Review of: "Precipitation and Temperature Trends over the Lake Tana Basin, Ethiopia"

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Potential competing interests: No potential competing interests to declare.

Precipitation and Temperature Trends over the Lake Tana Basin, Ethiopia

1. The term rainfall and precipitation were inconsistently used throughout the paper. It is recommended to use either of the two consistently throughout the paper.
2. Page 6

The title on “Historical Precipitation and Temperature Extremes” and details presented under it cannot match. I did not see any explanation and discussion on extreme temperature and rainfall conditions. Remember, extreme temperature is represented by number of hot days, number cold days, extreme maximum and minimum temperatures, etc. Similarly, extreme rainfall is represented by maximum one day rainfall, wet and dry spell, number of wet and dry days, number of heavy and very heavy rainfall events, rainfall intensity, etc. No description has been given on the variability and trends of these extreme events in this study. Hence I suggest the title should be formulated as “ Trends and variability of historical precipitation and temperature amounts”

3. Page 6,

Part 4 Historical Precipitation and Temperature Extremes

The first paragraph (presented below) is irrelevant to present here, it should be moved to the introduction section

Climate change is now increasing the occurrence, frequency, and magnitude of extremes, rising the risk of drought and flooding, particularly in developing countries like

Ethiopia, where agricultural production is dependent on rainfall (Alemayehu & Bewket, 2016; Birara et al., 2018; Chen et al., 2014). Climate change, variability, and trend analysis of such as precipitation and temperature extremes at different timescale is important for water resource planning and management, agricultural planning, flood risk assessment, ecosystem management, and climate change adaptation (Alemayehu et al., 2020). Extreme precipitation events have played a significant influence in many national disasters and remain a persistent issue. It is a key contributor to significant socio-economic loss, including property destruction and loss of life (Davenport et al., 2021; Kunkel et al., 2020). When it happens, it has a devastating impact on society, the economy,

and the environment (dos Santos & de Oliveira, 2017; Guan et al., 2015). The variability of surface air temperature extremes has received attention in recent decades, and it may have a significant impact on the global hydrologic cycle

and energy balance through thermal forcing (Guan et al., 2015).

4. Authors did not systematically present trends for temperature and rainfall in section 4. It will be good if they can systematically present results for rainfall and temperature separately paragraph by paragraph.
5. Page 7, second paragraph:

The author's report "Mengistu et al. (2014) reported that annual rainfall increased at statistically insignificant increasing trends by 35 mm per decade, whereas the maximum and minimum temperatures increased at a rate of 0.1 and 0.15 °C per decade throughout approximately 33% of the basin, respectively; however, the western part

(12%) of the basin experienced declining trends on annual and seasonal timescales" is not correct. Mengstu et al's (2014) study covered the Upper Blue Nile Basin, although it covers the Lak Tana Basin. Hence, your usage of "throughout approximately 33% of the basin" talks about the Upper Blue Nile Basin, not about your study area (Lake Tana Basin"

Similarly, your expression "the western part (12%) of the basin" not totally represent your study area. Because in Mengistus et al's (2014) study it represent around Benishangul area.

6. Page 7 "**Table 2.** General overview of selected research findings on historical precipitation and temperature extremes in the Tana basin". It looks good, but not smartly presented and contains some errors.

Example: Under climate variables, authors said "Seasonal and precipitation" what does mean by this?

Similarly they said "precipitation and temperature" and "Rainfall and temperature" Are these monthly or what? They mentioned for the others. Hence why not for this?

On the same Table under "used method", author's said "Statistical methods" for two literatures. What statistical method, linear regression or what? For example, Mengistu et al. (2014) used Linear regression and F distribution tests"

On the same Table result section, level of significance was not reported for all studies. Please be consistently present the same level of information for all.

The other big mistake was how authors used this literature for their study "Habte, A.,

Mamo, G., Worku, W., Ayalew, D., & Gayler, S. (2021). Spatial Variability and Temporal Trends of Climate Change in Southwest Ethiopia: Association with Farmers' Perception and Their Adaptation Strategies. *Advances in Meteorology, 2021*. https://doi.org/10.1155/2021/3863530 "???

7. The sub-title for section 5 "Projected Precipitation and Temperature Extremes" should be modified as there was no any discussion that the authors made on extreme rainfall and temperature changes.
8. Similar to section 4, results in section 5 did not systematically. It will be good if they can systematically present results for rainfall and temperature separately paragraph by paragraph.
9. Page 7, first paragraph,

"Similarly, Setegn et al. (2009) demonstrated that all projected temperature increases in the region for all periods and

emission scenarios, while the projected precipitation showed an increase and decrease with the seasonal timescale."

This information is not appeared in Setegn et al. (2009), it should be in Setegn et al. (2011). Please see your references below:

Setegn, S. G., Rayner, D., Melesse, A. M., Dargahi, B., & Srinivasan, R. (2011). Impact of climate change on the hydroclimatology of Lake Tana Basin, Ethiopia. *Water Resources Research*, *47*(4). https://doi.org/10.1029/2010WR009248

Setegn, S. G., Srinivasan, R., Dargahi, B., & Melesse, A. M. (2009). Spatial delineation of soil erosion vulnerability in the Lake Tana Basin, Ethiopia. *Hydrological Processes*, *23*(26), 3738–3750. https://doi.org/10.1002/HYP.7476

10. The statement on page 8 second paragraph " A consistent increase in both precipitation and temperature was also observed.", contradict what was reported in the study
11. …scenarios. according… should be modified as ……scenarios. According…
12. Page 8, paragraph 3, the following two expression were wrong:

Cherinet et al. (2019) indicated that annual precipitation increased slightly in most of the stations, whereas surprisingly, the average mean annual temperature trend increased dramatically.

Desalegn et al. (2016) analyzed daily rainfall, and maximum and minimum temperatures for the forecasting period in the eastern Tana Lake basin, which ranged from 0 to 95.8 mm, 18 to 28 °C, and 9 to 18 °C, respectively.

Both of Cherinet et al. (2019) and Desalegn et al. (2016) were studied historical period, between 1980 and 2016 and 1996 and 2004. Thus, how these two studies can be used to discuss the future rainfall and temperature conditions????

13. Table 3, Recitation and temperature correct as Precipitation and temperature correct
14. **The discussion** part is quite poor and should be present in this way. It looks the other way of presenting discussion for section 4 and 5. It is also better to move all the details to section 4 and 5 according to their suitability.
    And the discussion section should present about the implications of trends on environmental resources and socioeconomic wellbeing both for current and future time scales, or should show knowledge (study) gaps for both current and future time scales, or both knowledge gaps and implications. If they failed to modify in these way, it is better to remove the discussion part.
15. I also suggest that the review should include discussion on extreme rainfall variability and trends for both current and future time scales. These issues were not appear or quite poorly addressed in the study. They can present in a separate section or can be present in section 4 and 5 in separate paragraphs and clearly show the discussion on extreme rainfall and temperature variability and trends.