

Editor feedback to author response: os-2017-32 Lizotte et al.

15 Sep 2017

Thanks for the detailed responses and track changed modifications in response to reviewers RC-1 and RC-2.

Further responses required:

Please can you also respond to RC-2 points that you have not responded to.

L616: The papers by Tortell et al. that emphasize DMS increases across oceanic fronts should be cited.

L643-669: To what extent the 50-fold range in DMSPd consumption rate constants cannot be due to methodological uncertainties in either DMSPd concentrations or the 35S experiments? This range factor seems very large, and the turnover at station 5 seems super fast (turnover time 1 h). More so when there is no correlation to bacterial abundance or production. I agree that bulk bacterial production holds less potential to drive DMSPd consumption than taxon-specific production, but a critical view of uncertainties is warranted. By the way, the range of turnover times shown in Table 3 for the present study is 0.1-1.6 d – if the fastest was 1 h, this should read 0.05-1.6.

L699-703: The relationship between the DMSPd-to-DMS conversion efficiency and rates of bacterial leucine incorporation is intriguing. You claim this is because as bacteria increase their C incorporation, they do it by cleaving more DMSP to use its C. I am not persuaded by the argument. Bacteria also increase their S demand, when increasing C incorporation. Why not taking up DMSPd as both a C and a S source? From the subsequent arguments, should we understand that abundance of other labile C forms (and potentially org S forms), bacteria exhibited low DMSP assimilation rates and rather they cleaved quite a share of the available DMSPd? But DMS yields were not particularly high either. Please clarify your arguments. You could also invoke phycosphere-associated processes. In blooms like these there may be many bacteria closely associated to microalgae and therefore exposed to even higher concentrations of DMSP.

L778: Give range or std dev.

L775-787: To support the idea that phytoplankton-mediated DMS production largely contributed to gross DMS production, note that, in the DISCO experiment, Steinke et al. (AME 2002) found that the majority of potential DMSP-lyase activity occurred in particles >10 m, namely dinoflagellates.

RC-1, point 3

– suggest it is useful to reiterate here:

Following “assimilation into bacterial biomass”
with

“and has not considered dissolved non-volatile degradation products.”

RC-1, point 10 -

The addition:

“Dinoflagellate abundance was determined for surface waters (not for near surface waters) and is not shown here.”

is not particularly useful to the reader. Can a reference to data be given or numbers included in Table 1?

RC-2 point 5

Suggest reword:

“while the strength of the relationship between DMSPp and chl a is also strong ($r^2 = 0.57$, data not shown).”

With

“while the correlation between DMSPp and chl a is of similar strength ($r^2 = 0.57$, data not shown).”

RC-2 point 6

With the addition:

“The SOAP blooms were coherent discrete areas of elevated ocean colour identified in satellite images characterised by a maximum of 1 mg/m^3 chl a or higher. Sampling took place near the center of these blooms but also at stations on the periphery and outside the blooms (Table 1), as defined by the distance from the bloom centre and clear demarcation in surface biogeochemical variables (see Law et al., this issue).”

I believe this should read:

“The SOAP blooms were coherent discrete areas of elevated ocean colour identified in satellite images characterised by a **minimum** of 1 mg m^{-3} chl a or higher. Sampling took place near the center of these blooms but also at stations on the periphery and outside the blooms (Table 1), as defined by the distance from the bloom centre and clear demarcation in surface biogeochemical variables (see Law et al., this issue).”

Saying blooms are chl-a areas up to 1 mg m^{-3} or greater sets no limits at all! I think this should read "by a minimum" rather than "by a maximum"

RC-2 point 7 (and parts of 6)

You say: “We are not certain what the reviewer is asking here. If possible, added information would help us address any concerns regarding this part of the paper.”

I read that the reviewer is questioning the partitioning of sample sites between "in" the bloom and "in the vicinity" of the bloom and you do mention that this is a geographic distinction - Would it be more accurate to replace

"and clear demarcation in surface biogeochemical variables (see Law et al..." with:

“determined from pre-site surveys with bloom centre marked by drifting spar buoy (see Law et al....”

I read that the reviewer questions variables in Table 1 including Chl-a, nutrients and DMSP:Chla that do not show clear differences related to e.g. nutrient drawdown in bloom or greatly elevated Chla or DMSP in the bloom compared with the 2 stations north and south of blooms. (Perhaps this can be addressed by discussing that stations adjacent to bloom were also in generally productive waters).

Additional corrections:

I note error in footnote to Table 1

Change "then the 9 presented"

to "than the 9 presented"