

Authors: Thanks a lot to the Editor to read our paper again and helped us to improve our manuscript.

Editors comment paper acp-2017-9; Oxygenated volatile organic carbon in the western Pacific convective centre: ocean cycling, air-sea gas exchange and atmospheric transport by Schlundt et al.

Abstract: "The flux of atmospheric OVOCs was on average into the ocean for all gases, except butanal, with a few important exceptions near the coast of Borneo"

This added sentence was actually raising confusion since 1) the previous sentences are initially suggesting that the ocean is a source of OVOCs 2) are the few exceptions referring to butanal or to the fact that for all OVOCs there is generally deposition? I would anyhow also reformulate this sentence after having read in detail again the overall the document. It seems that those couple of sentences of the abstract were not clearly explaining the main findings. I propose just a change in the sequence of the sentences that might help in overcoming this:

"The measurement-inferred OVOCs fluxes away from the North Borneo coastal waters were generally reflecting uptake of OVOCs by the ocean for all gases, except of butanal. Over the Borneo coastal waters, the atmospheric OVOC mixing ratios were relatively high compared with literature values, suggesting that this coastal region of North Borneo is a local hotspot for atmospheric OVOCs including a significant coastal water source of atmospheric OVOC's."

Authors: We changed the sentence as the Editor suggested with minor changes. We hope that the new version is clearer. We wrote: "The measurement-inferred OVOC fluxes showed generally an uptake of atmospheric OVOCs by the ocean for all gases, except for butanal. A few important exceptions were found along the Borneo coast, where OVOC fluxes from the ocean to the atmosphere were inferred. The atmospheric OVOC mixing ratios over the northern coast of Borneo were relatively high compared with literature values, suggesting that this coastal region is a local hotspot for atmospheric OVOCs."

Editor: Introduction: Reading the following sentence;

“OVOCs, such as acetone and acetaldehyde, are involved in the production of reactive nitrogen compounds, such as nitrogen dioxide (NO₂, involved in ozone production), peroxyacetic acid (HNO₄), and nitric acid (HNO₃)”

I started to wonder if you can really say that NO₂ is produced involving these OVOCs. The NO₂ is produced from the NO involving the RO₂ and which is affected by the OVOCs but the NO-NO₂-O₃ system is expressing a cycle. I would rephrase this to:

“OVOCs, such as acetone and acetaldehyde, are affecting the cycling of the reactive nitrogen compounds nitrogen oxide (NO) and nitrogen dioxide (NO₂), and associated ozone production, and involved in the production of peroxyacetic acid (HNO₄), and nitric acid (HNO₃)”

Authors: The Editor is right that OVOCs only affecting the NO₂ cycle but not are involved in the production. We changed the sentence as the Editor suggested with slight changes for a better reading.

Editor: Pp2: Carpenter *et al.* (2012) and references therein. Make this reference listing consistent with how other references are included.

Authors: We changed it to “(Carpenter et al., 2012)”.

Editor: Pp2; line 37: -48 to -1 Tg yr⁻¹; does a negative value here reflect a source or sink for OVOCs to the atmosphere? I would add after the listed references “, with the negative values here reflecting the ocean being a sink for acetone”

Authors: We added the part in the sentence.

Editor: Pp3, line 2 “...no ocean-atmosphere butanal or butanone fluxes..”

Pp3, line 8 “..trace gases ~~even~~ into the UT...”

Pp 6, line 19; add here something like “Note that according to Eqn 1, a negative flux reflects a flux from the atmosphere to the ocean and vice versa.”

Authors: We changed it all.

Editor: Pp 6, line 23: “...at 10 m height and on..” and replace “Within the Johnson (2010) publication, there is a critical discussion of using Duce et al. (1991) to compute k_a ” with

“Johnson (2010) provided a discussion of using Duce et al. (1991) to compute k_a ”

Authors: done

Editor: Pp 6, line 25: “The newly computed fluxes were an on average of 20% higher (lower in the case of negative fluxes). We treat this difference in the calculated fluxes as uncertainty and use the lower fluxes as a conservative estimate of OVOC fluxes into and out of the ocean surface.” This revised text further confuses the interpretation of the paper in terms what negative and positive values of fluxes reflect. So, if I get it right using the alternative approach to calculate k_a , inferred negative/deposition (atmosphere-to ocean) fluxes are reduced by about 20% whereas positive fluxes (emissions) are “on average 20% higher”?

Authors: We saw by using the k_a from Duce 91 a 20% higher flux for positive fluxes and 20% lower flux for negative fluxes, which means that the fluxes were around 20% stronger in both directions. We changed it in the sentences as followed: “The newly computed fluxes were on average 20% higher for positive fluxes and around 20% lower in the case of negative fluxes, resulting in higher amount of OVOC concentrations exchanged between the ocean and the atmosphere in both directions. We treated this difference in the calculated fluxes as uncertainty and used the previous fluxes determined by using Duce 91 k_a as a conservative estimate of OVOC fluxes into and out of the ocean surface.”

Editor: Pp6; line 35 and beyond; since you are discussing the emissions of OVOCS into the MBL being studied with FLEXPART; you list all the processes that are considered in FLEXPART except of emissions! How are these treated in this model? As a negative dry deposition flux?

Authors: We have added 'emission of tracers' to the list of the processes considered in FLEXPART. More detailed information on how the emissions are treated in the model have been added to the second paragraph of section 2.8. We wrote: “For each data point of the observed sea to air flux, 10 000 air parcels were released from a $0.1^\circ \times 0.1^\circ$ grid box at the ocean surface centered at the measurement location and loaded with the amount of the OVOCs prescribed by the observed emissions at this location.”

Editor: Pp 7, line 30: “compared to a study along the South-East Florida coast” (or alternatively “in the coastal waters of South-East Florida”

Pp 8; line 16 “compared with”; check the whole document actually on this; according to me it is here “compared to” (compared with is used when things are similar, e.g., of magnitude) whereas “compared to” is used when you contrast things.

Pp 10: line 28 “for the entire ocean mixed layer” (to contrast this with the atmospheric mixed/boundary layer)

Authors: done

Editor: Pp 11, line 30: suggesting to change to; “For all measurement locations with a positive flux, reflecting the ocean being a source for atmospheric OVOCs,” and would it be useful here to shortly indicate how many of all samples are indeed showing positive fluxes?

Authors: We changed it and added the number of samples used for the calculations.

Editor: Pp 12: line 30: “...driven by the hotspots east of 116°E which occur in all three OVOCs.” this statement reads weird: I would suggest to say, “..due to presence of areas east of 116 °E with large sources reflected in the measurements of all three OVOCs”

Pp 13: line 9-10: “ hot spots exist at some short distance from the cruise track area. However, we think this is less likely as these hotspots”; hot spots or hotspots? And would it not be better to refer instead of a hotspot to “ a strong source area”?

Authors: We changed it to “strong” or “large source areas”.

Editor: Pp 13, line 35: list the reference Blitz et al. in the proper way

Authors: done

Editor: Pp 13, line 41: I happen to know the EMAC modelling system but not other readers; revise by or explaining the acronym or simply referring to EMAC as a “global chemistry-climate modelling system”

Authors: We added the information about EMAC. We wrote: “By combining their data with simulations from the global chemistry-climate modeling system (ECHMA/MESSy Atmospheric Chemistry, EMAC), Neumaier et al. showed ...”