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Interactive comment on "Analysis of how dry-hot wind hazard has changed for winter wheat in the Huang-huai-hai plain" *by* B. L. Shi et al.

Anonymous Referee #1

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Review of the manuscript entitled:

"Analysis of how dry-hot wind hazard has changed for winter wheat in the Huang-huai-hai plain"

By Benlin Shi, Xinyu Zhu, Hongzhong Li, Yunchuan Hu and Yi Zhang

Manuscript Number: nhess-2015-330

GENERAL COMMENTS

This manuscript deals with the climatic conditions during the last fifty years over central east China that are considered of relevance for the wheat harvest in winter time in this region. The document presents an evaluation of the temporal evolution of some climatological variables and their connection to the variations of wheat production. There-

fore, this represents an impact case study about the potential implications of the climate evolution in the agricultural sector. Studies like the present one are of great value for the impact community and its interest relies on the their ability to detect causalities between the climatic forcing and the effect on societal areas of primary importance. However, the work presents a bit too shallow analysis of the results and the methodological aspects are somehow too superficially elucidated.

Based on the above concerns I suggest a major revision of the manuscript. Some suggestions and comments follow to help disentangling the main issues addressed above. The authors should address them prior a potential publication of the paper.

SPECIFIC COMMENTS

a) Major Comments (MC)

MC1. As commented above, one of the major issues refers to how the methodological aspects are presented in the manuscript. In my opinion a too technical language within a superficial description of the premises and outcomes of methodology obscure the interpretation of the results and it is somehow unbalanced. This would difficult the understanding of a potential reader about the author's reasoning on the outcomes of the manuscript.

First of all, the abstract includes too detailed results. It should instead include an overview of the main ideas of the work considering the focus and the methodologies applied in a shallow fashion and definitely a general statement about the achievements and conclusions of the paper. I would for instance consider eliminating the lines 32 to 39, where it goes too much into the detail of single years response to the analysis.

MC2. The ideas within the Introduction are a bit muddled, some order in the sequence of ideas will benefit the comprehension of the motivation of this work: first of all, it is necessary an explanation about the concept of "dry-hot wind" as many potential readers are not necessarily familiar with such terminology; second the authors might

explain why is this topic relevant in the region, highlighting what are the aspects of the climate variability in the region with a potential impact on the winter harvest; finally it should be stated how the authors will address the questions posed. All in all, I also find a general tendency along the text to repeat unnecessarily some ideas, e.g., the paragraph at the beginning of Section 3.1 is overstated as it was already explained before in Section 2.2 (where it is mentioned which climatological variables are used for the present work).

MC3. "The Methods and data Collection" (please, mind when to use capitol letters) is poorly described. Apart from some details that I will outline in the section below, the authors should provide some hints why the Mann-Kendall mutation test was selected in their study (further than citing a couple of previous works).

MC4. An explanation about the methodology is strongly recommended. What are the expectations from the use of such methodologies? What is the basis on which the method is useful to understand the connections between the climatological and agricultural records?

MC5. It is of great importance to guide the reader across the manuscript; therefore the authors should provide a more clear explanation about: the meaning of mutation points (Line 136, in addition there is no need to specify that the programming was done in Excel or Origin, at least it is clear that it contributes less to the overall understanding of the paper); the definition of dry-hot wind (Line 142) arrives, as said before, a little too late in Section 2.2; the reader could understand that the threshold line is equivalent 1 sigma, but it should be clarified directly, what are the implications (in Line 153) when a series exceeds the named threshold line (it can be extrapolated from the text and from the knowledge of the reader, but in my view the paper would largely benefit from a more clarifying reading), the same applies to the concepts of ordinal and inverse sequence statistics (Line 154), what do we learn from these curves and from the cumulative departure curves (Line 162)?

MC6. As a result of the scant explanations about methodological aspects and terminology, the reader might wonder what do we learn from the sequences plotted in Figure 1 that cannot be explored in an initial stage just from the anomalies of the temperature, humidity and wind? Therefore, it can be said that to some extent, Figure 1 is poorly explained across the text. Is the methodology based on raw series or in anomalies? In the case of the latter, with respect to what reference period?

MC7. Sections 3.3, 3.4 and the Discussion are in general a bit discouraging as they do not offer a comprehensive view about the claims that the manuscript proposed at the beginning in the abstract or in the Introduction: there is an overall over-use of the concept climate change, specially when apparently there is in general some disconnection between the increase of temperatures over the region as a consequence of the global warming trends while the amount of days categorized as dry-hot wind days decreases and the winter wheat production has broadly increased. Section 3.3 just provides results that arise more from a logical thinking about climatic variations during the last decades than from what data and graphs shows in this manuscript (e.g., paragraph between Lines 237-243). The relevance of this manuscript lies on the exercise of exploring the climatic and harvesting data and their interconnections. It is a reality that adaption should be a primary target of societies, but this paper just stresses too much this idea while it sacrifices a straight approach showing how to relate the different type of data. The authors could make some effort in disentangling the too repetitive discourse and show plain but still valid approach and results.

b) Further comments (FC)

FC1. The keyword grain filling does not appear in the whole manuscript. Would the authors revise the role of the selected keywords?

FC2. I would recommend to revisit the title of the manuscript stating it more clearly that an analysis of the climatological conditions over the region of interest is presented and their connection to the wheat production is evaluated ("... how the dry-hot wind hazard

has changed for the winter wheat. . ." is a bit misleading).

FC3. In Line 159 it is stated that the ordinal sequence "exhibited an increasing trend in fluctuations, indicating that within the recent 5 decades, relative humidity at 2:00 exhibited a significant increasing trend". This is an example connected to the comment in MC6 in this manuscript: what is the difference between both trends? Could the authors clarify what do we learn from this ordinal sequence increase compared to what we would learn from the raw trends of the variables? Certainly the text will highly benefit from clarifications in this sense to help interpret results.

FC4. What does it imply that a mutation gradually increased in appearance in Line 167? And where or how is the statistical significance evaluated?

FC5. Could the authors explain why the mutation tests failed in Line 176?

FC6. Could the authors illustrate more rigorously the meaning of the fitted equations in Line 195? Do they refer to linear regressions over the series of the dry-hoy days? What do they need this equations for is not yet clear in the documents. Neither it is obvious in the text why the authors adjust the data in three different regressions for different periods (1963-1980, 1981-1996 and 1997-2012).

FC7. It would be elementary to gain some insight into the differences between the impact of the light and the heavy dry-hot days on the winter harvest, provided that there is such classification in Section 3.2 of the manuscript.

TECHNICAL COMMENTS (TC)

TC1. Line 11. Should read ". . .a key constraint on agriculture".

TC2. Line 23. "We synthesized analyzed the distribution. . ."? Is there some extra word in this sentence?

TC3. Revise the expression in Line 30 (". . . while damages appear less in the...").

TC4. Line 42: ". . .through improving filed microclimatic condition"?

TC5. References on Line 47? (they do appear a bit too late in Line 50).

TC6. Cite dates in Line 60.

TC7. Instead of "Some scholars", cite some refs in Line 72.

TC8. Review the meaning of the sentence "the frequency of occurrence of meteorological disasters has intensified with the rapid development of China's agricultural ecosystems" in Lines 80-81. Is the sense correct?

TC9. Define "temperature accumulation" in Line 111.

TC10. Would a map of the area under study be of great visual help in Section 2.1?

TC11. Add a brief explanation about why the meteorological records are taken at 2:00 pm. Is that the single sampling time per day? Once it is mentioned for the first time, the authors do not need to state that the variables are measured at 2:00 pm every time along the manuscript.

TC12. What does it mean, "Sample distribution of this method does not necessary follow certain rules..." in Line 133?

TC13. In Line 154 it should read, "It is shown. . .".

TC14. Caption of Figure 1: comprise the two sentences in only one including the references to the panels (a - f).

TC15. Is the average of the number of light dry-hot days what fluctuates between 0 and 5.9? Or is it just the number of days, where the average is then 1.5 days (Lines 190-191). Afterwards it is said that the maximum number of light dry-hot days is 5.8. Review the numbers here please.

TC16. Could the authors find a more compact way of expressing their results than citing sequentially all years with no occurrence of dry-hot days (e.g., Line 194)?

TC17. Line 229, it should read, "It indicated that..."

TC18. What do the authors refer to with. . .", during the period of moderate and cooling weather" in Line 242?

TC19. Line 246, it should read "It is shown that the number. . ."

TC20. What do the "sliding curves" mean in Line 260?

TC21. Line 261, ". . . mutations gradually increased. . ."

TC22. The paper will largely benefit from a native English speaker reviews.

I encourage the authors to accomplish these comments and suggestions for a better and easier understanding of their work in order to end up with a comprehensive piece of work that could be then published.