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Comment on essd-2021-351

Heather Bouman

Community comment on "Primary productivity measurements in the Ross Sea, Antarctica: a regional synthesis" by Walker O. Smith Jr., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-351-CC1, 2022

The Ross Sea primary productivity dataset is a valuable resource for biogeochemical and ecological modellers as well as remote sensing scientists. It is a unique polar dataset that allows researchers to examine how changes in growth factors governs the seasonality of carbon fixation my marine algal in this productive marine environment. In addition to making this dataset freely available the author also provides an expert narrative of the ecology and biogeochemistry of the region.

P1 L18 – photosynthesis/irradiance measurements, I would instead write as photosynthesis-irradiance experiments.

General comment: although Phaeocystis antarctica is italicised in the abstract, in the main text it is not (nor is P. antarctica). Also for units, exponents are not superscript on P5, some instances on P6.

P3 L76 – I would also add ocean biogeochemical models.

P3 Could the author provide more details on the type of plastic bottles used (typical volume? polycarbonate?) and the source of the blue filters used?

P 4 The author mentioned that HPLC phytoplankton pigments were measured alongside fluorometric chlorophyll. Was the relationship robust between the two across the seasons/regions sampled? Was there any evidence of the presence of phaeopigments?

P5 "diatoms, in contrast, have chlorophyll c3". The work of Wright and others suggests that c3 is more widespread in the haptophytes (including coccolithophores and Phaeocystis) and only found in some species of diatoms (e.g. Pseudonitzschia)? Is the author suggesting that chl c3 is a marker of diatom presence?

P5 L147 Phaoecystis – typo

P 5 151 is the maximum rate of photosynthesis at saturating light levels using controlled light incubations (in the absence of photoinhibition). This should not be confused with chlorophyll-normalised rates in situ (e.g.) which uses solar light that changes (diel and diurnal variability).

Was the same type of blue light filter used for all bottles, in terms of its spectral distribution? Is the author stating that the chlorophyll-normalised values from the deck incubations were in line with those determined using conventional P-E incubations? This could be clarified.

P5 L159-160 On the pdf copy the values reported for the daily uptake rates have a comma rather than a decimal point, so look like they are a factor of 10^3 too high? I suspect that this is likely a typesetting issue.

Fig 2 & Table 3. The standard deviations are reported in Table 3 and standard errors are reported in Figure 2. Since the dataset is provided the sample statistics can be directly computed, perhaps it is sufficient to just show the profiles, in which case I would include the standard deviations to show that despite the cold temperatures and corresponding low assimilation numbers, there is still considerable variability in the chlorophyll-normalised rates of carbon fixation.