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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 #3

Received and published: 28 October 2014

General Comments:

In this paper, the authors evaluate halocarbon fluxes in a seagrass-dominated lagoon during two sampling campaigns. The authors use dynamical flux chamber measurements, water sampling, measurements of air mixing ratios and isotopic composition analysis to investigate the fluxes of CH3Cl, CH3Br, CH3I and CHBr3 in the lagoon, Ria Formosa. The authors additionally calculate a rough estimate of global production rates of these compounds from seagrass-dominated meadows. The paper is well written, the structure of the paper is intelligible and points made are clear. I recommend publication with minor revision.

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Interactive Discussion
Discussion Paper

I suggest removing the seasonal dependence in section “4.2 Flux pattern from sea-grass meadows”. Sampling in April in 2012 and in July/August in 2011 (25 days) is not enough two discuss seasonal changes. I like the other points you raise in this section like diurnal cycles, tidal effects, temperature dependence or flux dependence on solar radiation, so maybe you can restructure this section.

Specific Comments:

The abstract is a comprehensive summary of the paper. If you remove the seasonal dependence of halocarbon fluxes in section 4.2, you should remove it here too. The expression in line 20 on page 10606 “a significant contribution of the water column to the atmospheric CH3Br” seems a bit strange to me. The water column cannot emit halocarbons to the atmosphere. Emissions take place at the water surface, maybe you can change this sentence to clarify what you mean.

I like the precise introduction and the material and method section and have only one comment: You explain the extraction efficiency of CHBr3 clearly but when you discuss the results you do not mention that it is an underestimate. Maybe you can recall this fact in the result section again.

The result section is an extensive list of air mixing ratios measured, fluxes calculated and results of stable isotope analysis in water samples. Although the descriptions are good in this whole section the authors might think about using a different way of showing results than tables. (Table2 could be a column chart, maybe on a map?) This is just a thought not a mandatory change in the paper.

I would like a different start for the Discussion section; “Despite the short residence time. . .” is not a nice start.

Paragraph “4.1 Dissolved halocarbons “would benefit if you start with the comparison (L21) and add lines 14-20 at the end of this paragraph.

The second paragraph “4.2 Flux pattern. . .” should be changed (as highlighted above).

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It is impossible to investigate seasonal behavior with the limited measurements.

Maybe you can add the discussion about atmospheric lifetimes of the different halocarbons in the part (i) diurnal variations?

In "(ii) Tidal effects" you discuss the primary productivity; maybe you can add a sentence to the production mechanism of halocarbons and its connection to primary productivity.

In paragraph "4.3 . . .an isotopic perspective" only some technical comments need to be included.

Paragraph 4.4 is nicely written and I like the caution you use when extrapolating your measurements to global source strengths.

The conclusions at the end are reasonably drawn and no changes need to be done in my opinion. I like the outlook section at the very end of the conclusion paragraph.

Table1: Can you give the air mixing ratios as mean and range in brackets " mean (min-max)" as you do it for the water concentrations?

Table2: If you like to give the sampling time maybe CET would be better. Maybe you think about changing this table to some other graphic (column chart, plot the concentrations as column on a map etc. . .)

Figure 2: Can you give variations of the flux as error bars?

Figure3: I cannot read this figure at all. If you want people to read it you have to enlarge it at least twice the size it has now. Maybe you can shorten the description by adding the published date you adopted the values from to a table inside the graph.

Technical Comments:

P10606L7: Change "..seagrass patches were air exposed and submerged. . ." to "seagrass patches were either air exposed or submerged. . ."

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P10606L10: Change “Furthermore, at least” to “Furthermore, during the. . .”

P10608L1: Please explain in more detail “most productive ecosystem”

P10609L9: which unit for salinity? ppt ?

P10610 L3-L23: Please state the footprint/surface area of the flux chamber.

P10611L2: can you give coverage also as area in m2?

P10611L7: Is Praia de Faro upwind or downwind from the other sampling locations?

P10611L14: How do you avoid air and sediment intrusions?

P10612L1-24: Can you state a limit of detection for the method used?

P10615L23: CH3I is smaller at sampling points 6 and 7 compared to sampling point 3.

P10616L15-L19 and P10617L15-L18: Maybe you can provide correlation scatter plots in the supplement?

P10623 L7: Is physiological stress higher during the change in water level or when the seagrass is exposed over a longer time to the oxidative atmosphere?

P10623L13: Please describe the degradation mechanism you propose.

P10624L19-L23: You can delete this if you do not use a seasonal dependence anymore.

P10625L27: which degradation processes?

P10626L7: it is hard for me to understand how the water column influences the atmosphere? Maybe you mean emissions from the water surface?

P10626L13: Transhalogenation, exchanging Cl with Br, would also influence the isotopic ratios of 13CHCl and 13CHBr. Is there any information about isotopic fractionation for this process?

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P10628L14: which season was the campaign in Northern Germany?

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