

Nat. Hazards Earth Syst. Sci. Discuss., author comment AC2  
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## Reply on RC2

Edward E. Salakpi et al.

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Author comment on "A dynamic hierarchical Bayesian approach for forecasting vegetation condition" by Edward E. Salakpi et al., Nat. Hazards Earth Syst. Sci. Discuss.,  
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Reviewer 2

### General comments

The paper has objectives similar to those of the paper by Salakpi et al., NHESD, "Forecasting vegetation conditions with a Bayesian auto-regressive distributed lags (BARDL) model (<https://doi.org/10.5194/nhess-2021-223> ). The aim is to forecast vegetation conditions leading to agricultural droughts. The paper presents a new method, as compared to the previous paper, based on a dynamic Hierarchical Bayesian Model (HBM). The data used in the two papers are the same, and the method for assessing the forecasts are also similar. The HBM model has the advantage of providing differentiated forecasts within the same region, as compared to BARDL that provides homogeneous forecasts within each region. The BARDL model is used as benchmark for assessing the improvements provided by the HBM model. There are therefore lots of repetitions between the two papers. The present one refers to the previous one to present the data used in the study. This is not acceptable, as a paper should be self-contained and a minimum of information should be provided about data. The problem would be solved if the two papers were merged in a unique paper.

Concerning the present paper, I find it is well written and the analysis is sounded and honest. I only have a few minor comments listed below.

Response:

Thank you for the feedback, the issues on the omission of the data description are well noted and will be fixed in the final draft of the paper. The issue with repetitions is also noted and instead of merging, both papers will be published as parts A and B.

### Specific comments

1/ P.1 line 16: the number of affected persons is different than in the previous paper

Response:

Comment well noted, this was an error and has been corrected in that paper, the correct figure is the one stated I this paper.

2/P.5. Section 2.1 should be developed

Response:

Comment noted and accepted, details on the data description will be added.

3/ p. 6 line 116: ROI is not defined

Response:

Comment well noted and will be fixed. This was an oversight and has been addressed

4/ p.7 line 135: the authors mention that seasonal means are subtracted, but how are the seasons defined?

Response:

That statement should read annual mean per land cover type and AEZ is subtracted. The error will be corrected

5/ p.9 lines 172-175: this section is not clear

Response:

Comment well-noted sentence should not have started with "However" that will be fixed and sentences in that section will be restructured to make it clear to the reader.

6/ Figure 4: I do not understand how to read this figure

Response:

The figure shows how the HBM is structured. The figure depicts how the model parameters and data are defined and how it all fits together. Maybe this is not too clear in the paper, the description of the figure will be elaborated in the caption of the figure.

7/ p.10 eq.(3). This is strange to present the equation of the model after the presentation of the HBM model that refers to the parameters listed in Eq. (3).

Response:

Comment well noted and this will be rearranged in a proper order that makes more sense

8/ p.12 line 253. The BARDL model based on a "no-pooling" is the same as the model

presented in the previous paper, isn't it? If this is true, this should be stated.

Response:

Yes it's the same approach used in the previous paper, the comment is well-noted and will be well detailed in the paper.

9/ p.12 line 261: the differences between the two models in Figure 5 are not so large. So the claim that HBM model is more accurate than BARDL is not fully justified.

Response:

The statement will be toned down, rather the emphasis will be on the improvement in the lead times. Figure 5 will be dropped from the paper.

10/ Revise Figures 6, 7, 9, 10, 13 as the full line and dotted lines cannot be distinguished.

Response:

Comment well-noted figures will be replotted and made more legible to readers.

11/ p. 20 section test transfer learning. From Figure 2, it is not easy to see which counties are used for calibration and for validation.

Response:

Comment well-noted, the black boundary lines indicating the Non-Train counties in the figure will be made more visible. The maps will be redone.