

Interactive comment on “Assessing the spatial variability in peak season CO₂ exchange characteristics across the Arctic tundra using a light response curve parameterization” by H. N. Mbufong et al.

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Reviewer #1 comments

C: Comment; R: Response

C: The title of the Mbufong et al. manuscript “Assessing the spatial variability in peak season CO₂ exchange characteristics across the Arctic tundra using a light response curve parameterization” tells exactly what the manuscript is all about. All in all it is a very nice manuscript and a good example of collaboration of many researchers from

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many countries and research institutes. There are interesting findings in the paper and it gives a nice overview of the highest component of CO₂ fluxes during the summer in the Arctic. R: We thank this anonymous reviewer for the patience and helpful insights into this manuscript. Your comments and suggestions have been very important in bringing the manuscript to fruition. Thank you too for your kind words.

Technical notes:

C: page 6421, line 2: “Functional variability”, what does it mean in the context of the manuscript? R: We have taken out the “functional” so as to avoid any misinterpretation. The idea was to introduce that we are investigating relationships between CO₂ and environmental variables using mathematical functions. Thank you for this.

C: 6421, 21: “Thus, indicating. . .” I think this sentence is missing a verb. R: The sentence has been rephrased.

C: 6422, 25 – 6423, 2: This is a very long sentence, please shorten. R: Sentence has been shortened.

C: 6423, 21: “. . .that light is not limiting. . .” You mean lack of light? R: We mean the abundance of light. Unlike during the winter in the tundra when light is a limiting factor to plant growth.

C: 6423, 28: “. . .the best approach. . .” be more specific, e.g.: “. . .the best approach associated with EC. . .” R: We thank you for this clarification. Sentence has been updated accordingly.

C: 6429, 26: There are two numbers and three respective parameters. R: 32 to 35% is written here as a range because temperature explained 32% of F_{csat}, 32% of P_{sat} and 35% of F_{c1000}. We have also deleted the respectively at the end of the sentence.

C: 6431, 17-21: First you write about relative variability, and based on that you make suggestion to the absolute variability. The logic is broken here. R: We have rephrased the latter sentence so we focus on relative variability. Rd is more variable suggesting

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that it drives the total CO₂ flux variability more than the assimilation parameters (F_{csat}, P_{sat} and F_{c1000}) do. Thank you for this.

C: 6432, 14: “construction of plant stems. . .” – For my background “growth of stems, leaves and roots” would be faster to understand, but perhaps construction is all right as well. R: “construction” has been changed to “growth”.

C: 6432, 27: “temperature was > 1 stdev above the mean” Perhaps this could be written more clearly? R: Thank you for this. The sentence has been rephrased to make it clearer.

C: 6433, 15: “These are higher than estimated in our study because. . .” Are you sure that this is the reason? If so, please explain why. R: The more northerly location of our sites and the associated lower temperatures compared to the sites in Frolking et al, 1998 could explain why the respiration rates at our sites are lower than estimates from Frolking’s study. This has been incorporated in the manuscript. Thank you for pointing this out.

C: 6433, 25: “. . .correctly simulate. . .” There is no ‘correct’ / ‘incorrect’ (or maybe everything is ‘incorrect’. It’s better to say that some simulation methods can be better justified (and better) than others. R: Thank you for this very important point. “Correctly” has substituted with “better”.

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