Reply to reviewer #1

Regarding below:
"I wish to get the explanations behind (8). Why is it power of 4? Is that based on some previous studies?
Authors: The equations for light and temperature limitation are adapted to Nemo-SCOBI from the original model by Beckmann and Hense (2004) and Hense and Beckmann (2006)."
I took a look at both paper but I could not find the same equation. I suggest the authors cite specific equation in these papers. If the formation is modified, I suggest that the author show derivation in supplementary material. Also, the previous papers do not seem to clarify why it is power of 4, which still remains question in this paper. I suggest that the author state why the authors chose power of 4. If it is imply empirical, that is fine too, but I suggest that it is stated.

Authors: *Thank you for your observation. The temperature dependence of the cyanobacteria growth rate was designed to represent the observational data presented in Lethimäki et al. (1997). It closely resembles that of Hense and Beckmann (2006) but was redesigned as the original formulation was found to be numerically unstable in the 3d framework. We have added a few lines clarifying this in the manuscript (lines 163 to 167). We have also added references in the Supplementary material.*

Author References:

Lehtimäki, J., Moisander, P., Sivonen, K., and Kononen, K.: Growth, nitrogen fixation, and nodularin production by two baltic sea cyanobacteria. Appl Environ Microbiol., 63(5), 1647-1656, doi:10.1128/aem.63.5.1647-1656, 1997.

Hense, I. and Beckmann, A.: Towards a model of cyanobacteria life cycle—effects of growing and resting stages on bloom formation of N2-fixing species, Ecol. Model., 195, 205 – 218, https://doi.org/10.1016/j.ecolmodel.2005.11.018, 2006.

List of relevant changes:

- An explanation to the origin of the temperature limitation equation has been added to Section 2.3.
- References to the temperature limitation equation (Table S.3 Eq. (8)) and the light limitation equation (Table S.3 Eq. (9) and (27)) have been added.
- A reference list has been added to the supplementary material.