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Interactive comment on "Bacterial survival governed by organic carbon release from senescent oceanic phytoplankton" *by* S. Lasternas and S. Agustí

Anonymous Referee #1

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Review of 'bacterial survival governed by organic carbon release from senescent oceanic phytoplankton', by Lasternas and Agusti

I find this ms original and interesting, the whole data set and variety of methodologies used merits publications. However, an effort should be done to be more rigorous in the description of results, particularly considering statistics (text and figures says sometimes the opposite), and the way to estimate the average percentages and their associated errors. Because results are most of the time pooled, we have not information on evolution along depth, just general trends along sites, and this could give also interest in this ms, because PER is very sensitive to light and nutrient stress.

Detailed comments

P 16975. Line 25. It should be better emphasized what are the topic and originality of the two papers (Agusti and Duarte 2013, Lasternas et al 2013), compared to this one.

Not clear the end of the sentence line 27 verb of comma missing?

16976. Line 2 The status of bacterial cells... Line 22 . was Feb 2007 a bloom? pre bloom period? due to the delay for sampling all stations, was the seasonal situation of the bloom equal at all the sites? (the ship could be in pre bloom in one zone, and post bloom in the other one) line 23. 9+8+8 is 25 stations, not 24. I could see only 23 dots on the map of Figure 1.

P 16977. Incubation for primary production lasted 4h. From which day time to which day time? Could 4h of incubation be considered as a gross or net release for DOC production? is there a correction of bacterial re-use of DOC released during the incubation time? If the sampling time for PP was not always the same, does it influence %DC? PER?

Line 15. It is not clear how the obscure sample is treated. Are their respective dpm substracted form particulate? From total of the light samples?

P 16977 Line 1 What could be the error of Pdoc and then PER based on a difference between total primary production (based on 5 ml water volume) and particulate primary production (based on 150-2x5=140 ml water volume filtered)? Line 18 Does PI technique allow to discriminate % viability between HNA and LNA cells?

P 16979 line 26 . It s not absolutely clear that the cell digestion assay was made on unfixed cells and in which portion. Total water? 70 ml concentrate? Filter? Is there an influence of the DNAse and trypsine concentrations and/or on the incubation time of the enzyme cocktail on the different types of species affected? i.e is there a different resistance to the cocktail according to the phytoplankton species targeted? For instance I would imagine cell walls of Bacteria (Syn and Prok) more resistant than

that of eukaryotes? And inside eukaryotic cells, is a cocolithophore or a diatom more resistant than an flagellate?

P 16980 Line 7 : The percentage of dead cells was calculated for the different phytoplankton groups It should be written there. Line 10-15. Student t test is only applicable for normalized data

P 16981. line 3. In the text it seems that primary production is different between the 3 sites but from statistics on table 1 it is not.

Line 5-8. It would be interesting to know if this relationship is driven by depth, or by differences between stations. Adding a figure should be nice.

P 16982. line 12 'heterotrophic bacteria. . ..across communities' which communities? Was this test made on the whole data set? Was it a paired comparison? Or based on averages of both groups? If the whole phytoplankton group is considered, its % of dead cells average is necessarily related to the most abundant phytoplankton group's one. Line 13-14. It seems from this sentence that the authors compared the % of living heterotrophic bacteria (with PI technique) with the percentage of living phytoplankton (I assume 100 - % of dead phytoplankton, with the cell digestion assays). Thus it seems that both methods give equivalent results in terms of '% dead cells'. Is it really the case? Because the authors counted by epifluorescence prok and syn on filters after the cell digestion assay, they could also count heterotrophic bacterial cells after staining with a DNA probe. Did they check that PI and CDA techniques give the same results on heterotrophic bacteria cells?

Line 14. There are no heterotrophic bacterial abundance data on Table 2 or on Figure 5. Line 19. Was the flux divided by total abundance or only by living cells ? h-1 is missing after pgC.bacterial cell-1

Line 21" .. than at the other zone. . ." No, as shown by statistics, there is no difference with intermediate zone.

P 16983 lines 5-10. It should have been interesting to see the plots of PDOC with PPP and PDOC with bacterial production

Line 12 There must be other references dealing on pDOC in Mediterranean sea

lines 25-30. The authors mostly considered averages between stations (like on figure 4 for example) or all over a group of stations (like on table 1). Was there an effect of depth as irradiance, nutrients, temperature, and phytoplankton populations, all probably changed with depth in stratified conditions. this is partly discussed p 16984. So why choosing averages between stations? because the trend is higher with trophic conditions?

p 16984 line 1-3. Why % of dead cells could vary proportionally to mortality rates?

line 13 There are detectable ammonium concentrations in the upwelling (table 3)

line 21 ' the magnitude... was higher, because....' No it is not the case, as shown by table 1, the average DOC production rate by phytoplankton rate is not statistically different among the three zones.

lines 27-28. Again, statistics of table 1 don't confirm this. the PDOC flux per bacterial cell is lower in upwelling zone and not statistically different than in intermediate zone

p 16985 lines 3. No, bacterial abundance are not higher in the upwelling, as I can see from figure 2 line 5 No, Pdoc do not decrease toward oligotrophic zone, as I can see from table 1

Table 1. it is not clear how all means and se are calculated. For nutrients in upwelling for instance, 9 stations x 7 depth layers = 63 data? and for PER? mean of each PER (9 stations x 5 layer depths=45 data) or PER based on averages of PDOC and PPP fluxes? and for phytoplankton dead cells? average of %DC for all data (9 stations x 2 depths x 5 phytoplankton categories (diatoms, syn, prok, nanomicrophyto, picophyto), or ratio of mean total abundance of living cells to total abundance of dead cells?

Fig 2. , Fig 5 Pdoc per cell. Because the data are presented on log scale, I wonder if statistics for comparison of data were made on log-transformed values or not.

pico eucaryotes are used Fig 2, and picophytoplankton figure 3. Be homogeneous.

Figure 4 Only 10 dots for 25 stations.why ? Again, how are calculated percentages? how is calculated the error bar?

Figure 6. Is the relationship on all data points also significant? I don't understand why the black points are not equally distributed every 20% PER. X axis correct for 'percent extracellular release'

Interactive comment on Biogeosciences Discuss., 10, 16973, 2013.