

Review of “**Model-based study of the role of rainfall and Land Use Land Cover in the changes in Niger Red floods occurrence and intensity in Niamey between 1953 and 2012.**”

By C. Casse et al. submitted to Hydrology and Earth System Science.

The authors investigated the reasons for the evolution of the Niger Red flood in Niamey with long-term records of various data source. For this purpose, a hydrologic model and three precipitation datasets, three Land Use and Land Cover (LULC) condition sets are employed for simulation and comparison with long-term observed run-off rates. In their conclusion, the LULC 's relationship with the hydrologic change are identified and discussed. The topic of the manuscript is closely related to the HESS journal and should be of great interests to its readership. The manuscript is well written and clearly presents the idea, motivation and the results of the study. However, four important questions (as listed under “major comments” below) are posed for the authors’ consideration. Upon satisfactory response to the comments below, I recommend publication in the Journal. .

Major Comments:

1. The authors suggest that by combining the “theoretical” vegetation change (VC) and reduce in drainage (RD), called (VCRD) condition, there is a closer match between the simulation and the observation. However, this does not necessarily lead to the conclusion that LULC is closely related to the hydrologic change in this region. I recommend the authors to consider strengthening this argument by providing at least two of the following evidence:

- a. The VC and RD have indeed changed over the past decades (possibly looking at some Landsat images)
 - b. No other parameters have changed significantly over the past several decades in order to eliminate that other factors could have been responsible for the observed changes.
 - c. Only such combination of VC and RD will provide the closest match, no other combinations will have the same effect.
2. CPC “gauge-based” data is different from “gauge data”, according to the references provided in the manuscript, the rain gauge value is adjusted by PRISM model, which means that the climatology are based on climate models outputs. According to the reference provided in the manuscript, the CPC data’s gauge stations have very sparse density in the study region (The above information should be properly stated in the manuscript). Expanding the discussion will help readers to understand what they should expect from CPC “gauge-based” products.

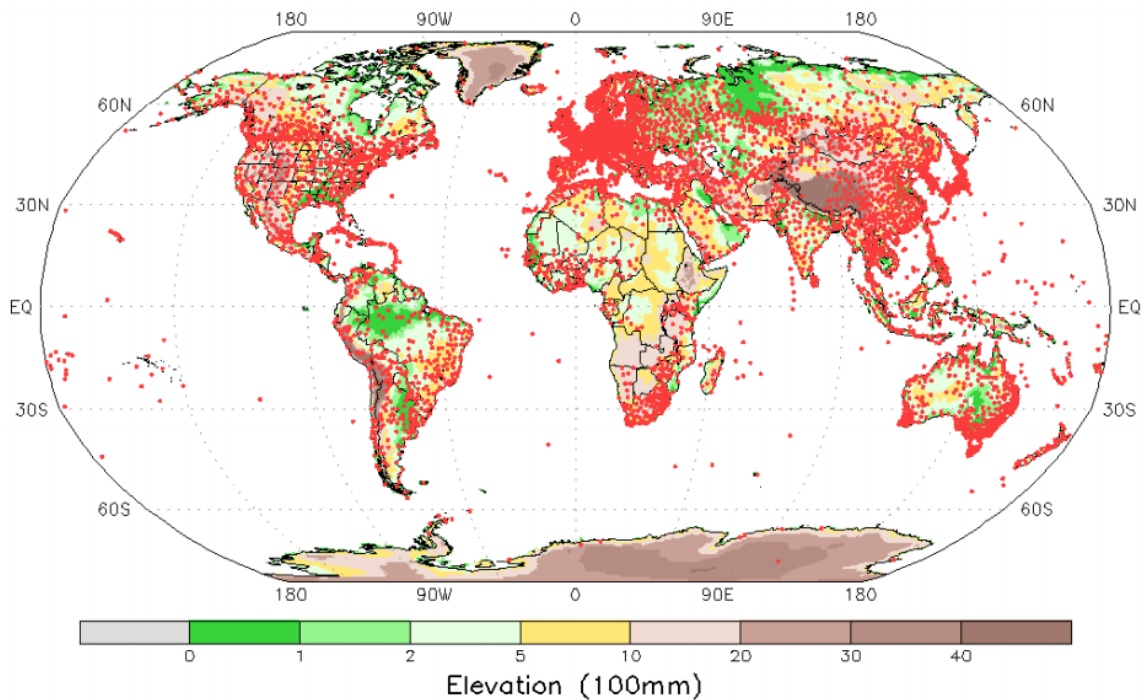


Figure 1. GTS gauge locations for July 1, 2005, plotted on the background of Elevation (from Mingyue Chen et al. (2008) Quality Control of Daily Precipitation Reports at NOAA/CPC

3. In the study the PERSIANN-CDR and “CPC gauge” datasets are used and the comparison results are provided in a number of figures. The authors should provide some discussion about the strength and shortcomings of three precipitation data sets they use in their study. In the case of the gauge data it is important to make some remarks about the limitations of the geostatistically gridded gauge data from very sparse gauge distribution. Furthermore, the conclusion section lacks any discussion of their role in the study. What is the message to the readers about the role of these data sets? Are there any promising features and are there any recommendation to the users with respect to their strengths and weaknesses for future studies? This discussion in the conclusion section will strengthen the paper.

4. Finally, the present study lacks any connection/reference to previous work. Is it fair to assume that no previous studies have been reported related to the Niger basin? There is only very brief mention of previous work (Page 20 Line 9-10) but relevance and difference with the current study is not sufficiently discussed.

Minor edits

Page 1 Line 25, “long term” or “long-term”?

Page 1 Line 26, “first” or “firstly”?

Page 3 Line 25: “invoque” is not a English words (a French word) , probably use “invoke” instead.

Figure 7c, the “CDR” looks like “CDP” since the figure seems to be cropped at “R”, please fix that.

I recommend moderate revision to this manuscript.