

Vegetation modulates the impact of climate extremes on gross primary production by M. Flach et al.

The study deals with the role of vegetation for the effects of climate extremes on gross primary production (GPP). This is by analysing a selection of different observational data sets for the last 15 years or so. I find the subject of the study interesting and highly relevant. The authors have responded the majority of my comments and suggestions, and I find the manuscript very much improved. Therefore, I now want to recommend the manuscript for publication in *Biogeosciences* after minor revision. I will further explain my reservations in the following:

General comments:

1. I still find that the presentation of the results (Section 3) makes up a relatively small part of the paper as compared to the introduction and the section on the methodology. The section has been extended somewhat, but maybe there is still some potential for discussing some of the figures in further detail. Also, it might be interesting to relate more to the cases described in the Supplementary Material, where relevant.
2. I am aware that the second reviewer asked for more details on the methodology (Section 2). I am, however, not sure that these additional details are necessary, given that they can be found in the publications that the authors refer to. This means that this section now fills quite a bit.

Specific comments:

Abstract

3. Page 1, lines 9-10: “On the one hand... has occurred.” – I don’t really understand the point here. Please clarify.

Introduction

4. Page 2 line 36: “other factors” – I think it would be interesting to have some examples of such factors here.
5. Page 2, line 42: I think it should be “can also be considered” here.

Method

6. Page 5, lines 102-103: “5% is... (McPhillips et al., 2018)” – This seems to be redundant (see page 4, lines 86-88). Can one of the statements be omitted/shortened?
7. Page 5, caption of Fig. 1: I wonder, whether one could say a bit more about the colour scale, given that readers may not be familiar with it.
8. Page 8, line 133: I think it would be relevant to know, who the regional “growing seasons” have been defined.
9. Page 9: line 150: I wonder, whether the reader needs to know what “bag fraction” means. Is such specific information needed?

Results

10. Page 9, caption of Fig. 4: As for part c), it might be helpful to use something like “25% (stippled lines) and 50% (solid lines)”.
11. Page 9, lines 158-159: “Our analysis... 2003 and 2018.” – This statement was already made before. Is it necessary to have it two times? If not, it should be removed, where least relevant.
12. Page 10, line 165: “95% confidence interval” – I think it would be better to have that the first time, when the interval is specified, i.e. (56-75%, 95% confidence interval)”.
13. Page 10, lines 170-172: ”Note that... in this paragraph.” – I think a further discussion of Fig. 3 would be very helpful here.
14. Page 10, line 188: “(Figure 4(b))” – I am puzzled by the fact that in the preceding statement different ecosystem types are mentioned, but they cannot be inferred from Fig. 4(b). Is there a mistake?
15. Page 11, line 195: There are two “are”, one needs to be omitted.
16. Page 12, line 230: It should be “both in space and time” here.

Discussion

17. Page 15, lines 239-240: It should be “growing seasons are firstly” here.

Conclusions

18. Page 17, line 318: “would expect it to be” – I find this statement very speculative. What is the basis of such an expectation?

References

19. Page 23, line 516: It should be ”spatiotemporal” here. I discovered this typo by chance, maybe there are more in the list of references. Please check.

Figures

20. Figure 5: It might be helpful to graphically separate the upper part of b), i.e. the land cover types, from the lower part, representing various other impacts on GPP. Maybe a line, separating the two parts.

Supplementary material

21. Page 3, Siberian heatwave 2011: “in forest (other) ecosystems (43 TgC)... other ecosystems” – I don’t understand this statement. Please clarify.