Review of: "Analysis of climatic parameters in the upper Awash River basin of Ethiopia"

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Potential competing interests: No potential competing interests to declare.

The analysis of variability (including low–frequency) of climatic parameters is of great fundamental and applied importance. In the first case, it is necessary to study regional climate changes. In the second case, the results of such an analysis are important for the development of adaptation strategies both in agriculture and in the social life of people. The reviewed article «Analysis of climatic parameters in the upper Awash River basin of Ethiopia» – has an undoubted relevance. In the process of reviewing the manuscript, I had several comments.

For a better understanding of the results, it is necessary to disclose all the abbreviations made by the author in the abstract and the main text of the article at their first mention.

It follows from the abstract that the main conclusion of the article: « The variations and fluctuation in the crop yield anomalies resulted from variations that prevailed in the annual main-season rainfall along the sub-basin.». Have other factors affecting crop yields been considered?

Much attention should be paid to the description of the Materials and Method section. Since the correct description of the methods used will allow a better understanding of the results obtained.

In section 2.3, you need to provide a link to the data source.

Equations 4 and 5 are similar.

I believe that more attention can be paid to describing and assessing the statistical significance of the calculated trends. The article proves with reference to [33] that the parametric approach to estimating the linear trend has advantages over the non–parametric one. Further in the article, there is no mention anywhere of assessing linear trends based on a non–parametric test. I propose (1) or remove description 2.4.2 from the methodology Mann-Kendall Test (Non–Parametric), for which the results are not shown, (2) or provide the results of the analysis of the non–parametric test in the article and compare them with the results obtained from the parametric test.

Rainfall is not normally distributed. This is clearly seen in figures 9 and 10. In the article, the first sentence of section 2.4.1 states that «A linear regression test is a parametric test that assumes that the variables are normally distributed». In such a case, one must first show that the rainfall and temperature data used are normally distributed. For example, calculate the coefficients of skewness and kurtosis. After proving the Gaussianity of the time series used, the method described in the article can be applied to these data.

A more detailed definition of Short–Season/Belg and Long–Season/Meher rainfalls is required. Perhaps one should show the climatic seasonal cycle of temperature and rainfall according to the data used or cite those articles to which it was previously described.

Clarify the method for calculating the coefficient of variation. Is it calculated from the data in use, with a linear trend, or

after removing the linear trend from the data? A significant linear trend determines the change in the average state of the climate system and, thus, contributes to an increase in the standard deviation of climatic parameters.

The first paragraph of section 3.1.1 gives the linear trend coefficients for both belg and meher season rainfalls with magnitudes of 1.974mm/year and 2.753mm/year, respectively. Figure 2 shows the values 1.794 and 2.753. In Table 2, the regression coefficient (β (Slope)) is 1.7880 and 2.7482 for Belg–season rainfall and Main–season rainfall, respectively. It is necessary to bring to a single form.

I think that the analysis of linear trends in temperature and temperature variability is better studied separately, that is, temperature variability is studied after removing the linear trend from the original time series. Because in paragraph 3.2.2 the temperature anomalies contain a visible linear trend (Figures 11 and 12). In these figures, the average anomaly for the period 1991–2020 is not zero.

All illustrations must be uniform. For example, the vertical scales in Figure 5. Figure 6 (left panel) does not show the linear trend equation and the coefficient of determination. The vertical scales on the left and right panels of Figures 6 and 7 are inconsistent. The left and right panels of Figure 8 can be combined and shown in one figure.