

Interactive comment on “Global marine plankton functional type biomass distributions: *Phaeocystis* sp.” by M. Vogt et al.

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Response to interactive comment on “Global marine plankton functional type biomass distributions: *Phaeocystis* sp.” by I. R. Jenkinson

We thank I. R. Jenkinson for his very positive and constructive comments to our manuscript. All suggestions of this reviewer have been included in the final revised version of our manuscript. Below please find our reply to the specific comments of our reviewer:

IRJ: TITLE Should be *Phaeocystis* spp. not sp.

MV et al.: This has been changed in the title.

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IRJ: INTRODUCTION: This is very good. In my opinion, however, it leaves out two special aspects of the way *Phaeocystis* is known to affect the ocean system. This should be remedied by brief addition. The aspects are:

IRJ1. Although *Phaeocystis* has been found to be only a minor player in vertical flux, at least directly, there are suggestions that “post-bloom mucilage sedimentation could be secondary pathway for the vertical flux of *Phaeocystis*-derived organic matter” (Riebesell et al, 1995). This potentially important biogeochemical importance is already mentioned implicitly as “carbon export, citing DiTullio et al. (2000), but I consider that the mention should be more explicit.

MV et al.: We have followed up on this issue by revising the literature since Riebesell et al. (1995). One of the co-authors of this study, M. Reigstad addresses the importance of *Phaeocystis* for carbon export in:

M. Reigstad and P. Wassmann, ‘Does *Phaeocystis* spp. Contribute significantly to vertical carbon export of organic carbon?’, *Biogeochemistry*, 83, 1-3, 217-234, 2007.

The authors now conclude after a compilation from several stations, that the contribution of *Phaeocystis* to vertical export is small, even if mucus carbon is included in the estimate. We thus change the text on page 5/39 (former page 409, lines 5 – 7) as follows:

“Three of the six recognised *Phaeocystis* species are known to form massive blooms of gelatinous colonies (Medlin and Zingone, 2007), which may contribute significantly to carbon export (Riebesell et al. 1995, DiTullio et al. 2000), although recent observations suggest that the contribution of *Phaeocystis* spp. to the vertical flux of organic matter is small (Reigstad and Wassmann, 2007).”

IRJ2. *Phaeocystis* has been well documented as associated with marked increases in seawater viscosity (Jenkinson & Biddanda, 1995; Kesaulya et al., 2004; Seuront et al., 2006, 2007) particularly at small scales.

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MV et al.: This aspect has also been included on page 5/39 (former page 409, line 11), and the respective references have been added to our reference list.

IRJ: DISCUSSION Very good. It addresses the principal issues I can think of. Page 420, Lines 1-2: "North Pacific" should be "Northwest and West Pacific". (Given the high abundances noted at times in Pacific Alaska, it's a pity there are not data points here, from Pacific Russia, Japan, Korea or China.

MV et al.: "North Pacific" has been changed to "Northwest and West Pacific". We agree with the reviewer that it would have been very valuable to have data from Pacific Russia, Japan, Korea and China, and while we have approached researchers residential in these countries, we have not received data that could be included in our data base, nor have we been able to extract such data from any of the online repositories. We sincerely hope to be able to improve this data base in the future, and to encourage data originators to submit further data once they see the large impact the MAREDAT project will be able to generate for the modelling community.

IRJ: There is also a gap in the Arctic waters north of Siberia, as well as north of N. America, and in Greenland waters, despite published reports of high biomass off Greenland (Smith, 1993), (and this could/should be mentioned).

MV et al.: This has been mentioned on page 16/39 (former page 420, lines 1-2) in the final revised version of the manuscript, and the corresponding reference has been inserted in the reference list. The text is now as follows:

"Some areas such as the Pacific Ocean are clearly under-represented and we were not able to acquire any Phaeocystis measurements from the Northwest and West Pacific. Furthermore, there is a gap in our observations in the Arctic waters north of Siberia, and north of North America and in Greenland waters, despite published reports of high biomass off Greenland (Smith1993)."

IRJ: FIGURES Generally very good and well-designed. Fig. 5b in particular is very god

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and original. Fig. 6b suggests that Phaeocystis should be sampled more at depths >200 m or >300 m or even deeper. Fig. 8 would benefit from the inclusion of zero values (at the bottom of the log distribution). Fig. 9: The legend should repeat that values of mucus biomass are estimated differently (and probably more conservatively) for the SH than for the NH.

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Fig 6b. A sentence has been included on page 13/39 (former page 417, line 22) to include the recommendation of the reviewer.

Fig 8: This figure needs to be consistent with Fig.6, and the settings used by the other MAREDAT PFT lead authors. Hence, and for better clarity zero values have not included in these figures in any of the MAREDAT manuscripts.

Fig 9. This information has been included in the figure legend. It now states:

"Estimates of (a) log-normalized total mean Phaeocystis biomass including colonial mucus for the surface layer (0-5 m) and (b) fraction of total mean surface biomass composed of mucus carbon. Zero values are not represented. The difference between the ratios of total carbon to cell carbon for the three species leads to a greater contribution of the Northern Hemisphere species to total Phaeocystis biomass."

Interactive comment on Earth Syst. Sci. Data Discuss., 5, 405, 2012.

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