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Interactive comment on “Drivers of spatial and temporal variability of streamflow in the Incomati River Basin” by A. M. L. Saraiva Okello et al.

Anonymous Referee #3

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Saraiva Okello et al. report on the drivers of spatial and temporal variability of streamflow in the Incomati River Basin in Southern Africa using rainfall and streamflow observations over a relatively long time period. The topic is relevant to a wide range of readers and fits well within the scope of the Hydrology and Earth System Sciences journal. However, important links between the research objectives and analysis of outcomes in this MS are broken and need further attention before the paper is suitable for publication. Some of the overarching issues are summarized below. In addition, the MS would benefit from a thorough edit for English language usage.

1. Page 8880, line 4 (and throughout the MS): The authors discuss natural (environmental) flows and changes to the flow regime due to water management activities in response to different human-driven demands for water across the basin. The study,

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however, does not succeed in isolating the impacts of one or the other on streamflow. Taking this into consideration, the MS needs a thorough revision in order to make the research objectives more focused and feasible.

2. Page 8881, lines 20-27: The discussion of climate change impacts on hydrology are somewhat irrelevant, as the MS does not really provide a focused investigation of these. Investigating projected impacts such as decreased rainfall events would require analysis of sub-daily data, if the authors mean decreased rainfall duration. If number of rainy days is meant, however, this could be investigated from the relatively long time series of daily rainfall data that the authors have analyzed. However, this is not clearly addressed and instead the IHA methodology is followed without much justification on how it contributes to addressing the research questions of the study.

3. Page 8882, lines 19-26: Generally, the research objectives then need to be followed by a focused methodology for answering these. This is not well achieved in the current MS version. What is needed is an explanation for the observed trends in streamflow, but not in rainfall. Land use changes appear to have contributed substantially to this but there is no mention of other variables such as temperature and humidity, for example, which could also have a pronounced effect on streamflow. Even the links with land use changes are not investigated in sufficient detail in order to draw the relevant conclusions and possibly this is one of the reasons for the authors struggling to interpret the outcomes from this study in the final sections.

Some comments on figures and tables:

- Table 3: The use of the @ symbol is inappropriate, the location could be given with either a comma or in parentheses.
- Figure 2: The text is very unclear in this figure, consider revising the layout and presentation.
- Figure 3: Is the N-S variability unimportant? Would it be better to present the error

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bars on a map?

- Figure 9: The shaded box with trend parameters might not appear well in print, consider revising the figure.
- Figures 10&11: The text in the legends of these figures is too small to read, consider revising the layout and labeling of these plots.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 8879, 2014.

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