Annotations for 2019JC015007

Merged PDF

By	Context	Comment	Categories	
Reviewer #1	highly spatially	It should read: "spatially highly variable"	Minor Edit	
Reviewer #1	ncreasingly complex mosaic composed of ridges,21hummocks, melt ponds, leads and snow.	None of these features is new to the Arctic icescape,so why is it increasingly complex? If this is supposed to be related to global warming and the increase of certain features vs others, these needs to be clarified. The first part of the introduction is written in a less misleading way for example.	Minor Edit	
Reviewer #1	sing single-point mea-39surements	Using single point measurements of light or of carbon uptake or photosynthetic parameters? The photosynthetic parameters used in this study also come from single point measurements. Please clarify.	Minor Edit	
Reviewer #1	Calculation of primary production based on incubations or photosynthetic parameters61derived from photosynthesis vs. irradiance curves (P vs. E curves) requires adequately62measured or estimated values of irradiance.	References to other studies using this kind of approach to calculate and upscale PP should be included here. (eg Fernández-Méndez et al 2015)	Minor Edit	

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Reviewer #1	We further94used these transmittance data measured at di erent horizontal spatial scales to quantify95how they in uence primary production estimates derived from photosynthetic parameters.96The results provide new guidance on how to derive more representative primary production97estimates under a heterogeneous and changing icescape.	This study focuses on the impact of transmittance variability when calculating primary productivity, but it fails to point out the importance of the variability in point-measurements derived photosynthetic parameters, which are the key to obtain "more representative" primary production estimates. Photosynthetic parameters are not only governed by light but also by nutrients and there is no mention about this in this study. This limitations of the study to provide "better" or "more representative PP estimates" should at least be acknowledged and discussed.	Major Edit	
Reviewer #1	Due to instrument failure of the Magna Probe, no121snow measurements were available for stations 46 and 47. Sea-ice thickness was calculated122as the di erence between total snow and -ice thickness and snow depth.	What snow data was used for the calculations at those stations instead?	Minor Edit	
Reviewer #1	One mL aliquots of the inoculated sample were dispensed208into twenty-eight 7 mL glass scintillation vials.	6 mL of headspace seems like a lot for this method since the 14C sodium bicarbonate can easily go into gaseous form. Also, did you estimate the number of algal cells per ml at the low biomass concentrations typical for Arctic waters..is this enough to have a reliable measurement?	Minor Edit	
Reviewer #1	he samples were cooled to 0°C	Does this mean that samples were handled at room temperature until now? Surface waters in the Arctic can be colder than 0, by incubating all samples at the same temperature, could there be a bias in the photosynthetic parameters?	Minor Edit	

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Reviewer #1	The incubation lasted for 120 minutes	Are 2 hours enough for the algae to recover from the lag phase after sampling? It should also be specified that what is being measured with these short incubations is probably gross community production.	Minor Edit	
Reviewer #1	primary production	gross or net?	Minor Edit	
Reviewer #1	photosynthetic parameters	Usually photosynthetic parameters are biomass (Chla) normalised. How was biomass in the incubations taken into account in this study?	Minor Edit	
Reviewer #1	device	Is this word repeated here?	Minor Edit	
Reviewer #1	production	Since you are calculating rates per hour it should be productivity. Production is usually used for annual estimates.	Minor Edit	
Reviewer #1	methodological issues (e.g., light absorbed before incubation started for example)	Please explain this better.	Minor Edit	
Reviewer #1	Depth-integrated primary production (mgC m-2d-1) was then calculated243by integrating daily primary production over the water column	Which photosynthetic parameters were used for each profile? If you sampled 7 depths and you did 7 PE curves per profile, what was the variability of the PE parameters with depth? At which discrete depths did you use each parameter?	Minor Edit	
Reviewer #1	when sampling at a single point location	when measuring light or transmittance at a single point. The PE parameters come, also in this case from single point sampling.	Minor Edit	
Reviewer #1	pot measurements	spot light measurements	Minor Edit	

By	Context	Comment	Categories	
Reviewer #1	representative values of primary production	It needs to be stated more clearly that representative values of PP are not only dependant on a good representation of the light field experienced by phytoplankton. Nutrients, temperature and grazing are also important for representative values of PP. The approach of this paper is neat but only addresses one parameter influencing PP.	Minor Edit	
Reviewer #1	spot measurement	again, spot measurements of light, not of 14C uptake	Minor Edit	
Reviewer #1	All statistical analysis and graphics were carried out with R 3.5.2 (R Core Team, 2018).293The non-linear tting for the P vs. E curves was done using the Levenberg-Marquardt294algorithm implemented in the minpack.lm R package (Elzhov, Mullen, Spiess, & Bolker,2952013).	According to latest publication standards, scripts used for data analysis should be made available in a public repository. Please add the corresponding link.	Minor Edit	
Reviewer #1	he SUIT measurements were also covering greater ranges of transmittances313compared to the ROV.	was the sampling depth below the ice the same for both devices? Could this also be part of the explanation for the differences?	Minor Edit	
Reviewer #1	asymptotic regime at maximum 30 m depth	How do you define depth of the euphotic zone for the depth integration of PP?	Minor Edit	
Reviewer #1	production	productivity	Minor Edit	
Reviewer #1	731	If the P mixing calculations include open waters while the P underice does not, how could it be that the maximum PP is under ice and not in the mixed calculation?	Minor Edit	

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Reviewer #1	in situ spot measurements	Again in this paragraph it needs to be clear that the number of measurements/samples that you are referring to are light measurements and not photosynthetic parameters/carbon uptake. Also I miss the PE parameters results and assessment of their variability and error.	Major Edit	
Reviewer #1	Lange, Katlein, et370al., 2017	Why some references show 2, 3 or 4 names and others the regular Name et al? please check.	Minor Edit Reference	
Reviewer #1	.	remove the extra dot	Minor Edit	
Reviewer #1	earlier suggestion	references?	Minor Reference	
Reviewer #1	relative errors varying between 47% and 88%	How do these relative errors compared to the errors derived from the 14C method to measure carbon uptake and the curve fitting to obtain the photosynthetic parameters? What about the variability of photosynthetic parameters?	Major Edit	
Reviewer #1	Ekan index of photoadaptation.	Is there no data from this study on the photosynthetic parameters that could be discussed here?	Minor Edit	
Reviewer #1	measurements varying between four and 35	covering an area of how many meters?	Minor Edit	

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Reviewer #1	have provided local estimates that were simply scaled to an assessment of442percent ice-cover in the vicinity of the ship (Gosselin, Levasseur, Wheeler, Horner, & Booth,4431997; Mei et al., 2003; Smith, 1995).	There have been later studies (eg. Palmer et al 2011, Fernandez-Mendez et al 2015..) in which similar approaches to calculate PP have been used. I am missing a more thorough comparison with previous primary productivity data. Do your estimates fall in the range of previous published values for that area? What about the PE parameters? Despite the differences in 14C uptake methodologies, do they agree with previous published work? A part of the discussion dedicated to the variability of PE parameters is key and missing in this manuscript.	Major Edit Reference	
Reviewer #1	can signi cantly improve the accuracy of primary pro-460duction	How can you be sure that your primary productivity estimates are more accurate? The light transmittance is definitely more accurate but there are many other parameters affecting primary productivity. As highlighted in Palmer et al 2011 and many other studies photosynthetic parameters can vary substantially spatially. If the temporal and spatial variability of photosynthetic parameters and phytoplankton biomass are not well resolved with more in situ measurements of carbon uptake and Chla, the primary productivity estimates can not be significantly improved, no matter how well resolved the light field below the ice is.	Summary	
Reviewer #1	F. Bruyant, M. Beaulieu for carrying out the P vs. E curve measurements	maybe these scientists should be included in the manuscript to discuss the photosynthetic parameters.	Minor Edit	

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Reviewer #1	Violinplots	what does the spread of the red and blue blobs mean? the error? the variability of PP at different depths?	Minor Edit Figure	
Reviewer #1	Figure7	Adding a figure with the PE curves for each station would improve the manuscript and should be part of the discussion about improving PP estimates.	Figure	