Annotations for 2019JC015007R

Merged PDF

By	Context	Comment	Categories	
Reviewer #1	measured with short (under two hours)71incubations of seawater samples inoculated with14C.	Why short incubations under two hours? The literature does not agree on this, so I wouldn't state it as "the better option". It depends if you want to measure gross or net PP among other things.	Minor Edit	
Reviewer #1	photosynthetic parameters could provide a better option to107estimate primary production under sea ice compared to traditional in situ incubations per-108formed at single locations using seawater samples inoculated with14C or13C.	This is confusing because photosynthetic parameters are also derived from 14C 13C in situ inoculated samples, the only difference is that they are incubated under a range of different irradiances and not just under one light intensity. This needs to be clarified because as it is it reads as if the 13C or 14C incubation method is not appropriate to measure PP.	Minor Edit	
Reviewer #1	Due to instrument failure of the136Magna Probe, no snow measurements were available for stations 46 and 47.	As you mention in your reply, this data was not used in the statistical analysis and therefore the lack of data on these two stations has no influence on the manuscript. I would add this information here.	Minor Edit	
Reviewer #1	di erent irradiance levels	Specify the different irradiance levels used for the PE curve incubations.	Minor Edit	
Reviewer #1	integrating262daily primary production over the rst 40 m of the water column.	Add here the information that you provided in the answers to the reviewers, stating that this depth roughly coincides with the depth of the euphotic zone.	Minor Edit	

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Reviewer #1	maximum depth of winter mixing397(which determine the amount of nutrients available for summer primary production)	The maximum depth of winter mixing determines the amount of nutrients available for that years PP which happens in spring-summer. So here you are talking about annual primary production and not about individual daily rates of carbon uptake which is what you are talking about before. The comparison is therefore not valid for your argument about the variability of daily PP.	Minor Edit	
Reviewer #1	In our399approach, the impact of light history, nutrients, temperature, and community composition400are implicit in photosynthetic parameters and chl a concentration. The instantaneous e ect401of light variations is explicit.	Correct, but to constrain the variability in PP estimates and improve their accuracy, which is the aim of this paper, you need to take into account the variability in photosynthetic parameters due to all these factors. I know that in this paper you are just focusing on light, but you need to state somewhere that to improve the accuracy of PP estimates it is not only necessary, as you very nicely show, to improve our under-ice light field measurements, but also to have a seasonally and regionally extensive set of PE curves to constrain the variability due to nutrient availability.	Minor Edit	
Reviewer #1	dynamic approac	I am glad that you added this paragraph. What do you mean here by "dynamic?" Please specify.	Minor Edit	
Reviewer #1	o reasonably capture the spatial variability of sea ice transmittance to de-476rive average primary production estimates over a given area. This shows, that local primary477production estimated from just a single or even a handful of light observations has limited478value.	And a similar study to capture the variability of photosynthetic parameters should be conducted in the future to test if a handful of PE curves is enough to estimate PP correctly or we need as many as we can get seasonally and spatially resolved to improve Arctic PP estimates.	Minor Edit	

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Reviewer #1	to obtain the best505possible estimates of primary production	In your guideline to obtain the best possible estimates of primary production, you should remember the reader that the number of in situ PE curves measured is also very important to constrain the photosynthetic parameters under different nutrient conditions. If you only have one PE curve to calculate PP for the entire Arctic, the estimates will not be very accurate even if you have a super high resolution light transmission dataset.	Minor Edit	