

Interactive comment on "Effects of ultraviolet radiation on photosynthetic performance and N₂ fixation in *Trichodesmium erythraeum* IMS 101" by Xiaoni Cai et al.

Xiaoni Cai et al.

xc_601@usc.edu

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General Comments: Also the ecological consequences in a climate change context must be highlighted in the discussion section as well as including future research that would be necessary to confirm and/or deepen the consequences of the studied effects in C and N cycle on the ocean (see Trichodesmium ecological role as C and N source in the ocean, Berger et al., 2012).

Response: we added discussion in Line 510-511: "future research that would be necessary to confirm and/or deepen the consequences of UV effects in carbon and nitrogen cycle in the ocean."

C1

Specific Comments

Response: we added texts in new line78-80: "Because of the importance of Trichodesmium in the input of carbon and nitrogen on oligotrophic oceans, and the lack of studies about the impact of enhanced UVR on the C and N fixation, is that we design the experiments."

Responses: We replace "study strategy" by "experimental design". And added texts in line 88-90: "The experiments to evaluate how UVR affects photosynthesis and N2 fixation of Trichodesmium were carried on indoor and outdoor as follows:"

2.-Line 154: The specific growth rate is only calculated for days 8 to 11 and 12 to 16. What happened from days 1 to 7 is not shown, nor justified the reasons for that. If your study only assessed the exponential growth phase, it is necessary to define it.

Responses: We added texts to explain it in new line 154-155: "In order to evaluate

adaptation responses of Trichodesmium to natural solar irradiance, all parameters were obtained after one week acclimation outdoor."

3.-Line 167: The measurement of effective quantum photochemical yield is not justified. It would be clarifying to include a paragraph explaining what this proxy indicates.

Responses: we added texts to explain Fv'/Fm' in line 173-175: "Effective photochemical quantum yield (FV'/FM') is generally considered to be light quantum using efficiency. We use this parameter to indicate Photosystem II activity."

4.-Line 199: Because the procedure for absorption spectra measurement is explained before for Trichodesmium, it's not necessary to repeat the same for the other species.

Responses: we added text "as the same method in Trichodesmium" in lin 208 to illustrate the same measurement as Trichodesmium. But in the Trichodesmium part I emphasize the Chlorophyll-specific absorption cross-sections (a*) measurements not the Chl a measurement.

 Line 239: Acclimatization conditions of cultures instead of culture conditions is better understood

Responses: revised in new line 247.

ResponseïijŽwe added texts: "....not present differences between radiation treatments after exposure to UV for 10 hrs." in line 295.

2.- Line 312: The paragraph is not clear and/or wrong because you talk about long-term UV-A exposure, and the long term treatments were only PAB and P, there was not

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PA. I would replace this paragraph with "inhibition induced by UV-A at short exposures in PAB and P acclimated cells. was....... and higher than inhibition induced by UV-B"

Responses: we revised the text to "However, inhibition induced by UV-A at short exposures was about 58% in both P and PAB treatments and significantly higher than inhibition induced by UV-B radiation (Fig. 6B, p<0.01)."in line 321-325.

Comments: Discussion 1.- It would be necessary to give a better closure to the discussion adding future research (see General Comments)

Responses: we emphasize the future research in the last paragraph: "....future research that would be necessary to confirm and/or deepen the consequences of UV effects in carbon and nitrogen cycle in the ocean." 2.- Lines 348, 431: The genus Anabaena for planktic morphotypes was replace by Dolichospermum since 2009 (see Wacklin et al., 2009) We added the new name in brackets in line 359 3.-Line 412: I would replace "adaptation" with "acclimatization capacity depending on intensity and spectral quality of radiation". The latter is based on the difference between adaptation and acclimatization terms.

ResponsesïijŽreplaced

4.-Line 429: See Fiorda et al., 2011. It would be very valuable adding their results in the discussion about the change of morfology due to UVR exposure

Responses:We added texts to show their discussion : "..... because UVR may affect calcium signaling then the expression of the key genes responsible for cell differentiation"

Technical corrections

Responses: All revised.

Please also note the supplement to this comment: https://www.biogeosciences-discuss.net/bg-2017-106/bg-2017-106-AC2-

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