Interactive comments on

"Droughts and floods over the upper Blue Nile catchment and their connections to the timing of El Nino and La Nina events" by Zaroug et al

This paper is about droughts and floods over the upper Blue Nile catchment and their connections to the timing of El Nino and La Nina events. The effect of SST in the Nino 3.4 of the Pacific Ocean on the occurrence of droughts and floods of the upper Blue Nile catchment was investigated. The focus was on the timing of El Nino and La Nina on the occurrence of drought and floods on the study area.

This is a good paper and it worth to be published in HESS after minor revisions to improve the manuscript. My specific comments on the paper are as follow:

1) Sometimes the authors mixed between the Blue Nile and the Nile. E.g., on page 10972 line 5, flow over the Nile basin. On the same page line 9, Nile should be changed to Blue Nile. Page 10977 line 13, Nile River should be changed to Blue Nile and on the same page line 19, the upper catchment of the Nile should be the upper catchment of the Blue Nile. Page 10978, line 20 Upper Nile catchment should be upper Blue Nile catchment. Page 10979, line 2 the upper Nile catchment should be the upper Blue catchment. Heading 3.2 (page 10979) it should be .,..in the upper Blue Nile catchment. Page 10980, line 10, the Nile River should be Blue Nile River. The focus of study is on the Blue Nile. It's true that the Blue Nile is a main tributary of the Nile River.
2) The introduction is more about the Nile River rather than the focus of the study: on Blue Nile. Line 24 on page 10972, …to the main Nile discharge (Ref). Please put a reference as indicated in the parenthesis.
3) Page 10973, lines 14 to 16, these two natural extreme disasters…… You need a reference for that.
4) Page 10973, lines 24 to27, Eltahhir (1996)……the Nile floods. This sentence relates El Nino to floods. As discussed later in the paper is that El Nino is related to droughts.
5) Page 10974 line15, however, no study focused on the June to September rainfall in Ethiopia. This is not true, Seleshi and Zanke (2004) have focused on the analysis of

rainfall in Ethiopia in the same period (see line 9 on the same page). Please give strong reasons for the importance of your study. It would be good if you define El Nino and La Nina

6) In Data and Method section, you cannot have one heading (2.1), please delete 2.1 heading. The missing data of Eldiem station in the period 1997-2001 was filled using the nearest station, Rosieres. The filling method has to be reported in some details. It seems that you use the Rosieres values to fill Eldiem because you mentioned that there are no contributing tributaries in Rosieres – Eldiem reach. If yes, in this case you neglect the contribution of local rainfall, rainfall amount is relatively high in this area. Further, the infiltration in the river reach is also neglected; the distance between Rosieres – Eldiem is 120 km, as you mentioned, and that is long distance. You use GPCP dataset with 2.5^0 resolutions. This resolution is too course in such mountainous region, I would rely on the other high resolution products.
7) Page 10976, line 16 there is space between with and some; written withsome. Line 22, while the number drought and flood. The sentence should be while the number of drought and flood.
8) In figure 3, it seems the extreme drought of 1984 is associated with La Nina. It's important to discuss the link between El Nino/ La Nina and such extreme drought.
9) Figure 4 is not clear, you mentioned in line 9, page 10976 is that the fig. shows monthly precipitation while in the fig is written monthly discharge. The text above the fig "Monthly averaged discharge in El diem station during El Nino, La Nina and normal years" should be removed. How did you calculate the time in months that shown in x-axis of fig. 4, please explain in some details.
10) For fig 5, please use different line types for the thresholds and delete the title above the fig. You could move x-axis to cross y-axis at -15000. Page 10976 lines 23-25, this classification is in line with…. Electricity of Sudan (Ref). Please give a reference as indicated in the parenthesis. Page 10977, line 1-2, There are nine cases……, this sentence is not clear and to be rewritten. In fig. 5 and for extreme drought, four extreme years could be considered on the threshold; only five years could be considered as extremely dry years.

11) The quality of fig. 6 is bad and you don't need to have a title above each fig; Discharge anomalies …from 1982 to 2009 was repeated in all figures (6a, 6b, and 6c). Lines 3 and5, page 10977, Nino3.4 should be Nino 3.4 (space between Nino and 3.4). The discharge anomalies don't change with season as illustrated in figs 6a-6c. Why? any explanations for that. Line 6 on the same page you wrote…is evident in the middle panel of Fig 6. It's also evident in the lower panel of Fig 6. Why you select the middle panel?
12) Table 1, the unit of length should be written; length (months). I would classify the table into zones:

AMJ as extreme drought

JJA as drought

JAS as transitional zone (mixed behavior)

ASO as No drought zone

13) Table 2, the unit of length should be written; length (months). I would classify the table into zones:

AMJ to JJA as variable zone (transitional)

JAS as extreme flood zone

ASO as no flood zone

14) Page 10978, line 16, AMJ,JJA, and JAS, 67% of the times….. From table 2 if you count the extreme flood and flood events (that are 7 events) and divide that with the total events (12), the percentage will be 58 and not 67. Line 17 page 10979 why you did not use the whole dataset, from 1965 to 2012?
15) You reported that 67% of cases in which El Nino was followed by La Nina there were extreme floods in the Blue Nile. Can you give interpretations for that?
16) Please remove the titles on top of figs 7-9.

17) This study needs further discussions on the results and the findings of this study have to be compared with the literature. Figures need to be discussed in more details.