

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2022-78

Anonymous Referee #1

Referee comment on "Estimating propagation probability from meteorological to ecological droughts using a hybrid machine learning copula method" by Tianliang Jiang et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-78-RC1>, 2022

General comments:

Drought risk is a common threat in many parts of the globe, and is expected to increase due to climate change and increasing pressure on water resources. However, meteorological drought does not necessarily imply ecological drought. The paper presents an innovative approach to study the relationship between these two types of droughts.

- Powerful machine learning approaches were applied. What were the degrees of freedom of the machine learning approaches? What is the ratio of the degrees of freedom over the rather small number of 81 meteorological drought events? According to Fig. 7 propagation probability is nearly exclusively determined by the severity of the meteorological drought which would meet common expectations. In contrast, any effect of duration or area is hardly discernible. Please compare the performance of the machine learning approaches to that of a multivariate linear regression.
- Please check the use of definite and indefinite articles and the use of plural "s".

Details:

- 53-55: Who is "they"?
- 73-79: Section "2 Study area" comprises only 6 lines and should be merged with the subsequent section 3, or at least with section "3.1 Datasets".
- 82-85: Verb is missing.

- 91: Use lowercase letter in "Root".
- 98: Replace "deep phreatic buried depth" by "great depth to groundwater".
- 112: Both "SEWDI" and "SEBS" need to be explained in a concise way. Referring to the Jiang et al. (2021) paper does not suffice.
- 124: Should be "three steps", not "two steps".
- 147: Delete "to".
- 200: Do you mean "Johnson S_B distribution"?
- 224: What does "DS" mean?
- 265: Please explain "itau method".
- 280-297: Section 5.1 should be either part of the methods or of the results section.
- 349-352: Verb is missing.
- Figure 3: I guess that the drought event numbers reflect chronological order, is that right? The colour scale indicates about the same meteorological-ecological drought event number for very different ecological and meteorological drought event numbers. E.g., green symbols show up for ecological drought event number 1-10, 30-50 and >150. How can that be? Is there something wrong with the colour coding of the symbols?
- Figure 7: In the figure caption correct "exceeding" to "exceed".