

# ***Interactive comment on “Vegetation modulates the impact of climate extremes on gross primary production” by Milan Flach et al.***

**Milan Flach et al.**

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*Response on the interactive comment by Anonymous Referee 2*

Received and published: 17 April 2020

Reviewer: The paper investigates the importance of land cover type in controlling the impacts of climate extremes relative to other factors using a global upscaled product of GPP. The results show that heat and drought events seem to reduce GPP in grasslands and agricultural areas and to increase GPP in forests. The work calls for considering different land cover types in the assessments of the impact of climate extremes on ecosystem functioning. Overall, the objectives of the paper are clear. However, some methodology and results still need further improvement, and some Figure needs to do

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some improved. I would recommend a major revision. Detailed comments are listed below:

*Response: We would like to thank the author for the feedback on our manuscript. We address the comments in the following more specifically.*

Reviewer: 1. Figure 1 is not intuitive enough; it needs some improvement. It should label the specific events name rather than region and year.

*Response: We would like to thank the reviewer for this comment. As the space in the figure itself is limited, we would prefer to add specific names rather to the caption of the figure, than to the figure itself. However, we would like to note that some of the events have a well known name (e.g. Russian Heatwave 2010, Amazon Drought 2010, European Heatwave 2003, ...) but some do not have well known or clearly defined names (e.g. Siberia 2011, Horn of Africa 2009).*

Reviewer: 2. I suggest Figure 2 need to label the proportion value.

*Response: We fully agree with the reviewer and would like to thank the reviewer for this suggestion. We will provide labels for the proportions in a revised version of the manuscript.*

Reviewer: 3. Figure 3a is too orderless. I suggest it needs not to label the events.

*Response: We will remove the event specific labels from the figure as requested.*

Reviewer: 4. The authors group land cover classes in forest and agricultural ecosystems, what about grasslands? Abstract illustrates GPP in grasslands is generally reduced during heat and drought events. And which year the land cover data is?

*Response: We will add more details about grasslands to the result section. Figure 4(a) shows that they have a general negative response coefficient in the impact model. Of course, we will add the information of the land cover data to a revised version of the manuscript.*

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Reviewer: 5. I am so fusing about the methodology; I suggest to introduce more detailed of the method about preprocessing and anomaly detection.

*Response: We will add more details about preprocessing and anomaly detection in the method section as requested.*

Reviewer: 6. The results section needs further analysis, especially need quantitative analysis.

*Response: We would like to note that the result section provides quantitative statistics on which our findings are based. For instance, we provide fractions of the events with reduced / enhanced productivity including estimates of uncertainty, or we identify the main drivers of the ecosystems response based on gradient boosting machines. We would be very pleased if the reviewer could provide more details on which quantitative analysis he is specifically aiming for.*

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