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Discussions

Interactive comment on "Simulating compound weather extremes responsible for critical crop failure with stochastic weather generators" *by* Peter Pfleiderer et al.

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The paper is based on a previous study (Ben-Ari et al., 2018) that identified two climatic conditions, more specifically not enough cold days in December of the year before harvesting and too much precipitation during the spring before harvesting, to be key factors in diminishing the wheat productivity in northern France for the year 2016. The paper works around these two compounded conditions and aims at exploring how extreme each of them actually is in terms of physical plausibility, finally establishing how rare this event of 2016 was and what are the odds of them happening again. In the introduction section, it would be perhaps interesting to explain the underlying factors

that makes France a major wheat producer with high yields, maybe climate conditions or the practices used. The methodology proposed by the authors, an adaptation of stochastic weather generators (SWG), is innovative in the field and duly addresses the original research question. In addition, it is data-driven based, suggesting a more flexible and cheaper approach to simulating extreme conditions with respect to the physical climate models. Maybe explaining the methods before the data section would make more sense in this work? The authors mention the paper is designed following the storyline concept, however it seems a bit shallow and too implicit the theoretical conception, in spite of the main references being rightly cited. Some minor alterations in the section presentation (lines 57 – 64, especially this passage "In this paper, we construct a climate storyline of a warm winter followed by a wet spring that is likely to lead to extremely low wheat crop yield in France" could better demonstrate the rationale behind the storyline approach used and provide a clearer description of the importance of the storylines in the current work. In my perspective, it should be more explicitly explained that the starting point of the simulations stems from the 2015/2016 season and that the counterfactuals obtained are all based on these real occurrences. On the data section, it would be profitable to justify the choice of averaging the rectangle encompassing the northern France (line 79). Ben-Ari, 2018 decided to average the area within each department of the country and justified this by stating there was not much spatial variability within each of these departments. Perhaps a similar justification could be added so others can better understand the reason this decision was made. The paragraph starting at line 251, which describes the way precipitation data were grouped, could be possibly improved in a way to better explain the decision behind the 5-day selection of the data chunk length. It is understandable that 1 day would not work well and that 5 days are a good representation of a coherent time series, but what prevents the chunks from being longer or slightly shorter? According to figure A4, 4 or 7 days could work as well. Perhaps some explanation on this side to justify the parameter value selection would add some value to the work. In addition, the following paragraph starting at line 261 behaves in a similar way but this time on the amount of

precipitation alpha parameter and it is not exactly evident the choices behind selecting the chosen values. For both paragraphs, it is my opinion some further explanation on the reasoning behind the parameters choices will improve the general understanding of the work. In line 283 some reference would be welcome so that the cold days can be duly justified. The conclusions section is clear and concise. The last paragraph, line 321, holds a statement that could be better contextualized. Since the extreme events are within given scenarios, it is not exactly assessing all possibilities in the world (climatic or non-climatic). It may very well be it is not the purpose of the paper to account for that, but then it would be interesting to make explicit these limitations, such as the uncertainty of the scenarios, non-climatic drivers (pests, supply chain, management, economy and so on). Some minor mistakes encountered along the text: Line 167: “the the”; Figure 6: “te black line”; Line 304: “Thompson et al” – no date;

Sincerely,

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