Biogeosciences

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Discussions

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Interactive comment on "Risk of crop failure due to compound dry and hot extremes estimated with nested copulas" *by* Andreia Filipa Silva Ribeiro et al.

Anonymous Referee #1

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This study evaluated the risk of crop failure due to compound dry and hot extremes. A copula model is fitted to estimate the response of crop yield with respect to different dry and hot conditions. This manuscript is well crafted with clear structure. A few issues need to be addressed before the potential publication of this study.

(1) Selection of the periods Line 92-93: "We used 3-monthly means of Tmax and 3-monthly means of P during spring". Here the selection is based on the correlation analysis, but not the whole growing season, right? Please justify this period. It is easy to understand this from a statistical perspective. Is this selection still valid from a physical perspective?

(2) Copula implementation Line 161: "Due to the negative dependence between Tmax-MAM and both crop yields", The clayton copula does not permit the negative dependence. Is this the reason to "invert the margins of TmaxMAM for copula modelling"? The rationale of this transformation needs to be clarified. Suggest to make it clear to aid the understanding.

(3) Figure presentation Figure 7: "y-axis indicates the TmaxMAM percentile (Heat)". For heat, should you use the axis with the range like 0.5-0.95? Since for heat, we are interested in high percentile, right? Or if this is related to the aforementioned "inversion of the margins", please clarity this and make it clear.

(4) Figure discussion Regarding Figure 7, "When PMAM/TmaxMAM are below/above the median, the probability of crop loss is always higher than 40%." How could you tell this (i.e., above the median?) from the figure? The y-axis for heat stress is below median. Please make it clear.

Minor comments: Check the bracket in the caption of Figure 5.

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2020-116, 2020.