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Title: Global marine plankton functional type biomass distributions: *Phaeocystis* sp.

IThenticate: No problem

OVERALL EVALUATION : 1.5 on scale 1 (excellent) to 4 (poor)

SIGNIFICANCE

The database will be enormously usefully as the reference World database on *Phaeocystis* occurrence. As it available to all it will b available for constant improvement and updating.

UNIQUENESS:
While, theoretically it would be possible to recreate elements of the data base by counting and measuring *Phaeocystis* in archived, preserved samples, in practice this will rarely be done, as the samples deteriorate over the years, and priority attention will be given to newly acquired samples.

The data base will be far more valuable, as a source to monitor the changing state of the oceans.

COMPLETENESS:
The data base is far from complete, as the authors point out, and it needs continuous updating as well as populating with more samples from the Antarctic in winter and the NW and W Pacific, as well as tropical waters, and samples from deeper than ~300 m.

DATA QUALITY
The quality of the data are quite poor, but they are essentially the best that exists. This report highlights the need for increasing the quality of data processing of *Phaeocystis* samples, particularly cell size and carbon content and even more so to develop routine ways to assess extracellular mucus biomass.

PRESENTATION QUALITY
Very high standard. Some minor improvements, however, are suggested below.
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TITLE
Should be *Phaeocystis* **spp. not sp.**

ABSTRACT:
A very good, quantitative abstract of the paper.

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:

1. 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.

2. *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

DATA
Origin of data
Seems good

Quality control
I cannot see how it could have been done better.

Biomass conversion
It is very difficult to assess mucus biomass from microscope observation and counts, especially of preserved material, and I think this is done as well as possible.

Colony size is well treated, but the literature reports huge variation in colony size, so it is difficult to treat synthetically. The authors have done the best synthesis possible given the difficult published and unpublished data

Future researchers will have to be careful with the different methods of estimating mucus biomass used for the NH and SH.

RESULTS
Global distribution of abundance data
The authors correctly note that sampling methods are not adapted to quantitative estimation of *Phaeocystis* in some sea areas, and the genus is not expected to be found.

Temporal distribution
Well treated.

DISCUSION
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.

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).

TABLES
All are useful and well designed

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

DATABASE :
I have opened the database in OpenOffice Spreadsheet, and it appears well-designed and easy to use.

References used in this referee's report, but not in the authors' document

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