

## ***Interactive comment on “A halocarbon survey from a seagrass dominated subtropical lagoon, Ria Formosa (Portugal): flux pattern and isotopic composition” by I. Weinberg***

**Anonymous Referee #1**

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General comments:

This paper reports the results of measurements of fluxes, and of seawater and air concentrations, of the halocarbon species CH<sub>3</sub>Cl, CH<sub>3</sub>Br, CH<sub>3</sub>I and CHBr<sub>3</sub> at a large coastal lagoon in southern Portugal. Flux measurements were made using a dynamic chamber. A particular focus is on the influence of seagrass and tidal action on the emissions and concentrations. Field measurements were made in a spring-time period and a summer-time period. The carbon-13 isotopic ratios were also determined for many of the halocarbon samples.

These gases have large emissions from natural sources, and the CH<sub>3</sub>Cl and CH<sub>3</sub>Br

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gases in particular are important carriers of Cl and Br into the stratosphere. Not surprisingly the budgets of these gases are not fully known because of the wide range of potential terrestrial and coastal sources that may exist for these gases. The coastal margin is one obvious target for characterisation because of the larger halogen content present in these environments compared with other terrestrial ecosystems (although this must be balanced against the comparatively small area of coastal margins compared with other terrestrial ecosystems in a global scale-up). Previous research on fluxes at coastal margins have shown large between-ecosystem and within-ecosystem variations in fluxes.

These authors present results from some careful measurements. They draw out trends and associations with potential environmental influences (e.g. tidal cycle) from their data, and set their results in comparison with the current literature. Their final conclusion from a very rough scale-up is that seagrass regions, whilst comparatively large emitters, are not currently estimated to be large contributors to the full global budget of these gases.

The general scope and international interest of the work is appropriate for publication in Biogeosciences.

Specific comments:

In preparing a revised paper, the authors should include citation to, and data from, the recent relevant publication in Biogeosciences Discussion by Rhew et al. (Large methyl halide emissions from south Texas salt marshes, Biogeosciences Discuss., 11, 9451-9470, 2014) which provides additional data on methyl halide emissions from salt marshes for the current authors' section on comparing emissions from coastal regions globally. In particular, the recent Rhew et al. work provides further evidence for different magnitudes of methyl halide emissions between temperate and tropical salt marshes.

Section 2:2. Please provide the dimensions of the chambers, particularly the cross-sectional area of the base, and the volume of the enclosure.

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P10612, L18: It is not clear what is meant by the phrasing “We observed only occasional blanks for...”. What is meant by observing a blank? Is what is meant that values above LOD were only occasionally observed for blank samples? Please rewrite to make clear.

P10613, L15: Equation (2) does not appear to be consistent with the units given for its variables within the text. If the gas exchange velocity used is in units of  $\text{cm h}^{-1}$  then there is a factor 100 discrepancy with obtaining a flux,  $F$ , value in  $\text{nmol m}^{-2} \text{h}^{-1}$ .

Section 3.2, and corresponding tables of data: Are 3 significant figures justified for single flux values that demarcate the lower or upper end of a range of individual measurements? Is the precision in a single measurement that good; I doubt it. (An additional significant figure for calculated summary mean or median values is justifiable.)

Section 4.2(iii) seasonal trends: The authors should be cautious about statements of seasonal trends given that they have measurements for only a few days in one spring and a few days in one summer.

Technical:

Whilst the level of written English is generally fine, parts of the text lack complete fluency.

P10607, L8: Replace “were” with “have been”.

P10607, L12: Replace “out-weighted” with “unbalanced,” (note the addition of a comma also).

P10607, L24: Replace “being vital” with “as being important”.

P10608, L2-3: The whole sentence starting “They cover...” does not make sense and needs rephrasing. There should be a noun after “intertidal and subtidal”. Also it is not clear what the current phrasing “as well in...as in” is comparing what to what.

P10608, L5: Insert “yet” before “sufficiently” and delete the “, yet” from the end of this

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sentence.

P10608, L18: Replace “in” with “into”.

P10609, L10: Insert a noun after “intertidal”, e.g. “area”?

P10609, L12: Insert commas after “Further” and “abundant”.

P10609, L14: Again, insert a noun after “subtidal”, e.g. “areas”?

P10609, L18: Capital “M” for “Marine”.

P10610, L16: Delete the comma after “both”.

P10610, L19: Replace “was” with “were”.

P10611, L3: Insert a noun after “intertidal”; e.g. “area” or “region”?

P10612, L2: Capital “P” for “Peltier”.

P10613, L4: Delete “commonly”, it is not clear what this word is intended to convey here, and is surely superfluous anyway.

P10613, L11: Insert “of” after “calculation”.

P10613, L14: Delete “common”.

P10613, L24: Replace “were” with “where”.

P10613, L24: Replace “further” with “additionally”.

P10613, L25: Delete the comma after “thus”.

P10615, L5: The word “Punctual” is not the correct word to use here. However, it is not clear what meaning the authors do want to convey here. They should check again with a dictionary and/or thesaurus.

P10615, L7-L13: There are a number of instances in this block of text where the value given for the lower or upper end of a flux range is discrepant with the corresponding

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value given in Table 1. For example, in L7 a value of 158 pmol L<sup>-1</sup> is quoted in the text for the lower end of the range whilst the entry in Table 1 specifies this value to be 123 pmol L<sup>-1</sup>. The authors should recheck all quoted values and amend as required.

P10615, L11: Insert “=” before “0.20”.

P10616, L15: Insert “=” before “0.55”.

P10616, L27: Delete the comma after “both”.

P10617, L23: Rewrite word as “occasionally”.

P10617, L24: Insert “the” before “summer”.

P10619, L1: Replace “if” with “when”.

P10619, L5: Add a comma after “were” and another comma after the second numerical value quoted. Also, add the part per thousand ‘unit’ after each of the values quoted.

P10620, L8: Delete “Accordingly,” and start the sentence at “The area. . .”

P10620, L10: Insert “be” after “to”

P10620, L19: Replace “like” with “same”.

P10620, L22: Replace “were” with “where”.

P10621, L2: Replace “influence on” with “association with” (a correlation demonstrates association, not causation).

P10621, L22: Insert “of CH<sub>3</sub>I” after “correlations”.

P10621, L27: This sentence does not make clear that the subject is emissions of methyl halide fluxes. Rephrase the latter part of the sentence something along the lines of “. . .the main environmental association in salt marsh emissions of CH<sub>3</sub>Cl and CH<sub>3</sub>Br was with ambient temperature rather than light.”

P10622, L3: Insert “a” before “sink”.

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P10622, L6: Insert commas after “while” and “general”.

P10622, L23: Delete comma after “Obviously”.

P10623, L2: Delete “an”.

P10623, L15: Replace “as during” with “compared with”.

P10623, L15: Replace “inevitable prove” with “proof”.

P10623, L24: Replace “went along” with “was in parallel”.

P10623, L29: Replace “seasoning of” with “seasonal trend in”.

P10624, L18: Delete comma after “thus”.

P10625, L24: Delete “are”.

P10625, L24; Replace “as” with “compared with”.

P10625, L29: Replace “accompanied” with “accompanying”.

P10626, L17: Replace “as” with “compared with”.

P10626, L21: Insert “to” after “extent”.

P10626, L26: Replace “demanding” with “difficult” and delete “yet” from the end of this sentence.

P10627, L20: Replace “as” with “than”.

P10629, L20: Lower case “s” on “southern”.

P10630, L3: Remove hyphen from “species dependent”.

P10630, L6: Insert comma after “sediments”.

P10630, L7: Delete comma after “both” and replace “to act” with “of acting”.

P10639, L1 of caption of Table 1: Replace “General overview” with “Summary”.

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P10641, caption of Table 3: State in the caption what is represented by use of bold font for some of the values in the table.

P10643, caption of Table 5: State in the caption what is represented by use of bold font for some of the values in the table.

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Interactive comment on Biogeosciences Discuss., 11, 10605, 2014.

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