom-up emissions were derived in Ziska et al. In particular, it will be useful to show what are

the major drivers of the 30% increase in VSLS emissions, whether it is due to increased surface temperature, winds, salinity, etc.

2. Section 2.3, 2nd paragraph. I do not agree with the authors "active chlorine from CFC-11 will be impacted by changes in the stratospheric circulation in the same way as active bromine from CHBr3". The residual circulation will probably be sped up differently in different places. Since the short-lived and long-lived gases are released at different altitudes, the impact of CFC-11 and CHBr3 will be different, which will consequently affect the ODP calculation. However, I do agree with the authors that the impact of a speed-up circulation on CHBr3 ODP is small, compared to the other factors. Therefore, I suggest cutting the discussion short and ending with simply stating that the impact of the stratospheric residence time on CHBr3 ODP is expected to be small.

3. Ziska et al. 2013 emissions are found to be low-biased in the extratropics according to Hossaini et al. (2013). Although this bias will have a small, possibly negligible, impact on ODP-weighted CHBr3 emissions due to very small ODP in the extratropics, it still worth a brief discussion on the impact of this caveat on ODP-weighted emission calculation for CHBr3.

4. P14657, 2nd paragraph. Is it possible to find more literature information on how much of the CHBr3 emissions are currently due to aqua-farming? How much are they expected to grow (in percentage) in the coming decades? As stated by the authors, when it comes to ODP, it is indeed the anthropogenic component we care about.

Minor comments:

The usage of emission vs. emissions is not very accurate and consistent throughout the manuscript. In many places, they are misused. Please carefully read through the manuscript and correct.

P14644, L22-24: -> a future climate. However, at the same time, it is reduced by less

. . .

P14645, L12: Should cite Carpenter & Reimann et al. (2014) (Chapter 1 of WMO 2014) instead of Chapter 1 of WMO 2011.

P14646, L17: and not the -> but not the

P14646, L21-24: Change “Despite, . . .” to “The ODP is traditionally . . . However, some recent studies . . .”

P14646, L26: Add “the” before long-lived halocarbons

P14647, L16: inside -> insight

P14647, L24-25: “While we focus our analysis on one VSLS and introduce the method and application exemplary for CHBr3”, I understand what you mean here, but should consider rephrase

P14648, L7: introduce -> introduced

P14649, L4: -> than the other CHBr3 . . .

P14649, L8 & L17 & P14661, L17: Should this be Ziska et al. 2013? If it is Ziska 2015, it was not mentioned in the references.

P14650, L5: time scales play -> time scale plays

P14651, L14: delete “the” before tropospheric

P14652, L4: extent -> extend

P14652, L17: residence -> residence time

P14653, L22: -> the beginning and end

P14655, L17-21: Change “The potentially damaging effect of CHBr3” to “The impact of CHBr3”. Are these the column integrated ODPs at the corresponding grid-cells?

P14655, L21: delete “the” before “surface”

P14657, L2: “the mostly small ODP” – consider rephrase

P14658, L16: extent -> extend

P14658, L18: -> we first analyze

P14659, L1: within these two months -> for June and December

P14664, L10: given -> due to

P14667, L25: CHBr3 from the surface -> transport of CHBr3 from the surface

P14667, L29: und -> and

P14668, L3: not well enough understood yet -> not understood well enough yet

P14668, L8: add “,” after fields; “in order to derived” -> to derive

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