Post Response comments for Tanioka and Mastusmota 2020

Substantive Comments

Line 788-795: I don't understand why this paragraph refers to the effect of light on C:P in the context of P limitation. The previous paragraph just discusses the effect of light on C:N regardless of nutrient status. The papers cited and other work do not seem to indicate that the proposed effects of light on P:C only occur when P is limiting. On the contrary, light seems to have less of an effect on C:N:P when N or P are limiting (essentially nutrient status seems to dominate P:N:C when N or P are limiting and high or low irradiance appears to have little effect under these conditions). In light of this, the sentence in Lines 793-795 is not supported. Even if my conclusion stated above were not true, inferring that the studies used to determine the effect of light on P:C were done under P-limitation does not make sense. If this were true, aren't they confounded and thus should have been excluded from your analysis?
Also, couldn't the effect of light P:C still be observed under P-replete conditions? Simply dropping the phrases "if P is the main limiting nutrient" in Line 788 and "Under P limitation" in Line 789 and removing the sentence in Lines 793-795 would avoid the problems noted above and preserved the intent of this paragraph.

Iron effect analysis and Discussion Section 4.3 Iron: I only recently became aware of the paper cited below (Cunningham and John 2017) that shows a large effect of Fe stress on P:N:C. Prior to seeing this paper I would have assumed the effect of Fe on phytoplankton stoichiometry was small as you found in your meta-analysis based on the literature, experience, and physiological principles. However, the paper cited below worked with oceanic picocyanobacteria (*Prochlorococcus*, *Synechococcus*), which have obvious ecological importance. These taxa are also understudied and often have surprising physiological responses/strategies. I think your meta-analysis is already very comprehensive and so I'm not requesting this study be used for any re-analysis, but I share it in case the authors are interested. It may be good to at least cite this in Discussion to note that although Fe seems to generally have little impact on phytoplankton P:N:C, oceanic picocyanos may be an exception.

Cunningham, B. R., & John, S. G. (2017). The effect of iron limitation on cyanobacteria major nutrient and trace element stoichiometry. *Limnology and Oceanography*, *62*(2), 846-858.

Table 3: A great addition, but please make sure that this table has a similar format (font size, etc.) as other tables in the manuscript and matches formatting requirements for *Biogeosciences.*

Typos and Grammatical Errors

Line 48: should be "On a geological timescale" or "On geological timescales"

Line 49: should be "the atmosphere"

Line 52: should be “the elemental stoichiometry of phytoplankton"

Line 53: should be “influence from” or “influences from” or “influence(s) due to”

Line 55: “leads” should be “lead”

Line 97-98: In line 97 “highlighted” should be changed to “highlighting” OR in line 98, “determining elemental stoichiometry showed” should be “determining elemental stoichiometry and showed”

Line 700: should be “…scarce, the large cell size”

Line 719: the phrase “unlike irradiance increase” is redundant and should be removed

Line 772: “In the future study, we could…” is awkward and grammatically incorrect. Something like “Future studies could…” would be more appropriate.

Line 794: should be “with a statistically significant”

Line 824: should be “carried out” or “carried” could be replaced by “done”