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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Brief Communication: Drought Likelihood for East Africa" *by* Hui Yang and Chris Huntingford

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1. SUMMARY

The manuscript discusses the ongoing drought in East Africa and asks the question if there is a link between the drought and increasing greenhouse gas levels. The study uses both ERAinterim reanalysis data and CMIP5 models in order to try to establish this link.

2. GENERAL REMARKS

METHOD: The method is rather experimental and not well documented or explained. Even within the tight limits of this manuscript type, there would be plenty of room to explain the method and if it can indeed explain what is going on.

FIGURES: The figures are readable and do not have to be re-done. However, from

the figures, rather than focusing on the very small changes for the current level of precipitation, it would be worthwhile focusing on the clear change in the overall distribution, showing a significant increase in inter-annual variability, which is strongly linked to socio-economic indicators (see e.g. Brown & Lall, 2006).

REFERENCES: It is very surprising that no climate study is cited that looks at the impact of climate change on East African rainfall instead of just impact studies. Also, the impact of external forcings such as ENSO is not mentioned, although for East Africa that might be a major factor for the strong (and increasing) inter-annual variability.

LANGUAGE: The English should be improved.

CONCLUSION: The conclusion offers a smorgasbord of other studies, and does not help the reader understand what the present study is able to contribute to the current research. Instead, it suggests that other methods may be more worthwhile exploring. It will have to be made much more clear what the benefit of this study is in order for it to be published.

3. DETAILED COMMENTS

Page 1:

Line 10: "merging" could be explained better

Line 11: GCM is the acronym for "General Circulation Model"

Line 11: make sure to distinguish ERAinterim from other ECMWF reanalyses

Line 18: the reader would need at least some justification why there was a famine in East Africa and not in other regions, where according to Fig. 1a the rainfall deficiency is much worse

Fig. 1: that does not look like the percentage of average rainfall, as suggested in the figure, rather it must be the percentage deviation from the mean rainfall.

Line 18: “this” = this region?

Line 19: a list of the models would be helpful. Readers like to know which model they’re looking at, and if these particular models were picked for a reason.

Lines 20 – 23: describe the method more clearly.

Line 22: “This is also...”: this sentence is not clear.

Line 22: precipitation estimates in reanalysis products tend to be comparably poor. It will need to be justified why this particular dataset was used and not some other precipitation dataset.

Line 24: “31 times 37 numbers”: be more clear

Line 25: month-1 = per month?

Line 27/28: is this a significant increase? It seems rather small.

Line 28: “stretch in the distribution tail”? maybe just describe that the mean of the distribution shifts to higher rainfall amounts, while the tails flatten.

Line 29: “stretched left-tails”: same here

Line 30: “a few models”: which ones? How many?

Line 30: “increased interannual variability”: it would be helpful for the general reader to know the seasonal cycle of rainfall in this region. It seems there is a significant inter-model variability, and it does not become clear from the manuscript if these models can be trusted.

Page 2

Line 1: “considers models equally”: but the models are all modified to fit ERAinterim, so “equally” is maybe not the right term?

Lines 2 – 7: this conclusion has to be improved. Some sentences suggest other ap-

proaches may be better suited to study this problem, while some bring up topics that should have been covered in the introduction. What is the conclusion from your own method?

Figure 1b: is this year significantly different from other years? what about these other years when rainfall was low or even lower than this year? Were these also drought years?

Figure 1c: the PDFs look surprisingly smooth, it would have been nicer to see some structure. Or at the very least explain the smoothing that has been used.

Cited Reference: Brown, C. and Lall, U. (2006), Water and economic development: The role of variability and a framework for resilience. Natural Resources Forum, 30: 306–317. doi:10.1111/j.1477-8947.2006.00118.x

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