

## ***Interactive comment on “Relating climate change signals and physiographic catchment properties to clustered hydrological response types” by N. Köplin et al.***

### **Anonymous Referee #2**

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#### General comment

The article presents an approach for the classification of catchments based on their hydro-climate response types to climate change using a cluster analysis technique. The authors further tried to find a causal relationship between the catchments' hydrological response and their physiographic attributes and climate change signals using a redundancy analysis, which they also used as a test for the robustness of their classification. The methodology is applied to a set of catchments in Switzerland. I find the authors' approach interesting and given their results that can be articulated in a physically meaningful way, I believe that their work deserves publication. I only have a

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few fairly minor comments, which I believe the authors can address:

### Specific comments

Section 3.2: I understand that the authors classified the catchments based only on their hydro-climate responses and here they attempt only to find out if the resulting clusters can be characterised in terms of the physiographic attributes. Is that right? Then why leave out some of the attributes simply because they are correlated with some others? I think leaving out all soil parameters from the attributes, for instance, would lead to losing some important features that potentially explain some important runoff generation process. Why didn't the authors keep all the attributes?

Page 3178, lines 2-5: it is not clear to me how the absence of clear pattern with respect to dominant aspect and dominant landuse is attributable to the parallel plot. How would the authors interpret the result if most of the curves behind each of the visible ones were of the same cluster?

Page 3178, last paragraph and Figure 5: the absolute magnitude of the runoff of C1 is very low with no/weak annual cycle compared to that of the other clusters. The runoff change signals in Figure 5 appear to be in absolute magnitude, which could potentially mask the relative magnitude of the change in C1. I think, it would be better if the authors presented the change signals as relative changes. This would reveal if C1 is really insensitive.

I think the authors can use better discriminating colour codes for the different clusters in Figures 3-7. For instance, it is a bit difficult to distinguish between C4 and C6.

Page 3186, lines 10-13: How does the regionalization procedure implemented in the work for the estimation of the runoff mitigate the problem associated with the stationarity problem of the model parameters? Aren't the same parameter sets that are used in the calibration period used under climate change scenarios too?

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