

Hydrol. Earth Syst. Sci. Discuss., referee comment RC3  
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## Comment on hess-2021-569

Anonymous Referee #3

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Referee comment on "Long-term trends in agricultural droughts over Netherlands and Germany: how extreme was the year 2018?" by Yafei Huang et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-569-RC3>, 2021

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The main idea of this study is to assess how extreme the drought was in the year 2018 in Netherlands and Germany. They used Hydrus-1D model to simulate soil moisture, actual ET. Based on this and together with the meteorological station data, they calculated SPI, SSI, PPD and ET deficit to analyze the drought.

This topic is interesting and the manuscript is well-written. However, this manuscript needs some revision before publication. There are some questions to the authors:

### 1) Data and Methodology

Q1: Do you have insitu measurements to do validation about the HYDRUS 1-D model simulation? If not, how could you be sure the simulation results (actual ET, soil moisture) meet the evaluation requirements in statistics, for example, RMSE, pearson correlation coefficient. In lines 90-96, you mentioned in situ measured soil moisture data and remotely sensed soil moisture are not available for such long time series and are in general strongly affected by measurement uncertainties. But at least you should have some in situ measured soil moisture and actual ET to do the validation of the HYDRUS 1-D model simulation.

Q2: In lines 174-177, please give the equation and explain how did you derive the parameters of Penman-Monteith equation.

Q3: Why the pasture is assumed for all these stations? For these 31 stations, do you have the vegetation types information? You should use them in the simulation.

Q4: In lines 85-87, you used five different soil types out of 12 textural soil classes. How did you determine these five soil types? Do you have the soil types information of these 31 stations?

## 2)Results

Q1: The trend analysis of each variable should be more in-depth. The summary of part 3.1 is one sentence. The in-depth analysis and summary should be done based on the trends of multiple variables, combined with physical processes. For different sites, you should analyze the potential causes that may cause severe drought based on the specific local geographic environment. Probably you can put it in the discussion part, but at least you need to analyze it.

Q2: For the trend figure, I did not see the significance test result although you mentioned MK can do it in lines 250-252.

Q3: Logically, I did not understand the connection between the section 3.1 and section 3.2. You need to strengthen the logical connection.

Q4: To be honest, I do not understand what do you want to say in figure7. The description needs to be improved.

## 3)Discussion

You need to analyze more in this section.

Firstly, for the model set up, you need to point out the potential for further improvement.

Secondly, for the analysis part, you used precipitation, potential ET, actual ET, soil moisture, and four drought indices for drought trend analysis. There are other variables could be considered as well from the physical process point of view, please describe more about the future improvements.