

General comments

I am very happy with author responses and the changes made to the manuscript. The authors addressed my concerns regarding possible uncertainties resulting from the use of a single a priori by carrying out a sensitivity study whereby they repeated the emission inversion with two other published inventories for CHBr₃. I now fully support publication of this manuscript following only minor changes.

Specific Comments

Page 7, lines 250-253. You should probably make it a little clearer here that the forward model was run using the Ordonez emissions. You have three a priori tests now, so it may not be 100% clear that these forward model results are attributable to those emissions.

I recommend that the authors please find a new way to write the caption for Figure 4. I think it could be improved. For example, as the sentences jump from middle, to left, and then right. The different panels are labelled a, b, c, etc. I would recommend that you use these labels to help the reader. Another possible way to improve it would be better labelling on the figures themselves, e.g., labelling of the rows as CHBr₃ and CH₂Br₂, and labelling the columns Ziska a priori, Ordonez a priori, and a posteriori. Something similar has been done for Figure 6, but note the comments below.

Page 10, line 357. “we find significant improvement”. Do you mean *insignificant*? This seems more consistent with earlier discussion, Figure 2, and the argumentation that follows this line.

Page 11, line 378. You mention “*changes in ocean biology*”. It might be worth mentioning the link between ocean biology and climatic variability. See for instance Fig. 6 in Racault et al., 2017 “*Impact of El Niño Variability on Oceanic Phytoplankton*” in *Frontiers in Marine Science*.

Page 11, lines 380 onwards. There is possibly experimental support for the lack of a simplistic relationship between emissions of CHBr₃ and CH₂Br₂ (at least for macro algae). Recommend reading Sect. 3.3. of Leedham et al., 2013 “Emission of atmospherically significant halocarbons by naturally occurring and farmed tropical macroalgae” in *Biogeosciences*. Leedham et al. demonstrates correlations between the emissions of these compounds for single species, but the ratio of emission varies wildly.

I found the text in the Figure 5 caption to be quite unclear. The caption states it is a plot between “*a priori and a posteriori CHBr₃ and CH₂Br₂ fluxes*”. I would recommend the authors to simplify the description to state it is a plot of X versus Y, i.e., in this case CH₂Br₂ fluxes versus CHBr₃ fluxes. Then state the additional complexity that this plot includes both a priori (from two sources) and a posteriori data. As it is, too many things have been stated in a single sentence.

Technical Comments

Page 3, line 89. Please change “*The bottom-up approach assumes local flux estimates are **representation** of larger spatial scales.*” To “*The bottom-up approach assumes local flux estimates are **representative** of larger spatial scales.*”

Page 6, line 194. Missing full stop after “respectively”.

Page 7, line 244. Missing comma after “e.g.”

Page 8, line 282. Remove “the” before “a posteriori”.

Page 8, lines 280-284. Recommend changing the current text from “*are more consistent with the observations that a priori fluxes.*” to “are more consistent with the observations **than those from the** a priori fluxes.”

Page 10, lines 334. Recommend changing “*particularly over north of tropics*” to “particularly over the north of tropics”

Page 10, line 336. Missing “the” before “a priori”

Page 10, line 339. “*coincide with large boundary layer measurements from CAST and CONTRAST.*”. Measurements of what? It’s perhaps better to be precise and state CH₂Br₂ given that the sentence starts by mentioning CHBr₃.

Page 11, line 381. Change “use” to “uses”.

Page 11, line 382. Change “develop” to “develops”.

Figure 1. I would recommend that you label the individual panels with instructive headings such as CONTRAST and CAST.

Figure 2 caption. There is an unnecessary full stop in the second to last line of the caption.

Figure 3. The panels are labelled a, b, c, etc. but these labels are not used in the caption. I recommend that you use the labels to improve clarity.

Figure 6. I find the caption description to be unclear. To simplify this I would recommend re-designing the plot by shifting the three plots in the column on the right hand side to be a new row underneath the a posteriori row. Call this new row a posteriori zoom, for instance. I would recommend moving the “Posterior” label to above the bottom row in Figure 6 rather below it. In addition, The Ordonez label in Figure 6 is barely readable. I would recommend moving the labels for each column to be placed above the panels in black type font.