

## ***Interactive comment on “Ocean acidification and nutrient limitation synergistically reduce growth and photosynthetic performances of a green tide alga *Ulva linza*” by Guang Gao et al.***

### **Anonymous Referee #3**

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This paper reports results from an interesting study aiming to test the effects of ocean acidification and nutrients limitation on *Ulva*. The study is pretty straightforward: adult and juvenile algae were exposed to different conditions of CO<sub>2</sub> and nutrients and their physiological response was investigated. While this study is rather “classical”, the originality comes from the use of nutrient limitation, while most studies have used so far nutrients addition. The results are rather interesting and demonstrate that the interaction between pCO<sub>2</sub> and nutrient limitations are not straightforward. I find the discussion a bit complex and hard to read given the quantity of physiological parameters discussed. It might be worth considering adding a figure that would summarize all the results. Maybe a schematic representing the physiological impact of nutrients and

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carbon could be added.

I have listed below some specific comments.

Abstract: indicate the duration of the experiment

L55: Wrong reference for Cornwall et al. 2017, they looked at coralline algae not phytoplankton.

L63-64: reformulate this sentence

L119: "LCHNHP" is a bit hard to read/understand but I guess it's not really used later on.

L130: How does this light level compare to in situ?

L132: What was the size of the tanks? Did you use any pumps, etc , to create water motion? This is critical as it could affect the capacity of the organisms to uptake nutrients.

L133: Any reason to have chosen these durations? 9 days is rather short.

L156: What were those fragments? Just a piece of algae? I always have problem with this method, as I highly doubt it represents the response of the entire organism. When where the incubations done, at the end of the experiment? How many replicates were used?

L176: This was also done at the end of the 9 d?

Results: I would favour indicating the actual p-values rather than  $< 0.05$  or  $>0.05$

L-314-315: Any reason why the algae would do that? If they have more carbon available why would they reduce their photosynthesis? It doesn't make much sense from an organismal point of view.

L 331-332: Could this be due to pH rather than carbon?

L344-345: CCM activity has often been linked to the light level. Could it explain some of these results?

As explained before, I think that an additional figure to summarize all of those results (and mostly the link between each other) would be highly valuable.

L392-393: Could the seaweed culture also be affected by those limitations?

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