

# ***Interactive comment on “Investigation of the long-term variations in hydro-climatology of the Dinder and Rahad basins and its implications on ecosystems of the Dinder National Park, Suda” by Khalid Hassaballah et al.***

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This paper is generally of good quality, as methods used in the analysis are acceptable and have been widely used in other areas for trend analysis and for understanding the hydrologic alterations. The authors have elaborative, except for the few areas that have been outlined below. The presentation has been good and it is a contribution to knowledge. Variability of hydro-climatic parameters has a great influence on the hydrology and sustainability of ecosystems in many landscapes around the world. The situation is alarming in Africa, because of the anthropogenic influence. In order to properly man-

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age water resources, knowledge of variability and its impacts on hydrology is essential. This study has played a great role in understanding trends in rainfall, temperature and streamflow. The use of temperature as a proxy for evapotranspiration is especially interesting as it indicates the increasing or decreasing of evapotranspiration which has a great influence on the hydrology of the landscape or watershed. The use of the trend test is especially useful for a snapshot view of the general direction and magnitude of trends. In addition, the use of the using the Indicators of Hydrologic Alterations (IHA) has been important for understanding stream modifications in relation to ecological functions.

In line 22-25, the authors describe that there were missing gaps of the data variables, and had used visual inspection and regression analysis to fill in the missing gaps, and further describe about the streamflow data that had typos and outliers, but did not elaborate if the methods used were common for all the data variables or were specific. It will be especially important to note how missing gaps in flows were treated, for which I am sure are not going to be the same as rainfall data which can utilize the neighboring stations. Line 30... describes about the availability of long-term ETo data for some areas in the watershed, I am surprised why the authors did not want to use the data in the trend analysis. Section 4.1.1: line 9 describes that there are no significant trends at 5% level of significance from the 12 precipitation stations, but we do not see the data that support that. It is only a statement describing that, but it would be useful to have data that confirms what they describe.

Some Typos and other errors Section 4.1.2: line 22-23: these can be moved to the methodology section Section 4.2.1: line 29: ...”is likely affect”... Should read ...”is likely to affect”... Section 4.2.2: line 9.....”are likely affect” ..... should read .....”are likely to affect”..... Section 4.2.3: line 23-24 ...”Four large flood peaks were occurred .....” should read “...four large flood peaks occurred....” Section 4.2.3 line 26 ...”...Timing shift of the Dinder river peak flow may leads to...” Should read “tim- ing shift of the Dinder river peak flow may lead to...” Section 4.2.4: page 12 line 3-4:

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the sentence “Likewise, the median rate of flow rises in Rahad River has decreased by 40% from 5 m<sup>3</sup>/s/day during the pre-impact period to 3 m<sup>3</sup>/s/day during the post-impact period.” The sentence needs to be re-written to avoid ambiguity. Line 15: the phrase “His result found not significant trends in precipitation in all inspected stations” needs to be re-written as it is difficult to understand what the his refers to. . . Line 17 should read: LULC changes have widely been reported. . . . Line 21 the words “gapsand” should read “gaps and” End of line 22- beginning of line 23 . . . . . has been reported in the literature. . . . .

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