Journal: NHESS
Title: **Assessing floods and droughts in the Mékrou River Basin (West Africa): A combined household survey and climatic trends analysis approach**
Author(s): V. Markantonis et al.
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The paper aims at assessing the occurrence of floods and droughts events in the Mékrou river basin, as well as at estimating damage costs at the household level and mitigation behaviours adopted by the population due these kinds of events. To this aim, it combines a quantitative approach for detecting hydro-meteorological hazard prone areas (through the analysis of gridded climate datasets) with a quali-quantitative analysis of a household survey.

The paper is well structured, the research question is clear, methods are appropriately described but results presentation and discussion is still poor and imprecise. In general, I would say that, although the paper has significantly improved with respect to its first version and major concerns raised by the two previous referees were mainly addresses, it still suffers of several technical imprecisions (also in the English Grammar) and minor criticisms that prevent its publication in the present form.

In the following specific comments are provided.

Specific comments

<u>Introduction</u>

In general, the literature review could be better organised to improve the comprehensibility of the manuscript.

Pg. 2 line 1
"A recent study (Shiferaw et al 2014), for instance, found that frequent drought conditions have limited the economic growth of many African countries and frustrated the benefits derived from development strategies implemented in other economic sectors," → Which other sectors? Not clear

Pg. 2 line 7
"For these reasons, in the recent past, the disaster risk management community has extensively worked on the development of methodologies aimed at monitoring the risk prone areas and the overall vulnerability of the population threatened by the hydro-meteorological hazards. Progresses have been made in the assessment of the occurrence of extremes events, their magnitude, and the expected climate change impacts. Additional efforts were directed towards the improvement of both the assessment of risk and the estimation of the direct and indirect impacts, in particular related to loss of human lives, economic activities, infrastructures, natural and man-made capital. Technical advancement efforts allowed also an improved assessment of current mitigation measures and policies" → References are required for this part

Pg. 2 line 21
"Regarding cost estimation and impact assessment, instead, the knowledge about losses caused by past extreme events is still limited for a detailed quantitative analysis in many of the African countries. As described in Markantonis et al. (2012 and 2013), the methodologies used in literature are various: Hedonic Pricing; Travel Cost; Cost of Illness Approach; Replacement Cost; Contingent Valuation; Choice Modeling ; and Life Satisfaction Analysis (Welsch and Kühling, 2009; Luechinger and 25 Raschky, 2009; Welsch, 2006)."

→ I guess these methodologies are not quantitative nor based on knowledge about past losses, otherwise the two sentences are discordant. Please, clarify

Section 2

Although the full questionnaire is attached to the paper, a Table summarising main information (i.e. data, parameters) collected by means of the survey can increase the comprehensibility of the manuscript and also the analyses of significant variables in Section 3.4.

Pg. 5 line 1
"Following the data cleaning and validation of the survey, the information collected was processed through statistical analysis including all the parameters investigated." → Which are these parameters? Please see the general comment before

Pg. 5 line 23
"In the frame of household survey interpretation, quantitative estimates of these events are needed to understand the underlying direct (rainfall and discharge) and indirect (heat-waves) factors that have an impact on the respondents answers." Which events are referred to? this sentence is not related to the previous and following ones.

Pg. 6 line 16
"Additionally, in order to identify precipitation anomalies, we calculated the Standardized Precipitation Index (hereafter SPI) proposed by McKee et.al (1993; 1995). This index could be applied over different time scales, each providing information about the impact of a given anomaly on the availability of water resources (WMO 2012)." → A better description of the index and its meaning is required for non-expert readers.

Pg. 6 line 23
"The results are given in units of standard deviation, indicating how far a given precipitation event is below (drier events are associated with a negative SD) or above (wetter event, positive SD) the long term normal distribution" → The sentence is not clear, please rephrase

Pg. 6 line 28
"Finally, in order to get a general overview of the anomalies in the different administrative units, we calculated the area percentage affected by each class over the entire time series" → Figure S1 should be included in the paper to increase the comprehensibility of presented results

Section 3

Please, be consistent in the units of measures and significant figures adopted in presenting the results, both within the text and in the corresponding tables

Pg. 8 line 10
"In the period under consideration, mean annual temperature ranged between about 30º C in the North to 26.5º C in the South. 10 April was the warmest month, with a maximum temperature of 40º C in the North and 35º C in the South. Minimum temperature in the coldest month (September) ranged between 19º C in the North and 15º C in the South, presenting the semi-arid region the highest range of variation of about 25ºC." → this part is not related to the contents of section 3.1.1. I would move this part in section 3.1.3 and change the section title into "Precipitation patterns"

Section 3.1.4
What the analysis of river discharge says about the occurrence of floods?

Pg. 11 line 26
"Only a small percentage of the respondents (68 out of in total 660 interviewed households) stated that they had not experienced any flood occurrence during the last two years (Table 4)." → The table reports the opposite, please check

Pg. 12 line 16
"The cost of the recent floods is higher in Burkina Faso (Table 6), where the average cost for an affected household in 334,326 FCFA (West Africa Francs) (approximately 495 Euro in 2017)." → (1) 495 euro in Table 6 refers to all the basin and not only to Burkina Faso. I guess authors want to refer to the whole basin, please check (2) are three numbers after the comma significant/required? Please check

Pg. 13 line
"According to the multivariate regression model, the average cost of floods per household during the flood events of the last two years (2014-2015) was equal to 390.92 euro" → (1) Data from the survey were mainly reported in FCFA. Please, be consistent to allow comparison (2) are two numbers after the comma significant/required? Please check

Section 4

Pg. 14 line 14
"Especially concerning droughts, 86.8% of the population reported that dry periods were more frequent during the 15 ten years ranging between 2006 and 2015, while 23.3% experienced an extreme drought event during the last two years (2014-2015) resulting in 3.93 extreme drought events in average." → In Section 3.1.5 authors report 4 droughts events in average. Please be consistent with significant figures in order to allow comparison and increase comprehensibility

Pg. 15 line 7
"522 Euro" → I do not understand what this datum refers to, please check

Pg. 15 line 5
*"*The cost assessment is two-folded based on the sample estimations as well as on the results of the application of two linear multivariate regression econometric models. The average costs caused by flood events in the period 2014-2015 was estimated in 522 Euro per affected household basing on the average declared losses. Regarding the cost assessment of extreme droughts, the average value of the sample was 390 Euro per household" → I think that a comparison between observations and model is required along with a discussion on usability of model results. Nonetheless, given that the main reason for the model is to explain significant variables for damage costs, a comment on significant variables should be added to section 4.

Pg. 15 line 23
"In developing countries where information is limited such a coupling approach could integrated local characteristics and perceptions into natural hazards planning policies providing more efficient mitigation measure" → some examples should be supplied on the use/usefulness of collected information in practice, to be more explicative

Tables

In general, captions are quite generic and could be improved in order to better reflect the contents of the tables

Table 2 → Are six numbers after the comma significant/relevant? What do they mean/tell?

Table 5→ percentages should be reported beyond total count, to be coherent with the other tables and to increase the significance/understanding of data

Table 6 → (1) Are three numbers after the comma significant/relevant? What do they mean/tell? (2) commas are missing in the first column

Figures

Figure 1→ (1) Caption is missing. (2) Numbers can be added near survey points to highlight the number of surveys carried out in each point

Figure 2 → The figure is illegible in printed versions. Data in the table are not understandable without a description. I suggest to redraw the figure, representing also table data in graphs

Figure 3→ Please indicate the long-term average in the figure. The unit of measure is missing on the y axis.

References

I did not check the correspondence between the list of references and quotations in the text, as well as availability of all references, for lack of time.