

Interactive comment on “Deriving an atmospheric budget of total organic bromine using airborne in-situ measurements from the Western Pacific during SHIVA” by S. Sala et al.

Anonymous Referee #1

Received and published: 31 March 2014

General comments:

In recent years it has been found that a satisfying closure of the stratospheric inorganic bromine budget cannot be obtained by only considering the major organic sources (methyl bromide and halons). Additional sources are very short-lived substances (VSLs) of natural origin. Given the role played by bromine on the chemical budget of stratospheric ozone, it is of great importance to resolve current uncertainties on its budget and evolution. Especially since changes in vertical transport and photochemical degradation processes in the troposphere are of varying importance for the individual species.

C951

This paper presents an interesting dataset of the most occurring brominated VSLs, the halons and CH₃Br from the Western Pacific from 2 different airborne instruments: an in-situ gas chromatograph with coupled mass spectrometer and a whole-air sampler with subsequent GC/MS analysis.

The manuscript is generally well written, adequately structured, and full credit to published literature is given throughout the text. The data and results are discussed in detail and presented clearly in the figures and tables. The results certainly add to the ongoing discussion about the role VSLs play for total stratospheric bromine. The work is suitable for publication in ACP and I recommend publication after addressing the following minor comments.

Specific comments:

Page 4958, line 4: ... were collected ... Same in the conclusions. Please check the use of grammar throughout the text. One can clearly tell that section 2.2.2 was probably written by a native English speaker compared to the rest of the text. Since you have 2 native English speakers in your co-author team I strongly recommend to let them correct the rest of the text, for better readability and to avoid some odd grammar. So please make use of your co-authors.

Page 4958, line 23: Who do you mean by our group, since actually 3 groups are listed in the affiliations?

P 4958, l 26: ... factor of about 60... : Is this statement true throughout the stratosphere, or which part does it refer to?

P 4959, l 19: ... well correlated... : What do you understand under well correlated? And are you talking about a linear correlation?

P 4959, l 25: ... in the atmosphere: Do you mean free troposphere, or UT here? I guess there are observations of PGs in the boundary layer and in the stratosphere. Or which PGs do you mean? Only organic?

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P 4960, I 10: ... are decreasing in the atmosphere. Please add a reference here.

P 4961, I 5: ...in Northern Borneo. Please add longitude and latitude here.

P 4962, I 5: rationales? What do you mean? Seems an odd wording to me. See also comments on Table 1 below.

P 4962, I 6: 500? In the abstract you state 700. Or do the 700 refer to the total of both instruments?

P 4962, I 17-19: Not needed. Has been stated and explained before. I suggest to remove the entire sentence.

P 4967, I 15: Since you quantified the memory effect: Can you give explicit numbers here

P 4968, I 29: What do you mean by boundary layer altitude? The boundary layer height/thickness? Or the altitude of the top of the boundary layer?

P 4970, I 17: Can you quantify your reasonable agreement?

P 4973, I 12-15: How do your higher values of CH₂BrCl compare to the WASP samples for that particular flight?

P 4975, I 1-3: Please check the grammar – not sure what you mean here.

P 4976, I 27: Which sources? Do you have any suggestions/speculations?

P 4981, Paragraph 3.6: Please also list the total Br_{org} values here. From Table 10 on page 5001 I also calculate different % values for the VSLs contribution – 19% for WMO and 22% for SHIVA. Please check the number and correct accordingly.

P 4983, second and third paragraph: Please state all VSLs values from Table 12 also in the text at the appropriate place.

P 4985, I 8: Add reference at the end of the sentence for the balloon-borne measurements

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P 4992, Table 1: This post activity report mentioned in the header is not publicly available and also not listed in your list of references. What do you mean by Rationale? I guess the 4th column (Region) does not help any reader outside the SHIVA community. I suggest to either remove this column or to give some longitude, latitude range? Or you add a map where you indicate all these places.

P 5003, Table 12: Add an asterisk to your value for the Teresina 2005 observations published by Laube et al. and explain as stated in the text (Page 4983, line 25..) why these values probably deviate.

Technical comments:

Page 4957: Affiliations 2 and 3: Why is Centre for Oceanic and Atmospheric Science listed twice?

P 4959, line 5: ...source gases (SGs)... Also PGs further down. You use SGs sometimes and write source gases at other places. Once introduced you should use SGs in the following text.

P 4959, I 8: Change order of Brinckmann and Montzka, according to year.

P 4959, I 8: Sometimes Montzka et al. 2011 is used and at other occasions Montzka and Reimann et al., 2011 – please unify throughout the text.

P 4960, line 13: Eastern and Western Pacific – please check throughout the text: east, eastern, west, western ... seem to be used arbitrarily

P 4963, I 26: ... a novel ... remove the 'a'.

P 4966, I 9 and I 15: GCMS or GC/MS? Please check throughout the text.

P 4967, I 1: remove: ...in Miri.

P 4968, I 9 – I 10: Remove one of the two ... marine boundary layer. ...

P 4969, I 23/24: Remove the sentence: Both instruments ...

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P 4970, I 4: Either introduce FT before (e.g. page 4968, line 7) and use throughout the text, or remove this abbreviation from the whole text

P 4977, line 4: Capitalize Western, like in the rest of the text

P 4979, I 21: Replace substances with VSLS

P 4985, line 16: Western Pacific

P 4998, Table 7, line 1: Add the year for WMO, SHIVA, CARIBIC, like in the other tables.

All Tables and Figures: Not sure about ACP policy, but usually all labels and column headings should start with a capital letter, e.g. Time, Altitude, Mixing Ratio, Substance...

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 4957, 2014.