

## **RESPONSES TO THE COMMENTS FROM REVIEWER 1**

**Manuscript ID:** hess-2018-139

**Title:** Analysis of causes of decreasing inflow to the Lake Chad due to climate variability and human activities

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**General comments:** In order to understand the recent changes in Lake Chad, the authors have gathered the available climatic and hydrological data (observed and from international databases) from 1951 to 2015. They identified a change point in the sequence of rainfall and Chari River discharge (around 1971). The trend before 1971 is attributed to climatic changes, while the trend after 1971 is attributed to both climatic and human impacts. According to the authors, the human impact (mostly from irrigation development around 1970 in Nigeria) represents a major part of the decrease in discharge during the second period. The attribution of the main change in Chari discharge mainly to irrigation development is not substantiated and seems debatable for several reasons: i) the large Nigerian irrigation schemes developed in the early 1970s have never been in operation because of the rapid recession of Lake Chad at that time and ii) the amount of irrigation impact involved by the authors (in the order of 10 km<sup>3</sup>/year) would feed some 500 000 ha of irrigated land that are not identified on the ground nor by satellite observations. Although the rain decrease is clearly described, its impact on vegetation and land cover, on ground water level or soil surface should probably be discussed. In a region where quite a number of French authors have published papers, only one out of about 60 references quote a paper in French.

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**General Response:** We would like to offer many thanks to the reviewer for his valuable comments. His comments and indication of typos and grammar check will highly increase the quality of this manuscript. We tried our best to incorporate his comments. Yes, you are right these projects were not fully operational due to decrease in Lake level. Here, we are not specific to only these irrigation scheme like SCIP, we are considering all construction made for irrigation purposes like dams and small ponds and other development which cause decrease in streamflow to the Lake, collectively. Instead of SCIP and Baga Polder, there are other projects such as SONASUT at Banda, SEMRY project in Yagoua, Maga, and Kousseri, Kano irrigation project and Hadejia Valley projects etc. On the whole, the major water user in the basin is agriculture, which we wanted to highlight.

There might be even more documents on Lake Chad in French but problem was, we were restricted to English version because even none of us can understand French. The reference ([Lemoalle and Magrin, 2014](#)) you mentioned here was used to confirm the area of conventional basin, which is given in Table 1 (page 17) of this document. We were just searching and found this document. Although we cannot understand the French, we found a figure about conventional basin which could not found in English literature. That was the main reason of this reference.

The other comments which you have given in **hess-2018-139-RC1-supplement** are responded on the same **hess-2018-139-RC1-supplement** document, and your comments have been incorporated in the revised version of Manuscript and highlighted with green color for easy follow up.

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**Note:** For an easy follow up, the revised and incorporated comments are highlighted with the **Grey** color in the modified manuscript, for reviewer # 1.

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