**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "Comparative assessment of predictions in ungauged basins – Part 3: Runoff signatures in Austria" *by* A. Viglione et al.

Anonymous Referee #2

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The paper treats an interesting subject, which is important and relevant to the hydro-logic community, and appropriate for HESS. The main problem I had while reading the paper is a sense of superficiality, in the way the paper is written, referenced, structured, and also in the methods used to perform the analyses.

Essentially the paper compares regionalization based on Topkriging and of the model parameters of the HBV model. The only conclusions that are supported by the analysis are that (i) the regionalization based on Topkriging performs better than the HBV model parameters regionalization, and (ii) that regionalization performance may depend on some catchment characteristics or signatures.

But the paper is written in a way that it seems to want to cover much more ground, calling into question the co-evolution between climate and vegetation, landscape and

soils, the catchment organization, the relation between climate and catchment characteristics, etc. These are very interesting aspects, but talking about them, especially out of context, does not help to proof them. This is a paper about something else, and it should focus on what it is about.

1. The introduction is very self-centered. The authors are talking about huge topics (PUB, the relationships between catchment signatures, landscape and climate, etc.), which have puzzled the hydrological community for decades. The introduction how-ever references 4 papers in total, all from the Authors' previous work, and 2 of them are the companion papers of Salinas and Parajka. The introduction does not exhaus-tively illustrate what has been done, and does not convincingly show what needs to be done. What this paper adds to previous work is a question that should not remain after reading the introduction.

2. Section 2 seems to me at least out of place. It presents and discusses some results, and it is not described how these results are obtained. Is it summarizing previous work, or is it part of the work that has been done in this paper? In the first case, where are the references. In the second case, where is the methodology. It seems to me that the signatures are defined after being used...

3. Section 3 presents a distinction between statistical and process based regionaliza-tion methods. It is not clear if this is the authors own definition (in this case it needs to be better motivated, or applied to the authors own work and not generalized), or if it is common practice to do so (in this case it needs to be referenced).

4. Section 3.1 presents the regionalization based on the HBV model. Is this reusing results from previous studies, or are these results generated within this case study? The paper does not explicitly states this.

5. Section 3.2 same here. Are these new analyses, or have these been presented in previous papers? Ideally these questions need to be answered in the introduction, where it should be clearly apparent what is the new contribution of this paper. If Sec-

tions 3.1 and 3.2 are presenting results from previous studies, this obviously diminishes the added value of this paper to previous work.

6. Section 4.1: here it is not clear which catchments have been selected for blind testing and why.

7. Section 4.2: there might be a problem with Equation 3. It does not seem to do what specified in words above, as the numerator and denominator are not averages.

8. Equation 6: I guess you are confusing the coefficient of determination with the Nash and Sutcliffe coefficient.

9. Section 5 is in fact a results and discussion section, although it would be better to separate them. The absence of a separate discussion section is a drawback of the paper.

10. The results section mainly focuses on regressing some measures of errors versus catchment attributes or signatures. This in my opinion tells something about which types of catchments are easier to predict, however it does not seem to me the appropriate way to answer, for example, the question of paragraph 5.2: "In what way do the predictions depend on climate and catchment characteristics?". I think the Authors should find some other ways to extract this type of information from their material.

11. Overall, the paper says something about whether the HBV based regionalization is better than topkriging, and on whether prediction errors may depend on some catchment characteristics or signatures. Other conclusions or considerations are speculative, and should be removed.

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