

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1
<https://doi.org/10.5194/nhess-2021-290-RC1>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on nhess-2021-290

Anonymous Referee #1

Referee comment on "A dynamic hierarchical Bayesian approach for forecasting vegetation condition" by Edward E. Salakpi et al., Nat. Hazards Earth Syst. Sci. Discuss.,
<https://doi.org/10.5194/nhess-2021-290-RC1>, 2021

Review of: A Dynamic Hierarchical Bayesian Approach for Forecasting Vegetation Condition. This study proposed a method to forecast vegetation condition index by means of soil moisture and precipitation data in Kenya by means of Bayesian method. I find the study not very well structured and difficult to follow given lack of information on the data sources used and period of analysis. In any case the justification of the study is mostly related to the assessment of drought forecasting but I cannot find any analysis and result that can be directly focused on drought analysis. The authors should detail better and illustrate more if long-time series are used and if forecasting is useful during critical drought periods. See specific comments below. They refer to specific lines of the manuscript:

- Does this number refer to the global scale? What is the source?
- Note that enhanced atmospheric evaporative demand increases the severity of agricultural droughts, particularly under low soil moisture conditions.
- But also human practices may reinforce drought severity or reduce it as a function of soil management, crop rotation. See the several studies by Prof. Rattan Lal about this issue.
- I would say that ecological droughts and hydrological droughts are also strongly complex. I would qualify this issue.

24-24. I would include issues related to crop practices, crop types, etc.

36-88. In the introduction I am surprised that dynamic forecasting of drought based on climate models is not considered (e.g. <https://www.nature.com/articles/s41612-021-00189-4>). There is a large research topic on this issue that should be mentioned/discussed in relation to the statistical techniques proposed in this article.

- What are the sources of precipitation, VCI and soil moisture? This must be detailed and discussed in relation to the availability of the data, quality, time period of analysis, etc. There is not sufficient information to determine which data the authors are using.
- What are the variables that are intended to be forecasted (precipitation? Soil moisture? VCI? All of them?) This is not clear in the methodology what is the target variable and what is the usefulness of the other variables. Maybe are precipitation and soil moisture possible drivers of the VCI and they are used to generate a predictive model of VCI? This should be clarified. This is indicated below 180-220; but it should be explained in detail before to avoid confusion. I would also suggest atmospheric evaporative demand as predictor of the VCI as several studies have demonstrated strong importance on agricultural and ecological drought conditions.

Figure 5. Why is only one year of results showed in this plot? I would suggest to include longer time series as we cannot determine if this year correspond to drought or to normal and humid conditions.

Figure 6. What about seasonality? Is the model capable to forecast vegetation conditions with the same accuracy for seasons of high or low vegetation activity? This should be at least discussed. What is the different performance between drought and non-drought years?

Figure 7. I see not only agricultural areas are considered in the study but also forest lands so introduction should be modified to also focus on ecological droughts.

Basically all the figures are showing a single year for the VCI forecasting and it is not clear for me if this is the period of analysis or it is an arbitrary selection. In any case. This must be clarified as I do not think robust results and conclusions related to the suggested methodological approach can be obtained from the application to a single year.

- Where is this analysed? I cannot find a plot in which this relationship is showed.
- A reason to include also atmospheric evaporative demand as predictor...