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Interactive comment on "Light availability modulates the effects of warming in a marine N_2 fixer" *by* Xiangqi Yi et al.

Anonymous Referee #1

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The authors investigated the combined effects of light and temperature on the growth, N2 fixation and photosynthesis in the marine diazotroph, Trichodesmium. Light and temperature are two of the most environmental drivers for this species as for other marine primary producers. However, the combined effects of these two factors have surprisingly little been documented on Trichodesmium. This work fills such gap. The new finding from this work is that the thermal responses in Trichodesmium are strongly dependent on light exposures when grown under different light and temp levels. The parameters derived from the measurement are of significance in predicting the responses of Trichodesmium to ocean physical environmental changes associated with global changes. Generally, this work has been well performed and delivers a clear message, but some revisions are needed before being considered acceptable for pub-

lication at BG:

1. Line 65, "... where light intensity could be as low as 2 μmol quanta m-2 s-1". What's the source of this number? 2. Line 69, "... Trichodesmium's N2 fixation and growth,". It's better to delete " 's N2 fixation and growth". 3. Line 115 – 118. In the treatment "light-limiting, 31 oC", the N2 fixation rate under growth condition was obtained through an indirect and unusual way. I recommend that the authors should also take the N2 fixation rate measured at >31oC into consideration (maybe use the average of this and that measured at 30 oC), although such modification may alter the Figure 1b, and require revision of related text. 4. Line 122. "...Aliquots of 1.5 m ..." should be "1.5 ml". 5. The authors should describe the statistical analysis techniques they used in the Material and methods. Although I can roughly deduce the used statistical techniques from the text in Results, the authors should explicitly present them, which will help readers evaluate their results and conclusions. 6. Figure 3. It seems that the selections of temperature gradients are different among different treatments, which is uncommon. Why? Will this affect the interpretation of the data? 7. Line 202-205. How did the authors get the numbers ">28% and 7%-20%"? The cited literatures do not provide such numbers. 8. Table 1. In the text, the light treatments were referred as "light limiting" and "light saturating", but in this Table they were denoted as "LL" and "HL". It will be better to keep them consistent. 9. Fig 3b. The temperature norm of N2 fixation in the treatment "light-limiting, 31 oC" is quite different from those in other treatments, which deserves more discussion. However, authors didn't put much attention on this phenomenon.

All in all, this work focused on a valuable but previously overlooked scientific topic and obtained some interesting results. If the authors can properly deal with the concerns listed above, I think it will be qualified to be published in BG.

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